NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: TBD

Region: Raleigh Regional Office
County: Person
NC Facility ID: 7300086
Inspector's Name: N/A
Date of Last Inspection: N/A
Compliance Code: N/A

Facility Data

Applicant (Facility's Name): Moriah Energy Center

Facility Address:
Moriah Energy Center
6633 Helena Moriah Road
Rougemont, NC 27572

SIC: 4922 / Natural Gas Transmission
NAICS: 48621 / Pipeline Transportation of Natural Gas

Facility Classification: Before: Permit/Reg. Pending **After:** Synthetic Minor
Fee Classification: Before: N/A **After:** Synthetic Minor

Permit Applicability (this application only)

SIP: 2D .0202, 2D .0503, 2D .0516, 2D .0521, 2D .0535, 2D .0540, 2D .1100, 2D .1806, 2Q .0304, 2Q .0315, 2Q .0317 (Avoidance) and 2Q .0711.
NSPS: 2D .0524 (40 CFR 60, Subpart Dc, Subpart IIII, Subpart JJJJ)
NESHAP: 2D .1111 (40 CFR 63, Subpart ZZZZ),
PSD: minor
PSD Avoidance: Yes
NC Toxics: Yes
112(r): General Duty
Other: None

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Aaron Lyons Project Lead (804) 219-9200 600 East Canal Street Richmond, VA 23219	Don Harris VP & General Manager (704) 810-6622 800 Gastonia Rd Gastonia, NC 28056	Thomas Andrake Project Lead (804) 839-2760 120 Tredegar Street Richmond, VA 23219

Application Data

Application Number: 7300086.23A
Date Received: 08/31/2023
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

Review Engineer: Sindy Huang

Review Engineer's Signature: **Date:** Month XX, 2024

Comments / Recommendations:
Issue 10805/R00
Permit Issue Date: TBD
Permit Expiration Date: TBD

1. **Purpose of Application:**

The Public Service Company of North Carolina, Inc., a South Carolina Business dba Dominion Energy North Carolina submitted a permit application for the construction and operation of a liquid natural gas (LNG) storage facility to enhance service reliability. The storage facility, Moriah Energy Center (MEC), will be located in Rougemont, Person County, North Carolina. MEC will liquify natural gas during periods of excess capacity and convert it back to natural gas during high demand periods.

Phase I of the project will break ground Q2 2024 and is anticipated to be operational by Q3/Q4 2026. Phase I includes a storage tank with a capacity of 2,000 MMSCF and will be able to liquify 15 MMSCF per day and vaporize 200 MMSCF per day. Phase II of the project will double MEC's capacity.

MEC submitted a permit application to install six natural gas-fired glycol heaters (ID Nos. **ES1**, **ES2**, **ES3**, **ES10**, **ES11**, and **ES12**), two fuel gas-fired regeneration gas heaters (ID Nos. **ES4** and **ES13**), two hydrocarbon separators (ID Nos. **ES5** and **ES14**) controlled by two flares (ID Nos. **CD5** and **CD14**, respectively), six natural gas -fired emergency generators (ID Nos. **ES6**, **ES7**, **ES8**, **ES15**, **ES16**, and **ES17**), one diesel-fired firewater pump (ID No. **ES9**), two pigging operations (ID Nos. **ES18** and **ES19**), and one diesel storage tank (ID No. **IES1**).

2. Application Chronology:

August 31, 2023	RRO received a Greenfield air permit application for MEC. This application package included the required forms, signature of the responsible official, and a signed P.E. seal (Michael Plummer, #025495). **This action started the clock.**
September 8, 2023	Facility submitted $400 ePay.
September 8, 2023	An acknowledgement letter was sent to the facility noting that the application received was complete and had been accepted for processing.
September 13, 2023	RRO received a zoning consistency determination from Mr. Chris Bowley, Person County Planning and Zoning Director, stating that there were no applicable zoning ordinances for MEC at that time. However, the county was processing a new Unified Development Ordinance to repeal and replace the Planning Ordinance and upon adoption of the Unified Development Ordinance, the Liquefied Natural Gas Storage Facility land use would be permitted within the General Industrial (GI) zoning district. The facility had already applied for a zoning amendment to be processed upon Unified Development Ordinance adoption. In the meantime, Mr. Bowley said to consider the permit application without regard to local zoning and subdivision ordinances.
October 24, 2023	I received an internal memorandum from Nancy Jones, AQAB, for the review of the dispersion modeling analysis received by AQAB on September 5, 2023. The modeling adequately demonstrated compliance, on a source-by-source basis, for all toxics modeled.
November 1, 2023	I emailed Mr. Thomas Andrake, Project Lead, about the facility listing the flares (ID No. **ES5** and **ES14**) as both an emission source and a control device. I asked if we could call the emission source something else and keep the control device as a flare. **This action stopped the clock.**
November 6, 2023	Mr. Andrake replied that it was alright to change the emission source section to "hydrocarbon separator" and keep control device as a flare. **This action started the clock.**
November 16, 2023	I emailed Mr. Andrake about flow rate of the heavies from the facility to calculate the potential VOC and hexane emissions from the hydrocarbon separator. **This action stopped the clock.**
December 4, 2023	Person County Board of Commissioners held a meeting to, among other things, to discuss the approval of the MEC's Rezoning/Map Amendment Application RZ-02-23. This would rezone the property from RC (resource conservation) and R (residential) to GI (general industrial) to allow for heavy industrial permitted use. Prior to approving, the commissioners held a public hearing to receive input about rezoning to allow MEC to be constructed in Person County. The motion passed unanimously.
December 6, 2023	Mr. Andrake, Ms. Marleen Gillespie, Environmental Consultant, Mr. Kirk Dunbar, Environmental Consultant, Dena Pittman, Permits Coordinator, and I had a Teams Meeting to discuss the flow rate through the hydrocarbon separator. The same day, Taylor Hartsfield, Deputy Director, Dawn Reddix, Regional Supervisor, Dena Pittman, and I had a Teams meeting to discuss the increasing

