PROJECT REPORT

Core Appalachia Midstream LLC
N-7 Compressor Station

G35-D Permit Application

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December 2017

Trinity Consultants

EHS Solutions Delivered Uncommonly Well

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Core Appalachia Midstream LLC (Core) is submitting this G35-D Permit application to the West Virginia Department of Environmental Protection (WVDEP) for a natural gas compressor station located in Kanawha County, West Virginia (N-7 Compressor Station). Note that the N-7 Compressor Station is already in operation.[1]

1.1. FACILITY AND PROJECT DESCRIPTION

The N-7 Compressor Station is a natural gas compressor station covered under standard industrial code (SIC) 1311. The station compresses natural gas from nearby wells for transportation across the pipeline.

The station consists of the following equipment:

- One (1) natural gas-fired compressor engine (CE-1), rated at 95 bhp;
- One (1) 4,200 gallon pipeline fluids tank (TK-1) with associated liquid hauling; and
- Miscellaneous exempt sources.

A process flow diagram is included as Attachment D.

1.2. SOURCE STATUS

WVDEP must make stationary source determinations on a case-by-case basis using the guidance under the Clean Air Act (CAA) and EPA's and WVDEP's implementing regulations. The definition of stationary source in 40 CFR 51.166(b) includes the following:

> *"(6) Building, structure, facility, or installation means all of the pollutant emitting activities which belong to the same industrial grouping, are located on or more contiguous or adjacent properties, and are under control of the same person (or persons under common control)."*

Other additional pollutant emitting facilities should be aggregated with the N-7 Compressor Station for air permitting purposes if, and only if, all three elements of the "stationary source" definition above are fulfilled. Two sources owned/operated by Core are located within a quarter-mile radius of the facility. The combined emissions from the N-7 Compressor Station and the equipment under common control within a 0.25 mile radius have been included in the calculations (Attachment U):

- One (1) 504 gallon pipeline fluids tank (TK-2) with associated liquid hauling;[2] and
- One (1) wellhead.[3]

[1] Notification was provided via a phone conversation with Mr. James Robertson of WVDEP on October 24th, 2017.

[2] TK-2 is located off-site approximately 0.1 miles from the N-7 Compressor Station. The liquids from this tank sometimes are hauled to the larger 4,200 gallon tank (TK-1).

[3] Note that Core owns and operates a well (well #800970) approximately 0.2 miles away from the N-7 Compressor Station. However, there is only a wellhead and no emitting sources associated with this wellpad such as engines, tanks, etc.

1.3. G35-D APPLICATION ORGANIZATION

This West Virginia G35-D permit application is organized as follows:

- Section 2: Sample Emission Source Calculations;
- Section 3: Regulatory Discussion;
- Section 4: G35-D Application Form;
- Attachment A: Single Source Determination Form
- Attachment B: Siting Criteria Waiver *(not applicable)*
- Attachment C: Current Business Certificate
- Attachment D: Process Flow Diagram
- Attachment E: Process Description
- Attachment F: Plot Plan
- Attachment G: Area Map
- Attachment H: G35-D Section Applicability Form
- Attachment I: Emission Units/ERD Table
- Attachment J: Fugitive Emission Summary Sheet(s)
- Attachment K: Storage Vessels Data Sheet(s)
- Attachment L: Natural Gas Fired Fuel Burning Unit Data Sheet(s)
- Attachment M: Internal Combustion Engine Data Sheet(s)
- Attachment N: Tanker Truck Loading Data Sheet
- Attachment O: Glycol Dehydration Unit Data Sheet(s)
- Attachment P: Pneumatic Controller Data Sheet(s)
- Attachment Q: Centrifugal Compressor Data Sheet(s)
- Attachment R: Reciprocating Compressor Data Sheet(s)
- Attachment S: Blowdown and Pigging Operation Data Sheet(s)
- Attachment T: Air Pollution Control Device Data Sheet(s)
- Attachment U: Emission Calculations
- Attachment V: Facility-wide Emission Summary Sheet(s)
- Attachment W: Class I Legal Advertisement

2. SAMPLE EMISSION SOURCE CALCULATIONS

The characteristics of air emissions from the facility, along with the methodology for calculating emissions, are briefly described in this section of the application. Detailed emission calculations are presented in Attachment U of this application.

Emissions at this facility will result from combustion of natural gas (in the engine), operation of the storage tanks, as well as piping blowdowns and fugitive emissions from components leaks and the facility roadway. The methods by which emissions from each of these source types is calculated are summarized below.

- **Compressor Engine:** Potential emissions of nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOC), and formaldehyde (CH_2O) are calculated using factors provided by the engine and catalyst manufacturer. Potential emissions of sulfur dioxide (SO_2), particulate matter ($PM/PM_{10}/PM_{2.5}$), and all other hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for four-stroke rich-burn engines.

- **Storage Tanks and Liquid Loading:** Working, breathing, flashing, and loadout emissions of VOC and HAPs from the fluid tanks are calculated using ProMax software. Working and breathing emissions from all other tanks were calculated using EPA Tanks 4.0.9d.

- **Fugitive Emissions:** Emissions from fugitive equipment leaks are calculated using published EPA emission factors and 40 CFR Part 98, Subpart W emission factors. Emissions from blowdown events are calculated using engineering estimates of the amount of gas vented. Site specific gas analyses were used to speciate VOC, HAP, and GHG emissions.

- **Haul Roads:** Fugitive dust emitted from facility roadways has been estimated using projected vehicle miles traveled along with U.S. EPA's AP-42 factors for unpaved haul roads.[4]

Potential emissions of greenhouse gas pollutants (GHGs) are calculated using manufacturer's data as available (CO_2 and CH_4 in this case) and U.S. EPA's emission factors from 40 CFR Part 98, Subpart C for all others.

[4] U.S. EPA, AP 42, Fifth Edition, Volume I, Section 13.2.2, Unpaved Roads, November 2006.

This section documents the applicability determinations made for Federal and State air quality regulations. In this section, applicability or non-applicability of the following regulatory programs is addressed:

- Prevention of Significant Deterioration (PSD) permitting;
- Non-attainment New Source Review (NNSR) permitting;
- Title V of the 1990 Clean Air Act Amendments;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP); and
- West Virginia State Implementation Plan (SIP) regulations.

This review is presented to supplement and/or add clarification to the information provided in the WVDEP G35-D operating permit application forms.

In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the facility. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the station. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

3.1. PSD AND NNSR SOURCE CLASSIFICATION

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review. PSD regulations apply when a new source is constructed in which emissions exceed major source thresholds, an existing minor source undergoes a modification in which emission increases exceed PSD major source thresholds, or an existing major source undergoes a modification in which emission increases exceed PSD significant emission rates.

The N-7 Compressor Station is located in Kanawha County which is classified as attainment/unclassified for all NSR pollutants. As such, the applicable PSD major source thresholds are 250 tons per year (tpy) of NO_X, CO, VOC, PM_{10}, $PM_{2.5}$, and SO_2. As shown in the facility-wide emissions calculations (Attachment U), the facilities potential to emit is below the major source threshold; therefore PSD is not applicable.

3.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tpy of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants. The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility. Therefore, the facility is not a major source for Title V purposes.

3.3. NEW SOURCE PERFORMANCE STANDARDS

New Source Performance Standards, located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of 40 CFR 60 Subpart A (NSPS Subpart A), except where expressly noted. The following is a summary of applicability and non-applicability

determinations for NSPS regulations of relevance to the facility. Besides NSPS Subpart A, the following NSPS could potentially apply to the facility:

- 40 CFR Part 60 Subparts D, Da, Db, and Dc – Steam Generating Units
- 40 CFR Part 60 Subparts K, Ka, and Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids
- 40 CFR Part 60 Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines
- 40 CFR Part 60 Subpart OOOO – Crude Oil and Natural Gas Production, Transmission, and Distribution
- 40 CFR Part 60 Subpart OOOOa – Crude Oil and Natural Gas Facilities

3.3.1. NSPS Subparts D, Da, Db, and Dc – Steam Generating Units

These subparts apply to steam generating units of various sizes, all greater than 10 MMBtu/hr. The facility does not include any steam generating units with a heat input greater than 10 MMBtu/hr, therefore the requirements of these subparts do not apply.

3.3.2. NSPS Subparts K, Ka, and Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m^3 (~19,813 gallons). All of the tanks at the facility have a capacity less than 19,813 gallons. As such, Subparts K, Ka, and Kb do not apply to the storage tanks at the facility.

3.3.3. NSPS Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines

Subpart JJJJ – *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*, applies to manufacturers, owners and operators of stationary spark ignition (SI) engines. According to §60.4230(a)(4)(iii), for engines with a maximum engine power less than 500 HP, they must have been manufactured on or after July 1, 2008 for the requirements of this subpart to apply. Per the attached documentation, the compressor engine (CE-1) was manufactured on January 8, 2008. Therefore, the unit is not subject to the requirements of this subpart.

3.3.4. NSPS Subpart OOOO — Crude Oil and Natural Gas Production, Transmission, and Distribution

Subpart OOOO – *Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution*, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011 and before September 18, 2015. The facility does not include any sources that are affected sources under this regulation based on the commence construction dates occurring after September 18, 2015. Therefore, the facility has no applicable requirements under this regulation.

3.3.5. NSPS Subpart OOOOa — Crude Oil and Natural Gas Facilities

Subpart OOOOa, Standards of Standards of Performance for Crude Oil and Natural Gas Facilities, will apply to affected facilities that commenced construction, reconstruction, or modification after September 18, 2015. The regulation was published final in the Federal Register on June 3, 2016. The rule includes provisions for the following facilities:

- Hydraulically fractured wells;
- Centrifugal compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;

- Reciprocating compressors located between the wellhead and the point of custody transfer to the natural gas distribution segment;
- Continuous bleed natural gas-driven pneumatic controllers with a bleed rate of > 6 scfh located in the production, gathering, processing, or transmission and storage segments (excluding natural gas processing plants);
- Continuous bleed natural gas-driven pneumatic controllers located at natural gas processing plants;
- Pneumatic pumps located in the production and processing segments;
- Storage vessels located in the production, gathering, processing, or transmission and storage segments;
- The collection of fugitive emissions components at a well site;
- The collection of fugitive emissions components at a compressor station; and
- Sweetening units located onshore that process natural gas produced from either onshore or offshore wells.

Compressors - The compressor associated with engine CE-1 is a screw type compressor (i.e., not reciprocating and not centrifugal). Screw compressors are not affected facilities under NSPS OOOOa

Fugitives - As NSPS OOOOa currently stands, Core will be required to comply with the leak detection and repair (LDAR) monitoring for all fugitive emission components (ex. connectors, flanges, etc.) with an optical gas imaging (OGI) device, and repair all sources of fugitive emissions in accordance with the rule. The applicant must also develop a monitoring plan, conduct surveys on a quarterly basis, and will be subject to the applicable recordkeeping and reporting requirements of the rule. [5]

Pneumatic Controllers – The facility does not include any continuous bleed gas-actuated pneumatic controllers with a bleed rate greater than 6 standard cubic feet per hour (scfh). Therefore, they will not be subject to the pneumatic controller requirements under Subpart OOOOa.

Storage Tanks - The storage tanks will not be affected facilities under NSPS OOOOa as the potential emissions from the tanks are less than 6 tpy VOC.

As currently proposed, there are no other affected source categories under the rule that will apply to the proposed equipment involved in this project.

3.3.6. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas processing plants (Subparts OOOO and OOOOa) and associated equipment (Subpart K-Kb), the applicability of a particular NSPS

[5] Note that on May 26, 2017, EPA Administrator Pruitt signed a Federal Register notice that granted reconsideration of issues in NSPS OOOOa. On June 5, 2017, EPA granted a three-month stay of the following three requirements: (1) the compressor station fugitive emissions requirements, (2) the standards for pneumatic pumps at well sites, and (3) the requirements for closed vent assessments and certification by a professional engineer. On June 16, 2017, EPA proposed a longer two-year stay of these requirements as well as a second 90-day stay to cover an expected gap between the original 90-day stay and the longer two-year stay.

Environmental groups challenged U.S. EPA's authority to issue the original 90-day stay and requested the U.S. Court of Appeals for the District of Columbia Circuit to block this stay. On July 3, 2017, the court ruled in favor of environmental groups and vacated the original NSPS OOOOa 90-day stay. The July 3, 2017 court decision overturned the previous stay of NSPS OOOOa, including the stay of fugitive monitoring requirements, and reinstated full effectiveness of the rule. The status of the 2-year stay is still pending final publication by EPA.

to the facility can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to the proposed project.

