

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

Region: Fayetteville Regional Office
County: Bladen
NC Facility ID: 0900096
Inspector's Name: Jeffrey D. Cole
Date of Last Inspection: 01/08/2020
Compliance Code: W / Violation - procedures

Issue Date: May 4, 2021

Facility Data			Permit Applicability (this application only)				
Applicant (Facility's Name): Optima TH Facility Address: Optima TH 15855 Highway 87 West Tar Heel, NC 28392 SIC: 4925 / Gas Production/Distribution NAICS: 22121 / Natural Gas Distribution Facility Classification: Before: Permit/Registration Pending After: Title V Fee Classification: Before: N/A After: Title V			SIP: 02D .0516, .0521, .0535, .0540, .1100, and .1806 NSPS: N/A NESHAP: N/A PSD: N/A PSD Avoidance: N/A NC Toxics: 02Q .0711 112(r): N/A Other: 02Q .0207, .0304, and .0504				
Contact Data			Application Data				
Facility Contact	Authorized Contact	Technical Contact	Application Number: 0900096.20A Date Received: 08/20/2020 Application Type: Greenfield Facility Application Schedule: State Existing Permit Data Existing Permit Number: N/A Existing Permit Issue Date: N/A Existing Permit Expiration Date: N/A				
Mark Maloney Manager (312) 415-0044 4441-106 Six Forks Road, Unit 379 Raleigh, NC 27609	Mark Maloney Manager (312) 415-0044 4441-106 Six Forks Road, Unit 379 Raleigh, NC 27609	Mark Maloney Manager (312) 415-0044 4441-106 Six Forks Road, Unit 379 Raleigh, NC 27609					
Total Actual emissions in TONS/YEAR:							
CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
<No Inventory>							
Review Engineer: Rahul Thaker Review Engineer's Signature: <i>Rahul P. Thaker</i>				Comments / Recommendations: Issue 10673/R00 Permit Issue Date: 05/04/2021 Permit Expiration Date: 04/30/2029			

1. Purpose of Application

Optima TH LLC ("Optima") submitted an application to obtain an air permit in accordance with 15A NCAC 02Q .0300 "construction and operation permit" on August 20, 2020. The application deemed complete by DAQ on this date. Additional information requests were sent from the DAQ to Optima on September 3, 2020 and October 23, 2020.

A requirement in accordance with 15A NCAC 02Q .0504 will be placed into the air permit that will specify the requirement to obtain an operating permit under the Title V of the Clean Air Act (CAA).

2. Facility Description

Optima TH facility (Facility ID 0900096) is located on the property of Smithfield Fresh Meats Corp – Tar Heel facility (Facility ID 0900055), Tar Heel, Bladen County, NC. The Smithfield Fresh Meats facility is a hog slaughter, meat

preparation, and rendering operation. The Optima facility receives biogas produced by Smithfield Meats’ wastewater treatment plant (WWTP), including existing anaerobic digesters and associated biogas collection system. It processes biogas, removes the impurities, and separates and sells methane as a renewable natural gas to Duke Energy by transporting it via the Piedmont Natural Gas Company’s pipeline.

The Optima TH facility's primary business activity is classified under the Standard Industrial Classification (SIC) code 4925 “Mixed, Manufactured, or Liquefied Petroleum Gas Production and/or Establishments engaged in the manufacture and/or distribution of gas for sale, including mixtures of manufactured with natural gas...” under the Major Group “Electric, Gas, And Sanitary Services”.

3. Application Chronology

August 20, 2020	Fayetteville Regional Office (FRO) received the application.
August 21, 2020	DAQ acknowledged the receipt of the application and considered the application complete on this date.
August 25, 2020	Raleigh Central Office (RCO) received the application from FRO.
September 3, 2020	Requested additional information on emissions calculations.
September 7, 2020	Received the requested information on emissions calculations.
October 23, 2020	Requested to complete D3 Form and provide building parameters for DAQ modeling.
November 4, 2020	Received the additional information on D3 Form and building parameters.
November 18, 2020	DAQ completed its own modeling on facility H ₂ S and SO ₂ emissions.
December 8, 2020	Pre-public notice draft permit documents sent to central office personnel (supervisor, compliance), applicant, and regional office.
December 16, 2020	DAQ extended the un-official review period for the applicant till January 15, 2021 and requested actual SO ₂ emissions information.
March 2, 2021	Public notice on draft permit published on the DEQ web site.
March 5, 2021	Public notice on draft permit published in the Bladen Journal.
April 4, 2021	Public comment period (30-days) ended. Technically comment period ended on April 5th (since 4 th fell on a weekend/holiday).
April 15, 2021	Application review containing response to each public comment received sent to Director.
May 4, 2021	Director decided to issue the permit as modified per public comments (as appropriate).

4. Compliance Status

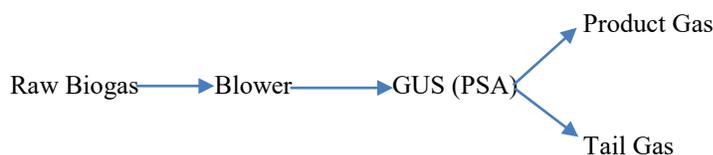
The facility has been built and in operation since December 11, 2019. Optima TH (owner/operator) has constructed and operated a major stationary source, violating both NC’s “construction and operation permits” program in 15A NCAC 02Q .0300 and the Title V program in 02Q .0500 with regard to the new flare. The DAQ through Fayetteville Regional Office (FRO) issued a Notice of Violation / Notice of Recommendation for Enforcement (NOV/NRE) on June 18, 2020 for the above matter.

5. Proposed Facility

The applicant has constructed a non-emitting gas upgrading system (GUS) and an emitting candlestick (open) flare.

5.1 Overview

Optima TH filters the raw biogas from the Smithfield facility, selecting for methane to produce pipeline quality renewable gas (RNG). The separation of methane from other biogas constituents occurs using the Gas Upgrading System (GUS) which is comprised of a Guild Pressure Swing Adsorption (PSA) system.



In general, PSA processes utilize the fact that under high pressure, gases tend to be attracted to solid surfaces, or "adsorbed". The higher the pressure, the more gas is adsorbed. When the pressure is reduced, the gas is released, or desorbed. PSA processes can be used to separate gases in a mixture because different gases tend to be attracted to different solid surfaces more or less strongly. Specific adsorbent materials (e.g., zeolites, activated carbon, molecular sieves, etc.) are used as a trap, preferentially adsorbing the target gas species at high pressure. The process then swings to low pressure to desorb the adsorbed material. PSA systems usually consist of two or more adsorption vessels; while one vessel is going through adsorption, the other goes through regeneration (desorption).

The Guild¹ describes its PSA technology as "simple-to-operate technology [that] has been installed at wastewater treatment plants and commercial digesters such as hog farms and rendering plants". The technology offers the following main benefits:

- Single step removal of impurities
- All media is regenerated – no need for replacement
- H₂S completely removed from any level up to 7000 PPM

The recovered methane (RNG or "product gas") meets the requisite quality specifications prior to being injected into Piedmont Natural Gas pipeline for off-site consumption.² The nonmethane constituents of the biogas, referred to as "tail gas", are oxidized using the proposed candlestick flare. The candlestick flare is also used to combust unrefined biogas during times when the upgrading system's operation is temporarily down for maintenance and/or repairs or unexpected events. Additionally, the candlestick flare is used to combust the "product gas", during facility startup and when the product gas does not meet pipeline specifications. The following provides definitions of each of these gas terms:

- Biogas - Gas produced by the biological decomposition of organic wastes in the wastewater treatment plant serving the Smithfield – Tar Heel facility. The observed and anticipated average biogas composition, by volume, is as follows: 65.0% methane (CH₄), 0.5% nitrogen (N₂), 34.17% carbon dioxide (CO₂), 0.02% oxygen (O₂), 0.01% ammonia (NH₃), and 0.3% hydrogen sulfide (H₂S). The biogas composition and production will vary depending on weather conditions, facility management practices, and other factors. The average biogas composition listed above is based on historic biogas production and constituent testing provided by Smithfield to Optima TH.
- Product Gas - Gas generated by the GUS that is approximately 98-99.9% methane by volume and meets all pipeline specifications, except delivery temperature and pressure requirements of the receiving utility.
- Tail Gas - The portion of the biogas separated from the product gas and generated by the GUS as part of the biogas upgrading process, primarily composed of carbon dioxide.
- Renewable Natural Gas (RNG) - Gas that complies with all pipeline specifications established by Piedmont Natural Gas, including minimum delivery pressure and temperature requirements.

Candlestick Flare (ID No. ES-1)

The installed flare will act both as an emission source and a control device for the facility. The maximum heat input capacity of the flare is 50 million Btu per hour when using biogas, product gas, tail gas, propane, or natural gas as fuel. The flare operation will be governed by how the GUS operates and does not operate: normal operation, bypass operation, and off-spec operation. These operating scenarios are described below with the associated schematics:

Operating Scenario 1: Normal Operation

¹ <https://www.guildassociates.com/BiogasPur>.

² Appendix F of the Piedmont Natural Gas Service Regulations, as approved by the North Carolina Utility Commission's January 11, 2019 Order, inter alia Docket No. G-9, Sub 698.

During the normal operation, the facility operation consists of the GUS receiving biogas and processing the biogas to produce tail gas and product gas. The product gas is injected into the existing natural gas pipeline as RNG after being compressed to pipeline pressure using electrically powered compressors. The tail gas is oxidized in the facility candlestick flare (ES-1), which utilizes propane or natural gas as pilot fuel. At times during normal operation, a small portion of the total biogas flow may be bypassed around the GUS and directed to the candlestick flare without methane recovery to increase the heating value of the flared gas to enhance tail gas combustion and ensure compliance with the emission standard of sulfur dioxide (SO₂). The normal operation is assumed to last 8,160 hours in any 12-months of operation.

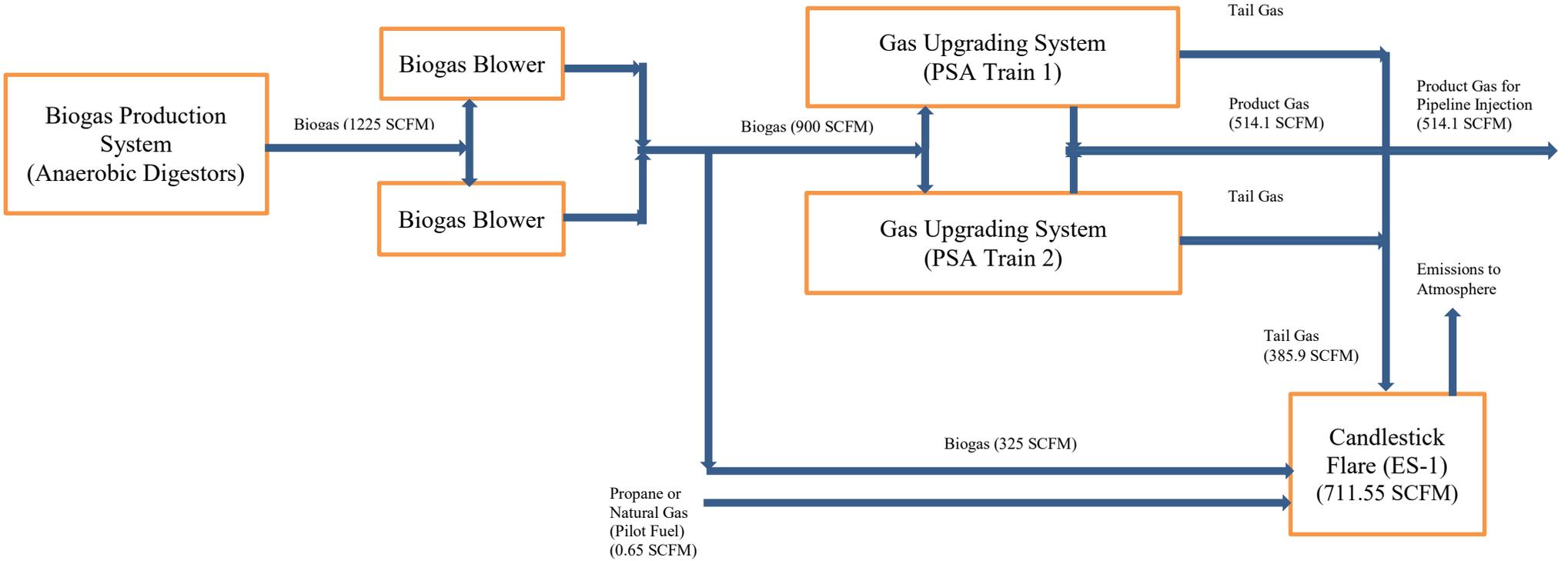
Operating Scenario 2: Bypass Operation

The Optima TH facility is designed to operate continuously, though it is expected that facility operations will be interrupted from time to time to perform necessary maintenance activities or for unpredictable events, such as extreme weather events or malfunctions of critical biogas system components. In such instances, the facility will either combust biogas in the candlestick flare or store biogas in the existing wastewater treatment facility's covered lagoon digesters for a short period of time. This infrequent operating scenario, not associated with the normal operation of the facility, is considered as "Bypass Operation." These infrequent events are conservatively estimated to occur for no more than 240 hours in any 12-months period. Therefore, the emission calculations for the facility assume combustion of the maximum flow of biogas in the candlestick flare for a total of 240 hours per 12-month period. The GUS will not be operated during Bypass Operation.