	possibility of a public hearing due to environmental concerns from the surrounding community. Most notably, the public hearing at the Person County Commissioners Meeting on December 4, 2023, to rezone the property had garnered significant public outcry.
December 7, 2023	Taylor Hartsfield, Deputy Director, communicated to me that DAQ management had decided to move forward with a public hearing for Moriah Energy Center's Permit. I notified Mr. Andrake of the decision the same day.
December 11, 2023	Mr. Andrake, Ms. Marleen Gillespie, Environmental Consultant, Dena Pittman, RRO Permits Coordinator, and I had a Teams Meeting to discuss the timeframe of the upcoming public hearing and its effect of the permit.
January 3, 2024	Mr. Andrake, Sent me a copy of the updated zoning approval letter from Mr. Chris Bowley, Person County Planning and Zoning Director, following the Person County Commissioners Meeting.
January 9, 2024	Ms. Gillespie sent me a copy of the updated permit application to include the operating scenario where in addition to sending heavies to the flare, the heavies can also be routed back into the pipeline. **This action started the clock.**
January 25, 2024	I asked Mr. Andrake to ask about the source of the CO emission factor for the flares. Mr. Andrake replied that was from the 2018 version of AP-42, 13.5, Industrial Flares and not the 1991 version.
February 6, 2024	I asked Mr. Andrake whether NSPS, Subpart Dc, applies to the glycol heaters if they are not specifically "steam generating units". Along the same vein, if the glycol heaters were classified as boilers, would the facility be considered a 100-tpy PSD source category under "fossil fuel boilers (or combinations) totaling over 250 million Btu per hour".
February 7, 2024	Dena Pittman, Mr. Andrake, Ms. Gillespie, and I had a Teams Meeting to discuss the categorization of the glycol heaters. We agreed that the glycol heaters are close enough to boilers, so NSPS, Subpart Dc, still applies. The facility would also be in the 100-tpy PSD source category to be on the safe side and to be consistent with other LNG storage facilities in North Carolina such as Pine Needle LNG Company (Facility ID No. 4101018).
February 19, 2024	I emailed Mr. Andrake and Ms. Gillespie a copy of the permit for the facility for review.
March 5, 2024	Mr. Andrake, Ms. Gillespie, Dawn Reddix, and I had a meeting to discuss the definition of fuel gas and updating the potential size of the regeneration gas heaters from 15 mmBtu/hr to 18 mmBtu/hr. The EPC vendor has not yet chosen the exact equipment to be installed. Following this meeting, I also sent Mr. Andrake and Ms. Gillespie a copy of the permit review for review.
March 28, 2024	Mr. Andrake emailed me back the facility's comments for the permit and permit review.
April 12, 2024	Ms. Gillespie emailed me an updated copy of the facility's permit application**.**
May 10, 2024	Taylor Hartsfield, Dawn Reddix, Dena Pittman, and I met with Mr. Andrake, Ms. Gillespie, Mr. Aaron Lyons, Mr. Todd Alonzo, and Mr. John White,

	representatives of Dominion Energy, to discuss the response to the questions submitted by the community.
May 9, 2024	Taylor Hartsfield, Dawn Reddix, Dena Pittman, Shawn Taylor (Public Information Officer), and I held a meeting to discuss the status of the permit and public hearing.
May 10, 2024	Taylor Hartsfield, Dawn Reddix, Dena Pittman, Shawn Taylor, Mr. Andrake, Ms. Gillespie, and I met to update all parties on the status of the permit and public hearing. We also discussed how to respond to the list of questions submitted by the Person County Community Action Network group to both the DAQ and Dominion Energy.
June 3, 2024	I received an internal memorandum from Nancy Jones, AQAB, for the review of the updated dispersion modeling analysis received by AQAB on April 12, 2024. The modeling adequately demonstrated compliance, on a source-by-source basis, for all toxics modeled.
June 14, 2024	I emailed Mr. Andrake and Ms. Gillespie a copy of the permit and permit review for the facility for review.
June 17, 2024	Ms. Gillespie emailed me back the facility's comments for the permit and permit review.
June 18, 2024	Dena Pittman, Dawn Reddix, Ms. Gillespie, and I had a meeting to review the changes requested by the facility.

3. New Equipment/Change in Emission and Regulatory Review:

Permitted Equipment:

MEC submitted a permit application to install six natural gas -fired glycol heaters (ID Nos. **ES1**, **ES2**, **ES3**, **ES10**, **ES11**, and **ES12**), two fuel gas-fired regeneration gas heaters (ID Nos. **ES4** and **ES13**), two hydrocarbon separators (ID Nos. **ES5** and **ES14**) controlled by two flares (ID Nos. **CD5** and **CD14**, respectively), six natural gas -fired emergency generators (ID Nos. **ES6**, **ES7**, **ES8**, **ES15**, **ES16**, and **ES17**), one diesel-fired firewater pump (ID No. **ES9**), and two pigging operations (ID Nos. **ES18** and **ES19**).

The pigging operations (ID Nos. **ES18** and **ES19**) were added to the permitted equipment list instead of the insignificant list as initially requested by the facility. The pigging operations were moved because they do not qualify as insignificant since they are a source of toxics and are not exempt from modeling, are not subject to a NESHAP, and were permitted after July 10, 2010.

The facility added fugitive emissions from truck loading and unloading and from component leaks (ID No. **ES-20**) to their updated modeling in April. As with the pigging operations, fugitive emissions have been added to the permitted equipment list despite low expected emissions because they were modeled. MEC is being designed to include a tanker truck loading and unloading operation allowing for the capability to load LNG trucks for offsite delivery or to receive LNG for storage. The only emissions from this would be from the loading/unloading decoupling. However, MEC is not intended to be used as a fuel terminal for the buying and selling of natural gas so significant emissions are expected from this operation.