3.4. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Part 63 NESHAP allowable emission limits are established on the basis of a maximum achievable control technology (MACT) determination for a particular major source. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. The facility is an area (minor) source of HAP since its potential emissions of HAP are less than the 10/25 major source thresholds. Besides 40 CFR 63 Subpart A (NESHAP Subpart A), which is similar to 40 CFR 60 Subpart A (NSPS Subpart A), the following NESHAP could potentially apply to the facility:

- 40 CFR Part 63 Subpart HH – Oil and Natural Gas Production Facilities
- 40 CFR Part 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines
- 40 CFR Part 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers

3.4.1. NESHAP Subpart HH - Oil and Natural Gas Production Facilities

This MACT standard contains requirements for both major and area sources of HAP. The N-7 Compressor station is an area HAP source. Under NSPS HH, the only affected facilities at area HAP sources are dehydration units. The facility does not have dehydration units, as such, this subpart does not apply.

3.4.2. NESHAP Subpart ZZZZ - Stationary Reciprocating Internal Combustion Engines

Stationary reciprocating internal combustion engines (RICE) at both area and major sources of HAP emissions are potentially subject to Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines (RICE). Per §63.6590(a)(2)(iii), a stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary reciprocating internal combustion engine (RICE) on or after 6/12/2006. The compressor engine commenced construction after this date, and is therefore a new RICE under Subpart ZZZZ. The compressor engine is a 95 bhp classified as a 4-stroke, rich burn, non-emergency SI units at an area source. As such, the unit is subject to the requirements for existing, non-emergency, SI units less than 500 horsepower at area sources.

Per 40 CFR §63.6590(c)(1), a new stationary RICE located at an area HAP source must meet the requirements of 40 CFR 63, Subpart ZZZZ by meeting the applicable requirements of Subpart JJJJ for spark ignition engines. No further requirements apply for such engines under NESHAP Subpart ZZZZ. The compressor station is an area HAP source and the engine at the site is considered a new stationary RICE. Therefore, the requirements contained in §63.6590(c)(a) are applicable and the only requirement under NESHAP Subpart ZZZZ is to comply with the applicable provisions of NSPS JJJJ.

3.4.3. NESHAP JJJJJJ - Industrial, Commercial, and Institutional Boilers

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types at area sources. No sources at the facility are subject to any requirements under 40 CFR 63 Subpart JJJJJ.

3.5. WEST VIRGINIA SIP REGULATIONS

The facility is potentially subject to regulations contained in the West Virginia Code of State Regulations, Chapter 45 (Code of State Regulations). The Code of State Regulations fall under two main categories: those regulations that are generally applicable (e.g., permitting requirements), and those that have specific applicability (e.g., PM standards for manufacturing equipment).

3.5.1. 45 CSR 2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel "for the primary purpose of producing heat or power by indirect heat transfer". There are not units that meet this definition at the facility. As such, the requirement is not applicable.

3.5.2. 45 CSR 4: To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

According to 45 CSR 4-3:

No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.

The facility is generally subject to this requirement. However, due to the nature of the process at the station, production of objectionable odor during normal operation is unlikely.

3.5.3. 45 CSR 6: To Prevent and Control the Air Pollution from the Combustion of Refuse

45 CSR 6 applies to activities involving incineration of refuse, defined as "the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer or thermal catalytic oxidizer stack shall be considered incineration." There are no control devices at the facility that utilize 'incineration'.

3.5.4. 45 CSR 10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

This rule potentially applies to fuel burning units, including glycol dehydration unit reboilers. Per 45 CSR 10-10.1, units rated less than 10 MMBtu/hr are exempt from the SO_2 emission limitations and testing, monitoring, recordkeeping, and reporting requirements of this rule. There are not units considered fuel burning units at the compressor station; as such, the rule is not applicable.

3.5.5. 45 CSR 16: Standards of Performance for New Stationary Sources

45 CSR 16-1 incorporates the federal Clean Air Act (CAA) standards of performance for new stationary sources set forth in 40 CSR Part 60 by reference. As such, by complying with all applicable requirements of 40 CFR Part 60 at the facility, the applicant will be complying with 45 CSR 16.

3.5.6. 45 CSR 17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter

According to 45 CSR 17-3.1:

No person shall cause, suffer, allow or permit fugitive particulate matter to be discharged beyond the boundary lines of the property lines of the property on which the discharge originates or at any public or residential location, which causes or contributes to statutory air pollution.

Due to the nature of the activities at the facility, it is unlikely that fugitive particulate matter emissions will be emitted under normal operating conditions. However, the applicant will take measures to ensure any fugitive particulate matter emissions will not cross the property boundary should any such emissions occur.

3.5.7. 45 CSR 21-28: Petroleum Liquid Storage in Fixed Roof Tanks

45 CSR 21-28 applies to any fixed roof petroleum liquid storage tank with a capacity greater than 40,000 gallons located in Putnam County, Kanawha County, Cabell County, Wayne County, and Wood County. The capacity of each storage tank at the facility is less than 40,000 gallons. Therefore, 45 CSR 21-28 does not apply to the storage tanks at this station.

3.5.8. 45 CSR 34: Emissions Standards for Hazardous Air Pollutants

45 CSR 34-1 incorporates the federal Clean Air Act (CAA) national emissions standards for hazardous air pollutants (NESHAPs) as set forth in 40 CPR Parts 61 and 63 by reference. As such, by complying with all applicable requirements of 40 CFR Parts 61 and 63 at the facility, the applicant will be complying with 45 CSR 34.

3.5.9. Non-Applicability of Other SIP Rules

A thorough examination of the West Virginia SIP rules with respect to applicability at the facility reveals many SIP regulations that do not apply or impose additional requirements on operations. Such SIP rules include those specific to a particular type of industrial operation that is categorically not applicable to the facility.

4. G35-D APPLICATION FORMS

The WVDEP permit application forms contained in this application include all applicable G35-D application forms including the required attachments.

west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304
Phone (304) 926-0475
Fax (304) 926-0479
www.dep.wv.gov

G35-D GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS COMPRESSOR AND/OR DEHYDRATION FACILITIES

☒ CONSTRUCTION
☐ MODIFICATION
☐ RELOCATION
☐ CLASS I ADMINISTRATIVE UPDATE
☐ CLASS II ADMINISTRATIVE UPDATE

SECTION 1. GENERAL INFORMATION

Name of Applicant (as registered with the WV Secretary of State's Office): **Core Appalachia Midstream LLC**

Federal Employer ID No. (FEIN): 81-4039924

Applicant's Mailing Address: 414 Summers Street

City: Charleston	State: WV	ZIP Code: 25301

Facility Name: N-7 Compressor Station

Operating Site Physical Address: See lat/long
If none available, list road, city or town and zip of facility.

City: Cedar Grove	Zip Code: 25039	County: Kanawha

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):
Latitude: 38.26085
Longitude: -81.42824

SIC Code: 1311 NAICS Code: 211111	DAQ Facility ID No. (For existing facilities) TBD

CERTIFICATION OF INFORMATION

This G35-D General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of the Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. **Any administratively incomplete or improperly signed or unsigned G35-D Registration Application will be returned to the applicant. Furthermore, if the G35-D forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

I hereby certify that is an Authorized Representative and in that capacity shall represent the interest of the business (e.g., Corporation, Partnership, Limited Liability Company, Association Joint Venture or Sole Proprietorship) and may obligate and legally bind the business. If the business changes its Authorized Representative, a Responsible Official shall notify the Director of the Division of Air Quality immediately.

I hereby certify that all information contained in this G35-D General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible.

Responsible Official Signature: John B. Lawman, Jr.
Name and Title: John B. Lawman, Jr. Senior Vice President – Midstream Operations
Phone: (304) 353-5116 Fax: (304) 353-5231
Email: jlawman@coreoperating.com Date: 12/5/17

If applicable:
Authorized Representative Signature: _____
Name and Title: Phone: Fax:
Email: Date:

If applicable:
Environmental Contact
Name and Title: Melissa Hatfield-Atkinson, Manager – Air Quality Phone: (304) 353-5118 Fax:
Email: mhatfield-atkinson@coreoperating.com Date:

OPERATING SITE INFORMATION

Briefly describe the proposed new operation and/or any change(s) to the facility:
Core is seeking a G35-D permit for their new N-7 Compressor Station. The station consists of one (1) 95 bhp compressor engine, one (1) 100 bbl pipeline fluids tank, and miscellaneous exempt equipment as well as one (1) nearby 12 bbl pipeline fluids tank.

Directions to the facility:
From Kelley's Creek Road Rt.81 turn left onto Bufflick Branch just past a Columbia Gas Corporation's compressor station. Travel up Bufflick Branch Hollow about 1300' and make a left taking it to the top of the hill. Make a hard right turn at the top of the hill onto the strip bench. Travel on the strip bench for 4950' to a crossroads and take a left. After taking the left at the crossroads, stay to the right through 3 intersections traveling a total of 3950' from the crossroads. Compressor is on the right side of the road.

ATTACHMENTS AND SUPPORTING DOCUMENTS

I have enclosed the following required documents:

Check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).

☒ Check attached to front of application.
☐ I wish to pay by electronic transfer. Contact for payment (incl. name and email address):
☐ I wish to pay by credit card. Contact for payment (incl. name and email address):

☒$500 (Construction, Modification, and Relocation) ☐$300 (Class II Administrative Update)
☒$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ and/or OOOO and/or OOOOa [1]
☒$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH [2]

[1] Only one NSPS fee will apply.
[2] Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy requirements by complying with NSPS, Subparts IIII and/or JJJJ.
NSPS and NESHAP fees apply to new construction or if the source is being modified.

☒ Responsible Official or Authorized Representative Signature (if applicable)	
☒ Single Source Determination Form **(must be completed in its entirety)** – Attachment A	
☐ Siting Criteria Waiver (if applicable) – Attachment B	☒ Current Business Certificate – Attachment C
☒ Process Flow Diagram – Attachment D	☒ Process Description – Attachment E
☒ Plot Plan – Attachment F	☒ Area Map – Attachment G
☒ G35-D Section Applicability Form – Attachment H	☒ Emission Units/ERD Table – Attachment I
☒ Fugitive Emissions Summary Sheet – Attachment J	
☒ Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment K	
☒ Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applic.) – Attachment L	
☒ Internal Combustion Engine Data Sheet(s) (include manuf. performance data sheet(s) if applicable) – Attachment M	
☒ Tanker Truck Loading Data Sheet (if applicable) – Attachment N	
☐ Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc™ input and output reports and information on reboiler if applicable) – Attachment O	
☒ Pneumatic Controllers Data Sheet – Attachment P	
☐ Centrifugal Compressor Data Sheet – Attachment Q	
☐ Reciprocating Compressor Data Sheet – Attachment R (NA - compressor is a screw type compressor)	
☒ Blowdown and Pigging Operations Data Sheet – Attachment S	
☒ Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment T	
☒ Emission Calculations (please be specific and include all calculation methodologies used) – Attachment U	
☒ Facility-wide Emission Summary Sheet(s) – Attachment V	
☒ Class I Legal Advertisement – Attachment W	
☒ One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments	

Single Source Determination Form

All attachments must be identified by name, divided into sections, and submitted in order.

ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Classifying multiple facilities as one "stationary source" under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of Building, structure, facility, or installation as given in §45-14-2.13 and §45-19-2.12. The definition states:

"Building, Structure, Facility, or Installation" means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same "Major Group" (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term "adjacent" and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

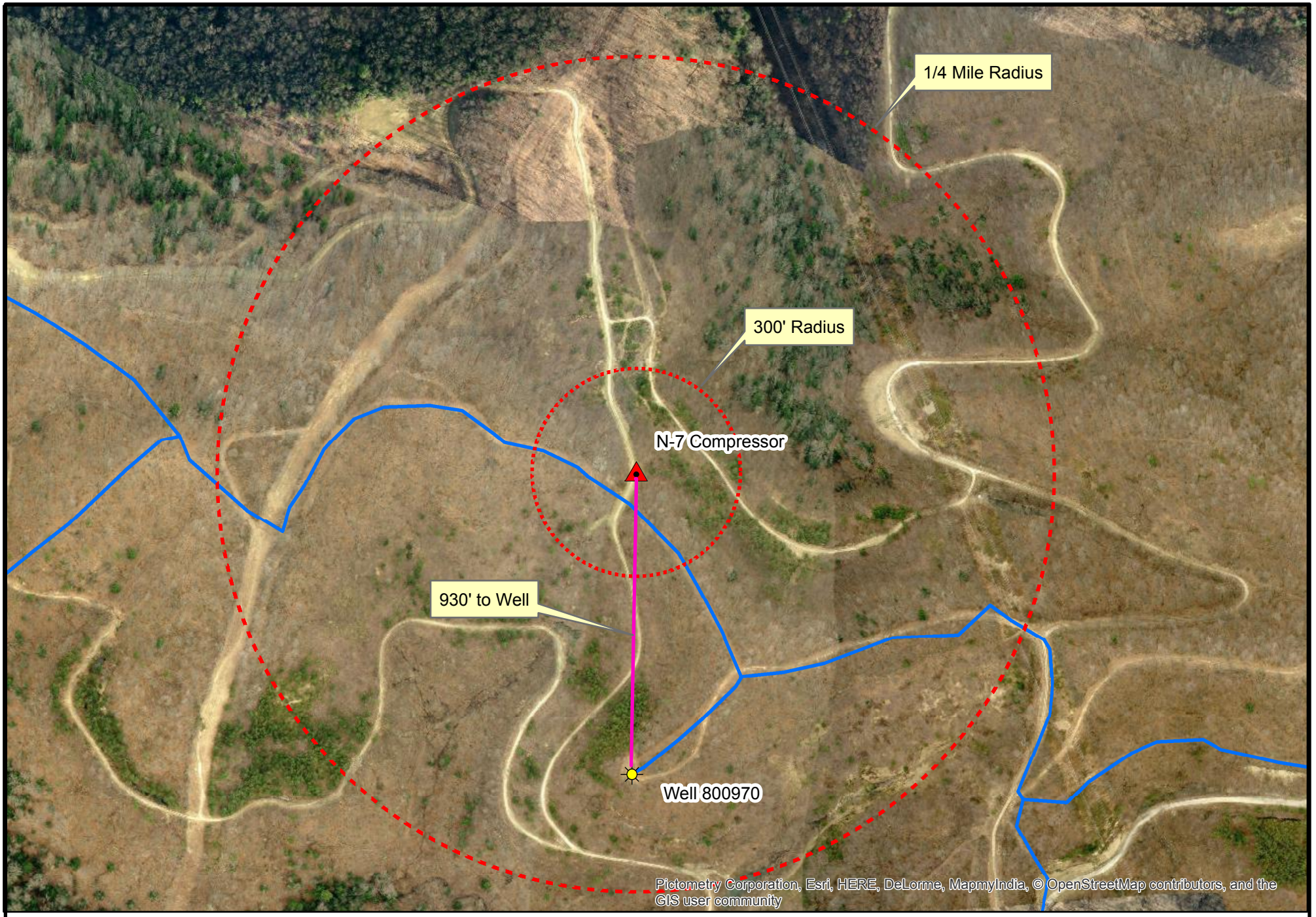
Is there equipment and activities in the same industrial grouping (defined by SIC code)?
Yes ☒ No ☐