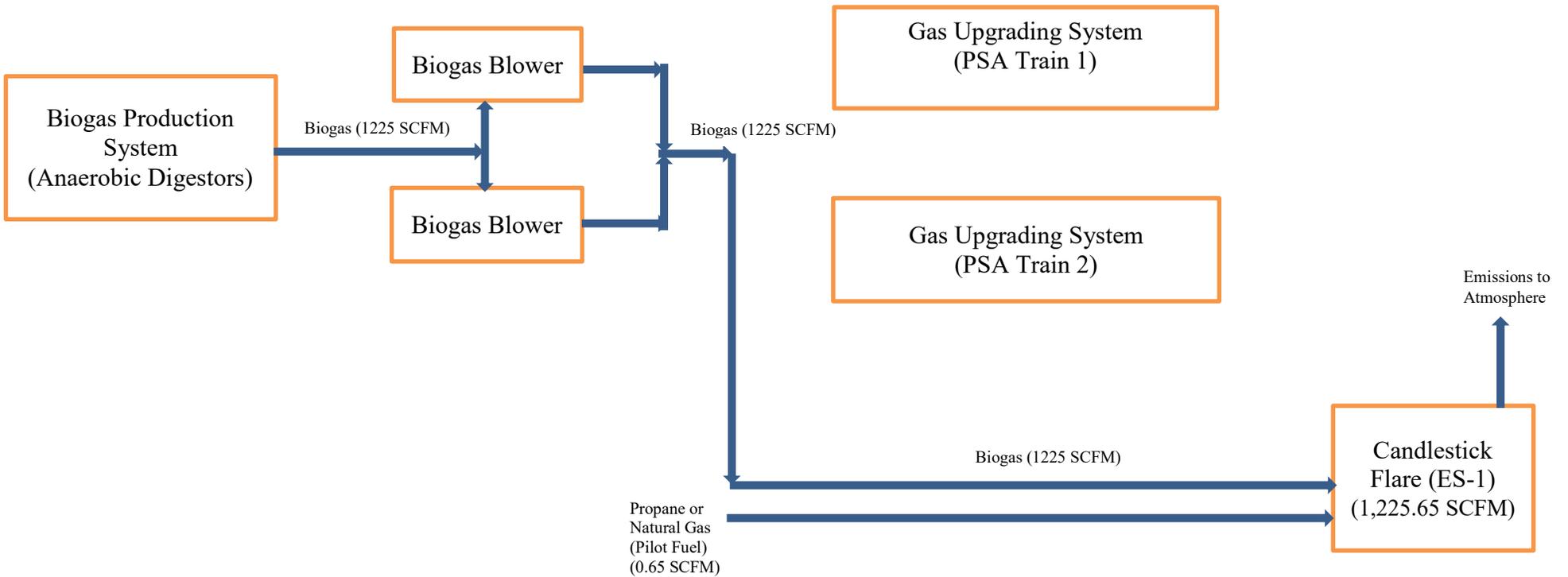
Operating Scenario 3: Off-Spec Operation

There will be brief periods of time when the product gas produced by the GUS does not meet pipeline specifications and therefore cannot be injected into the natural gas pipeline. During these times, the product gas (in addition to separated tail gas) will be combusted at the Optima TH facility in the candlestick flare. Product gas will also be combusted in the candlestick flare during GUS startup, which is anticipated to take one hour or less. These events are conservatively estimated to occur for no more than 360 hours in any 12-months period. Therefore, the emission calculations for the facility assume combustion of the maximum flow of product gas in the candlestick flare for a total of 360 hours per 12-months period. This hourly operating assumption is based on the operation of similar biogas upgrading facilities, the unfavorable economics of operating the biogas upgrading equipment without pipeline injection and RNG offtake, and the operation of the biogas.

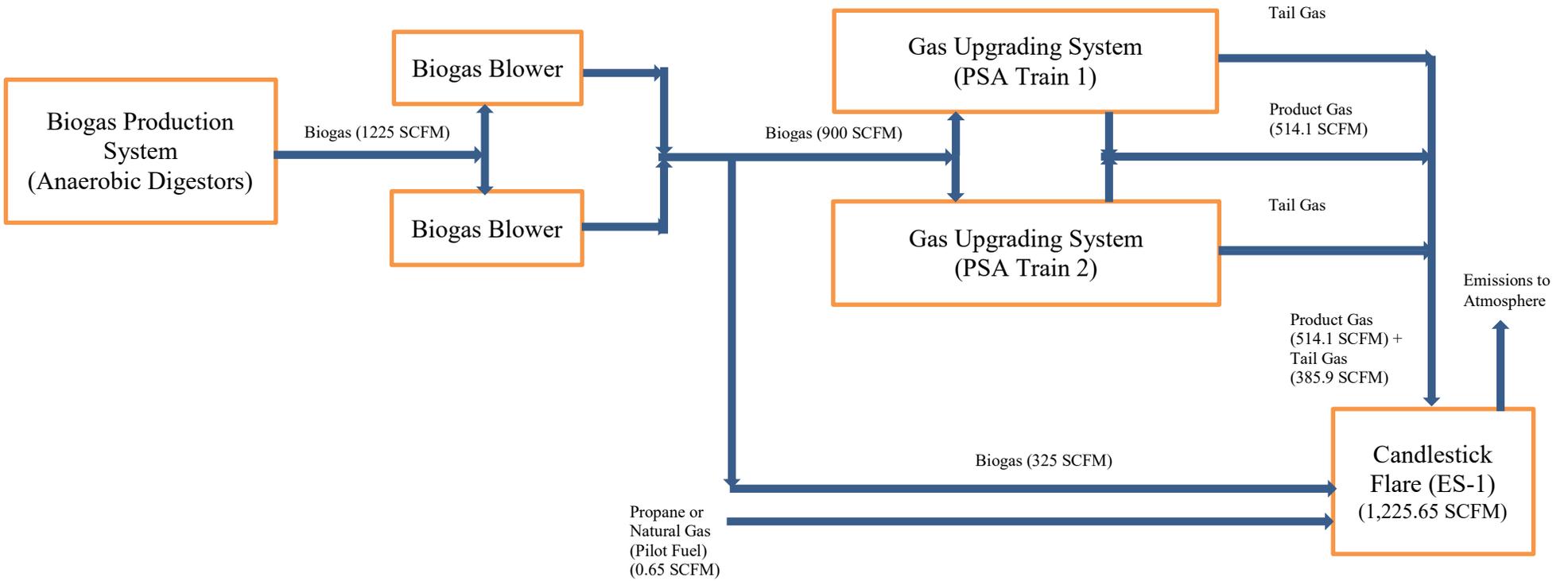
Process Flow Diagram
Operating Scenario 1: Normal Operation (8,160 hours)



Process Flow Diagram
Operating Scenario 2: Bypass Operation (240 hours)



Process Flow Diagram
 Operating Scenario 3: Off-Spec Operation (360 hours)



5.2 Stationary Source Determination

As part of this application, Optima TH (ID No. 0900066) and Smithfield Fresh Meats Corp – Tar Heel (ID No. 0900055) were evaluated as to whether the two facilities constituted one single stationary source or two separate stationary sources for Clean Air Act (CAA) permitting.

If the DAQ determines that both of these facilities constituted a single stationary source in the context of CAA permitting, then, the Optima TH application cannot be processed as a separate source from the Smithfield facility. If the two facilities are determined to be a single stationary source, a PSD major modification application (satisfying all applicable requirements: BACT, source impact analysis, additional impacts, Class I, etc.) will be required for SO₂ emissions because the modification has potential SO₂ emissions greater than the PSD significance emission rate and the existing Smithfield facility is a major stationary source for PSD.

The following evaluation process is in accordance with 40 CFR §51.166(b)(5) as incorporated in NC's State Implementation Plan (SIP)-approved PSD Program (15A NCAC 02D .0530) and was used to evaluate two facilities. A three-prong test is used in accordance with the rule to answer the following questions: (i) do the two facilities belong to the same industrial grouping, (ii) are they located on one or more contiguous or adjacent properties, and (iii) are they under the control of the same person or (persons under common control)?

It should be noted that the same above process is used for determining whether a stationary source is a “major source” in §70.2 as incorporated in NC's approved State Operating Permit Program (15A NCAC 02Q .0500).

Optima TH has asserted that it is a separate stationary source from the Smithfield Fresh Meats facility and should not be deemed one single stationary source.

The following facts and information need to be considered, which is based on telephone conversations³, email exchange⁴, and review of North Carolina Utilities Commission (NCUC) docket⁵:

- Optima TH facility is located on the Smithfield facility. Smithfield has leased the portion of its Tar Heel facility land to Optima TH.
- Optima TH has constructed and is operating a gas upgrading system (GUS) and an open flare since December 11, 2019.
- Both Smithfield and Optima TH have confirmed that the Optima TH facility is located to serve only the byproducts (biogas) produced by the Smithfield facility. Both confirmed that the Optima TH facility is designed to meet only the biogas generated from the Smithfield facility. Both have confirmed that in order to process additional biogas in Optima TH facility (from other suppliers, other than Smithfield), its existing gas upgrading capacity needs to be increased. Optima TH has also confirmed that it does not purchase any biogas from other suppliers at this time and if it decides to process additional biogas from other suppliers, it will have to increase its existing capacity.
- Smithfield has stated to NCUC that “Optima TH project will allow all biogas produced from [its Tar Heel] facility to be cleaned and injected...”
- Smithfield has confirmed that it has no plans to revise its current Title V permit for its permission for biogas burning in its existing boilers (ID Nos. ES-1 through ES-3) and flaring off biogas in its existing flare (ID No. CD-1) due to Optima TH operations.

³ Rahul Thaker (DAQ) and Gus Simmons (Consultant for Optima TH) on 9/2 and 9/3/2020, and Rahul Thaker (DAQ) and Robert Harris (Smithfield Fresh Meats Corp – Tar Heel) on 9/3/2020.

⁴ Keith Bailey (Smithfield Foods) and Rahul Thaker (DAQ), 9/18/2020.

⁵ No. G-9 Sub 726 for “*Application of Optima TH, LLC for Approval to Participate in Pilot Program*”, 7/12/2018, <https://starw1.ncuc.net/NCUC/PSC/DocketDetails.aspx?DocketId=71b00827-9251-484d-82d6-18b22bff9a4e>.

- Optima TH has currently removed the Smithfield's capability to burn biogas in the above boilers or flaring off in the above flare. Optima TH sealed off the pipes delivering biogas to Smithfield's boilers and flare (flanged off and bolted). However, Smithfield retains the authority to remove the flanged-off piping to both boilers and flare whenever it wishes.
- If Optima's GUS and flare are not operational for an extended period of time, Smithfield's flare and boilers could operate. Smithfield does not anticipate having to operate its flare. It would only be necessary if GUS and flare system are not functional. The possibility of both systems being out of commission for an extended period are low.
- Optima has the right to purchase the biogas from Smithfield and not a requirement (mandate) to purchase as per Smithfield. Same is also correct that Smithfield has the right to sell and not a mandate (requirement) to sell its biogas to Optima.

Prong 1: Same Industrial Grouping

In general, pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same two-digit SIC (Standard Industrial Classification) code.

The SIC code for the Smithfield facility is 2011 "Meat Packing Plants" under the Major Group 20 "Food And Kindred Products". The SIC code for Optima TH is 4925 "Mixed, Manufactured, or Liquefied Petroleum Gas Production and/or Establishments engaged in the manufacture and/or distribution of gas for sale, including mixtures of manufactured with natural gas..." under the Major Group 49 "Electric, Gas, And Sanitary Services".

Optima TH has argued in the air permit application that "the [Smithfield and Optima TH] facilities conduct entirely different and distinct activities and do not share a common industrial grouping."

It appears facially to DAQ that these entities do not have the same industrial grouping. However, the DAQ also evaluated whether the Optima TH facility is a "support facility" for Smithfield's primary activity of meat products packing.

EPA has stated that "a support facility analysis is only relevant under the SIC-code determination. EPA explained that when two activities have different SIC codes, a support facility analysis may be conducted to determine whether the activities should be treated as having the same industrial grouping. The [1980 NSR rules] preamble clarifies that "support facilities" that "convey, store, or otherwise assist in the production of the principal product or group of products produced or distributed, or services rendered" should be considered under one source classification, even when the support facility has a different primary two-digit SIC code. Thus, one source classification encompasses both primary and support facilities, even when the latter includes units with a different primary two digit SIC code. See 45 FR 52696."⁶

It is clear from the NCUC docket information and the telephone conversations with both Smithfield and Optima TH that the Optima facility is located on Smithfield property solely to process and dispose of biogas generated by the Smithfield's wastewater treatment plant (WWTP). There is no other function for Optima TH for locating on the Smithfield facility, except to process the byproducts produced by the Smithfield facility by cleaning the raw biogas and producing a pipeline quality renewable natural gas for sale, and disposing of the biogas (when the GUS is not available or product gas is not meeting the pipeline quality specifications or generated biogas is exceeding the design capacity of GUS).

⁶ *In the Matter of Anadarko Petroleum Corp; Frederick Compressor Station*, Order on Petition No. VIII-2010-4 at Page 16 and 17 (February 2, 2011) as referenced in the *Meadowbrook* guidance on "common control" (April 30, 2018).