The fuel gas combusted by the two fuel gas-fired regeneration gas heaters (ID Nos. **ES4** and **ES13**) and the pilot for the two flares (ID Nos. **CD5** and **CD14**) refers to any combustible gas that is part of the facility's fuel gas distribution system consisting of natural gas from the pipeline and gas removed from the LNG process. The flares control, via combustion, the heavy hydrocarbons that are separated from the natural gas stream in the hydrocarbon separator prior to liquefying and storage.

Emission Source ID	Emission Source Description	Control System ID	Control System Description
Phase I			
ES1 (**NSPS**), ES2 (**NSPS**), ES3 (**NSPS**)	Three (3) natural gas-fired glycol heaters (99 million Btu per hour maximum heat input, each) (Glycol Heater Nos. 1, 2, and 3)	N/A	N/A
ES4 (**NSPS**)	Fuel gas-fired regeneration gas heater (18 million Btu per hour maximum heat input) (Regeneration Heater No. 1)	N/A	N/A
ES5	Hydrocarbon Separator No. 1	CD5	Fuel gas-fired flare (75.7 million Btu per hour maximum heat input, 856.1 scfm maximum flow rate) with a fuel gas-fired pilot light (0.09 million Btu per hour maximum heat input) (Flare No. 1)
ES6 (**NSPS, NESHAP**)	Natural gas-fired emergency generator (2,000 kilowatt maximum output capacity) (Generator No. 1)	N/A	N/A
ES7 (**NSPS, NESHAP**)	Natural gas-fired emergency generator (2,000 kilowatt maximum output capacity) (Generator No. 2)	N/A	N/A
ES8 (**NSPS, NESHAP**)	Natural gas-fired emergency generator (2,000 kilowatt maximum output capacity) (Generator No. 3)	N/A	N/A
ES9 (**NSPS, NESHAP**)	Diesel-fired firewater pump (500 horsepower maximum output capacity) (Firewater Pump)	N/A	N/A
Phase II			
ES10 (**NSPS**), ES11 (**NSPS**), ES12 (**NSPS**)	Three (3) natural gas-fired glycol heaters (99 million Btu per hour maximum heat input, each) (Glycol Heater Nos. 4, 5, and 6)	N/A	N/A
ES13 (**NSPS**)	Fuel gas-fired regeneration gas heater (18 million Btu per hour maximum heat input) (Regeneration Heater No. 2)	N/A	N/A
ES14	Hydrocarbon Separator No. 2	CD14	Fuel gas-fired flare (75.7 million Btu per hour maximum heat input, 856.1 scfm maximum flow rate) with a fuel gas-fired pilot light (0.09 million Btu per hour maximum heat input) (Flare No. 2)
ES15 (**NSPS, NESHAP**)	Natural gas-fired emergency generator (2,000 kilowatt maximum output capacity) (Generator No. 4)	N/A	N/A
ES16 (**NSPS, NESHAP**)	Natural gas-fired emergency generator (2,000 kilowatt maximum output capacity) (Generator No. 5)	N/A	N/A

Emission Source ID	Emission Source Description	Control System ID	Control System Description
ES17 (**NSPS, NESHAP**)	Natural gas-fired emergency generator (2,000 kilowatt maximum output capacity) (Generator No. 6)	N/A	N/A
Miscellaneous			
ES18	Natural gas receive and send pipeline pigging operations	N/A	N/A
ES19	Regeneration and boil off gas pipeline pigging operations	N/A	N/A
ES20	Fugitive emissions from truck loading and unloading and component leaks	N/A	N/A

Insignificant / Exempt Activities:
MEC's permit application includes one insignificant diesel storage tank (ID No. **IES3**). The LNG storage tanks (ID No. **IES1** and **IES2**) were later also added to the insignificant equipment list.

Source	Exemption Regulation	Source of TAPs?	Source of Title V Pollutants?
IES1 - Liquid natural gas storage tank (25 million gallons maximum capacity)	2Q .0102 (g)(4)	Yes	Yes
IES2 - Liquid natural gas storage tank (25 million gallons maximum capacity)	2Q .0102 (g)(4)	Yes	Yes
IES3 - Diesel storage tank (550 gallons maximum capacity)	2Q .0102 (g)(4)	Yes	Yes

Regulatory Review:
Title 15A North Carolina Administrative Code (NCAC), Subchapter 2D .0202, 2D .0503, 2D .0516, 2D .0521, 2D .0524 (40 CFR 60, Subpart Dc, Subpart IIII, Subpart JJJJ), 2D .0535, 2D .0540, 2D .1100, 2D .1111 (40 CFR 63, Subpart ZZZZ), 2D .1806, 2Q .0304, 2Q .0315, 2Q .0317 (Avoidance) and 2Q .0711.

2D .0202, PERMIT RENEWAL AND EMISSION INVENTORY REQUIREMENT - At least 90 days prior to the expiration date of this permit, the Permittee shall submit the air pollution emission inventory report to the Regional Supervisor, DAQ. The report shall document air pollutants emitted for the 203X calendar year.
Compliance to be determined by CY203X AEI submittal 90 days prior to the expiration date.

2D .0503, PARTICULATE CONTROL REQUIREMENT - Particulate matter emissions from the fuel-burning indirect heat exchangers shall not exceed the allowable emission rates calculated by the equation below:

$\mathbf{E} = 1.090 * (\mathbf{Q})^{-0.2594}$ **Q** = total heat content of all fuels which are burned
$\mathbf{E} = 1.090 * (\mathbf{630})^{-0.2594}$ = 0.205 pounds of PM per million Btus of heat input

The glycol heaters (ID Nos. **ES1**, **ES2**, **ES3**, **ES10**, **ES11**, and **ES12**) and regeneration heaters (ID Nos. **ES4** and **ES13**) have a combined total heat content of 630 mmBtu/hr, for a limit of 0.205 lbs/mmBtu.
Compliance assumed. The PM emission factor from AP-42 section 1.4.2, natural gas combustion, is 0.0075 pounds per million Btu. This is well below the 0.205 pounds per million Btu limit.