Is there equipment and activities under the control of the same person/people?
Yes ☒ No ☐

Is there equipment and activities located on the same site or on sites that share equipment and are within ¼ mile of each other?
Yes ☒ No ☐

Two sources owned/operated by Core are located within a quarter-mile radius of the facility. The combined emissions from the N-7 Compressor Station and the equipment under common control within a 0.25 mile radius have been included in Attachment U:

- One (1) 504 gallon pipeline fluid waste fluids tank (TK-2) with associated liquid hauling. TK-2 is located off-site approximately 0.1 miles from the N-7 Compressor Station. The liquids from this tank sometimes are hauled to the larger 4,200 gallon tank (TK-1).
- One (1) wellhead (well #800970) approximately 0.2 miles away from the N-7 Station. However, there is only a wellhead and no emitting sources associated with this wellpad such as engines, tanks, etc.



CORE APPALACHIA

Date: 11/7/2017

N-7 Compressor Station
Lat: 38.260849, Long: -81.428237
Elev: 1,357'

1 inch = 500 feet

0 250 500 1,000 Feet

Well: 800970
Lat: 38.25837
Long: -81.42838
Elev: 1,380'

Siting Criteria Waiver *(not applicable)*

ATTACHMENT B – SITING CRITERIA WAIVER
NOT APPLICABLE AS THE DISTANCE TO NEAREST PUBLIC DWELLING > 300 FT. (APPROXIMATELY 2 MILES TO NEAREST DWELLING.)

If applicable, please complete this form and it must be notarized.

G35-D General Permit
Siting Criteria Waiver

WV Division of Air Quality 300' Waiver

I _____ hereby
Print Name

acknowledge and agree that _____ will
General Permit Applicant's Name

construct an emission unit(s) at a natural gas compressor and/or dehydration facility that will be located within 300' of my dwelling and/or business.

.

I hereby offer this waiver of siting criteria to the West Virginia Department of Environmental Protection Division of Air Quality as permission to construct, install and operate in such location.

Signed:

_____
Signature Date

_____
Signature Date

Taken, subscribed and sworn before me this _____ day of

_____, 20_____.

My commission expires: _____

SEAL_____
Notary Public

Current Business Certificate

State of West Virginia

Certificate

I, Natalie E. Tennant, Secretary of State of the State of West Virginia, hereby certify that

CORE APPALACHIA MIDSTREAM LLC

Control Number: 9AG2F

a limited liability company, organized under the laws of the State of Delaware

has filed its "Application for Certificate of Authority" in my office according to the provisions of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a foreign limited liability company from its effective date of October 12, 2016, until a certificate of cancellation is filed with our office.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

to the limited liability company authorizing it to transact business in West Virginia

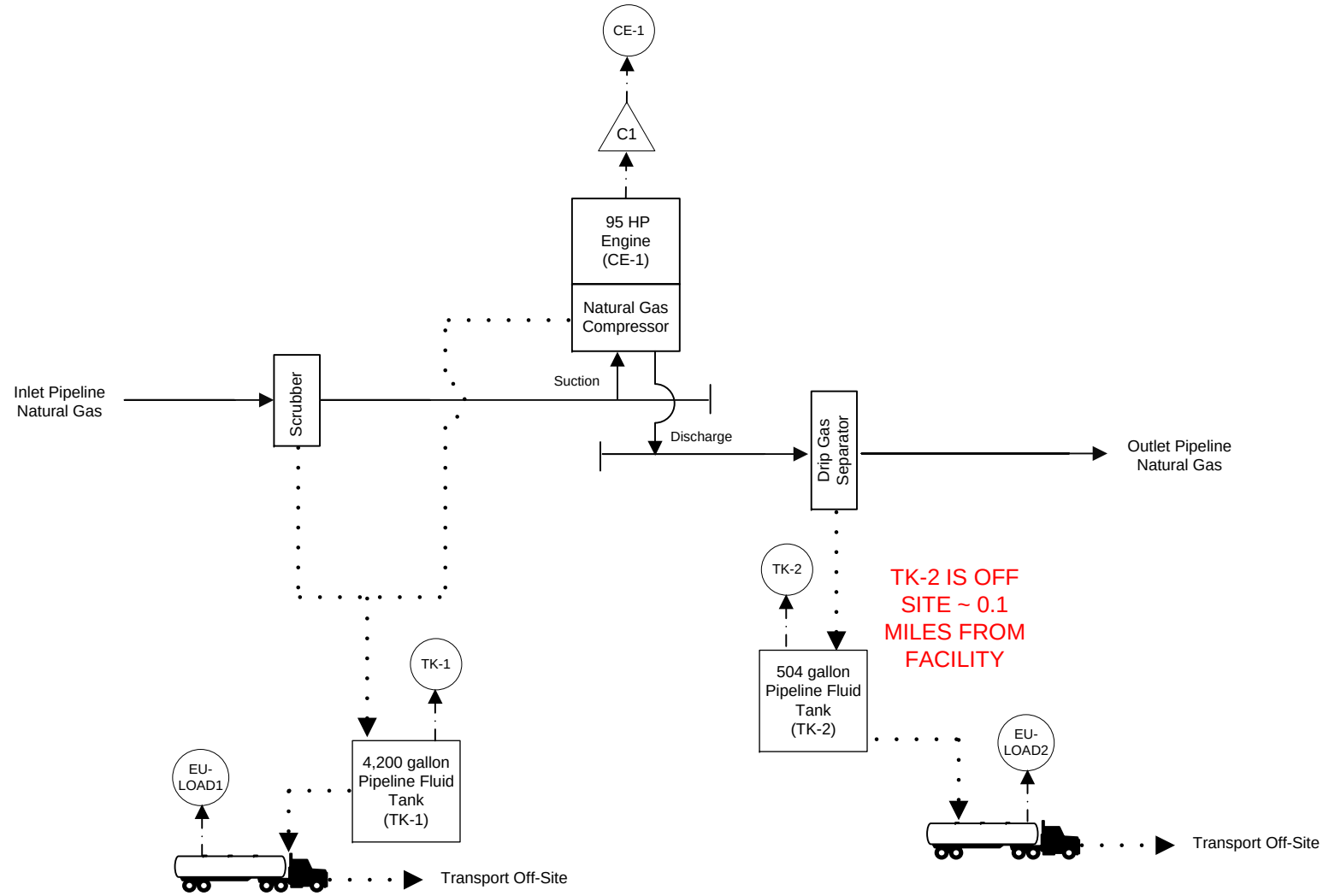
Given under my hand and the Great Seal of the State of West Virginia on this day of October 12, 2016

Natalie E Tennant

Secretary of State

Process Flow Diagram

*** Note that this is a simplified diagram for the purposes of explaining basic facility flow and emission points. The actual design is more complex and may vary.**



Flow Legend

- Gas Flow
- Stack Emissions
- Pipeline Fluid Flow
- Emission Point
- Control Device

Core Appalachia Midstream LLC

Process Flow Diagram
N-7 Compressor Station

Trinity Consultants

November 2017

Process Description

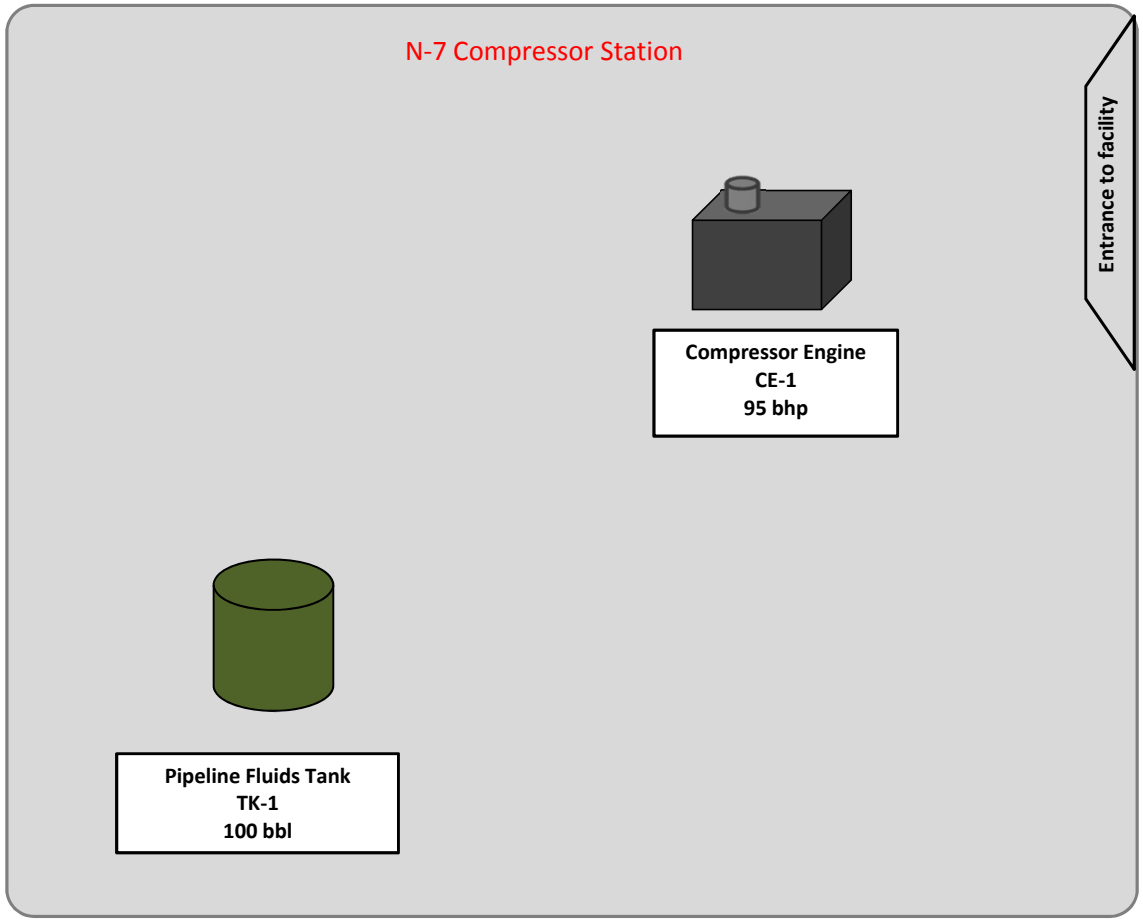
ATTACHMENT E: PROCESS DESCRIPTION

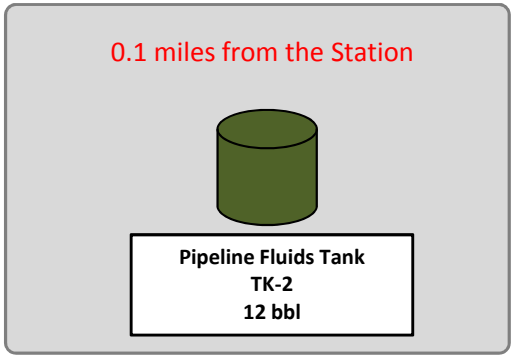
The N-7 Compressor Station compresses natural gas from production wells for transmission along the pipeline system. The screw compressor is used to raise the pressure of the incoming gas stream. Subsequently, the gas stream travels into the downstream pipeline. Note that the station includes two (2) pipeline fluid tanks that stored any fluids coming from the natural gas.