However, based on the email response⁷, it appears that the processing and disposal of Smithfield-generated biogas via the Optima TH facility is not the only option for Smithfield. Smithfield still has the authority and capability to flare off all generated biogas in its existing flare and/or burn in its boilers (Air Quality Permit 07221T22) as it retains the authority to remove the bolted-off flange for supplying biogas (if needed) to these emission sources. In addition, there is no mandate for Optima to purchase all biogas generated - Optima TH has only the right to purchase biogas from Smithfield. Similarly, Smithfield does not have a contractual requirement to sell all biogas to Optima - It is only an option to sell and not a mandate. This proves that Smithfield can still flare off its biogas in its flare and burn biogas in its boilers as per its Title V permit. Thus, Optima TH's operations are only incidental to Smithfield's primary activity and not a support facility for Smithfield. DAQ further believes that the Optima TH facility is not integral to the Smithfield's fresh meat production activity and its purpose is not for supporting the Smithfield's primary activity (meat production) especially in the context of CAA permitting. Therefore, DAQ believes that Optima TH is not a support facility for Smithfield; thus, Optima's pollutant emitting activities cannot be assigned the same Smithfield's SIC code (2011 "Meat Packing Plants" under the Major Group 20: Food And Kindred Products).

Prong 2: Contiguous or Adjacent

It is clear from the air permit application, statements made by both Smithfield and Optima TH during the telephonic conversations, and the NCUC docket information that the Optima TH facility is physically located on the Smithfield facility. In the air permit application, Optima TH states that it is "located approximately 900 feet from the existing Smithfield pork processing facility". Due to the fact that the Optima TH is physically located on the Smithfield property, as it leases the Smithfield facility land for its operations, the DAQ believes that these two facilities do meet the second prong of the evaluation of being "contiguous" or "adjacent".

Prong 3: Common Control

The DAQ determination on "common control" will be based upon the current EPA guidance in the *Meadowbrook* as referenced above. The guidance makes it clear that the common control determination needs to be focused on "the power or authority of one entity to dictate decisions of the other that could affect the applicability of, or compliance with, relevant air pollution regulatory requirements".

Optima TH is specifically designed to process only the maximum biogas generation of Smithfield's WWTP. From the NCUC docket and the telephone conversations, the DAQ has understood that Optima TH is to purchase all biogas generated in Smithfield's WWTP and process it in its gas upgrading system for selling renewable biogas (methane) and flare it off if it cannot sell or process in its GUS. DAQ understands that there are no other suppliers of raw biogas for the Optima TH facility. Moreover, if Optima TH decides to process additional biogas (more than the Smithfield's maximum biogas production capacity) by purchasing from non-Smithfield suppliers, it will have to first increase its gas processing capacity of the Optima TH facility.

Considering above, it appears that Smithfield dictates the amount of raw biogas available for purchase and processing by Optima TH (especially since it does not currently possess capability to burn biogas in its boilers or flaring it in its flare as the biogas supply to these equipment has been sealed off by Optima). At least facially it appears that Smithfield would have the power or authority over Optima's operations considering that the amount of supplied biogas would directly affect Optima's air emissions, applicability of permitting requirements, and its compliance with various air pollution-related requirements. However, the DAQ believes that this amounts to "influence" and not "control" as per EPA guidance. At best, this may be characterized as Smithfield providing/selling raw biogas feedstock to Optima TH for processing in its biogas processing facility through arm's length contract and during the normal course of contractual performance, air emissions occur at the Optima facility.

In addition, Smithfield has confirmed that it does not have the power or authority to start the Optima TH's biogas processing facility or start the new flare at Optima facility. Smithfield has specifically confirmed that it does not have the power or authority over Optima TH's air pollution related operations, or to determine applicability of or compliance with Optima facility's CAA requirements.

⁷ Id.

Therefore, DAQ concludes that Smithfield does not “control” Optima TH in determining whether these two facilities constitute a single source.

With respect to Optima TH, it can be said that it can decline to take the delivery of biogas from Smithfield. Thus, Optima TH accepting or not accepting the biogas from Smithfield could affect the Smithfield’s compliance with its air pollution requirements in its current Title V permit. Specifically, by accepting the delivery of all biogas by Optima, Smithfield will generally be in compliance with its Title V requirements for the said existing boilers and flare as those pieces of equipment will not be emitting (as all biogas is to be consumed by Optima and not available for Smithfield boilers and flare). In addition, by not accepting the biogas, for example, during unavailability of GUS due to maintenance / repair, the raw biogas will be stored for a short period of time in the Smithfield’s WWTP’s covered digesters, Smithfield facility will still remain in compliance with its Title V permit requirements. The DAQ believes that this limited amount of control of Optima TH over Smithfield operations should not hinder Smithfield’s ability to independently comply with its Title V permit obligations. In fact, Smithfield retains the ability to operate its boilers and flare by continuing to have an air permit, and the authority to remove the flanged-off piping to deliver the biogas to its flare and boilers (if needed). Importantly, Optima TH does not have the power or authority to burn or flare off biogas in Smithfield’s boilers and flare, respectively, in accordance with Smithfield’s Title V permit. Specifically, Optima TH does not have the power or authority over Smithfield’s air pollution related operations including compliance with Smithfield’s Title V permit.

In summary, neither Smithfield nor Optima TH has “control” over the other facility’s air pollution-related requirements, specifically the decision-making authority for applicability of or compliance with the CAA matters.

Conclusions

The DAQ concludes that both Smithfield Fresh Meats Corp – Tar Heel and Optima TH belong to two different two-digit SIC codes (2011 “Meat Packing Plants” under the Major Group 20 “Food And Kindred Products” for Smithfield and 4925 “Mixed, Manufactured, or Liquefied Petroleum Gas Production and/or Establishments engaged in the manufacture and/or distribution of gas for sale, including mixtures of manufactured with natural gas...” under the Major Group 49 “Electric, Gas, And Sanitary Services” for Optima TH). Both facilities are “contiguous” or “adjacent” to each other. However, neither facility has “control” over the decisions that could affect the air permitting and compliance obligations of the other facility.

Therefore, pursuant to NC’s SIP-approved PSD Program (02D .0530), DAQ concludes that Optima TH (ID No. 0900066) and Smithfield Fresh Meats Corp – Tar Heel (ID No. 0900055) facilities are not a single stationary source and they are two separate stationary sources for CAA permitting. In addition, pursuant to NC’s approved State Operating Permitting Program (02Q .0500), DAQ concludes that Optima TH (ID No. 0900066) is a separate major source for Title V permitting from the Title V major source of Smithfield Fresh Meats Corp – Tar Heel facility (ID No. 0900055).

5.3 Facility-wide Emissions Summary

The facility-wide emissions are based upon the following design features:

- Maximum biogas production: 1,225 scfm
- Average GUS methane recovery: 87%
- GUS uptime in normal operation: 97%
- GUS design capacity: 900 scfm
- Flare maximum heat input rate: 50 million Btu/hour

Emissions rates have been based upon a mass balance approach, considering the composition (% by volume) and flow rates (cfm) of various constituent gases (H₂S, N₂, NH₃, CH₄) in biogas, product gas, and tail gas, as applicable, and the resulting formation of SO₂, NO_x, ammonia, H₂S, and CH₄ (constituent of Greenhouse Gases (GHGs)), after applying the applicant-assumed destruction efficiency of 99 percent. The composition of biogas is based upon the historical data provided by Smithfield to Optima. The composition of product gas is based upon actual measurements by Optima. The composition of tail gas is simply the balance using the above biogas and product gas composition data.

The emissions estimate also accounts for emissions due to heat input provided by the new flare (i.e., products of combustion due to flaring off gases). Emissions factors for “Industrial Flares (Section 13.5, 02/18, AP-42)” have been utilized especially for NO_x and CO. For the remaining criteria pollutants and air toxics pollutants, emissions factors for “Natural Gas Combustion (Section 1.4, 7/98, AP-42)” have been utilized. For GHGs, the applicant has used the applicable Global Warming Potentials (GWP) for carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), and emissions factors of these gases due to natural gas burning in Tables A-1, and C-1 and C-2 of the EPA’s “Mandatory Greenhouse Gas Reporting” Rule (MRR) in 40 CFR 98, respectively.

Per the applicant, the destruction efficiency is based upon the information provided in “Industrial Wastewater Treatment” in Subpart II of Part 98, peer-reviewed paper for similar applications, and the flare design installed.

Actual emissions are based upon operating scenarios 1 through 3 described and shown above (i.e., 8,160 hours for normal operation, 240 hours for bypass operation, and 360 hours for off-spec operation) and actual yearly fuel usage.

Both potential to emit before and after control emissions are based on 8,760 hours of operation. Combusting 100 percent biogas in the flare results in the highest amount of emissions (i.e., no product gas is recovered and delivered in the pipeline for sell) for the worst-case scenario. For potential to emit before control, the maximum flare heat input rate is used while potential to emit after control accounts for limited annual fuel usage.

The following provides a facility-wide emission summary for the Optima TH facility (flare is the only emission source):

Regulated Air Pollutant	Actual Emissions, tons/yr	Potential to Emit Before Controls/Limitations, tons/yr	Potential to Emit After Controls/Limitations, tons/yr
Particulate Matter (PM)	0.10	0.17	0.17
Particulate Matter < 10 microns (PM ₁₀)	0.10	0.17	0.17
Particulate Matter < 2.5 microns (PM _{2.5})	0.08	0.14	0.14
Sulfur Dioxide (SO ₂)	170.78	170.86	170.86
Nitrogen Oxides (NO _x)	8.72	17.70	17.32
Carbon Monoxide (CO)	26.95	67.89	66.16
Volatile Organic Compounds (VOCs)	1.08	1.82	1.77
Lead	0.0000981	0.000165	0.000161
Hydrogen Sulfide (H ₂ S)	0.92	0.92	0.92
Greenhouse Gases (GHGs) as CO ₂ e	24,589	41,441	40,787
Single Largest Hazardous Air Pollutant (HAP), n-Hexane	0.353	0.595	0.580
Total HAPs	0.369	0.622	0.606

5.4 Regulatory Applicability

The flare emissions are subject to the requirements in 15A NCAC 02D .0516, .0521, .0535, .0540 and .1806, and 02Q .0207, .0504, and 02Q .0711. These requirements are discussed below:

15A NCAC 02D .0516 “Sulfur Dioxide Emissions from Combustion Sources”

Sulfur dioxide emissions from the flare are subject to the emission standard of 2.3 lb/million Btu.

The worst-case emission rate for normal operation (operating scenario 1) is 2.2 lb/million Btu/hr considering the emission rate of 38.99 lbs/hr and the associated heat input rate of 17.73 lb/million Btu.

However, the worst-case emission rate for both the bypass operation (operating scenario 2) and the off-spec operation (operating scenario 3) is 0.8 lb/million Btu, considering the emission rate of 39.01 lb/hr and the associated heat input rate of 48.72 million Btu/hr.

Since the worst-case emission rate for normal operation of 2.2 lb/million Btu is close to the emission standard of 2.3 lb/million Btu, the DAQ believes that monitoring for SO₂ emissions from the flare is justified for all scenarios to assure compliance. It should be noted that in general, it is technically infeasible to measure the actual emission rate for SO₂ (or for any other pollutant) accurately for open flares such as the proposed flare at Optima. Thus, in lieu of an actual source sampling, the DAQ proposes the following monitoring approach.

The Permittee will be required to determine the SO₂ emission rate (million Btu/hr) for the flare for all operating scenarios (normal operation, bypass operation, and off-spec operation) on a 24-hour block average basis, as below for each day the facility is in operation. If any 24-hour block average SO₂ emission rate (million Btu/hr) exceeds the above emission standard (2.3 lb/million Btu), the Permittee will be deemed to have violated this requirement.

Emission Rate Monitoring

Equation 1

SO₂ emission rate, lb/million Btu

$$= \{SO_2 \text{ formed due to destruction of } H_2S \text{ and other trace sulfur compounds in biogas and tail gas by flare}\} + \{SO_2 \text{ formed due to combustion of fuel in flare}\}$$

$$= \left\{ \left[\frac{(60 * MW * P * V)}{(R * T)} * \eta \right] / \{HI\} + \{0.001\} + \{EF\} / \{HV\} \right\}$$

Where,

MW = molecular weight of SO₂, lb/lb-mol = 64.06 lb/lb-mol

P = absolute pressure, psia = 14.7 psia (reference condition of 1 atmosphere)

V = average daily actual flow rate of H₂S in both biogas and tail gas, scfm

R = ideal gas law constant = 10.73 psia - ft³/lb-m °R

T = absolute temperature, °R = 528 °R (reference condition of 20 °C)

η = destruction efficiency of flare for H₂S, percent = 98 percent

HI = average daily actual heat input rate (biogas, tail gas, product gas⁸, propane, and natural gas) for flare, million Btu/hr

EF = SO₂ emission factor for combustion of fuel in flare, lb/10⁶ sft³ = 0.60 lb/10⁶ sft³

HV = weighted average fuel heating value (biogas, tail gas, product gas⁹, propane, and natural gas), based on the monthly measured or fuel-supplier's heating values for each of the fuels and actual fuel flow rate for each to flare, Btu/sft³

0.001 = default SO₂ emission rate for trace sulfur compounds in biogas and tail gas in lb/million Btu, unless and until the facility can demonstrate, through sampling, that an alternative value is more representative

The above default SO₂ emission rate for trace sulfur compounds is based upon a similar biogas generation project, recently approved by the DAQ for Align RNG, LLC – BF Grady Road, Turkey, NC (Air Permit No. 10644R00, January 6, 2021). The subject permit for this facility includes a default SO₂ emission rate of 0.05 lb/hr for trace sulfur compounds in biogas and tail gas. Using the maximum heat input rate of 50 million Btu/hr for the proposed flare at Optima TH, the equivalent emission rate of 0.001 lb/million Btu is estimated.