2D .0516, SULFUR DIOXIDE CONTROL REQUIREMENT - Sulfur dioxide emissions from the combustion sources shall not exceed 2.3 pounds per million Btu heat input.
Compliance is anticipated due to the use of natural gas and ULSD.

2D .0521, VISIBLE EMISSIONS CONTROL REQUIREMENT - Visible emissions from the emission sources, shall not be more than 20 percent opacity when averaged over a six-minute period.
Compliance is to be determined during inspection.

2D .0524 (Subpart Dc), "NEW SOURCE PERFORMANCE STANDARDS" – The Permittee shall comply with all applicable provisions, including the notification, testing, reporting, recordkeeping, and monitoring requirements in 40 CFR 60, Subpart Dc, including Subpart A "General Provisions." The Permittee must submit a notification of construction within 30 days after construction is commenced for the affected source and a notification of start-up within 15 days of the start-up of the affected source.
*This condition is applicable to the glycol heaters (ID Nos. **ES1**, **ES2**, **ES3**, **ES10**, **ES11**, and **ES12**) and regeneration heaters (ID Nos. **ES4** and **ES13**). Compliance is to be determined with notification of source construction and start-up.*

2D .0524 (Subpart IIII), "NEW SOURCE PERFORMANCE STANDARDS" – The Permittee shall comply with all applicable provisions, including the notification, testing, reporting, recordkeeping, and monitoring requirements in 40 CFR 60, Subpart IIII, including Subpart A "General Provisions." Emergency engines may not run more than 100 hours per year in non-emergency situations. To track this, the Permittee must install a non-settable hour meter. Additionally, the Permittee must maintain the engine regularly.
*This condition is applicable to the firewater pump (ID No. **ES9**). Compliance is to be determined with regular maintenance and tracking of the engine run times. The facility must purchase a certified unit or perform testing to determine if it meets the emission limits.*

2D .0524 (Subpart JJJJ), "NEW SOURCE PERFORMANCE STANDARDS" – The Permittee shall comply with all applicable provisions, including the notification, testing, reporting, recordkeeping, and monitoring requirements in 40 CFR 60, Subpart JJJJ, including Subpart A "General Provisions." Emergency engines may not run more than 100 hours per year in non-emergency situations. To track this, the Permittee must install a non-settable hour meter. Additionally, the Permittee must maintain the engine regularly.
*This condition is applicable to the fired emergency generators (ID Nos. **ES6**, **ES7**, **ES8**, **ES15**, **ES16**, and **ES17**). Compliance is to be determined with regular maintenance and tracking of the engine run times. The facility must purchase a certified unit or perform testing to determine if it meets the emission limits.*

2D .0535, NOTIFICATION REQUIREMENT - The Permittee of a source of excess emissions that last for more than four hours and that results from a malfunction, a breakdown of process or control equipment or any other abnormal conditions, shall 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.
Compliance is to be determined during inspection.

2D .0540, FUGITIVE DUST CONTROL REQUIREMENT - "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.
Compliance is to be determined during inspection.

2D .1100, TOXIC AIR POLLUTANT EMISSIONS LIMITATION AND REPORTING REQUIREMENT -"Control of Toxic Air Pollutants," and in accordance with the approved application for an air toxic compliance demonstration, the permit limits shall not be exceeded.
Compliance is expected for toxics if the facility operates as detailed in this permit application. The modeling is based on maximum operation capacity so no recordkeeping or reporting requirements are included in the permit.

2D .1111 (Subpart ZZZZ), "NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS" – The Permittee shall comply with all applicable provisions, including the notification, testing, reporting, recordkeeping, and monitoring requirements in 40 CFR 63, Subpart ZZZZ, including Subpart A "General Provisions."
*This condition is applicable to all internal combustion engines (ID Nos. **ES6**, **ES7**, **ES8**, **ES9**, **ES15**, **ES16**, and **ES17**). The Permittee may meet the requirements of NESHAP Subpart ZZZZ by meeting the requirements of NSPS Subpart IIII for compression ignition engines or NSPS Subpart JJJJ for spark ignition engines.*

2D .1806, CONTROL AND PROHIBITION OF 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 to be determined during inspection.

2Q .0304, ZONING SPECIFIC CONDITION - Prior to construction or operation of the facility under this permit, the Permittee shall comply with all lawfully adopted local ordinances that apply to the facility at the time of construction or operation of the facility.
This condition was added to the permit because while the facility is currently zoned properly, there are efforts in the local community to overturn the December 4, 2023 decision by the Person County Board of Commissioners to allow the facility to be built at its current proposed site. If the zoning ordinances change, the facility may no longer be allowed to operate at this location.

2Q .0315, LIMITATION TO AVOID 15A NCAC 2Q .0501 – To avoid applicability of Title V permitting due to the emissions of NOx, VOC, and CO potentially being greater than 100 tons per year, hexane potentially being greater than 10 tons per year, the facility has agreed to take the following limits. The facility initially proposed their combustion limits in Btu (heat content) per year, which I converted to cubic feet (volume) per year to make tracking easier. The facility then reviewed and accepted the updated limits. Further details of how the permitted limits were determined can be found in the emissions review section.

Combustion Source	Requested Limits	Permitted Limits
Glycol Heaters, combined	285,120 mmBtu/yr, HHV	**280 mmscf/yr**
Regeneration Gas Heaters, combined	248,400 mmBtu/yr, HHV	**244 mmscf/yr**
Flares, combined	428,500 mmBtu/yr, HHV	**290 mmscf/yr**
Emergency Generators	Certification to non-emergency engine standards	--

Compliance is to be determined by tracking the amount of natural gas and fuel gas combusted by each source. The facility must maintain records and submit annual reports to show compliance.