A process flow diagram is included as Attachment D.

Plot Plan

NOTE: This diagram is not to scale.

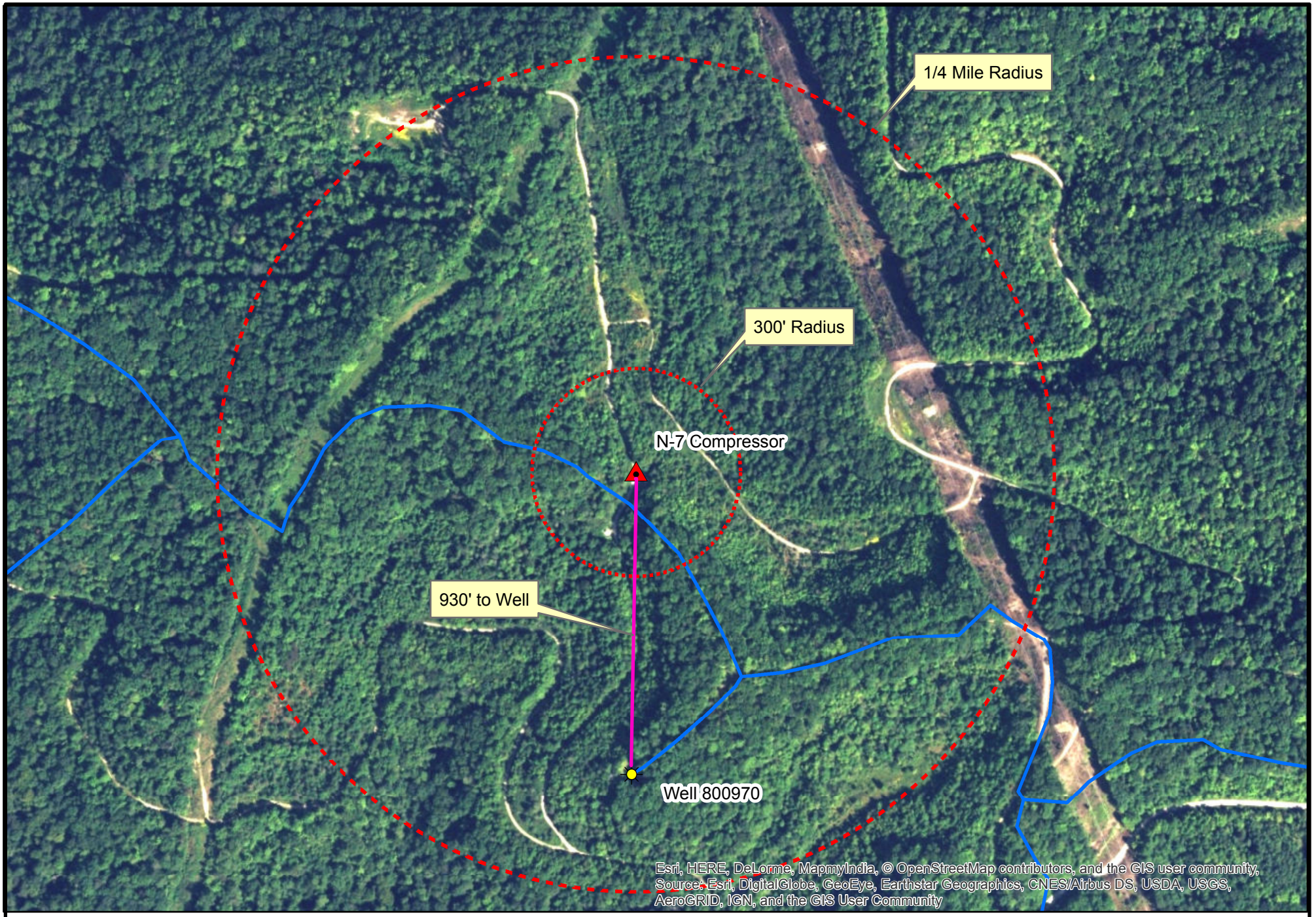




Attachment F

N-7 Compressor Station
Plot Plan

Area Map



CORE APPALACHIA

Date: 11/7/2017

N-7 Compressor Station
Lat: 38.260849, Long: -81.428237
Elev: 1,357'

1 inch = 500 feet

0 250 500 1,000 Feet

Well: 800970
Lat: 38.25837
Long: -81.42838
Elev: 1,380'

G35-D Section Applicability Form

ATTACHMENT H – G35-D SECTION APPLICABILITY FORM

General Permit G35-D Registration
Section Applicability Form

General Permit G35-D was developed to allow qualified applicants to seek registration for a variety of sources. These sources include storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, centrifugal compressors, reciprocating compressors, reciprocating internal combustion engines (RICEs), tank truck loading, fugitive emissions, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G35-D allows the registrant to choose which sections of the permit they are seeking registration under. Therefore, please mark which additional sections that you are applying for registration under. If the applicant is seeking registration under multiple sections, please select all that apply. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

GENERAL PERMIT G35-D APPLICABLE SECTIONS	
☒ Section 5.0	Storage Vessels Containing Condensate and/or Produced Water[1]
☐ Section 6.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
☒ Section 7.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
☐ Section 8.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
☐ Section 9.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
☐ Section 10.0	Centrifugal Compressor Affected Facility (NSPS, Subpart OOOO/OOOOa)[2]
☐ Section 11.0	Reciprocating Compressor Affected Facility (NSPS, Subpart OOOO/OOOOa)[2]
☒ Section 12.0	Reciprocating Internal Combustion Engines, Generator Engines. Microturbine Generators
☒ Section 13.0	Tanker Truck Loading[3]
☐ Section 14.0	Glycol Dehydration Units[4]
☒ Section 15.0	Blowdown and Pigging Operations
☒ Section 16.0	Fugitive Emission Components (NSPS, Subpart OOOOa)

1 *Applicants that are subject to Section 5 may also be subject to Section 6 if the applicant is subject to the NSPS, Subpart OOOO/OOOOa control requirements or the applicable control device requirements of Section 7.*

2 *Applicants that are subject to Section 10 and 11 may also be subject to the applicable RICE requirements of Section 12.*

3 *Applicants that are subject to Section 13 may also be subject to control device and emission reduction device requirements of Section 7.*

4 *Applicants that are subject to Section 14 may also be subject to the requirements of Section 8 (reboilers). Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 7.*

Emission Units/ERD Table

ATTACHMENT I – EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE

Include ALL emission units and air pollution control devices/ERDs that will be part of this permit application review. Do not include fugitive emission sources in this table. Deminimis storage tanks shall be listed in the Attachment K table. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed	Manufac. Date[3]	Design Capacity	Type[4] and Date of Change	Control Device(s)[5]	ERD(s)[6]
CE-1	CE-1	Caterpillar G3304 Compressor Engine	2017	01/2008	95 HP	New	C1	---
TK-1	TK-1	Pipeline Fluids Tank	2017	---	4,200 Gallons	New	None	---
TK-2	TK-2	Pipeline Fluids Tank	2017	---	504 Gallons	New	None	---
EU-LOAD1	EU-LOAD1	Liquid Loading for TK-1	---	---	29,740 Gallons*	New	None	---
EU-LOAD2	EU-LOAD2	Liquid Loading for TK-2	---	---	15,330 Gallons*	New	None	---
---	---	Fugitives	---	---	---	New	None	---
---	---	Haul Roads	---	---	---	New	None	---

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] When required by rule
[4] New, modification, removal, existing
[5] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.
[6] For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

*** TK-2 is located 0.1 miles away from the N-7 Compressor Station. As such, TK-1 and TK-2 have different loading events. However, sometimes the liquids from TK-2 are hauled to TK-1. The estimated liquid throughput above is a combination of the estimated of each tank throughputs.**

Fugitive Emission Summary Sheet(s)

ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

Sources of fugitive emissions may include loading operations, equipment leaks, blowdown emissions, etc.
Use extra pages for each associated source or equipment if necessary.

Source/Equipment: Fugitive Emissions

Leak Detection Method Used	☐ Audible, visual, and olfactory (AVO) inspections	☒ Infrared (FLIR) cameras	☐ Other (please describe)	☐ None required

Is the facility subject to quarterly LDAR monitoring under 40CFR60 Subpart OOOOa? ☒ Yes ☐ No. If no, why?

Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)		
					VOC	HAP	GHG (CO_2e)
Pumps	☐ Yes ☒ No	---	---	☐ Gas ☐ Liquid ☐ Both	---	---	---
Valves	☐ Yes ☒ No	5 Gas 33 Light Liquid	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☐ Liquid ☒ Both	0.20	0.02	6.81
Safety Relief Valves	☐ Yes ☒ No	5	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	0.08	0.01	0.76
Open Ended Lines	☐ Yes ☒ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	---	---	---
Sampling Connections	☐ Yes ☒ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	---	---	---
Connections (Not sampling)	☐ Yes ☒ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	---	---	---
Compressors	☐ Yes ☒ No	3 seals	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☒ Gas ☐ Liquid ☐ Both	0.05	<0.01	0.10
Flanges	☐ Yes ☒ No	43 gas 120 light liquid	U.S. EPA. Office of Air Quality Planning and Standards. Protocol for Equipment Leak Emission Estimates. Table 2-1. (EPA-453/R-95-017, 1995).	☐ Gas ☐ Liquid ☒ Both	0.06	0.01	1.87
Other[1]	☐ Yes ☒ No	---	N/A	☐ Gas ☐ Liquid ☐ Both	---	---	---

[1] Other equipment types may include compressor seals, relief valves, diaphragms, drains, meters, etc.

Please indicate if there are any closed vent bypasses (include component):

Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck loading, etc.)

Storage Vessel Data Sheet(s)

ATTACHMENT K – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for ***each*** new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water. (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.**

The following information is REQUIRED:

☒ Composition of the representative sample used for the simulation (inlet gas sample used for ProMax simulation)
☒ For each stream that contributes to flashing emissions:
- ☒ Temperature and pressure (inlet and outlet from separator(s))
- ☒ Simulation-predicted composition
- ☒ Molecular weight
- ☒ Flow rate

☒ Resulting flash emission factor or flashing emissions from simulation
☒ Working/breathing loss emissions from tanks and/or loading emissions if simulation is used to quantify those emissions

Additional information may be requested if necessary.

GENERAL INFORMATION

1. Bulk Storage Area Name N-7 Compressor Station	2. Tank Name Pipeline Fluids Tanks
3. Emission Unit ID number TK1 and TK2	4. Emission Point ID number TK1 and TK2
5. Date Installed , Modified or Relocated *(for existing tanks)* Was the tank manufactured after August 23, 2011? ☒ Yes ☐ No	6. Type of change: ☒ New construction ☐ New stored material ☐ Other ☐ Relocation
7A. Description of Tank Modification *(if applicable)* N/A	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Was USEPA Tanks simulation software utilized? ☐ Yes ☒ No ***If Yes, please provide the appropriate documentation and items 8-42 below are not required.***	

TANK INFORMATION

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 4,200 gal (TK1) & 504 gal (TK2)	
9A. Tank Internal Diameter (ft.) 10 & 5	9B. Tank Internal Height (ft.) 8.5 & 3.5
10A. Maximum Liquid Height (ft.) 8.5 & 3.5	10B. Average Liquid Height (ft.) 4 & 2
11A. Maximum Vapor Space Height (ft.) 8.5 & 3.5	11B. Average Vapor Space Height (ft.) 4.5 & 1.5
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume". 4,200 gal (TK1) & 504 gal (TK2)	
13A. Maximum annual throughput (gal/yr) 29,740 gal/yr (TK1) & 15,330 gal/yr (TK2) **See attached emissions calculations for all throughput values**	13B. Maximum daily throughput (gal/day) 81 gal/d (TK1) & 42 gal/d (TK2) **See attached emissions calculations for all throughput values**
14. Number of tank turnovers per year **See attached emissions calculations for all throughput values**	15. Maximum tank fill rate (gal/min) **See attached emissions calculations for all throughput values**
16. Tank fill method ☐ Submerged ☒ Splash ☐ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof ☒ vertical ☐ horizontal ☐ flat roof ☒ cone roof ☐ dome roof ☐ other (describe) ☐ External Floating Roof ☐ pontoon roof ☐ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ☐ vertical column support ☐ self-supporting ☐ Variable Vapor Space ☐ lifter roof ☐ diaphragm ☐ Pressurized ☐ spherical ☐ cylindrical ☐ Other (describe)	

PRESSURE/VACUUM CONTROL DATA

19. Check as many as apply:

☐ Does Not Apply ☐ Rupture Disc (psig)

☐ Inert Gas Blanket of _____ ☐ Carbon Adsorption[1]

☐ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers, enclosed combustors)

☐ Conservation Vent (psig) ☐ Condenser[1]

Vacuum Setting Pressure Setting

☐ Emergency Relief Valve (psig)