The DAQ approval of 98 percent destruction efficiency (instead of applicant-assumed 99 percent) for H₂S is justified with supporting rationale in Sections 7 and 10 below and shall be used for monitoring of SO₂ emissions.

⁸ For off-spec scenario only.

⁹ Id.

For each of the hourly operation of flare, flow rate of H₂S as V_h (scfm) shall be determined as below in Equation 2 and the average of all calculated hourly values of the day shall be determined and input as average daily value of V (scfm) in the Equation 1 above:

Equation 2

$$V_h, \text{ scfm} = (\% \text{ by volume H}_2\text{S in biogas} * \text{amount of biogas, scfm}) + (\% \text{ by volume H}_2\text{S in tail gas} * \text{amount of tail gas, scfm})$$

For each of the hourly operation of flare, heat input for flare as HI_h (million Btu/hr) shall be determined as follows in Equation 3 and the average of all calculated hourly values for the day shall be determined and input as average daily value of HI (million Btu/hr) in the Equation 1 above:

Equation 3

$$\text{HI}_h, \text{ million Btu/hr} = \{ \{ (\text{biogas flow rate, scfm}) * (\text{biogas heating value (HHV), Btu/sft}^3) \} + \{ (\text{tail gas flow rate, scfm}) * (\text{tail gas heating value (HHV), Btu/sft}^3) \} + \{ (\text{product gas flow rate, scfm}) * (\text{product gas heating value (HHV), Btu/sft}^3) \}^{10} + \{ (\text{propane flow rate, scfm}) * (\text{propane heating value (HHV), Btu/sft}^3) \} + \{ (\text{natural gas flow rate, scfm}) * (\text{natural gas heating value (HHV), Btu/sft}^3) \} \} * \{ 60 \text{ min/hr} \}$$

Monitoring

- The Permittee will be required to perform the following monitoring on an hourly basis of each day the facility is operating:
 - Measure the amount of biogas entering the GUS (scfm) using a flow monitor.
 - Measure the amount of biogas entering the flare (scfm), bypassing the GUS, using a flow meter.
 - Measure the tail gas leaving the GUS (scfm).
 - Determine the product gas leaving the GUS (scfm) using the mass balance method and the data collected for the amounts of biogas and tail gas as above.
 - Measure the amount of propane and natural gas entering the flare (scfm).
 - Measure the concentrations of both methane (% volume) and H₂S (% volume) in the biogas using a biogas analyzer (gas chromatograph).
 - Measure the methane concentration (% volume) in the product gas using a gas analyzer.
 - Determine the concentration of H₂S (% volume) in the tail gas using the biogas data for H₂S as above.
- The Permittee will be required to analyze biogas and tail gas samples once every month to determine their heating values (HHV), Btu/sft³.
- The Permittee will be required to verify that the flare is designed and operated as below within 180 days of the issuance of an air quality permit:
 - Flare shall be designed for and operated with no visible emissions as determined by the Method 22 of Appendix A to 40 CFR 60, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. The observation period is 2 hours and shall be used according to Method 22.

¹⁰ Id.

- Flare shall be operated with a flame present at all times, as determined by the following method. The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.
- Flare shall meet the following heat content and maximum tip velocity specifications as below:
 - Flare shall be used only with the net heating value of the gas being combusted being 300 Btu/scf or greater if the flare is steam-assisted or air-assisted; or with the net heating value of the gas being combusted being 200 Btu/scf or greater if the flare is non-assisted.
 - If the flare is steam-assisted or non-assisted flare, it shall be designed for and operated with an exit velocity less than 60 ft/sec with the exceptions as provided below.
 - If the flare is steam-assisted or non-assisted flare, it shall be designed for and operated with an exit velocity greater than 60 ft/sec but less than 400 ft/sec, provided the net heating value of the gas being combusted is greater than 1,000 Btu/scf.
 - Steam-assisted or non-assisted flare designed for and operated with an exit velocity less than 400 ft/sec is permitted as long as the exit velocity is less than the velocity, V_{max} , as determined below.
 - The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^n C_i H_i$$

where:

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25 °C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20 °C;

$$K = \text{Constant, } 1.740 \times 10^{-7} \left(\frac{1}{\text{ppm}} \right) \left(\frac{\text{g mole}}{\text{scm}} \right) \left(\frac{\text{MJ}}{\text{kcal}} \right)$$

where the standard temperature for $\left(\frac{\text{g mole}}{\text{scm}} \right)$ is 20°C;

C_i = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77 or 90 (Reapproved 1994);
and

H_i = Net heat of combustion of sample component i, kcal/g mole at 25 °C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 or 88 or D4809-95 if published values are not available or cannot be calculated.

- The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D of Appendix A to 40 CFR 60, as appropriate; by the unobstructed (free) cross sectional area of the flare tip.
- The maximum permitted velocity, V_{max} , for the flare shall be determined by the following equation.

$$\text{Log}_{10}(V_{max}) = (H_T + 28.8)/31.7$$

V_{max} = Maximum permitted velocity, M/sec
 28.8 = Constant
 31.7 = Constant

H_T = The net heating value as determined above.

- If the flare is air-assisted flare, it shall be designed and operated with an exit velocity less than the velocity, V_{max} , as determined by the following method:

$$V_{max} = 8.706 + 0.7084 (H_T)$$

V_{max} = Maximum permitted velocity, m/sec

8.706 = Constant

0.7084 = Constant

H_T = The net heating value as determined above.

Recordkeeping and Reporting

The Permittee will be required to keep records of all monitoring activities as described above. The Permittee will be required to report the SO₂ emissions rates of flare on a 6-month basis (January-June and July-December) within 30 days of end of each of the 6-month periods, containing a summary of average SO₂ emission rates (lb/million Btu) for each day.

15A NCAC 02D .0521 "Control of Visible Emissions"

The flare has been manufactured on September 1, 2020 as per the application, after the cut-off date of July 1, 1971 in 02D .0521. Therefore, the visible emissions from the flare shall not exceed 20% opacity when averaged over a six-minute period. It is this engineer's judgement that visible emissions from biogas, tail gas or propane combustion would be low to negligible. Compliance is expected, but, it will be determined through facility inspection when the air permit is issued for the facility.

15A NCAC 02D .0535 "Excess Emissions Reporting and Malfunctions"

If excess emissions from the flare last for more than four hours and that results from a malfunction, a breakdown of process or control equipment or any other abnormal conditions, the Permittee shall

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

It should be emphasized that this reporting requirement does not allow the Permittee to operate the flare in non-compliance with the applicable Environmental Management Commission Regulations, as discussed in this application review.

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).

15A NCAC 02D .1806 “Control and Prohibition of Odorous Emissions”

The purpose of this Rule is to provide for the control and prohibition of objectionable odorous emissions.

The Permittee shall not operate the facility without implementing management practices or installing and operating odor control equipment sufficient to prevent odorous emissions from the facility from causing or contributing to objectionable odors beyond the facility's boundary.

Compliance is expected. But it will be confirmed during routine compliance inspections after permit issuance or during any complaint investigations.

15A NCAC 02Q .0207 “Annual Emissions Reporting”

The Permittee will be required to submit an emission inventory by June 30th of each year for the previous year’s actual emissions for the pollutants listed in 02Q .0207(a).

15A NCAC 02Q .0504 “Option for Obtaining Construction and Operation Permit”

The Permittee will be required to apply for a Title V permit within one year from the date of beginning operation of the facility. As stated earlier, the facility commenced operation of a major source (Title V) on December 11, 2019. Therefore, the Permittee will be required to submit a timely and complete Title V application on or before December 11, 2020. However, after additional discussions with the Director’s office, it was decided that the permit, when issued, will require the owner/operator to submit another application, a complete Title V application under 02Q .0500 “Title V procedures” within 90 days from the issuance of this air permit, which is processed under 02Q .0300 “construction and operation permits”. Refer to Section 10 below for details.

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

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

The facility-wide (flare is the only emission source) emissions on a potential to emit basis for the air toxic pollutants expected to be emitted are as below:

Toxic Air Pollutant	Averaging Period	Potential Emissions	TPER	Modeling Required?
Acetaldehyde (75-07-0)	lb/hr	0.00000115	28.43	No
Acrolein (107-02-8)	lb/hr	0.00000136	0.08	No
Ammonia (7664-41-7)	lb/hr	0.245	2.84	No
Benzene (71-43-2)	lb/yr	0.824	11.069	No
Benzo(a)pyrene (50-32-8)	lb/yr	0.000471	3.044	No
Formaldehyde (50-00-0)	lb/hr	0.136	0.16	No
n-Hexane (110-54-3)	lb/day	3.26	46.3	No
Hydrogen sulfide (7783-06-4)	lb/day	5.04	5.1	No
		9.96		Yes
Toluene (108-88-3)	lb/day	0.00616	197.96	No
	lb/hr	0.000257	58.97	No

As can be seen in the above Table, for all pollutants expected to be emitted, the facility-wide emissions are less than the respective toxics pollutant emission rates (TPERs). Therefore, an air toxics permit application containing a modeling analysis demonstrating compliance with the applicable acceptable ambient levels (AALs) in 02D .1104 is not required for the pollutants listed. However, with the applicant-assumed destruction efficiency of 99 percent for sulfur in H₂S, it is noted that the facility-wide potential emissions of H₂S (5.04 lbs/day) are very close to the applicable

TPER (5.1 lb/day). In addition, with the DAQ-approved destruction efficiency of 98 percent (instead of applicant-proposed 99 percent) for sulfur in H₂S, the facility-wide potential emissions of H₂S (9.96 lb/day) will exceed the above TPER. Thus, the DAQ will include a requirement for controlling the toxic emissions of H₂S below the above rate pursuant 02D .1100, using the monitoring approach below and the DAQ-conducted modeling in Section 7 below:

The following monitoring approach (similar to SO₂ emissions above) will be included in the permit to ensure compliance with 02D .1100:

Emission Rate Monitoring

H₂S emission rate, lb/day

= {H₂S emitted from flare (i.e., H₂S in biogas and tail gas not destructed by flare)}

= $\{[(60 * MW * P * V) / (R * T)]\} * \{1-\eta\} * \{24\}$

Where, MW = molecular weight of H₂S, lb/lb-mol = 34.06 lb/lb-mol

P = absolute pressure, psia = 14.7 psia (reference condition of 1 atmosphere)

V = average daily actual flow rate of H₂S in both biogas and tail gas, scfm

R = ideal gas law constant = 10.73 psia - ft³/lb-m °R

T = absolute temperature, °R = 528 °R (reference condition of 20 °C)

η = destruction efficiency of flare for H₂S, percent = 98 percent (DAQ-approved)

As stated earlier, the DAQ approval of 98 percent destruction efficiency (instead of applicant-assumed 99 percent) for H₂S is justified with supporting rationale in Sections 7 and 10 below and shall be used for monitoring of H₂S emissions.

The Permittee will be required to calculate H₂S emissions on a daily basis (24-hour block average) when the flare is in operation. The measurements and calculations for both H₂S flow rates and concentrations, as included in the SO₂ requirements above, shall be used to determine daily H₂S emission rate for the flare to ensure that the H₂S TPER is not exceeded. No additional monitoring shall be required.

Recordkeeping and Reporting

The Permittee will be required to keep records of all monitoring activities as described above. The Permittee will be required to report the H₂S emissions rates (lb/day) for the flare on a 6-month basis (January-June and July-December) within 30 days of end of each of the 6-month periods.

DEQ's Environmental Justice Analysis

As per DEQ's environmental justice (EJ) criteria, evaluation will be performed for each greenfield Title facility before an air permit is to be issued. The DEQ will conduct an EJ evaluation for the Optima TH facility and prepare a separate report (if required) which will be available along with other draft permit documents for public comment on DEQ's website at <https://deq.nc.gov/news/events/public-notice-hearings> when the draft permit is noticed for public comments (Refer to Section 8 below).

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

NSPS

Not applicable.

NESHAP

Not applicable.

PSD

Bladen County is in attainment or unclassifiable for all promulgated National Ambient Air Quality standards (NAAQS) in accordance with §81.334. The PSD program applies to major stationary sources and major modifications in this airshed.

Based upon the facility wide emissions summary in Section 5.3 above, the Optima TH is not a major stationary source for PSD. Bladen county has triggered minor source baseline dates for both PM₁₀ and SO₂. The actual emissions increases for the proposed project are 0.02 lb/hr (PM₁₀) and 38.99 lbs/hr (SO₂).

No further review is required under PSD.

112(r)

As per the applicant, the facility does not store any regulated toxic substances in amounts exceeding the threshold amounts in Subpart F of 40 CFR 68 “Regulated Substances for Accidental Release Prevention”. Therefore, the CAA §112(n) requirements implemented through Part 68 (40 CFR) do not apply except the following.

Pursuant to §112(n)(1), as implemented in §68.1 of 40 CFR, the facility owner has “a general duty in the same manner and extent...to identify hazards which may result from such releases using appropriate hazard assessment techniques, to design and maintain a safe facility taking such steps as are necessary to prevent releases, and to minimize the consequences of accidental releases which do occur.”