2Q .0317, LIMITATION TO AVOID 15A NCAC 2D .0530 "PREVENTION OF SIGNIFICANT DETERIORATION" - to comply with this permit and avoid the applicability of 15A NCAC 2D .0530 "Prevention of Significant Deterioration," as requested by the Permittee, NO_x, CO. and VOC emissions shall be limited to 100 tons per consecutive 12-month period.
Permittee to use Synthetic Minor limits under 2Q .0315 to avoid this PSD applicability by limiting emissions to <100tpy.

2Q .0711, TOXIC AIR POLLUTANT EMISSIONS LIMITATION REQUIREMENT - the Permittee has made a demonstration that facility-wide potential emissions do not exceed the Toxic Permit Emission Rates (TPERs) as listed in 15A NCAC 2Q .0711 for the following toxic air pollutants:
Compliance is expected for the annual pollutants if the facility operates as detailed in this permit application, which is based on maximum operation capacity.

Emissions Review:

Natural Gas Combustion Emissions:
Natural gas has a high heating value (HHV) of 1,020 Btu per scf. The fuel gas has an HHV of 1,477 Btu per scf (based on a similar facility in Utah).The facility requested a limit of 285,120 mmBtu per year for the total of all six glycol heaters and 248,400 Btu per year for the total of both regeneration gas heaters. The glycol heaters are **99 mmBtu/hr** each, and regeneration gas heaters are **18 mmBtu/hr** each. The uncontrolled emissions are based on **8760 hours of operation** per year. The permitted limits were found using the following equations:

285,120 (mmBtu/yr requested limit) / **1,020** (Btu/scf NG HHV) **= 279.53** mmscf/yr **glycol heater** limit, combined
248,400 (mmBtu/yr requested limit) / **1,020** (Btu/scf NG HHV) **= 243.53** mmscf/yr **regen gas heater** limit, combined

The requested limit for the regeneration gas heaters were initially inadvertently converted from Btu/yr to mmscf/yr using the heat content for natural gas instead of fuel gas. However, the facility will still be in compliance with synthetic minor limits using the higher limit for the regeneration gas heaters.

The PM, SO_2, and VOC emission factors were taken from AP-42 1.4.2, natural gas combustion. The NO_X and CO emission factors are guaranteed by the vendor to meet 30 ppm of NO_x and 50 ppm of CO for the glycol heaters and 30 ppm of NO_X and 100 ppm of CO for the regeneration gas heaters at 3% O_2. These concentration limits were then converted to emission factors using 49 CFR 60, Method 19.

Example Calculation for CO Emission Factor for the Glycol Heaters:
50 ppm * 28.01 molecular weight of CO * 2.59E-09 lbmol/mmscf of natural gas * 8,710 scf/mmBtu fuel factor for natural gas * [20.9 / (20.9 – 3 percent duct gas oxygen content)] = **0.0369 lb/mmBtu CO emission factor**

Example Calculation for Uncontrolled CO Emissions for the Glycol Heaters:
0.0369 lb/mmBtu CO * 99 mmBtu/hr * 8,760 hours/yr / 2000 lbs/ton * 6 heaters = **96.00 tpy CO**

Example Calculation for Permit Potential CO Emissions for the Glycol Heaters:
0.0369 lb/mmBtu CO * 280 mmscf/yr limit * 1,020 btu/scf / 2000 lbs/ton = **5.27 tpy CO**

Pollutant	GH Emission Factor	Glycol Heaters, total (6) (99 million Btu/hr, each)		GH Emission Factor	Regen Gas Heaters, total (2) (18 million Btu/hr, each)		Permit Potential Emissions*	Title V Potential Emissions**
		Permit Pot.	Title V Pot.		Permit Pot.	Title V Pot.		
	lb/MMBtu	tpy	tpy	lb/MMBtu	tpy	tpy	tpy	tpy
TSP	0.0075	1.07	19.51	0.00515	0.93	0.93	2.00	20.44
PM-10	0.0075	1.07	19.51	0.00515	0.93	0.93	2.00	20.44
SO_2	0.0006	0.09	1.56	0.00041	0.07	0.07	0.16	1.63
NO_X	0.0364	5.20	94.70	0.03640	6.56	6.56	11.76	101.26
CO	0.0369	5.27	96.00	0.05687	10.25	10.25	15.52	106.25
VOC	0.0054	0.77	14.05	0.00372	0.67	0.67	1.44	14.72

* Permit potential emissions are based on the combustion of 280 million cubic feet of natural gas per year by all the glycol heaters, combined, and the combustion of 244 million cubic feet of natural gas per year by all the regeneration gas heaters, combined.
** Title V potential emissions based on 8760 hours of operation per year (24 hours per day, 365 days per year).

Hydrocarbon Separator and Flare Emissions:
The fuel gas, or heavies, have an HHV of 1,477 Btu per scf (based on a similar facility in Utah). The facility requested a limit of 428,500 mmBtu per year for the total of both hydrocarbon separator units. The flare pilot lights are **0.09 mmBtu/hr** each and the flares are **75.7 mmBtu/hr** each (based on an EPC contractor design value of 3,717 lb/hr of fuel gas and a density of 0.064688 lb/scf). The uncontrolled emissions are based on 8760 hours of operation per year. The permitted limits were found using the following equations:

428,500 (mmBtu/yr requested limit) / **1,477** (Btu/scf heavies HHV) **= 290.12** mmscf/yr flare limit, combined

The flare PM, SO_2, and VOC emission factors were taken from AP-42 Table 1.4-2, natural gas combustion. The hexane combustion emission factor was taken from AP-42 Table 1.4-3, natural gas combustion. The conversion of the emission factors in Tables 1.4-2 and 1.4-3 were originally given in lbs/mmscf and were converted to lbs/MMBtu assuming the burning of natural gas (1,020 btu/scf) instead of heavies (1,477 btu/scf), for a more conservative emission factor. The NO_X emission factor was taken from AP-42, Table 13.5-1, Industrial Flares. The CO emission factor was taken from AP-42 Table 13.5-2, and then adjusted from LHV to HHV, since the factor was developed using natural gas' lower heating value (LLV). For natural gas, HHV = LHV * 1.11.