Vacuum Setting Pressure Setting

☒ Thief Hatch Weighted ☒ Yes ☐ No

[1] Complete appropriate Air Pollution Control Device Sheet

20. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name	**Flashing Loss**		**Breathing Loss**		**Working Loss**		**Total Emissions Loss**		**Estimation Method[1]**
	lb/hr	**tpy**	**lb/hr**	**Tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
TK-1	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	ProMax
TK-2	0.14	0.62	<0.01	0.01	<0.01	0.02	0.15	0.65	ProMax

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

TANK CONSTRUCTION AND OPERATION INFORMATION			
21. Tank Shell Construction: ☒ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)			
21A. Shell Color: Blue	21B. Roof Color: Blue	21C. Year Last Painted:	
22. Shell Condition (if metal and unlined): ☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable			
22A. Is the tank heated? ☐ Yes ☒ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): TBD **Must be listed for tanks using VRUs with closed vent system.**			
24. Is the tank a **Vertical Fixed Roof Tank**? ☒ Yes ☐ No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):	
25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☒			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type *(check one):* ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No			
25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):			
25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No			
25F. Describe deck fittings:			
26. Complete the following section for **Internal Floating Roof Tanks** ☒ Does not apply			
26A. Deck Type: ☐ Bolted ☐ Welded	26B. For bolted decks, provide deck construction:		
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? ☐ Yes ☒ No			
28. Closed Vent System with Enclosed Combustor? ☐ Yes ☒ No			
SITE INFORMATION - Not Applicable: Tank calculations performed using ProMax software			
29. Provide the city and state on which the data in this section are based:			
30. Daily Avg. Ambient Temperature (°F):	31. Annual Avg. Maximum Temperature (°F):		
32. Annual Avg. Minimum Temperature (°F):	33. Avg. Wind Speed (mph):		
34. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):	35. Atmospheric Pressure (psia):		
LIQUID INFORMATION - Not Applicable: Tank calculations performed using ProMax software			
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	
37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):	
38A. Minimum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):		
39A. Avg. liquid surface temperature (°F):	39B. Corresponding vapor pressure (psia):		
40A. Maximum liquid surface temperature (°F):	40B. Corresponding vapor pressure (psia):		
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
41A. Material name and composition:			
41B. CAS number:			
41C. Liquid density (lb/gal):			
41D. Liquid molecular weight (lb/lb-mole):			
41E. Vapor molecular weight (lb/lb-mole):			
41F. Maximum true vapor pressure (psia):			
41G. Maximum Reid vapor pressure (psia):			
41H. Months Storage per year. From: To:			
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.			

STORAGE TANK DATA TABLE

List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)

Source ID #[1]	Status[2]	Content[3]	Volume[4]
N/A			

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:
   - EXIST Existing Equipment
   - NEW Installation of New Equipment
   - REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, diesel, mercaptan etc.
4. Enter the maximum design storage tank volume in gallons.

*** The facility includes existing tanks and will be installing new tanks, however this permit application seeks to revise the list of tanks to ensure completeness and correctness. The permit application forms include a complete listing of tanks; the applicant is requesting that the issued permit reflect the forms (all tanks are listed as 'New*'.**

Natural Gas Fired Fuel Burning Unit Data Sheet(s)

ATTACHMENT L – SMALL HEATERS AND REBOILERS NOT SUBJECT TO 40CFR60 SUBPART DC
DATA SHEET – NOT APPLICABLE

Complete this data sheet for each small heater and reboiler not subject to 40CFR60 Subpart Dc at the facility. ***The Maximum Design Heat Input (MDHI) must be less than 10 MMBTU/hr.***

Emission Unit ID#[1]	Emission Point ID#[2]	Emission Unit Description (manufacturer, model #)	Year Installed/ Modified	Type[3] and Date of Change	Maximum Design Heat Input (MMBTU/hr)[4]	Fuel Heating Value (BTU/scf)[5]

1 Enter the appropriate Emission Unit (or Source) identification number for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S…or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the Glycol Dehydration Unit Data Sheet.

2 Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E…or other appropriate designation.

3 New, modification, removal

4 Enter design heat input capacity in MMBtu/hr.

5 Enter the fuel heating value in BTU/standard cubic foot.

Internal Combustion Engine Data Sheet(s)

ATTACHMENT M – INTERNAL COMBUSTION ENGINE DATA SHEET

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

Emission Unit ID#[1]	CE-1			
Engine Manufacturer/Model	Caterpillar G3304			
Manufacturers Rated bhp/rpm	95			
Source Status[2]	RS			
Date Installed/ Modified/Removed/Relocated[3]	2017			
Engine Manufactured /Reconstruction Date[4]	01/2008			
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5]	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☒ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources	☐40CFR60 Subpart JJJJ ☐JJJJ Certified? ☐40CFR60 Subpart IIII ☐IIII Certified? ☐40CFR63 Subpart ZZZZ ☐ NESHAP ZZZZ/ NSPS JJJJ Window ☐ NESHAP ZZZZ Remote Sources
Engine Type[6]	4SRB			
APCD Type[7]	3-Way Catalyst			
Fuel Type[8]	RG			
H_2S (gr/100 scf)	Neg.			
Operating bhp/rpm	95 / 1,800			
BSFC (BTU/bhp-hr)	8,735 (HHV @ 100%)			
Hourly Fuel Throughput	671 ft^3/hr	ft^3/hr	ft^3/hr	ft^3/hr
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)	5.9 $MMft^3/yr$	$MMft^3/yr$	$MMft^3/yr$	$MMft^3/yr$
Fuel Usage or Hours of Operation Metered	Yes ☒ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☒ No ☐

Calculation Methodology[9]	Pollutant[10]	Hourly PTE (lb/hr)[11]	Annual PTE (tpy)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tpy)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tpy)[11]	Hourly PTE (lb/hr)[11]	Annual PTE (tpy)[11]
See Emissions Calculations	NO_X	0.42	1.83						
See Emissions Calculations	CO	0.42	1.83						
See Emissions Calculations	VOC	0.23	1.02						
See Emissions Calculations	SO_2	<0.01	<0.01						
See Emissions Calculations	PM_{10}	0.02	0.07						
See Emissions Calculations	Formaldehyde	0.02	0.10						
See Emissions Calculations	Total HAPs	0.03	0.14						
See Emissions Calculations	GHG (CO_2e)	116	508						

1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. Microturbine generator engines should be designated MT-1, MT-2, MT-3 etc. If more than three (3) engines exist, please use additional sheets.

2 Enter the Source Status using the following codes:

NS	Construction of New Source (installation)	ES	Existing Source
MS	Modification of Existing Source	RS	Relocated Source
REM	Removal of Source		

3 Enter the date (or anticipated date) of the engine's installation (construction of source), modification, relocation or removal.

4 Enter the date that the engine was manufactured, modified or reconstructed.

5 Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart IIII/JJJJ? If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance as appropriate.

Provide a manufacturer's data sheet for all engines being registered.

6 Enter the Engine Type designation(s) using the following codes:

2SLB	Two Stroke Lean Burn	4SRB	Four Stroke Rich Burn
4SLB	Four Stroke Lean Burn		

7 Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

A/F	Air/Fuel Ratio	IR	Ignition Retard
HEIS	High Energy Ignition System	SIPC	Screw-in Precombustion Chambers
PSC	Prestratified Charge	LEC	Low Emission Combustion
NSCR	Rich Burn & Non-Selective Catalytic Reduction	OxCat	Oxidation Catalyst
SCR	Lean Burn & Selective Catalytic Reduction		

8 Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas /Production Gas	D	Diesel

9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

MD	Manufacturer's Data	AP	AP-42	
GR	GRI-HAPCalc™	OT	Other	(please list)

10 Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet*.

11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

Engine Air Pollution Control Device
(Emission Unit ID# CE-1, use extra pages as necessary)

Air Pollution Control Device Manufacturer's Data Sheet included?
Yes ☒ No ☐

☒ NSCR	☐ SCR	☐ Oxidation Catalyst

Provide details of process control used for proper mixing/control of reducing agent with gas stream:
N/A

Manufacturer: Murphy (or equivalent)	Model #: E237901 (or equivalent)
Design Operating Temperature: 1089 ºF	Design gas volume: 447 scfm
Service life of catalyst: TBD	Provide manufacturer data? ☒Yes ☐ No
Volume of gas handled: 447 at 1089 ºF	Operating temperature range for NSCR/Ox Cat: From 750 ºF to 1250 ºF
Reducing agent used, if any: N/A	Ammonia slip (ppm): N/A

Pressure drop against catalyst bed (delta P): 6 inches of H_2O

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:
TBD

Is temperature and pressure drop of catalyst required to be monitored per 40CFR63 Subpart ZZZZ?
☐ Yes ☒ No

How often is catalyst recommended or required to be replaced (hours of operation)?
TBD

How often is performance test required?
☐ Initial
☐ Annual
☐ Every 8,760 hours of operation
☐ Field Testing Required
☒ No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT: **Not Subject to NSPS JJJJ and no requirements under NESHAP ZZZZ.**

Tanker Truck Loading Data Sheet(s)

ATTACHMENT N – TANKER TRUCK LOADING DATA SHEET

Complete this data sheet for each new or modified bulk liquid transfer area or loading rack at the facility. This is to be used for bulk liquid transfer operations to tanker trucks. Use extra pages if necessary.

Truck Loadout Collection Efficiencies

The following applicable capture efficiencies of a truck loadout are allowed:

- For tanker trucks passing the MACT level annual leak test – 99.2%
- For tanker trucks passing the NSPS level annual leak test – 98.7%
- For tanker trucks not passing one of the annual leak tests listed above – 70%

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for ***every*** truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application and will be noted on the issued G35-D Registration.

Emission Unit ID#: EU-LOAD1 and EU-LOAD2	Emission Point ID#: EU-LOAD1 and EU-LOAD2	Year Installed/Modified: N/A
Emission Unit Description: Liquid loading of pipeline fluids		
Loading Area Data		
Number of Pumps: 2	Number of Liquids Loaded: 1	Max number of trucks loading at one (1) time: 1
Are tanker trucks pressure tested for leaks at this or any other location? ☒ Yes ☐ No ☒ Not Required If Yes, Please describe: Trucks may be DOT pressure tested per the standard requirements of 49 CFR 180.407, however, no collection efficiency is being claimed.		
Provide description of closed vent system and any bypasses. N/A		
Are any of the following truck loadout systems utilized? ☐ Closed System to tanker truck passing a MACT level annual leak test? ☐ Closed System to tanker truck passing a NSPS level annual leak test? ☒ Closed System to tanker truck not passing an annual leak test and has vapor return?		

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	2	2	2	2
Days/week	5	5	5	5

Bulk Liquid Data (use extra pages as necessary)

Liquid Name	Pipeline Fluids EU-LOAD1	Pipeline Fluids EU-LOAD2	
Max. Daily Throughput (1000 gal/day)	0.08 Mgal/day	0.04 Mgal/day	
Max. Annual Throughput (1000 gal/yr)	~30 Mgal/yr	15-16 Mgal/yr	
Loading Method[1]	SUB	SUB	
Max. Fill Rate (gal/min)	~60	~60	
Average Fill Time (min/loading)	~60	~60	
Max. Bulk Liquid Temperature (°F)	58.06	58.06	
True Vapor Pressure[2]	0.35	3.33	
Cargo Vessel Condition[3]	U	U	

Control Equipment or Method[4]		None	None	
Max. Collection Efficiency (%)		NA	NA	
Max. Control Efficiency (%)		0	0	
Max.VOC Emission Rate	Loading (lb/hr)	**See attached emissions calculations**	**See attached emissions calculations**	
	Annual (ton/yr)			
Max.HAP Emission Rate	Loading (lb/hr)			
	Annual (ton/yr)			
Estimation Method[5]		AP-42 Section 5.2 Methodology (via ProMax)	AP-42 Section 5.2 Methodology (via ProMax)	

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

Glycol Dehydration Unit Data Sheet(s)

ATTACHMENT O – GLYCOL DEHYDRATION UNIT DATA SHEET – NOT APPLICABLE

Complete this data sheet for each Glycol Dehydration Unit, Reboiler, Flash Tank and/or Regenerator at the facility. Include gas sample analysis and GRI- GLYCalc™ input and aggregate report. Use extra pages if necessary.