CAM

Compliance assurance monitoring (CAM) requirement under 40 CFR 64, as implemented through 02D .0614, is a Title V program requirement. When the DAQ processes the facility’s Title V application (when submitted), such applicability analysis must be conducted. This application is processed pursuant to 02Q .0300 “construction and operation permits”. Therefore, CAM analysis need not be performed at this time.

7. DAQ-Conducted Modeling

As discussed above in Section 5.4 above, the worst-case SO₂ emission rate for the flare (facility wide) is 2.2 lb/million Btu, just below the standard of 2.3 lb/million Btu (02D .0516). In addition, the worst-case facility wide H₂S emission rate is 0.21 lb/hr (or 5.04 lb/day), which barely meets the applicable TPER of 5.1 lb/day (02Q .0711). Both of these emissions rates account for the applicant-assumed 99 percent destruction efficiency for sulfur in H₂S, which the DAQ finds not supportable. Because the emissions of H₂S and SO₂ are close to their respective regulatory thresholds, the DAQ decided to conservatively assume a 98 percent destruction efficiency for sulfur in H₂S. The DAQ performed its own modeling for the facility wide emission rate of 0.415 lb/hr (or 9.96 lb/day) for H₂S and predicted that the impact would be less than 1 percent of the applicable Acceptable Ambient Level of 0.12 mg/m³ in 02D .1104.

Moreover, using the unrealistic assumption of 100 percent (instead of realistic 98 percent) destruction efficiency for sulfur in H₂S and its conversion to SO₂, the DAQ conducted modeling to predict the worst-case SO₂ impact for the mass rate of 39.1 lb/hr. The following Table provides the predicted impacts against the ambient standards:

Pollutant	Averaging Period	Maximum Impact ug/m ³	NAAQS ¹¹ or SAAQS ¹² ug/m ³
SO ₂	1-hour	43.50	196
	3-hour	47.78	1,300
	24-hour	14.27	365
	annual	1.89	80

¹¹ National Ambient Air Quality Standard.

¹² State Ambient Air Quality Standard.

Thus, the DAQ concludes that neither the emissions of H₂S nor SO₂ on a facility wide basis are expected to create any adverse health impacts beyond the property boundary. The DAQ memorandum (November 18, 2020) on its modeling is included in Appendix 1 of this application review.

8. Public Participation

The draft permit documents including permit, application review, and the DEQ's Environmental Justice (EJ) Analysis report were noticed on the DEQ's web site on March 2, 2021 and in Bladen Journal (a local newspaper) on March 5, 2021, for seeking public and EPA comments in accordance with 02Q .0306 and .0307. The notice provided for a 30-day comment period for these draft documents which ended on April 4, 2021 (technically April 5th since 4th fell on a weekend/holiday).

The DAQ received comments on the publicly noticed draft permit documents including EJ report. Each of the comments on these documents along with the DAQ responses have been included in Section 10 below.

9. Stipulation Review

Not applicable. This is an unpermitted ("greenfield") facility. Thus, no existing stipulations are available for any revisions. All stipulations included in the air permit are new.

10. Conclusions, Comments, and Recommendations

- Professional Engineer (PE) Seal Requirement

A professional engineer (PE)'s seal is not required.

The application does include a new emission source which is also a control device (flare) to destroy hydrogen sulfide emissions. The application includes some design information including its destruction efficiency. This design data has been utilized to estimate emissions and the determination of expected compliance with various regulatory requirements (e.g., 02D .0516, 02Q .0711, etc.). The applicant's consultant (Mr. William G. Simmons) has sealed the technical portion of the application with his PE (professional engineer) license. Mr. Simmons' current PE license (27407) status is "active" as per North Carolina Board of Engineers for Engineers and Surveyors (NCBELS) web site¹³.

- Zoning Requirement

The new facility of Optima TH requires a local zoning consistency determination as per 02Q .0304(b)(1). Bladen County Planning Department Director (Gregory J. Elkins) has issued a Zoning Consistency Determination on 9/2/20 certifying that "I have received a copy of the air permit application (draft or final) and the proposed operation is consistent with the applicable zoning ordinances".

- Pre-Public Noticed Draft Permit Documents - Applicant Comments

The pre-public notice draft permit was emailed to the Permittee for review and comment on December 8, 2020. The DAQ provided additional time to review the draft permit till January 15, 2021 after receiving a request from the applicant attorney on December 14, 2020. The applicant's comments were received from Mr. Mark Maloney (responsible official) of Optima TH on January 15th. The following includes each of the applicant-comments and the DAQ response to each:

Comment 1:

"Page 2, Specific Condition 1: As previously stated, we believe the application of 15A NCAC 02D .0516 in the manner described in the draft permit to be inconsistent with the language and history of this regulation. The sulfur

¹³ <https://www.membersbase.com/ncbels/search>.

dioxide (SO₂) emission limit in 15A NCAC 02D .0516(a) is based on SO₂ emissions from any “source of combustion” that is discharged from any “vent, stack, or chimney.” On its face, this rule does not seem to apply to emissions from a flare – only a vent, stack or chimney. “Stack” is defined to not include flare in the ancillary regulation 15A NCAC 02D.0533. Flares also do not fall within the ordinary meaning of a “vent” or “chimney.” Optima’s operation involves SO₂ emissions from a gas upgrading system (GUS), that does not have combustible fuel, and that is discharged through a flare which does not seem to fall under the .0516 regulation. However, we understand DAQ’s historical use of .0516 and we would like the opportunity to discuss further.”

DAQ Response:

The requirement in 02D .0516(a) mandates that “emission of sulfur dioxide from **any source of combustion discharged from any vent, stack, or chimney** shall not exceed 2.3 pounds of sulfur dioxide per million BTU input.”

The applicant argues that requirements in 15A NCAC 02D .0533 “Stack Height” specifically exempts flares from the definition of “stack”; thus, he believes that the DAQ cannot regulate the SO₂ emissions from the flare at the Optima TH facility under 02D .0516. The applicant further argues that the flares also do not fall within the ordinary meaning of “vent” or “chimney”. Moreover, the applicant appears to contend that the GUS emits SO₂ emissions instead of the candlestick flare, and it does not have any combustible fuels, implying that the GUS is not an emission source.

DAQ has deemed the candlestick flare (CD-1) on the GUS (ES-1) both an emission source and a control device for air permitting requirements. The DAQ believes that based upon the application, GUS only processes biogas and it is a non-emitting source (not a combustion source).

NC has historically treated flares as sources of combustion. NC has issued numerous Title V permits for flares, controlling emissions of municipal solid waste landfills (MSWLs). The flare permits for MSWLs include both the emission source standards such as SO₂ in 02D .0516 and the inspection and maintenance provisions as control device requirements for the landfill gas emissions. In addition, as stated previously, NC recently issued an air permit for a similar biogas generation project where the agency included the SO₂ standard in 02D .0516 as an applicable standard for the facility flares.

In summary, DAQ concludes that the candlestick flare at Optima TH is a “source of combustion”, emitting SO₂ through a “vent, stack, or chimney”. Finally, the DAQ believes that the entire height of the flare can be deemed a “stack” in the context of 02D .0516 even if the definition of stack in 02D .0533 explicitly states contrary. No change to the permit will be made.

Comment 2:

“Page 2, Specific Condition 3.a: Please clarify if we may provide a letter from the Engineer of Record for the project demonstrating conformance with this requirement by flowrate/area calculation?”

DAQ Response:

Condition 3a requires a demonstration for proper design and operation of the candlestick flare containing the following: no visible emissions, continuous operation of flame while operating flare, and compliance with the heat content and maximum tip velocity specifications. The Permittee is required to submit a report within 180 days of the issuance of the air quality permit 10673R00, verifying that the candlestick flare (ID No. CD-1) is designed and operated as per the requirements included in Condition 3a. Thus, the applicant needs to provide a report for such demonstration containing all above elements for proper design and operation of the flare.

Comment 3:

“Page 2, Specific Condition 3.a.iii.(A): The tail gas has a heating value of 204 Btu/scf, as stated in the permit application, based on 87% methane recovery. This is a conservative estimate (as is typical of our estimates in the calculations) as we may achieve ≥90% recovery, and may observe higher methane content (and therefore heating

value, as expressed in Btu/SCF) in the biogas, at times. For normal operation we will blend tail gas, biogas, and or flare pilot fuel for oxidation of the tail gas.”

DAQ Response:

It is understood that the flare will burn the combination of gases and fuels (biogas, tail gas, propane, natural gas) in normal operation and the heat content of these blended fuels will generally be higher than the specified heat content requirement.

Comment 4:

“Page 4, Specific Condition Monitoring/Recordkeeping b. Equation 1 and Equation 3: The terms “HI” and “HV” in Equation 1 should be restated to include the total of biogas, tail gas, propane and natural gas (natural gas is missing). Similarly, Equation 3 should include the natural gas flowrate and heating value for natural gas. The destruction efficiency is also prescribed in the permit to be used as “98 percent (DAQ-approved)”. As noted in the attached Toxic Release Inventory (TRI) Reporting Guidance for Poultry Processing for Hydrogen Sulfide (H₂S), Revision 1 published March 15, 2017, 99% destruction efficiency for hydrogen sulfide in the flare (equal to that for methane per USEPA GHG Reporting Rule) is reasonable. We respectfully request the variable “η” be revised to include “99 percent (DAQ-approved).”

DAQ Response:

The DAQ will revise the Equations 1 and 3 to include the contribution of natural gas with regard to calculating average daily heat input rate of flare and average heat content of fuels combusted. DAQ will also revise the same equations for the off-spec scenario only, for including the contribution of product gas in determining the average daily heat input rate of flare and the average heat input rate of all fuels combusted.

Regarding the applicant’s contention on reasonableness of H₂S destruction efficiency of 99 percent, it needs to be emphasized that the applicant has not provided any information on manufacturer’s warranty for the proposed flare. Moreover, the EPA regulation in “Subpart II—Industrial Wastewater Treatment, 40 CFR 98 “Mandatory Greenhouse Gas Reporting (MRR)”, cited by the applicant, specifies that under this Subchapter, the owner/operator is to use the “lesser of manufacturer's specified destruction efficiency and 0.99” for the biogas generated in anaerobic digesters and controlled by on-site devices such as flares. Finally, the industry guidance¹⁴ cited by the applicant indicates the use of manufacturer guarantees or assumption of 99% destruction efficiency for hydrogen sulfide for flares, referring to the above EPA’s MRR Subchapter, for estimating emissions of H₂S emissions for anaerobic treatment units.

In summary, the DAQ believes that because the applicant has not provided the reasoned justification (vendor guarantees) indicating that the destruction efficiency of 99 percent for H₂S is achievable for the proposed flare, it is not reasonable for this state agency to approve the applicant’s request of this control efficiency. Moreover, the agency has decided to use 98% destruction efficiency for flares in NC, combusting biogas from the animal waste operations, unless manufacturer’s guarantee of a higher destruction efficiency is provided.

Comment 5:

“Page 5, Specific Condition c.iii: We currently measure the tail gas with a flow meter, but not the product gas for each PSA. We derive product gas flow for each PSA through mass balance by measuring the biogas into the plant, and measuring the tail gas stream, deriving the product gas as the difference, since there is no other outlet or flow stream. Please confirm that product gas flow may continue to be derived via mass balance rather than adding additional, redundant flow meters.”

DAQ Response:

¹⁴ “Toxic Release Inventory (TRI) Reporting Guidance for Poultry Processing for Hydrogen Sulfide (H₂S), Revision 1”, prepared by US Poultry & Egg Association and Woodruff & Howe Environmental Engineering, Inc., March 15, 2017.

The DAQ agrees with the applicant that it is not necessary to monitor the product gas flow rate. The DAQ further agrees that it would be appropriate to determine the product gas flow rate using a mass balance approach and the monitored data of biogas and tail gas. This change will be made to the permit.

Comment 6:

“Page 5, Specific Condition c.iv: Natural gas needs to be included.”

DAQ Response:

The DAQ agrees with the applicant and will make this change to the permit.

Comment 7:

“Page 5, Specific Condition c.vii: The tail gas is moist and typically higher H₂S concentrations prior to control via the flare. Such moist, higher H₂S conditions are very difficult to measure with an "online" analyzer, as the H₂S is corrosive, and the moisture tends to “gum up” or facilitate corrosion of the delicate instruments. As such, we respectfully ask for this permit condition to allow the use of the raw biogas value for H₂S, and through mass balance calculation, consider all H₂S is directed to the control device, the flare. This is a conservative approach as some trace amount of H₂S is delivered with the product gas, so this approach should over-account, by a minor amount, the mass of H₂S directed to the flare.”

DAQ Response:

The DAQ agrees with the applicant with regard to the technical difficulties in accurately measuring the H₂S content of the tail gas; thus, it will allow the use of biogas H₂S content data for determining the H₂S content of the tail gas as a conservative approach.

Comment 8:

“Page 7, Specific Condition 11.c: Please confirm that laboratory analysis of samples taken suffice for performing these calculations.”

DAQ Response:

Specific condition 11.c. includes the requirement to obtain an air toxics permit before the facility wide actual emissions for acetaldehyde (75-07-0), acrolein (107-02-8), ammonia (7664-41-7), benzene (71-43-2), benzo(a)pyrene (50-32-8), formaldehyde (50-00-0), n-Hexane (110-54-3), hydrogen sulfide (7783-06-4), or toluene (108-88-3) exceed the respective TPERs.