Example Calculation for Uncontrolled Combustion VOC Emissions for the Flare:
0.0054 lbs/mmBtu * 75.79 mmBtu/hr *8760 hours/yr / 2000 lbs/ton * 2 flares = **3.58 tpy VOC**

Example Calculation for Permit Potential Combustion VOC Emissions for the Flare:
0.0054 lbs/mmBtu * 290 mmscf/yr limit * 1,477 btu/scf / 2000 lbs/ton = **1.16 tpy VOC**

The uncontrolled emission factor for the hydrocarbon separator is based on the worst case from the Transco pipeline, 1,488 pounds per hour of VOC's and 27.5 pounds per hour of hexane in **109,930 scf of heavies from the pipeline per hour**. The incoming natural gas is comprised of mostly of methane but also contains a mixture of other chemicals such as a variety of heavier hydrocarbons, carbon dioxide, and nitrogen. These are collectively known as "heavies". Using those numbers, we get 0.0135 pounds of VOC's and 2.50E-4 pounds of hexane per scf of fuel gas/heavies. Controlled emissions from the hydrocarbon separation are based on a **98% destruction efficiency** by the flare.

Example Calculation for VOC Emission Factor for the Hydrocarbon Separator:
1,488 lbs/hr VOC / 109,930 scf/hr heavies = **0.0135 lbs VOC / scf heavies**

Example Calculation for Uncontrolled VOC Emissions for the Hydrocarbon Separator:
0.0135 lbs/scf * 109,930 scf/hr *8760 hours/yr / 2000 lbs/ton * 2 separators = **10,833.56 tpy VOC**

Example Calculation for Permit Potential VOC Emissions for the Hydrocarbon Separator:
0.0135 lbs/scf * 290,000,000 scf/yr limit / 2000 lbs/ton * (1 – 0.98 flare destruction efficiency) = **39.15 tpy VOC**

Pollutant	Flare Emission Factors	Flare, total (2) (75.7 million Btu/hr with 0.09 million Btu/hr pilot light, each)		HS Emission Factors	Hydrocarbon Separator, total (2)		Permit Potential Emissions*	Title V Potential Emissions**
		Permit Pot.	Title V Pot.		Permit Pot.	Title V Pot.		
	lb/MMBtu	tpy	tpy	lb/scf	tpy	tpy	tpy	tpy
TSP	0.0075	1.61	4.98	--	--	--	1.61	4.98
PM-10	0.0075	1.61	4.98	--	--	--	1.61	4.98
SO_2	0.0006	0.13	0.40	--	--	--	0.13	0.40
NO_X	0.068	14.56	45.15	--	--	--	14.56	45.15
CO	0.279	59.75	185.23	--	--	--	59.75	185.23
VOC	0.0054	1.16	3.59	0.0135	39.15	13,000.32	40.30	13,003.91
Hexane	0.00176	0.38	1.17	2.50E-4	0.725	240.75	1.10	241.92

* Permit potential emissions for the flares are based on the combustion of 290 million cubic feet of heavies per year, combined. Permit potential emissions from the hydrocarbon separators are based sending 290 million cubic feet of heavies to the flare and the use of the flares to control said heavies emissions. The flares have a control efficiency of 98%.

** Title V potential emissions based on 8760 hours of operation per year (24 hours per day, 365 days per year).

Emergency Generators and Fire Pump Emissions:

The facility will have six natural gas-fired emergency generators each with a capacity of 2,000 kilowatts (3,000 hp, **19.1 mmBtu/hr**), each, and one diesel-fired firewater pump with a capacity of 500 horsepower (**3.45 mmBtu/hr**).

The emergency generator emissions for PM and SO_2 were calculated using AP-42 Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. The emergency generator emissions for NO_X, CO, and VOCs are based on NSPS Subpart JJJJ, Table 1, Stationary Non-Emergency Engine Standards, where the limits for units manufactured 2011 and later are 1.0 g/hp-hr of NO_X, 2.0 g/hp-hr of CO, and 0.7 g/hp-hr of VOC. The VOC emission factor was modified to include formaldehyde (formaldehyde emission factor, 0.0528 lb/mmBtu, from AP-42 Table 3.2-2).

Example Calculation for VOC Emission Factor for the Emergency Generators:
0.7 g/hp-hr * 3000 hp / 19.1 mmBtu/hr / 453.59 g/lbs = 0.2424 lb/mmBtu VOC (not including formaldehyde)
0.2424 lbs/mmBtu VOC (w/o formaldehyde) + 0.0528 lb/mmBtu formaldehyde = **0.295 lb/mmBtu VOC** (total)

Example Calculation for VOC Emissions for the Emergency Generators:
0.295 lb/mmBtu * 19.1 mmBtu/hr *500 hours/yr / 2000 lbs/ton * 6 generators = **8.45 tpy VOC**

The chosen EPC (engineering, procurement, and construction) vendor has indicated that the facility will meet the NSPS Subpart JJJJ Stationary Non-Emergency Engine Standards. Emissions are based on **500 hours of operation** per year, each.

The firewater pump's PM, NO_X, CO, and VOC emission factors are based NSPS Subpart IIII, Table 4, Stationary Fire Pump Engine Standards, where the limits for units between 300 and 600 horsepower are 0.15 g/hp-hr of PM, 3.0 g/hp-hr of NO_X, 2.6 g/hp-hr of CO, and 3.0 g/hp-hr of VOC. The SO_2 emission factor, 1.21 lb/hp-hr was taken from DAQ's Gas & Diesel Internal Combustion Engines Emissions Calculator, rev. S, which is based on AP-42, Fifth Edition, Section 3.3. The firewater pump is required by NSPS Subpart IIII to burn ultra-low sulfur diesel with a 0.0015% sulfur content.