Manufacturer:	Model:
Max. Dry Gas Flow Rate:	Reboiler Design Heat Input:
Design Type: ☐ TEG ☐ DEG ☐ EG	Source Status[1]:
Date Installed/Modified/Removed[2]:	Regenerator Still Vent APCD/ERD[3]:
Control Device/ERD ID#[3]:	Fuel HV (BTU/scf):
H_2S Content (gr/100 scf):	Operation (hours/year):
Pump Rate (scfm):	
Water Content (wt %) in: Dry Gas:	

Is the glycol dehydration unit exempt from 40CFR63 Section 764(d)?
☐ Yes ☐ No: If Yes, answer the following:

The actual annual average flowrate of natural gas to the glycol dehydration unit is less than 85 thousand standard cubic meters per day, as determined by the procedures specified in §63.772(b)(1) of this subpart.
☐ Yes ☐ No

The actual average emissions of benzene from the glycol dehydration unit process vent to the atmosphere are less than 0.90 megagram per year (1 ton per year), as determined by the procedures specified in §63.772(b)(2) of this subpart.
☐ Yes ☐ No

Is the glycol dehydration unit located within an Urbanized Area (UA) or Urban Cluster (UC)?
☐ Yes ☐ No

Is a lean glycol pump optimization plan being utilized?
☐ Yes ☐ No

Recycling the glycol dehydration unit back to the flame zone of the reboiler.
☐ Yes ☐ No

If yes:
Is the reboiler configured to accept flash drum vapors (straight from the glycol dehydrator)? ☐ Yes ☐ No
Is the reboiler configured to accept still vent vapors (after a condenser)? ☐ Yes ☐ No
Is the reboiler configured to accept both in the same operation? ☐ Yes ☐ No

Recycling the glycol dehydration unit back to the flame zone of the reboiler and mixed with fuel.
☐ Yes ☐ No

What happens when temperature controller shuts off fuel to the reboiler?
☐ Still vent emissions to the atmosphere.
☐ Still vent emissions stopped with valve.
☐ Still vent emissions to glow plug.

Please indicate if the following equipment is present.
☐ Flash Tank
☐ Burner management system that continuously burns condenser or flash tank vapors

Control Device Technical Data

Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)

Emissions Data					
Emission Unit ID / Emission Point ID[4]	**Description**	**Calculation Methodology[5]**	**PTE[6]**	**Controlled Maximum Hourly Emissions (lb/hr)**	**Controlled Maximum Annual Emissions (tpy)**

1 Enter the Source Status using the following codes:
NS Construction of New Source ES Existing Source
MS Modification of Existing Source

2 Enter the date (or anticipated date) of the glycol dehydration unit's installation (construction of source), modification or removal.

3 Enter the Air Pollution Control Device (APCD)/Emission Reduction Device (ERD) type designation using the following codes and the device ID number:
NA None CD Condenser FL Flare
CC Condenser/Combustion Combination TO Thermal Oxidizer O Other (please list)

4 Enter the appropriate Emission Unit ID Numbers and Emission Point ID Numbers for the glycol dehydration unit reboiler vent and glycol regenerator still vent. The glycol dehydration unit reboiler vent and glycol regenerator still vent should be designated RBV-1 and RSV-1, respectively. If the compressor station incorporates multiple glycol dehydration units, a Glycol Dehydration Emission Unit Data Sheet shall be completed for each, using Source Identification RBV-2 and RSV-2, RBV-3 and RSV-3, etc.

5 Enter the Potential Emissions Data Reference designation using the following codes:
MD Manufacturer's Data AP AP-42
GR GRI-GLYCalc™ OT Other (please list)

6 Enter the Reboiler Vent and Glycol Regenerator Still Vent Potential to Emit (PTE) for the listed regulated pollutants in lbs per hour and tons per year. The Glycol Regenerator Still Vent potential emissions may be determined using the most recent version of the thermodynamic software model GRI-GLYCalc™ (Radian International LLC & Gas Research Institute). **Attach all referenced Potential Emissions Data (or calculations) and the GRI-GLYCalc™ Aggregate Calculations Report (shall include emissions reports, equipment reports, and stream reports) to this Glycol Dehydration Emission Unit Data Sheet(s). Backup pumps do not have to be considered as operating for purposes of PTE.** This PTE data shall be incorporated in the Emissions Summary Sheet.

Pneumatic Controller Data Sheet(s)

ATTACHMENT P – PNEUMATIC CONTROLLERS DATA SHEET

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after September 18, 2015?

☒ Yes ☐ No

Please list approximate number: 2 Low Bleed Pneumatic Devices

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list approximate number.

Centrifugal Compressor Data Sheet(s)

ATTACHMENT Q – CENTRIFUGAL COMPRESSOR DATA SHEET - NOT APPLICABLE

Are there any centrifugal compressors at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list:

Emission Unit ID#	Compressor Description

Are there any centrifugal compressors at this facility that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list:

Emission Unit ID#	Compressor Description

Reciprocating Compressor Data Sheet(s)

ATTACHMENT R – RECIPROCATING COMPRESSOR DATA SHEET – NOT APPLICABLE (CE-1 IS A SCREW COMPRESSOR)

Are there any reciprocating compressors at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?

☐ Yes ☒ No

Please list:

Emission Unit ID#	Compressor Description

Are there any reciprocating compressors at this facility that commenced construction, modification or reconstruction after September 18, 2015?

☐ Yes ☒ No

Please list:

Emission Unit ID#	Compressor Description

Blowdown and Pigging Operation Data Sheet(s)

ATTACHMENT S – BLOWDOWN AND PIGGING OPERATIONS DATA SHEET

Will there be any blowdown and pigging operations that occur at this facility?

☒ Yes ☐ No

Please list:

Type of Event	# of Events (event/yr)	Amount Vented per event (scf/event)	MW of vented gas (lb/lb-mol)	Total Emissions* (ton/yr)	VOC weight fraction	VOC emissions (ton/yr)
Compressor Blowdown	60	4,500	20.31	7.24	0.1938	1.40
Compressor Startup	60	1,000	20.31	1.61	0.1938	0.31
Plant Shutdown	1	100,000	20.31	2.68	0.1938	0.52

Type of Event	# of Events (event/yr)	Amount Vented per event (scf/event)	MW of vented gas (lb/lb-mol)	Total Emissions* (ton/yr)	HAP weight fraction	HAP emissions (ton/yr)
Compressor Blowdown	60	4,500	20.31	7.24	0.0166	0.12
Compressor Startup	60	1,000	20.31	1.61	0.0166	0.03
Plant Shutdown	1	100,000	20.31	2.68	0.0166	0.04

*Total emissions represent total natural gas.

Air Pollution Control Device Data Sheet(s)

ATTACHMENT T – AIR POLLUTION CONTROL DEVICE / EMISSION REDUCTION DEVICE SHEETS NOT APPLICABLE

Complete the applicable air pollution control device sheets for each flare, vapor combustor, thermal oxidizer, condenser, adsorption system, vapor recovery unit, BTEX Eliminator, Reboiler with and without Glow Plug, etc. at the facility. Use extra pages if necessary.

Emissions calculations must be performed using the most conservative control device efficiency.

The following five (5) rows are only to be completed if registering an alternative air pollution control device.	
Emission Unit ID: N/A	Make/Model:
Primary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No
Secondary Control Device ID:	Make/Model:
Control Efficiency (%):	APCD/ERD Data Sheet Completed: ☐ Yes ☐ No

VAPOR COMBUSTION – Not Applicable
(Including Enclosed Combustors)

General Information

Control Device ID#: N/A	Installation Date: ☐ New ☐ Modified ☐ Relocated	
Maximum Rated Total Flow Capacity scfh scfd	Maximum Design Heat Input (from mfg. spec sheet) MMBTU/hr	Design Heat Content BTU/scf

Control Device Information

Type of Vapor Combustion Control?

☐ Enclosed Combustion Device ☐ Elevated Flare ☐ Ground Flare
☐ Thermal Oxidizer

Manufacturer: Model:	Hours of operation per year?

List the emission units whose emissions are controlled by this vapor control device (Emission Point ID#)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description

If this vapor combustor controls emissions from more than six (6) emission units, please attach additional pages.

Assist Type (Flares only)	Flare Height	Tip Diameter	Was the design per §60.18?
☐ Steam ☐ Air ☐ Pressure ☐ Non	feet	feet	☐ Yes ☐ No Provide determination.

Waste Gas Information

Maximum Waste Gas Flow Rate (scfm)	Heat Value of Waste Gas Stream BTU/ft^3	Exit Velocity of the Emissions Stream (ft/s)

Provide an attachment with the characteristics of the waste gas stream to be burned.

Pilot Gas Information

Number of Pilot Lights	Fuel Flow Rate to Pilot Flame per Pilot scfh	Heat Input per Pilot BTU/hr	Will automatic re-ignition be used? ☐ Yes ☐ No

If automatic re-ignition is used, please describe the method.

Is pilot flame equipped with a monitor to detect the presence of the flame? ☐ Yes ☐ No	If Yes, what type? ☐ Thermocouple ☐ Infrared ☐ Ultraviolet ☐ Camera ☐ Other:

Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty. *(If unavailable, please indicate).*

Additional information attached? ☐ Yes ☐ No
Please attach copies of manufacturer's data sheets, drawings, flame demonstration per §60.18 or §63.11(b) and performance testing.

CONDENSER – Not Applicable		
General Information		
Control Device ID#: N/A	Installation Date: ☐ New ☐ Modified ☐ Relocated	
Manufacturer:	Model:	Control Device Name:
Control Efficiency (%):		
Manufacturer's required temperature range for control efficiency. °F		
Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:		
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.		
Additional information attached? ☐ Yes ☐ No Please attach copies of manufacturer's data sheets.		
Is condenser routed to a secondary APCD or ERD? ☐ Yes ☐ No		

ADSORPTION SYSTEM – Not Applicable		
General Information		
Control Device ID#: N/A	Installation Date: ☐ New ☐ Modified ☐ Relocated	
Manufacturer:	Model:	Control Device Name:
Design Inlet Volume: scfm	Adsorbent charge per adsorber vessel and number of adsorber vessels:	
Length of Mass Transfer Zone supplied by the manufacturer:	Adsorber diameter: ft Adsorber area: ft^2	
Adsorbent type and physical properties:	Overall Control Efficiency (%):	
Working Capacity of Adsorbent (%):		
Operating Parameters		
Inlet volume: scfm @ °F		
Adsorption time per adsorption bed (life expectancy):	Breakthrough Capacity (lbs of VOC/100 lbs of adsorbent):	
Temperature range of carbon bed adsorber. °F - °F		
Control Device Technical Data		
Pollutants Controlled	Manufacturer's Guaranteed Control Efficiency (%)	
Describe the warning and/or alarm system that protects against operation when unit is not meeting the design requirements:		
Has the control device been tested by the manufacturer and certified?		
Describe all operating ranges and maintenance procedures required by the manufacturer to maintain the warranty.		
Additional information attached? ☐ Yes ☐ No Please attach copies of manufacturer's data sheets, drawings, and performance testing.		

VAPOR RECOVERY UNIT – Not Applicable

General Information

Emission Unit ID#: N/A	Installation Date: ☐ New ☐ Modified ☐ Relocated

Device Information

Manufacturer:
Model:

List the emission units whose emissions are controlled by this vapor recovery unit (Emission Point ID#)

Emission Unit ID#	Emission Source Description	Emission Unit ID#	Emission Source Description

If this vapor recovery unit controls emissions from more than six (6) emission units, please attach additional pages.

Additional information attached? ☐ Yes ☐ No
Please attach copies of manufacturer's data sheets, drawings, and performance testing.

The registrant may claim a capture and control efficiency of 95 % (which accounts for 5% downtime) for the vapor recovery unit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup flare that meet the requirements of Section 8.1.2 of this general permit.

The registrant may claim a capture and control efficiency of 98% if the VRU has a backup VRU.