The DAQ agrees with the applicant that he/she can use the laboratory sample results for various gases and pollutants for determining the facility wide emissions for the pollutants of concern.

Comment 9:

“Page 8, Specific Condition d: The destruction efficiency is also prescribed in the permit to be used as “98 percent (DAQ-approved)”. As noted in the attached Toxic Release Inventory (TRI) Reporting Guidance for Poultry Processing for Hydrogen Sulfide (H₂S), Revision 1 published March 15, 2017, 99% destruction efficiency for hydrogen sulfide in the flare (equal to that for methane per USEPA GHG Reporting Rule) is reasonable. We respectfully request the variable “η” be revised to include “99 percent (DAQ-approved).”

DAQ Response:

Refer to the response to the comment 4 above.

Comment 10:

“Page 8, Specific Condition g: Assuming the permit is issued prior to Jan 30, 2021, is the permittee required to provide this report for July-December 2020? All data may not be available, as we were not required to monitor it in the manner described in the permit.”

DAQ Response:

The permit requirements can only be prospective. Assume the hypothetical case that the DAQ is to issue the permit for the Optima TH facility on March 1, 2021. For this assumed case, the first semi-annual report for H₂S emissions rates (lb/day) for the flare under this Condition A.11.g. will be due on July 30, 2021 for the period of March 2021 - July 2021. No change to the permit is required.

- Pre-Public Noticed Draft Permit Documents - Regional Office Comments

The pre-public notice draft permit was emailed to the FRO for review on December 8, 2020. Jeff Cole from the regional office emailed on December 15th the comments on the application review and the draft permit. Almost all comments pertain to the formatting issues (extra space within the word or between the words, extra tab, etc.) in these documents, except the comments on (i) the consistent discussion on H₂S destruction efficiency in the application review in the context of applicant-proposed (99 percent) v. DAQ-approved (98 percent), how the emissions of H₂S vary, and their comparisons with the associated TPER, and (ii) the requirement of submittal of a complete Title V application within one year from the date of beginning operation of either the (non-emitting) GUS (ID No. ES-1) or the candlestick flare (ID No. CD-1) in the air permit. These substantive comments from the regional office have been discussed below:

With regard to the issue of flare destruction efficiency, the DAQ will amend the application review to make the discussions on DAQ-approved 98 percent H₂S destruction efficiency consistent to avoid any ambiguity with the applicant-proposed 99 percent destruction efficiency and their effects on emissions.

With respect to the requirement to submit a complete Title V application within one year from the date of beginning operation of either the (non-emitting) GUS (ID No. ES-1) or the candlestick flare (ID No. CD-1), it should be noted that the applicant started operating a major source for Title V on December 11, 2019. Both the CAA (§503(c)) and the implementing regulations (§70.5(a), and 02Q .0501(e) and .0504(d)) require that the applicant must submit a timely and complete application within one year from the commencement of facility operations. After additional discussions with the Director’s office, it was decided that the permit, when issued, will require the owner/operator to submit another application, a complete Title V application under 02Q .0500 “Title V procedures” within 90 days from the issuance of this air permit, which is processed under 02Q .0300 “construction and operation permits”. In summary, the draft permit will be modified to specify this 90 day deadline to submit a Title V application.

Finally, all formatting issues will be taken care of as needed.

The following comment/DAQ response section pertains to the version of the permit and technical review that went to 30-day public comment period. As above, the comments are grouped by the type of commenter.

- Public-Noticed Draft Permit Documents Comments

The following section includes DAQ response to each comment received on the publicly noticed version of the draft permit documents including the EJ report:

Private Citizens

Comment 1:

The DAQ (Rahul Thaker) received a voice mail from Alfred G. Roberts (910-991-6687) on March 8, 2021, a resident of Bladen County (almost 71 years old), who lives near Tar Heel NC. He read the public notice in the

newspaper. He said that he had read about flares and flares were bad for the environment, children, and animals. He further said that the flare at Optima TH was located near the Tar Heel school and the DAQ should think twice on what it was doing. Mr. Roberts requested a public hearing so that people could ask questions to the agency.

DAQ Response:

The DAQ will consider the comments from Mr. Roberts in deciding whether to hold a public hearing on the draft permit for Optima TH, LLC.

With regard to the general comment on flares and their operations, please refer to the DAQ response to Comment 4 below (Page 28) from Citizen Group (Clean Water for North Carolina (CWFNC)).

Comment 2:

Maple MaryAnn Osterbrink of Chapel Hill, NC, emailed the DAQ on April 4th the following comments:

“N! to more CAFO hog proliferation enabling Dominion can count "clean" or "renewable" energy credits for damaging quality of life for human area residents and hurt wate[r], soil, animals with UNSUSTAINABLE businesses.”

“Mega-business, not-really-farms, because the ANIMALS are not owned by the NC people trying to earn a living raising them, but by the huge corporations. The 'farmers' own the headache, debts, insurance, waste responsibility (and so have NOT done well!).”

“We need to help REAL farms that GROW varieties of HEALTHY FOOD, not fuel and pollution sources from outside corporations then Chinese killing hogs for their export using still-questionable slaughterhouse labor practices even after unionizing.”

“DOMINION should spend its time and (our) money CREATING CLEAN energy transitioning items like converters for tractors to EV ones, solar at farms, new small farm wind mills like in the 1920's but BETTER.”

DAQ Response:

The DAQ acknowledges receipt of this comment. However, no specific technical comments are being presented for the draft permit or technical review; therefore, no further action is required in response to this comment.

Citizen Group (Alliance to Protect the People and Places We Live/APPPL)

Comment 1:

Kay Reibold, Raleigh of APPPL emailed the DAQ on April 2, 2021 with the following comment:

“Please be informed of my objection to DAQ issuing an air permit for the proposed Optima biogas facility at the Smithfields Fresh Meats Plant in Tar Heel NC. This facility would create a health hazard with the plant's air pollution emissions on an already over burdened low income and black community living in the vicinity of the Smithfield plant.”

“The proposed biogas facility would be a major source of greenhouse gas emissions emitting over 170 tons of sulfur dioxide annually, as well as carbon monoxide, particulate matter and other pollutants.”

“DAQ MUST start considering the environmental justice implications in its air permitting process. These communities who live near Smithfield Foods should not have to suffer with yet another industry source causing bad air and polluted water.”

“Please deny the air quality permit for this proposed biogas facility.”

DAQ Response:

The DEQ prepared and Environmental Justice (EJ) Report in conjunction with this permit application and related materials to ensure EJ was considered throughout the decision making process. This Report specifically assisted DEQ in its conduct of meaningful outreach to the surrounding communities, whose demographic and socioeconomic composition (referenced in the comment) can be found detailed within the aforementioned EJ Report. However, no specific technical comments are being presented for the draft permit or technical review; therefore, no further action is required in response to this comment.

Citizen Group (Clean Water for North Carolina (CWFNC))

The DAQ received the following comments on the draft permit documents from Ms. Rachel Velez of CWFNC on April 4, 2021, in addition to the questions or comments received from this entity during March 23-30, 2021:

Comment 1:

“If approved, the Optima TH facility will further entrench North Carolina in dirty energy programs that continue to pollute our drinking water and the air we breathe. While industry giants, including Smithfield Foods and Duke Energy, tout this process as a green energy solution, this “waste-to-energy” industry falls short of more sustainable options like solar power and wind power. The Smithfield Foods/Optima TH biogas project does nothing to address the legacy of environmental and community health concerns created by the hog industry, and would emit 24,500 to 40,800 tons of greenhouse gases each year.”

“The Optima site will be a major emissions source due to the amount of gases that will be burned off through the flare. In addition to greenhouse gases, the facility would emit 170 tons of sulfur dioxide annually, as well as lesser amounts of carbon monoxide, particulate matter and other pollutants, according to the company’s permit application. Research shows that open flares, such as the candlestick flare included in this permit, are associated with a number of health risks, including heightened risk of preterm births, impacts to the heart, lungs and nervous system, and increased psychosocial stress.”

“Smithfield Foods, the company supplying Optima TH with the hog waste biogas, operates one of the world’s largest slaughterhouses in Bladen County. Smithfield has faced - and lost - numerous lawsuits, including when 500 community members filed 26 nuisance lawsuits in 2018 to seek compensation for damages to quality of life caused by the facility. The NC Department of Environmental Quality (DEQ), including its Division of Air Quality (DAQ), is acutely aware of the cumulative water, air, and quality of life impacts the hog industry has on nearby communities, yet continues to permit both individual hog operations and the massive biogas processing plants that perpetuate this toxic industry.”

“Optima TH duped both DEQ and our state’s environmental regulations when it decided to begin operations on the Smithfield property in 2019 without an air permit. The company’s disregard for any type accountability regarding its emissions and the impacts on nearby communities should be weighed heavily by the agency. This is especially true given Optima’s massive contribution to the cumulative toxic air pollution already being emitted in this region.”

“Within a 3 mile radius of the facility sits five permitted animal operations, four pollution incidents and three underground storage tanks. Releases in the area in 2019 included nitrate compounds, ammonia, hydrogen sulfide and chlorine dioxide -- all of which pose developmental and respiratory health risks. Additionally, the Optima TH facility sits directly on the same property as one of the world’s largest hog slaughterhouses owned by Smithfield, which kills 35,000 hogs per day and has its own associated air, water, and community health impacts. Once the biogas from the Smithfield operation is upgraded at the Optima site, the methane will then be injected into a Duke pipeline and transported to several coal-fired power plants to produce energy. The large, multi-faceted scope of this project, including the pre-existing pollution sources near the facility’s property, raises serious questions about the added cumulative health burdens the Optima project will pose to the nearby Bladen County communities.”

“Bladen County is designated as a Tier 1 County in NC and is among the 40 most economically distressed counties. It ranks 94th in health factors and 88th in health outcomes, and performed worse than state averages for most death rates. Communities surrounding the facility are disproportionately Black, Indigenous, and Hispanic populations when compared to state averages. The Environmental Justice report prepared by DAQ also shows that the surrounding communities are overwhelmingly low-income.”

“Despite this permit being categorized as a Title V, no public meeting or public hearing was scheduled by DAQ. Further, the public comment period ends on Easter Sunday, which presents a potential barrier for community members who celebrate the holiday to submit comments. It is unclear what public outreach activities have been performed by the agency to ensure adequate public participation during this permitting process. It is for these reasons that Clean Water for North Carolina urges DAQ to schedule a public meeting and hearing, and perform meaningful outreach to nearby community members who stand to be impacted by Optima TH and its polluting activities.”

DAQ Response:

The DAQ will consider the comments from Ms. Velez in deciding whether to hold a public hearing on the draft permit for Optima TH, LLC.

Comment 2:

How is the candlestick flare similar or different from those used for conventional gas?

- If similar, I have seen different states regulate the flares in different ways, how does NC regulate the flares?
- If different, what research have you been using to learn more about these flares?

DAQ Response:

DAQ has deemed the candlestick flare (CD-1) on the gas upgrading system (GUS, ES-1) for Optima TH facility both an emission source and a control device for air permitting requirements.

NC has historically treated flares as sources of combustion. NC has issued numerous Title V permits for flares, controlling emissions of municipal solid waste landfills (MSWLs). The flare permits for MSWLs include both the emission source standards, for example, SO₂ emissions standard in 02D .0516, and the inspection and maintenance (I&M) provisions as control device requirements for the landfill gas emissions. Moreover, NC recently issued an air permit for a similar biogas generation project (Align RNG LLC) where the agency included both the SO₂ standard in 02D .0516 as an emission source for this facility flares and the I & M provisions as control device requirements.

Comment 3:

“I understand that DAQ has determined that the Smithfield and Optima facilities are considered multiple stationary sources, how would having a single stationary source and code change the permit application? Would it require additional monitoring apart from the sulfur dioxide?”

DAQ Response:

The existing Smithfield facility is a major stationary source for PSD. If the two facilities were determined to be a single stationary source, a Prevention of Significant Deterioration (PSD) major modification application (satisfying all applicable requirements: Best Available Control Technology, source impact analysis, additional impacts, Class I if applicable, etc.) would be required for SO₂ emissions only because the modification has potential SO₂ emissions greater than the PSD significance emission rate.

Comment 4:

“For this permit with the candlestick flare, is this technology the same often used for conventional, fracked gas?”

“Additionally, as this facility had not had the appropriate permit for the candlestick flare and gas upgrading system, what more can or will the agency do to ensure this facility will remain in compliance in the future?”

DAQ Response:

In general, open flares have been installed extensively for decades at variety of industrial operations¹⁵ and permitted by various local, state, and federal environmental agencies.

The candlestick flare at the Optima TH facility is similar to the candlestick flare used at the recently permitted Align RNG LLC’s biogas processing plant. In fact, candlestick flares at Optima and Align facilities are identical in nature. That is, both are open flares, both are approximately the same size (50 million Btu/hr for Optima v. 45 million Btu/hr for Align), both are processing biogas generated from animal waste operations, and both are designed and constructed by ProPump & Controls.

The flare at Optima TH facility is also similar to open flares used to control landfill gas emissions at municipal solid landfills (MSWLFs).

Finally, the candlestick flare operated at the Optima facility is similar in design to open flares used for natural gas fracking operations¹⁶.