Example Calculation for VOC Emission Factor for the Fire Pump:
3.0 g/hp-hr * 500 hp / 3.45 mmBtu/hr / 453.59 g/lbs = **0.959 lb/mmBtu VOC**

Example Calculation for VOC Emissions for the Fire Pump:
0.96 lb/mmBtu * 3.45 mmBtu/hr * 500 hours/yr / 2000 lbs.ton = **0.828 tpy VOC**

Pollutant	**Generator Emissions, total (6)**		**Fire Pump Emissions**		**Title V Potential Emissions***
	lb/mmBtu	tpy	lb/mmBtu	tpy	tpy
TSP	0.010	0.28	0.048	0.04	0.32
PM-10	0.010	0.28	0.048	0.04	0.32
SO_2	0.0006	0.02	0.002	0.00	0.02
NO_X	0.335	9.60	0.96	0.83	10.43
CO	0.69	19.77	0.83	0.72	20.49
VOC	0.295	8.45	0.96	0.83	9.28

* Title V potential emissions based on 500 hours of operation per year. This is based on the EPA memo from September 6, 1995, which said: "The EPA believes that 500 hours is an appropriate default assumption for estimating the number of hours that an emergency generator could be expected to operate under worst-case conditions."

Other Sources:
The emissions for the remaining sources, the diesel storage tank (ID No. **IES3**), the LNG storage tanks (ID No. **IES1** and **IES2**), and truck loading/unloading (ID No. **IES4**) are negligible.

Pigging operation (ID Nos. **ES-18** and **ES-19**) emissions in the toxics modeling are based on emissions during pigging operations. Pigging is used to clean and inspect pipes by forcing the pig or scraper (a barrel shaped device with various attachments such as disks and brushes) through the pipe using pressure. Per the facility's permit application, the facility only anticipates to pig periodically (once every few years). Based on this frequency, the emissions from the pigging operations are considered negligible.

The truck loading and unloading (ID No. **IES4**) is a closed-loop system, and the only losses would be what is in the valves themselves. MEC is not designed for retail delivery and the truck loading/unloading is only intended for backup for Dominion itself.

Emission Totals:

Pollutant	Natural Gas Combustion		Hydrocarbon Separators and Flares		Internal Combust-ion Engines	Permit Potential Emissions	Title V Potential Emissions
	Permit Pot.	Title V Pot.	Permit Pot.	Title V Pot.	Permit Pot. & Title V Pot.	Permit Pot.	Title V Pot.
	tpy	tpy	tpy	tpy	tpy	tpy	tpy
TSP	2.00	20.44	1.61	4.98	0.32	3.93	25.74
PM-10	2.00	20.44	1.61	4.98	0.32	3.93	25.74
SO_2	0.16	1.63	0.13	0.40	0.02	0.31	2.05
NO_X	11.76	101.26	14.56	45.15	10.43	36.75	156.84
CO	15.52	106.25	59.75	185.23	20.49	95.76	311.97
VOC	1.44	14.72	40.22	13,003.91	9.28	51.03	13027.91
Hexane	--	--	1.10	241.92	--	1.1	241.92

4. NSPS, NESHAPS, PSD, and Attainment Status:

- **NSPS Subparts**
  - **Subpart Dc** - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
    - **Applicable** to the glycol heaters (ID Nos. **ES1**, **ES2**, **ES3**, **ES10**, **ES11**, and **ES12**) and regeneration heaters (ID Nos. **ES4** and **ES13**)
  - **Subpart Kb** - Standards of Performance for Volatile Organic Liquid Storage Vessels (including Petroleum Liquids)
    - **NOT applicable** because the combined partial pressure of propane and butane at the storage temperature of approximately -260°F is below 3.5 kPa.
  - **Subpart KKK** - Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants
    - **NOT applicable** because the facility is an onshore natural gas processing plant.

- **Subpart IIII** - Standards of Performance for Stationary Compression Ignition Combustion Engines
  - **Applicable** to the firewater pump (ID No. **ES9**).
- **Subpart JJJJ** - Standards of Performance for Stationary Spark Ignition Combustion Engines
  - **Applicable** to the NG-fired emergency generators (ID Nos. **ES6**, **ES7**, **ES8**, **ES15**, **ES16**, and **ES17**)
- **Subpart OOOOa** - Standards of Performance for Crude Oil and Natural Gas Facilities
  - **NOT applicable** because the facility will be situated downstream of the custody transfer of the natural gas.
- **Subpart OOOOb** - Standards of Performance for Crude Oil and Natural Gas Facilities
  - **NOT applicable** because the facility will be situated downstream of the custody transfer of the natural gas.

- **NESHAP Subparts**
  - **Subpart DDDDD** - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
    - **NOT Applicable** because the facility is an area source of HAPs.
  - **Subpart HHH** - National Emission Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities
    - **NOT Applicable** because the facility is an area source of HAPs.
  - **Subpart JJJJJJ** - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources
    - **NOT Applicable** because the glycol heaters and regeneration gas heaters are all gas-fired..
  - **Subpart ZZZZ** - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
    - **Applicable** to all internal combustion engines (ID Nos. **ES6**, **ES7**, **ES8**, **ES9**, **ES15**, **ES16**, and **ES17**)

- Moriah Energy Center is in one of the 28 PSD categories subject to the 100 ton per year emission limit as a "fossil fuel boilers (or combinations) totaling over 250 million Btu per hour". However, Moriah's actual emissions are not high enough to be considered a PSD major source. Moriah will have a PSD avoidance rule in their permit and their emissions are already limited to below 100 tons per year by their synthetic minor condition.
- Only the general duty clause of Section 112(r) applies to this facility. While methane is one of the regulated substances under the risk management program, the transportation exemption applies to LNG storage facilities. Transportation activities are exempted from compliance with the risk management program because they are regulated by other agencies.
- PFAS database was checked, neither the SIC code (4922) nor the NAICS codes (486210) are associated with PFAS.
- Person County is in attainment.

5. Facility Wide Air Toxics:

A toxic review was triggered for the facility. This facility was modeled at the maximum capacity.