Emission Calculations

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Facility-Wide Emission Summary

Wells	1	930 feet from site
Storage Tanks:	2	per site
Compressors:	1	per site
High Pressure Separators:	1	per site
Length of lease road:	15,000	feet

Carbon equivalent emissions (CO_2e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:

CO_2	1
CH_4	25
N_2O	298

Emission Point ID #	Emission Source ID#s	Emission Source Description	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		CH_4		CO_2e	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	CE-1	Caterpillar G3304 Comp. Engine	0.42	1.83	0.42	1.83	0.23	1.02	<0.01	<0.01	0.02	0.07	0.02	0.07	0.51	2.24	115.87	507.53
TK1	TK1	Pipeline Fluids Tank	---	---	---	---	<0.01	0.01	---	---	---	---	---	---	1.5E-03	0.01	0.04	0.16
TK2	TK2	Pipeline Fluids Tank	---	---	---	---	0.15	0.65	---	---	---	---	---	---	<0.01	<0.01	<0.01	<0.01
EU-LOAD1	EU-LOAD1	Liquid Loading TK1	---	---	---	---	0.04	0.01	---	---	---	---	---	---	<0.01	<0.01	<0.01	<0.01
EU-LOAD2	EU-LOAD2	Liquid Loading TK2	---	---	---	---	0.04	0.01	---	---	---	---	---	---	<0.01	<0.01	<0.01	<0.01
---	---	Fugitives	---	---	---	---	---	2.74	---	---	---	---	---	---	---	8.30	---	207.57
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	0.33	---	0.03	---	---	---	---
Facility Total			0.42	1.83	0.42	1.83	0.47	4.45	<0.01	<0.01	0.02	0.40	0.02	0.10	0.51	10.55	115.91	715.26
Facility Total (excluding fugitive emissions)			0.42	1.83	0.42	1.83	0.47	1.71	<0.01	<0.01	0.02	0.07	0.02	0.07	0.51	2.24	115.91	507.69

Emission Point ID #	Emission Source ID#s	Emission Source Description	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		n-Hexane		Total BTEX		Total HAP	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	CE-1	Caterpillar G3304 Comp. Engine	0.02	0.10	1.3E-03	5.7E-03	4.6E-04	2.0E-03	2.1E-05	9.0E-05	1.6E-04	7.1E-04	---	---	2.0E-03	0.01	0.03	0.14
TK1	TK1	Pipeline Fluids Tank	---	---	4.9E-06	2.1E-05	8.0E-06	3.5E-05	4.6E-07	2.0E-06	1.9E-06	8.2E-06	3.9E-04	1.7E-03	1.5E-05	6.7E-05	4.1E-04	1.8E-03
TK2	TK2	Pipeline Fluids Tank	---	---	2.2E-04	9.8E-04	3.3E-04	1.4E-03	1.6E-05	6.9E-05	6.2E-05	2.7E-04	0.02	0.08	6.3E-04	2.8E-03	0.02	0.08
EU-LOAD1	EU-LOAD1	Liquid Loading TK1	---	---	3.8E-05	9.9E-06	5.6E-05	1.5E-05	2.7E-06	7.1E-07	1.3E-05	3.3E-06	4.7E-03	1.2E-03	2.2E-04	5.7E-05	4.8E-03	1.2E-03
EU-LOAD2	EU-LOAD2	Liquid Loading TK2	---	---	3.8E-05	9.8E-06	5.5E-05	1.4E-05	2.7E-06	6.9E-07	1.3E-05	3.3E-06	4.6E-03	1.2E-03	1.1E-04	2.8E-05	4.7E-03	1.2E-03
---	---	Fugitives	---	---	---	3.0E-03	---	4.3E-03	---	2.2E-04	---	8.9E-04	---	0.23	---	8.4E-03	---	0.24
---	---	Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Facility Total			0.02	0.10	1.6E-03	9.8E-03	9.1E-04	7.8E-03	4.2E-05	3.8E-04	2.5E-04	1.9E-03	0.03	0.31	2.9E-03	0.02	0.06	0.46
Facility Total (excluding fugitive emissions)			0.02	0.10	1.6E-03	6.8E-03	9.1E-04	3.5E-03	4.2E-05	1.6E-04	2.5E-04	1.0E-03	0.03	0.08	2.9E-03	0.01	0.06	0.23

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Compressor Engine

Engine Information:

Source Designation:	**CE-1**
Manufacturer:	Caterpillar
Model No.:	G3304 NA
Stroke Cycle:	4-stroke
Type of Burn:	Rich
Rated Horsepower (bhp):	95

Engine Fuel Information:

Fuel Type:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,237
Specific Fuel Consumption (Btu/bhp-hr):	8,735
Maximum Fuel Consumption at 100% Load (scf/hr):	671
Heat Input (MMBtu/hr):	0.83
Potential Fuel Consumption (MMBtu/yr):	7,269
Max. Fuel Consumption at 100% (MMscf/hr):	0.0007
Max. Fuel Consumption (MMscf/yr):	5.9
Max. Annual Hours of Operation (hr/yr):	8,760

Engine Emissions Data:

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
NO_X	2.00	g/bhp-hr	0.42	1.83	Manufacturer Specifications
VOC (excludes HCHO)	1.00	g/bhp-hr	0.21	0.92	Manufacturer Specifications
VOC (includes HCHO)	---	---	0.23	1.02	VOC + HCHO
CO	2.00	g/bhp-hr	0.42	1.83	Manufacturer Specifications
SO_X	0.001	lb/MMBtu	0.00	0.00	AP-42, Table 3.2-3 (Aug-2000)
PM_{10}	0.02	lb/MMBtu	0.02	0.07	AP-42, Table 3.2-3 (Aug-2000)
$PM_{2.5}$	0.02	lb/MMBtu	0.02	0.07	AP-42, Table 3.2-3 (Aug-2000)
Formaldehyde (HCHO)	0.11	g/bhp-hr	0.02	0.10	Manufacturer Specifications
GHG (CO_2e)	See Table Below		116	508	40 CFR 98, Tables C-1 & C-2
Other (Total HAP)	See Table Below		0.03	0.14	AP-42, Table 3.2-3 (Aug-2000)

1. PM_{10} and $PM_{2.5}$ are total values (filterable + condensable).
2. GHG (CO_2e) is carbon dioxide equivalent, which is the summation of CO_2 (GWP = 1) + CH_4 (GWP = 25) + N_2O (GWP = 298).
3. Total HAP is the summation of all hazardous air pollutants for which there is a published emission factor for this source type.

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Compressor Engine

Greenhouse Gas (GHG) & Hazardous Air Pollutant (HAP) Emissions Calculations:

Pollutant	Emission Factor	Units	Maximum Potential Emissions		Estimation Basis / Emission Factor Source
			lbs/hr	tpy	
GHGs:					
CO_2	492.00	g/bhp-hr	103.04	451.33	Manufacturer Specifications
CH_4	2.440	g/bhp-hr	0.51	2.24	Manufacturer (THC - NMHC)
N_2O	0.0001	kg/MMBtu	0.00	0.00	40 CFR 98, Table C-2
GHG (CO_2e)			**116**	**508**	
Organic HAPs:					
1,1,2,2-Tetrachloroethane	2.53E-05	lb/MMBtu	2.1E-05	9.2E-05	AP-42, Table 3.2-3 (Aug-2000)
1,1,2-Trichloroethane	1.53E-05	lb/MMBtu	1.3E-05	5.6E-05	AP-42, Table 3.2-3 (Aug-2000)
1,3-Butadiene	6.63E-04	lb/MMBtu	5.5E-04	2.4E-03	AP-42, Table 3.2-3 (Aug-2000)
1,3-Dichloropropene	1.27E-05	lb/MMBtu	1.1E-05	4.6E-05	AP-42, Table 3.2-3 (Aug-2000)
Acetaldehyde	2.79E-03	lb/MMBtu	2.3E-03	1.0E-02	AP-42, Table 3.2-3 (Aug-2000)
Acrolein	2.63E-03	lb/MMBtu	2.2E-03	9.6E-03	AP-42, Table 3.2-3 (Aug-2000)
Benzene	1.58E-03	lb/MMBtu	1.3E-03	5.7E-03	AP-42, Table 3.2-3 (Aug-2000)
Carbon Tetrachloride	1.77E-05	lb/MMBtu	1.5E-05	6.4E-05	AP-42, Table 3.2-3 (Aug-2000)
Chlorobenzene	1.29E-05	lb/MMBtu	1.1E-05	4.7E-05	AP-42, Table 3.2-3 (Aug-2000)
Chloroform	1.37E-05	lb/MMBtu	1.1E-05	5.0E-05	AP-42, Table 3.2-3 (Aug-2000)
Ethylbenzene	2.48E-05	lb/MMBtu	2.1E-05	9.0E-05	AP-42, Table 3.2-3 (Aug-2000)
Ethylene Dibromide	2.13E-05	lb/MMBtu	1.8E-05	7.7E-05	AP-42, Table 3.2-3 (Aug-2000)
Methanol	3.06E-03	lb/MMBtu	2.5E-03	1.1E-02	AP-42, Table 3.2-3 (Aug-2000)
Methylene Chloride	4.12E-05	lb/MMBtu	3.4E-05	1.5E-04	AP-42, Table 3.2-3 (Aug-2000)
Naphthalene	9.71E-05	lb/MMBtu	8.1E-05	3.5E-04	AP-42, Table 3.2-3 (Aug-2000)
PAH	1.41E-04	lb/MMBtu	1.2E-04	5.1E-04	AP-42, Table 3.2-3 (Aug-2000)
Styrene	1.19E-05	lb/MMBtu	9.9E-06	4.3E-05	AP-42, Table 3.2-3 (Aug-2000)
Toluene	5.58E-04	lb/MMBtu	4.6E-04	2.0E-03	AP-42, Table 3.2-3 (Aug-2000)
Vinyl Chloride	7.18E-06	lb/MMBtu	6.0E-06	2.6E-05	AP-42, Table 3.2-3 (Aug-2000)
Xylene	1.95E-04	lb/MMBtu	1.6E-04	7.1E-04	AP-42, Table 3.2-3 (Aug-2000)
Total HAP (including HCHO)			**0.03**	**0.14**	

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Storage Vessel - TK1

Operational Hours 8,760 hrs/yr
Maximum Produced Water Throughput[1] 1 bbl/day

Storage Tanks - Uncontrolled

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Methane	6.0E-05	2.6E-04	1.2E-05	5.1E-05	1.40E-03	6.14E-03	1.47E-03	6.45E-03
Propane	1.0E-04	4.4E-04	2.0E-05	8.6E-05	9.67E-04	4.24E-03	1.09E-03	4.76E-03
Isobutane	2.6E-05	1.1E-04	5.0E-06	2.2E-05	2.8E-04	1.24E-03	3.1E-04	1.37E-03
n-Butane	4.7E-05	2.1E-04	9.1E-06	4.0E-05	5.19E-04	2.27E-03	5.75E-04	2.52E-03
Isopentane	2.5E-05	1.1E-04	4.8E-06	2.1E-05	2.9E-04	1.27E-03	3.2E-04	1.40E-03
n-Pentane	1.8E-05	8.0E-05	3.5E-06	1.5E-05	2.2E-04	9.53E-04	2.4E-04	1.05E-03
Hexane	3.0E-05	1.3E-04	5.7E-06	2.5E-05	3.6E-04	1.56E-03	3.9E-04	1.71E-03
Heptane	1.9E-05	8.3E-05	3.7E-06	1.6E-05	2.5E-04	1.08E-03	2.7E-04	1.18E-03
Octane	3.9E-06	1.7E-05	7.6E-07	3.3E-06	5.3E-05	2.3E-04	5.8E-05	2.5E-04
Nonane	2.0E-06	9.0E-06	4.0E-07	1.7E-06	2.9E-05	1.3E-04	3.1E-05	1.4E-04
Decane	2.3E-07	1.0E-06	4.5E-08	2.0E-07	3.6E-06	1.6E-05	3.8E-06	1.7E-05
Undecane	1.3E-08	5.8E-08	2.6E-09	1.1E-08	2.2E-07	9.5E-07	2.3E-07	1.0E-06
Dodecane	8.5E-09	3.7E-08	1.7E-09	7.3E-09	1.5E-07	6.6E-07	1.6E-07	7.0E-07
Tridecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	2.6E-07	1.1E-06	5.0E-08	2.2E-07	4.6E-06	2.0E-05	4.9E-06	2.1E-05
Toluene	4.0E-07	1.8E-06	7.8E-08	3.4E-07	7.5E-06	3.3E-05	8.0E-06	3.5E-05
Ethylbenzene	2.4E-08	1.1E-07	4.7E-09	2.1E-08	4.3E-07	1.9E-06	4.6E-07	2.0E-06
m-Xylene	1.0E-07	4.5E-07	2.0E-08	8.8E-08	1.4E-06	6.3E-06	1.6E-06	6.9E-06
o-Xylene	1.4E-08	6.0E-08	2.6E-09	1.2E-08	2.9E-07	1.3E-06	3.1E-07	1.4E-06
Total VOC Emissions:	2.71E-04	1.19E-03	5.27E-05	2.31E-04	2.98E-03	0.01	3.30E-03	0.01
Total HAP Emissions:	3.04E-05	1.33E-04	5.90E-06	2.59E-05	3.69E-04	1.62E-03	4.06E-04	1.78E-03

[1] Uncontrolled emissions calculation using Promax.