With regards to the permitting and compliance, the DAQ’s technical review of the application, as submitted, determined that a properly run facility would be expected to be in compliance with all the applicable requirements. The DAQ will verify compliance via review of monitoring records and unannounced facility inspections. Further, the air permit requires the Permittee to submit its TV 1st time application within 90 days of permit issuance. Finally, the DAQ/FRO submitted an enforcement package to the Division Director for failure of Optima to get an air permit prior to construction and operation. That enforcement package is currently in process.

Citizen Group (Duke Climate Coalition)

The DAQ received the following comments on the draft permit documents from Ms. Caroline Heitmann of Duke Climate Coalition on April 1, 2021.

Comment 1:

Environmental Justice

“The environmental justice report examines the demographics of Bladen County, North Carolina, but does not make a clear connection between the demographics and the possible impacts the Optima Tar Heel Facility could have on various groups of people. For example, Section 8 on Local Sensitive Receptors identifies sensitive receptors in the one-mile radius of the Optima Tar Heel Facility, but provides no information on how these receptors will be given “extra care” besides mentioning that these organizations will be contacted. This report should be edited to clarify the reason for including demographic information and how each group of people will be uniquely impacted by this system.”

DAQ Response:

The DAQ will consider the above comment on Optima TH facility operations potential impacts on the nearby residents when finalizing the DEQ’s EJ report.

Comment 2:

¹⁵ Section 13.5 “Industrial Flares”, AP-42, 02/18.

¹⁶ [Natural Gas Flaring and Venting Report.pdf \(energy.gov\)](#) and [candlestick flares for fracking natural gas - Bing images](#).

Financial Impacts

“The environmental justice report details that around 28-29% of the population residing in the area most impacted by this project is below the poverty line. This is almost three times the national poverty level of 10.5%, [citing US Census Bureau report] but the report does not outline any specific financial impacts, whether good or bad, that Optima TH could have on the community. Especially since those living in this area were already struggling financially, it is crucial that Optima TH does not further harm the financial circumstances of residents.”

DAQ Response:

The DAQ will consider the above comment on Optima TH facility operations impacting the financial wellbeing of the nearby residents when finalizing the DEQ’s EJ report. However, this analysis is outside the scope of DAQ and this permitting action.

Comment 3:

Flare System

“Is a flare system the best technology available? What research has gone into choosing this approach/technology? While it is clear that Optima TH has decided on a flare system, it is much less clear as to what considerations went into this decision. It would be helpful to gain more insight into what specific research and calculations were used to select this approach.”

DAQ Response:

The DAQ is required to evaluate the air impacts of pollutant emissions from any source and its ability to comply with applicable regulations as submitted through the permit application process. For applications not required to be processed under the PSD program, neither the applicant nor the agency is required to analyze the appropriateness of alternative control technologies.

Comment 4:

Safety Technology

“An additional concern we have is if Optima TH is making its best effort to incorporate the safest technologies into its facilities. Given the many negative health impacts that biogas facilities can have on nearby communities, we are concerned that Optima TH might try to cut corners in how it constructs safety systems, like the flare in question, potentially resulting in the unnecessary release of contaminants into the surrounding areas. Even if the DEQ lacks power under current regulations to reject the Optima TH system outright, everything should be done to minimize the effects of air and water pollutants on nearby communities. At the very least, effects should be monitored, and limits enforced. For too long, environmental justice issues in rural areas like Bladen County have been ignored by corporations and the state government. Regardless of the ultimate expense, Optima TH should be compelled to do whatever is necessary – including installing the best safety technology available – to mitigate the environmental impacts associated with its operations.”

DAQ Response:

The DAQ appreciates the comments on negative effects of air and water pollution. The air permit when issued, will include the necessary tools to ensure compliance with the permit limits and requirements. Please refer to details included in the response to Comment 4 above (Page 28) from the Citizen Group (Clean Water for North Carolina (CWFNC) on ensuring compliance with the permit limits.

Comment 5:

Outreach Efforts

“Section 10 of the environmental justice report, Conclusions, identifies a variety of outreach efforts that are recommended, but these outreach efforts do not contain much information. They mention reaching out to “known leaders” and providing information to officials in the Lumbee Tribe and the Town of Tar Heel without specifying which leaders they will contact, when they will be contacted, or what feedback they will be accepting. Additionally, we want to emphasize that when the organizations in the list of sensitive receptors are consulted, every effort should be made to adhere to their requests and feedback.”

DAQ Response:

The names of individuals and organizations contacted through DEQ’s outreach are not included in this report to protect their privacy. Each recommended outreach task listed out in Section 10 of the Draft EJ Report was conducted and will be described further in the Final EJ Report. All comments received by DEQ are considered in the decision making for permit actions.

Comment 6:

Future Improvements

“The permit will expire eight years after its issue date. If more stringent air quality controls are implemented before then, will a new permit be required? Since Optima TH has already violated both the permit program in 15A NCAC 02Q.0300 and the Title V program in 02Q.0500, how can the public be assured that Optima TH will be held accountable for its transgressions?”

DAQ Response:

Please refer to the response to Comment 4 above (Page 28) from the Citizen Group (Clean Water for North Carolina (CWFNC) on ensuring compliance with the permit terms and the Permittee obligations. If the installed equipment is to be modified or a new equipment (say another flare) is to be installed before the expiration date of the air permit, the agency will evaluate it at that time on resulting air impacts and compliance with the applicable regulations. In addition, the facility will be required to submit a TV 1st time application within 90 days of issuance of this permit. That permitting action will require both a public comment period and EPA review prior to its issuance.

Applicant (DRAFT PERMIT)

The applicant has emailed on April 3, 2021 the following comments on the draft air permit and EJ report.

Comment 1:

“Page 1, the legal entity name of permittee is Optima TH, LLC.”

DAQ Response:

Disagreed. In general, air permit is issued under the name of the specific facility and the application form A of the submitted application clearly indicates the name of the facility as “Optima TH.” In summary, the 1st paragraph of the 1st page of the cover letter includes the correct name for the permittee; thus no change can be made.

Comment 2:

“Page 1, Control System Description: “One biogas/tail gas...gas-fired non-assisted candlestick...”

DAQ Response:

The DAQ will clarify the source descriptor to describe the installed flare as a non-assisted candlestick flare.

Comment 3:

“Page 2, Specific Condition 1: As previously stated, we strongly believe the application of 15A NCAC 02D .0516 in the manner described in the draft permit to be in error with the language, inconsistent with the history of this regulation and the modeling performed by DAQ. First, the language of the regulation does not support application to Optima’s operation. The sulfur dioxide (SO₂) emission limit in 15A NCAC 02D .0516(a) is based on SO₂ emissions from any “source of combustion” that is discharged from any “vent, stack, or chimney.” As such, this rule does not seem to apply to emissions from a flare – only a vent, stack or chimney. “Stack” is defined to not include flare in the ancillary regulation 15A NCAC 02D.0533. Flares also do not fall within the ordinary meaning of a “vent” or “chimney.” Optima’s operation involves SO₂ emissions from a gas upgrading system (GUS), that does not have combustion, and that is discharged through a flare which does not seem to fall under the .0516 regulation. The DAQ’s Air Permit Review agrees that the definition of stack in 02D .0533 “explicitly” excludes flare. While we understand DAQ’s historical use of .0516 to flares, its application to Optima’s operation is inconsistent with the explicit language of the regulation.”

“Further, the history of the regulation and the modeling of DAQ further support that .0516 does not apply to Optima’s operation. Rule 15A NCAC 02D .0516 was first codified by North Carolina February 1, 1976 as a regulatory mechanism for plant-level restrictions to protect the SO₂ National Ambient Air Quality Standards (NAAQS). At that time, air dispersion modeling used as a tool to demonstrate protection of the NAAQS was in its infancy. For Optima’s application, the DAQ completed air dispersion modeling of SO₂ with a potential emission rate of 39.1 lb/hr. The Air Permit Review document presents the results of this modeling indicating that the controlling 1-Hr averaging period results are 22.2% of the NAAQS (no background included). Assuming a conservative background concentration of 16 µg/m³ for Tarheel, NC, the final modeled results would be 30.4% (59.5/196 µg/m³) of the 1-Hr SO₂ NAAQS. In summary, without the applicability of 15A NCAC 02D .0516 codified in 1976, the DAQ has demonstrated Optima TH will not cause a violation of an SO₂ NAAQS codified in 2010. Permit conditions to demonstrate compliance with the modeled SO₂ emission rate can be reduced to monitoring the flame presence.”

DAQ Response:

The DAQ had responded to this comment on applicability of emission standard in 02D .0516 to the facility flare at the time of the review of the pre-public notice version of the draft permit by the applicant. See the response to Comment 1 (Page 21) above.

Regarding the additional comment on DAQ’s own modeling showing compliance with the 1-hour SO₂ NAAQS (196 µg/m³), the Permittee states that without and with the inclusion of the background SO₂ concentration for the Tar Heel facility, the predicted impacts are at 22.2% (43.59 µg/m³) and 30.4% (59.5 µg/m³) of the 1-hour SO₂ NAAQS, respectively, after accounting the background concentration of 16 µg/m³. Thus, the applicant argues that without the applicability of 02D .0516 (emission standard of 2.3 lb/million Btu), the facility is not expected to violate the stringent 1-hour SO₂ NAAQS and therefore, the agency should not apply the requirement in 02D .0516 to the facility flare.

It should be noted that the applicant has used a conservative SO₂ background concentration value of 16 µg/m³ for Bladen County to conclude that the predicted impact of the facility operations would be approximately 30% of the 1-hour SO₂ NAAQS. It is DAQ’s understanding that there is no SO₂ ambient monitor in Bladen County. The DAQ is unable to verify the basis for this conservative value. More appropriate background value for SO₂ is 2 ppb (equals to 5.24 µg/m³) from the closest monitor in Cumberland County or the next closest monitor in Wake County. In brief, the applicant-predicted impact after accounting for the background concentration is conservative.

Regardless of the above conclusion, the DAQ disagrees with the applicant’s contention that because the facility demonstrated compliance with the 1-hour SO₂ NAAQS, there is no basis or need for the DAQ to subject the facility flare to 2.3 lb/million Btu emission standard in 02D .0516. Specifically, the DAQ is bound by the regulations as promulgated and statues (both CAA and NCGS) as enacted, and its past applications to flares in general. The DAQ is required to enforce all air quality requirements consistently across the state as per its approved State-Implementation Plan (SIP) including the requirements in 02D .0516.

Moreover, it should be emphasized that, in general, the SIP for any jurisdiction in US is a vehicle to protect the NAAQS and the states / local agencies are required to carry out this CAA mandate by issuing air permits with all applicable requirements (e.g., emission standard in 02D .0516) under the jurisdictional-SIP included so that all NAAQSs are protected. That is the fundamental scheme designed by the US Congress in CAA. The DAQ cannot deviate from this CAA mandate or the design.

Comment 4:

“Page 2, Specific Condition 3.a: The Optima TH flare is a non-assisted candlestick flare. Please remove any reference or specific requirements associated with air- and steam-assisted flares.”

DAQ Response:

Agreed. The DAQ will remove references or requirements associated with air- and steam-assisted flares in Condition 3.a. of the permit as the installed flare is a non-assisted flare.

Comment 5:

“Page 2, Specific Condition 3.a: The permittee plans to demonstrate compliance with this condition via a letter from the Engineer of Record for the project demonstrating conformance with these requirements by flowrate/area calculation. As no other means of demonstrating compliance for these requirements is provided by the Division, if any other means is desired, such means should be described in the permit.”

DAQ Response:

The DAQ had responded to this same comment from the applicant at the time of the review of the pre-public notice version of the draft permit. See response to Comment 2 (Page 21) above. The applicant can submit the required report certified by the professional engineer meeting the requirements in Condition A.3.a.

Comment 6:

“Page 2, Specific Condition 3.a.iii.(A): The tail gas has a heating value of 204 Btu/scf, as stated in the permit application, based on 87% methane recovery. This is a conservative estimate (as is typical of our estimates in the calculations) as we aim to achieve $\geq 90\%$ recovery, and may observe higher methane content (and therefore heating value, as expressed in Btu/SCF) in the biogas, at times. For normal operation we will blend tail gas, biogas, and or flare pilot fuel for oxidation of the tail gas.”

DAQ Response:

The DAQ had responded to this same comment from the applicant at the time of the review of the pre-public notice version of the draft permit. See response to Comment 3 (Page 22) above.

Comment 7:

“Page 4, Specific Condition Monitoring/Recordkeeping b., Equation 1 and Equation 3: The destruction efficiency is prescribed in the permit to be used as “98 percent”. The permittee submitted to the Division a copy of Toxic Release Inventory (TRI) Reporting Guidance for Poultry Processing for Hydrogen Sulfide (H₂S), Revision 1 published March 15, 2017, in which is stated that a 99% destruction efficiency for hydrogen sulfide in the flare (equal to that for methane per USEPA GHG Reporting Rule) is reasonable. We respectfully request the variable “ η ” be revised to include “99 percent (DAQ-approved).”

DAQ Response:

The DAQ had responded to this same comment from the applicant at the time of the review of the pre-public notice version of the draft permit. See response to Comment 4 (Page 22) above.