Per the memorandum dated October 24, 2023, from Nancy Jones, Meteorologist with AQAB, the analysis successfully demonstrated compliance with the Acceptable Ambient Level (AAL) for all pollutants on a source-by-source basis. The pollutants analyzed included acrolein, benzene, formaldehyde, and n-hexane. The facility submitted updated modeling on April 12, 2024, to account for the larger size of the regeneration gas heaters. The memorandum for the updated modeling is dated May 29, 2024. The following is a summary of the inputs and maximum impacts from the memo:

Inputs to Moriah Energy Center Modeling

Source ID	Source Description	Acrolein	Benzene		Formaldehyde	n-Hexane	
		(lb/hr)	(lb/hr)	(lb/yr)	(lb/hr)	(lb/hr)	(lb/day)
EP1	GLYCOL HEATER NO.1	**1.75E-06**	2.04E-04	**1.79E+00**	**7.28E-03**	1.75E-01	**4.20E+00**
EP2	GLYCOL HEATER NO.2	**1.75E-06**	2.04E-04	**1.79E+00**	**7.28E-03**	1.75E-01	**4.20E+00**
EP3	GLYCOL HEATER NO.3	**1.75E-06**	2.04E-04	**1.79E+00**	**7.28E-03**	1.75E-01	**4.20E+00**
EP4	REGENERATION GAS HEATER NO. 1	**3.18E-07**	3.71E-05	**3.25E-01**	**1.32E-03**	3.18E-02	**7.63E-01**
EP5	FLARE NO.1	**1.34E-06**	1.56E-04	**1.37E+00**	**5.57E-03**	6.83E-01	**1.64E+01**
EP6	EMERGENCY GENERATOR NO. 1	**9.84E-02**	8.42E-03	**7.38E+01**	**1.01E+00**	2.12E-02	**5.09E-01**
EP7	EMERGENCY GENERATOR NO. 2	**9.84E-02**	8.42E-03	**7.38E+01**	**1.01E+00**	2.12E-02	**5.09E-01**
EP8	EMERGENCY GENERATOR NO. 3	**9.84E-02**	8.42E-03	**7.38E+01**	**1.01E+00**	2.12E-02	**5.09E-01**
EP9	FIREWATER PUMP	**3.19E-04**	3.22E-03	**2.82E+01**	**4.07E-03**	--	--
EP10	GLYCOL HEATER NO.4	**1.75E-06**	2.04E-04	**1.79E+00**	**7.28E-03**	1.75E-01	**4.20E+00**
EP11	GLYCOL HEATER NO.5	**1.75E-06**	2.04E-04	**1.79E+00**	**7.28E-03**	1.75E-01	**4.20E+00**
EP12	GLYCOL HEATER NO.6	**1.75E-06**	2.04E-04	**1.79E+00**	**7.28E-03**	1.75E-01	**4.20E+00**
EP13	REGENERATION GAS HEATER NO. 2	**3.18E-07**	3.71E-05	**3.25E-01**	**1.32E-03**	3.18E-02	**7.63E-01**
EP14	FLARE NO.2	**1.34E-06**	1.56E-04	**1.37E+00**	**5.57E-03**	6.83E-01	**1.64E+01**
EP15	EMERGENCY GENERATOR NO. 4	**9.84E-02**	8.42E-03	**7.38E+01**	**1.01E+00**	2.12E-02	**5.09E-01**
EP16	EMERGENCY GENERATOR NO. 5	**9.84E-02**	8.42E-03	**7.38E+01**	**1.01E+00**	2.12E-02	**5.09E-01**
EP17	EMERGENCY GENERATOR NO. 6	**9.84E-02**	8.42E-03	**7.38E+01**	**1.01E+00**	2.12E-02	**5.09E-01**
EXEMPT1	PIGGING OPERATIONS	--	--	--	--	1.40E+00	**3.36E+01**
EXEMPT4	FUGITIVES (Phase I)	--	--	--	--	4.77E-03	**1.14E-01**
EXEMPT5	FUGITIVE (Phase II)	--	--	--	--	4.77E-03	**1.14E-01**
--	FUGITIVES (Total)	--	--	--	--	1.91E-02	**4.58E-01**

Maximum Modeled Toxics Impacts
(May 29, 2024 Memorandum)

Pollutant	Averaging Period	Max. Conc. ($\mu g/m^3$)	AAL ($\mu g/m^3$)	% of AAL
Acrolein	1-hr	11.2	80	14 %
Benzene	Annual	0.018	0.12	15 %
Formaldehyde	1-hr	116	150	77 %
n-Hexane	24-hr	57	1,100	5 %

6. Compliance Status:
This facility is a Greenfield, therefore, there is no compliance history at this site.

7. Facility Emissions Review:
Calculations were taken from section 3 above.

Pollutant	Permit Potential Emissions	Title V Emissions
	tpy	tpy
TSP	3.93	25.74
PM-10	3.93	25.74
SO_2	0.31	2.05
NO_X	36.75	156.84
CO	95.76	311.97
VOC	51.03	13027.91
Hexane	1.1	241.92

This facility is correctly defined as a Synthetic Minor for fee purposes.

8. Summary of Permit Changes:

- The facility is a Greenfield and the following stipulations have been included in the permit: Title 15A North Carolina Administrative Code (NCAC), Subchapter 2D .0202, 2D .0503, 2D .0516, 2D .0521, 2D .0524 (40 CFR 60, Subpart Dc, Subpart IIII, Subpart JJJJ), 2D .0535, 2D .0540, 2D .1100, 2D .1111 (40 CFR 63, Subpart ZZZZ), 2D .1806, 2Q .0304, 2Q .0315, 2Q .0317 (Avoidance) and 2Q .0711.

9. Conclusions, Comments, and Recommendations:

I recommend the issuance of Permit No. 10805/R00.

Permit Coordinator: _____ **Date:** _____

Dena Pittman, P.E.

Regional Supervisor: _____ **Date:** _____

Dawn Reddix