Comment 8:

“Page 9, Specific Condition 12.a: The DAQ demonstrated that an emission rate of 9.96 lb/day of H₂S (89% DRE) resulted in a modeled concentration less than 1% of the 15 NACA 2Q .1104 Acceptable Ambient Level (AAL). From this, a linear calculation to an allowable, maximized H₂S emission rate that results in a modeled concentration of 90% of the AAL would be greater than 8,500 lb/day. In essence, Optima TH’s emissions of H₂S are clearly no threat to the H₂S AAL. Optima TH requests that the monitoring be reduced to only recording the H₂S concentration in the gas equivalent to 9.96 lb/day H₂S.”

DAQ Response:

First, there is a typographical error in describing “89% DRE”. The DAQ believes that the applicant meant to state 98% DRE. Then, the DAQ is unable to verify how the applicant derived the emission rate as high as 8,550 lbs/day corresponding to 90% of H₂S AAL. The DAQ’s emission calculation indicates that the allowable emission rate of 4,121 lbs/day at 90% of H₂S AAL, considering the predicted impact of 0.261 ug/m³ for an emission rate of 9.96 lbs/day, the AAL of 0.12 mg/m³, and the assumption that the concentration will linearly vary with the emission rate.

Regardless of the above, the DAQ disapproves the applicant’s request in reducing the monitoring requirements to only recording of the H₂S concentration equivalent to 9.96 lb/day limit without the corresponding emissions calculations for actual emissions of H₂S. In order for the H₂S limit to be enforceable it needs to be technically accurate with the averaging period included, the limit verified, and emissions monitored to ensure compliance. The DAQ believes that for the daily averaging period for H₂S AAL, the calculations of this pollutant on a daily basis (when the facility is in operation) are required to readily compare the actual emission rates for the days the flare is operating with the emission standard; thus providing sufficient assurance of compliance with the H₂S limit pursuant to 02D .1100.

Comment 9:

“Page 9, Specific Condition a: The destruction efficiency is prescribed in the permit to be used as “98 percent”. As noted in the Toxic Release Inventory (TRI) Reporting Guidance for Poultry Processing for Hydrogen Sulfide (H₂S), Revision 1 published March 15, 2017, 99% destruction efficiency for hydrogen sulfide in the flare (equal to that for methane per USEPA GHG Reporting Rule) is reasonable. We respectfully request the variable “η” be revised to include “99 percent (DAQ-approved).”

DAQ Response:

The DAQ had responded to this same comment from the applicant at the time of the review of the pre-public notice version of the draft permit. See response to Comment 4 (Page 22) above.

Comment 10:

“With regard to the DAQ’s Air Permit Application Review and comments on Optima TH’s compliance status, [in Section 4] Optima TH incorporates by reference the July 10, 2020 response from Cavanaugh on behalf of Optima TH, LLC to DAQ regarding the June 18, 2020 Notice of Violation/Notice of Enforcement.”

DAQ Response:

Agreed. Optima TH LLC has responded to DAQ’s NOV/NOE through the July 10, 2020 letter from its consultant (Cavanaugh & Associates, P.A.).

Applicant (DRAFT EJ REPORT)

With regards to the February 25, 2021 Draft Environmental Justice Report prepared by the DEQ, the applicant offers the following comments:

Comment 1:

“On Page 5, under the heading “Proposed Project”, we respectfully request the following comments be noted, and the draft Environmental Justice Report updated to accurately reflect Optima TH’s operation. The additions are shown in bold:”

“Optima TH, LLC facility (Facility ID 0900096) **is a waste to energy operation that converts biogas to renewable energy. The Facility** is located on the property of Smithfield Fresh Meats Corp – Tar Heel (Facility ID 0900055), Tar Heel, Bladen County, NC. **The Smithfield Fresh Meats operation has an existing air permit for controlling emissions associated with biogas from its wastewater treatment plant. Optima’s equipment simply removes a super majority of the methane from these same biogas emissions to produce pipeline renewable gas for injection into the gas pipeline. Optima’s facility is not adding new emissions, but is reducing existing, permitted emissions while recovering renewable energy. Optima’s facility reduces emissions by capturing the majority of methane for injection into the pipeline. Optima’s equipment** was originally evaluated and installed at the Smithfield Fresh Meats location. Optima TH installed a flare **for its Guild** Pressure Swing Adsorption equipment and is now required to obtain a permit for the equipment. The **Optima** facility purchases **the** biogas produced by Smithfield’s wastewater treatment plant (WWTP), including existing anaerobic digesters and associated biogas collection system. It processes **the** biogas, removes the impurities, and separates and sells methane as a renewable natural gas to Duke Energy by transporting it via the Piedmont Natural Gas Company’s pipeline.”

“The recovered methane (RNG or “product gas”) must meet the requisite quality specifications prior to injection into Piedmont Natural Gas’ pipeline for off-site consumption.¹ The nonmethane constituents of the biogas, referred to as “tail gas,” are oxidized (**burned or destroyed**) via a control device, an installed candlestick flare. The candlestick flare is also used to **oxidize** unrefined biogas during times when the upgrading system’s operation is temporarily down for maintenance and/or repairs or for unexpected events. Additionally, the candlestick flare is used to **oxidize** the “product gas,” during facility startup and when the product gas does not meet pipeline specifications.”

DAQ Response:

The suggested edits will not be included in the final EJ report as it was not included in the application.

Comment 2:

“On Page 7, we respectfully request the following comments be noted, and the draft Environmental Justice Report corrected as shown:”

“Product Gas - Gas **harvested/recovered** from [note: the gas is pulled from existing gas and is not newly “generated”] by the GUS that is approximately 98-99.9% methane by volume and meets all pipeline specifications, except delivery temperature and pressure requirements of the receiving utility.”

“Tail Gas - The portion of the biogas separated from the product gas ~~and generated by the GUS as part of the biogas upgrading process,~~ primarily composed of carbon dioxide.”

“Renewable Natural Gas (RNG) - Gas that meets all pipeline specifications established by Piedmont Natural Gas, including minimum delivery pressure and temperature requirements **and determined by the North Carolina Utilities Commission to be functionally equivalent to natural gas, but also recognized as having a lesser carbon emission impact.**”

DAQ Response:

The suggested edits will not be included in the final EJ report as it was not included in the application.

Comment 3:

“On Page 25, under the heading “Local Sensitive Receptors”, we respectfully request the following comments be noted, and the draft Environmental Justice Report updated for transparency as shown in bold:”

“The U.S. Environmental Protection Agency suggests that sensitive receptors include, but are not limited to, hospitals, schools, daycare facilities, elderly housing, and convalescent facilities. These are areas where the occupants are more susceptible to the adverse effects of exposure to toxic chemicals, pesticides, and other pollutants. Extra care must be taken when dealing with contaminants and pollutants in close proximity to areas recognized as sensitive receptors. For instance, children and the elderly may have a higher risk of developing asthma from elevated levels of certain air pollutants than a healthy individual aged between 18 and 64. **It should be noted that the emissions from the Optima TH facility are identical in form but smaller in quantity to the emissions stemming from the Smithfield Fresh Foods facility, which has been permitted for over 20 years.**”

DAQ Response:

The suggested edits will not be included in the final EJ report as it was not included in the application.

Comment 4:

“On Page 28, under the heading “Conclusion”, we respectfully request the following comments be noted, and the draft Environmental Justice Report updated for transparency as shown in bold:”

“Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (US EPA). This report examined the demographic and environmental conditions in North Carolina, Bladen County, census tracts 9502 and 9503, and the one-mile radius around the Optima Tar Heel facility. Potential emissions rates outlined in the permit application, **which are the same as have been permitted from the existing facility for over 20 years**, and county level health data are included, as well as data from the NCDEQ Community Mapping System. **The Optima TH project only recovers methane from existing emissions that are permitted from the facility, and alters the emission point through relocation of the candlestick flare used to oxidize the remaining biogas constituents.**”

DAQ Response:

The suggested edits will not be included in the final EJ report as it was not included in the application.

- Public-Noticed Draft Permit Documents Comments Received After the Close of Public Comment Period

The DAQ received the following comments on the draft permit documents on April 16, 2021 from a private citizen (anelsongf@gmail.com).

Comment:

“There is no need for any emissions at all from the flare. There's no need for the flare. Hydrogen sulfide is a chemical that can be captured and used. Carbon dioxide is a chemical that can be captured and used too. Look up "uses for..." each of these chemicals. They don't need to be released at all. They can be a secondary revenue stream for the company.”

“If they insist that this is impossible for them, then they must install scrubbers. An operation that large must install the best scrubbers they can. That would capture the post-flared chemicals.”

“Even sulfur dioxide is useful, if they want to bother to try and sell it to someone who will purify the stuff and sell it back to chemical companies.”

“Like I said, they're missing out on a revenue stream by emitting it instead of recapturing it and selling it.”

“The modern "biorefinery concept" is based on no emissions, everything recycled back into the system as much as possible. They're not actually participating in that if they need such a permit. It means they under-designed it and need to complete the design.”

DAQ Response:

The DAQ will not respond to the above public comments because the comments were received after the close of the comment period.

- This permit engineer recommends issuing the final permit after the completion of public comment (30-day) period.

Appendix 1
DAQ Memorandum on Modeling

DIVISION OF AIR QUALITY
November 18, 2020

MEMORANDUM

TO: Rahul Thaker, Engineer, RCO
Greg Reeves, Permit Coordinator, FRO

THRU: Tom Anderson, Supervisor, Air Quality Analysis Branch (AQAB)

FROM: Mark Yoder, Meteorologist, AQAB

SUBJECT: Toxics Dispersion Modeling Request
Optima TH, LLC
Tar Heel, Bladen County, NC, Facility ID 0900096

I have completed hydrogen sulfide (H₂S) and sulfur dioxide (SO₂) modeling for the Optima TH, LLC (Optima TH) in Tar Heel, Bladen County, North Carolina. Optima TH receives biogas produced by the wastewater treatment plant, including the existing anaerobic digesters and associated biogas collection system, serving the Smithfield Fresh Meats Corp. - Tar Heel facility. The Optima TH plant purchases and filters the biogas, selecting for methane, to produce pipeline-quality renewable natural gas (RNG). The nonmethane constituents of the biogas, referred to as “tail gas,” are oxidized using one candlestick flare. The candlestick flare is also used to combust unrefined biogas during times when the upgrading system’s operation is temporarily down for maintenance and/or repairs or unexpected events. Additionally, the candlestick flare is used to combust the renewable natural gas, referred to as “product gas,” during facility startup and when the product gas does not meet pipeline specifications. The modeling adequately demonstrates compliance on a facility-wide basis for H₂S. Modeling results for SO₂ are detailed below.

I evaluated the facility’s H₂S and SO₂ emissions using AERMOD (Version 19191) with five years (2014-2018) of surface weather data from the Lumberton Regional Airport (LBT) in Lumberton, NC and upper air meteorological data from the Piedmont - Triad International Airport in Greensboro, NC. The area, including and surrounding the site, is classified rural, based on the land use type scheme established by Auer 1978. The candlestick flare was modeled as a point source. Exit velocity and exit temperature default values from SCREEN3/AERSCREEN of 20 m/s and 1,273 K, respectively, were used for the candlestick flare. The stack diameter (1) and effective stack height (2) were calculated using the following equations:

$$D = 9.88 \times 10^{-4} \times \sqrt{HR \times (1 - HL)} \quad (1)$$

$$h_{eff} = H_s + 4.56 \times 10^{-3} \times HR^{0.478} \quad (2)$$

Where D is effective stack diameter, HR is the heat release rate (50 MMBTU/hr), HL is the heat loss fraction (default value of 0.55), H_{eff} is effective stack height and H_s is the stack height (26 feet). H₂S emissions corresponding to 98% and 99% destruction efficiencies were modeled. An SO₂ emissions rate corresponding to a 100% destruction efficiency was also modeled. Direction specific building dimensions, determined using the BPIP PRIME program, were used as input to the model for building wake effects. Full terrain elevations were included, as were normal regulatory defaults. Receptors were placed in ambient air beginning at the property boundary and were sufficient to establish maximum impacts.

The maximum predicted impact for H₂S is provided in the following table:

Maximum H₂S Impacts
Optima TH – Tar Heel, NC

Toxic	Averaging Period	% AAL
Hydrogen Sulfide	24-hour	<1%

The maximum predicted impact for SO₂ is provided in the following table:

Maximum SO₂ Impacts
Optima TH – Tar Heel, NC

Pollutant	Averaging Period	Maximum Impact (µg/m ³)	NAAQS (µg/m ³)
Sulfur Dioxide	1-hour	43.50	196
	3-hour	47.78	1,300
	24-hour	14.27	365
	Annual	1.89	80

Modeled emissions rates and stack parameters are included in the attached tables. The modeling results demonstrate compliance assuming the source parameter and pollutant emission rates used in the analyses are correct.

cc: Michael Pjetraj
Heather Carter
Tom Anderson
Gregory Reeves
Jeffrey Cole
Mark Yoder

Optima TH - Modeled Emissions Rates

Source ID	H ₂ S (98% DE)	H ₂ S (99% DE)	SO ₂ (100% DE)
	(lb/hr)	(lb/hr)	(lb/hr)
FLARE	0.415	0.21	39.1

Optima TH - Source Parameters

Source ID	Stack Release Type	Easting (X) (m)	Northing (Y) (m)	Base Elevation (ft)	Stack Height (ft)	Temperature (°F)	Exit Velocity (fps)	Stack Diameter (ft)
FLARE	DEFAULT	700990.01	3846537.39	125	46.09	1831.73	65.62	4.07