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Liquid Loading - TK1

Throughput (total):	29,740	gal/yr
Throughput (TK-1 only):	14,410	gal/yr
Control Efficiency	0%	Combustor destruction efficiency

Liquid Loading Emissions

	Uncontrolled Emissions		Uncaptured Emissions		Controlled Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Methane	1.18E-04	3.06E-05	1.18E-04	3.06E-05	1.18E-04	3.06E-05
Propane	1.97E-04	5.13E-05	1.97E-04	5.13E-05	1.97E-04	5.13E-05
Isobutane	5.07E-05	1.32E-05	5.07E-05	1.32E-05	5.07E-05	1.32E-05
n-Butane	9.22E-05	2.40E-05	9.22E-05	2.40E-05	9.22E-05	2.40E-05
Isopentane	4.82E-05	1.25E-05	4.82E-05	1.25E-05	4.82E-05	1.25E-05
n-Pentane	3.57E-05	9.27E-06	3.57E-05	9.27E-06	3.57E-05	9.27E-06
Hexane	5.81E-05	1.51E-05	5.81E-05	1.51E-05	5.81E-05	1.51E-05
Heptane	3.70E-05	9.63E-06	3.70E-05	9.63E-06	3.70E-05	9.63E-06
Octane	7.66E-06	1.99E-06	7.66E-06	1.99E-06	7.66E-06	1.99E-06
Nonane	4.02E-06	1.04E-06	4.02E-06	1.04E-06	4.02E-06	1.04E-06
Decane	4.58E-07	1.19E-07	4.58E-07	1.19E-07	4.58E-07	1.19E-07
Undecane	2.61E-08	6.78E-09	2.61E-08	6.78E-09	2.61E-08	6.78E-09
Dodecane	1.68E-08	4.36E-09	1.68E-08	4.36E-09	1.68E-08	4.36E-09
Tridecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	5.10E-07	1.33E-07	5.10E-07	1.33E-07	5.10E-07	1.33E-07
Toluene	7.91E-07	2.06E-07	7.91E-07	2.06E-07	7.91E-07	2.06E-07
Ethylbenzene	4.74E-08	1.23E-08	4.74E-08	1.23E-08	4.74E-08	1.23E-08
m-Xylene	2.03E-07	5.27E-08	2.03E-07	5.27E-08	2.03E-07	5.27E-08
o-Xylene	2.68E-08	6.96E-09	2.68E-08	6.96E-09	2.68E-08	6.96E-09
Total VOC Emissions (TK-1 only):	5.33E-04	1.39E-04	5.33E-04	1.39E-04	5.33E-04	1.39E-04
Total HAP Emissions (TK-1 only):	6.0E-05	1.55E-05	5.97E-05	1.55E-05	5.97E-05	1.55E-05
Total VOC Emissions (combined):	4.29E-02	1.11E-02	4.29E-02	1.11E-02	0.04	0.01
Total HAP Emissions (combined):	4.8E-03	1.24E-03	4.78E-03	1.24E-03	4.78E-03	1.24E-03

[1] Uncontrolled emissions calculation using Promax.
[2] Hourly emissions assume two hours of loading per day, five days per week.

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Storage Vessel - TK2

Operational Hours 8,760 hrs/yr
Maximum Produced Water Throughput[1] 1 bbl/day

Storage Tanks - Uncontrolled

	Breathing		Working		Flashing		Total Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Propane	1.18E-03	5.18E-03	1.48E-03	6.50E-03	4.54E-02	1.99E-01	4.81E-02	2.10E-01
Isobutane	3.4E-04	1.48E-03	4.2E-04	1.86E-03	1.41E-02	6.19E-02	1.49E-02	6.53E-02
n-Butane	6.30E-04	2.76E-03	7.90E-04	3.46E-03	2.63E-02	1.15E-01	2.77E-02	1.21E-01
Isopentane	3.2E-04	1.39E-03	4.0E-04	1.75E-03	1.45E-02	6.36E-02	1.52E-02	6.67E-02
n-Pentane	2.4E-04	1.04E-03	3.0E-04	1.30E-03	1.08E-02	4.72E-02	1.13E-02	4.95E-02
Hexane	3.6E-04	1.59E-03	4.6E-04	2.00E-03	1.66E-02	7.28E-02	1.74E-02	7.64E-02
Heptane	2.1E-04	9.30E-04	2.7E-04	1.17E-03	1.05E-02	4.62E-02	1.10E-02	4.83E-02
Octane	3.6E-05	1.6E-04	4.5E-05	2.0E-04	1.87E-03	8.19E-03	1.95E-03	8.55E-03
Nonane	1.2E-05	5.3E-05	1.5E-05	6.7E-05	6.57E-04	2.88E-03	6.85E-04	3.00E-03
Decane	6.5E-07	2.9E-06	8.2E-07	3.6E-06	3.8E-05	1.7E-04	4.0E-05	1.7E-04
Undecane	1.3E-08	5.5E-08	1.6E-08	6.9E-08	7.8E-07	3.4E-06	8.1E-07	3.5E-06
Dodecane	2.6E-09	1.1E-08	3.2E-09	1.4E-08	1.7E-07	7.6E-07	1.8E-07	7.8E-07
Tridecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	3.0E-06	1.3E-05	3.7E-06	1.6E-05	2.2E-04	9.54E-04	2.2E-04	9.83E-04
Toluene	4.4E-06	1.9E-05	5.5E-06	2.4E-05	3.2E-04	1.41E-03	3.3E-04	1.45E-03
Ethylbenzene	2.1E-07	9.2E-07	2.6E-07	1.2E-06	1.5E-05	6.7E-05	1.6E-05	6.9E-05
m-Xylene	8.8E-07	3.9E-06	1.1E-06	4.9E-06	5.0E-05	2.2E-04	5.2E-05	2.3E-04
o-Xylene	1.1E-07	4.9E-07	1.4E-07	6.1E-07	9.8E-06	4.3E-05	1.0E-05	4.4E-05
Total VOC Emissions:	3.34E-03	0.01	4.19E-03	0.02	0.14	0.62	0.15	0.65
Total HAP Emissions:	3.72E-04	1.63E-03	4.67E-04	2.05E-03	0.02	0.08	0.02	0.08

[1] Uncontrolled emissions calculation using Promax.

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Liquid Loading - TK2

Throughput	15,330	gal/yr
Control Efficiency	0%	Combustor destruction efficiency

Liquid Loading Emissions

	Uncontrolled Emissions		Uncaptured Emissions		Controlled Emissions	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Methane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Propane	1.50E-02	3.90E-03	1.50E-02	3.90E-03	1.50E-02	3.90E-03
Isobutane	4.30E-03	1.12E-03	4.30E-03	1.12E-03	4.30E-03	1.12E-03
n-Butane	7.98E-03	2.08E-03	7.98E-03	2.08E-03	7.98E-03	2.08E-03
Isopentane	4.03E-03	1.05E-03	4.03E-03	1.05E-03	4.03E-03	1.05E-03
n-Pentane	3.00E-03	7.79E-04	3.00E-03	7.79E-04	3.00E-03	7.79E-04
Hexane	4.62E-03	1.20E-03	4.62E-03	1.20E-03	4.62E-03	1.20E-03
Heptane	2.69E-03	7.00E-04	2.69E-03	7.00E-04	2.69E-03	7.00E-04
Octane	4.59E-04	1.19E-04	4.59E-04	1.19E-04	4.59E-04	1.19E-04
Nonane	1.55E-04	4.03E-05	1.55E-04	4.03E-05	1.55E-04	4.03E-05
Decane	8.29E-06	2.16E-06	8.29E-06	2.16E-06	8.29E-06	2.16E-06
Undecane	1.59E-07	4.12E-08	1.59E-07	4.12E-08	1.59E-07	4.12E-08
Dodecane	3.24E-08	8.43E-09	3.24E-08	8.43E-09	3.24E-08	8.43E-09
Tridecane	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	3.76E-05	9.78E-06	3.76E-05	9.78E-06	3.76E-05	9.78E-06
Toluene	5.52E-05	1.44E-05	5.52E-05	1.44E-05	5.52E-05	1.44E-05
Ethylbenzene	2.67E-06	6.93E-07	2.67E-06	6.93E-07	2.67E-06	6.93E-07
m-Xylene	1.12E-05	2.91E-06	1.12E-05	2.91E-06	1.12E-05	2.91E-06
o-Xylene	1.42E-06	3.69E-07	1.42E-06	3.69E-07	1.42E-06	3.69E-07
Total VOC Emissions:	4.23E-02	1.10E-02	4.23E-02	1.10E-02	4.23E-02	1.10E-02
Total HAP Emissions:	4.72E-03	1.23E-03	4.72E-03	1.23E-03	4.72E-03	1.23E-03

[1] Uncontrolled emissions calculation using Promax.
[2] Hourly emissions assume two hours of loading per day, five days per week.

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Fugitive Emissions

Fugitive VOC/Total Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Weight Fraction VOC	Weight Fraction HAP	VOC Emissions[3] (tpy)	HAP Emissions[3] (tpy)
Valves	Gas	4.50E-03	5	0.22	0.19	0.02	0.04	3.6E-03
Flanges	Gas	3.90E-04	43	0	0.19	0.02	0.03	2.7E-03
Compressor Seals	Gas	8.80E-03	3	0.25	0.19	0.02	0.05	4.2E-03
Relief Valves	Gas	8.80E-03	5	0.42	0.19	0.02	0.08	0.01
Open-Ended Lines	Gas	2.00E-03	0	0.00	0.19	0.02	0.00	0.00
Valves	Light Liquid	2.50E-03	33	0.80	0.19	0.02	0.2	0.01
Flanges	Light Liquid	1.10E-04	120	0.13	0.19	0.02	0.02	2.1E-03
Pump Seals	Light Liquid	1.30E-02	0	0.00	0.19	0.02	0.00	0.00
Other	Light Liquid	7.50E-02	0	0.00	0.19	0.02	0.00	0.00
Pneumatic Pump[4]	Gas	13.30	0	0.00	0.19	0.02	0.00	0.00
Intermittent-Bleed Pneumatic Devices[4]	Gas	13.50	0	0.00	0.19	0.02	0.00	0.00
Low-Bleed Pneumatic Devices[4]	Gas	1.39	2	0.65	0.19	0.02	0.13	0.01
			Emission Totals:	**2.64**	**---**	**---**	**0.51**	**0.04**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-4. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). The low-bleed pneumatic controller value is from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr-component).

[2] Pressure relief valves count includes two for each storage tank. A 50% compliance margin is added to the component counts based on Subpart W counts.

[3] Potential emissions VOC/HAP (tpy) = Emission factor (kg/hr/source) * Number of Sources * Weight % VOC/HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

[4] Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Fugitive Emissions

Fugitive Specific HAP Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Benzene Emissions[3] (tpy)	Toluene Emissions[3] (tpy)	Ethylbenzene Emissions[3] (tpy)	Xylene Emissions[3] (tpy)	n-Hexane Emissions[4] (tpy)
Valves	Gas	0.00450	5	0.22	4.6E-05	6.6E-05	3.4E-06	1.4E-05	3.5E-03
Flanges	Gas	0.00039	43	0.16	3.4E-05	4.9E-05	2.5E-06	1.0E-05	2.6E-03
Compressor Seals	Gas	0.00880	3	0.25	5.4E-05	7.7E-05	4.0E-06	1.6E-05	4.1E-03
Relief Valves	Gas	0.00880	5	0.42	9.0E-05	1.3E-04	6.7E-06	2.7E-05	0.01
Open-Ended Lines	Gas	0.00200	0	0.00	0.00	0.00	0.00	0.00	0.00
Valves	Light Liquid	0.00250	33	0.80	1.7E-04	2.4E-04	1.2E-05	5.0E-05	0.01
Flanges	Light Liquid	0.00011	120	0.13	2.7E-05	3.9E-05	2.0E-06	8.0E-06	2.0E-03
Pump Seals	Light Liquid	0.01300	0	0.00	0.00	0.00	0.00	0.00	0.00
Other	Light Liquid	0.07500	0	0.00	0.00	0.00	0.00	0.00	0.00
Pneumatic Pump[4]	Gas	13.30	0	0.00	0.00	0.00	0.00	0.00	0.00
Intermittent-Bleed Pneumatic Devices[4]	Gas	13.50	0	0.00	0.00	0.00	0.00	0.00	0.00
Low-Bleed Pneumatic Devices[4]	Gas	1.39	2	0.65	1.4E-04	2.0E-04	1.0E-05	4.1E-05	0.01
			Emission Totals:	**2.64**	**5.6E-04**	**8.0E-04**	**4.1E-05**	**1.7E-04**	**0.04**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-4. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). The low-bleed pneumatic controller value is from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr-component).

[2] Pressure relief valves count includes one Emergency Pressure Relief valve and one hatch for each storage tank. A 50% compliance margin is added to the component counts based on Subpart W counts.

[3] Potential emissions HAP (tpy) = Emission factor (kg/hr/source) * Number of Sources * Weight % HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

[4] Potential emissions HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Fugitive Emissions

GHG Fugitive Emissions from Component Leaks

Component	Service	GHG Emission Factor[1] cf/hr/componen	Component Count	CH_4 Emissions[2,3] (tpy)	CO_2 Emissions[2,3] (tpy)	CO_2e Emissions[4] (tpy)
Valves	Gas	0.027	5	0.02	6.6E-05	0.52
Flanges	Gas	0.003	43	0.02	6.3E-05	0.49
Compressor Seals	Gas	0.0088	3	4.0E-03	1.3E-05	0.10
Relief Valves	Gas	0.04	5	0.03	9.8E-05	0.76
Open-Ended Lines	Gas	0.061	0	0.00	0.00	0.00
Valves	Light Liquid	0.05	33	0.25	8.1E-04	6.30
Flanges	Light Liquid	0.003	120	0.05	1.8E-04	1.37
Pump Seals	Light Liquid	0.01	0	0.00	0.00	0.00
Other	Light Liquid	0.30	0	0.00	0.00	0.00
Pneumatic Pump[4]	Gas	13.30	0	0.00	0.00	0.00
Intermittent-Bleed Pneumatic Devices[4]	Gas	13.50	0	0.00	0.00	0.00
Low-Bleed Pneumatic Devices[4]	Gas	1.39	2	0.42	1.4E-03	10.61
Total				**0.81**	**2.6E-03**	**20.16**

[1] Population emission factors for gas service in the Eastern U.S. from *Table W-1A of Subpart W - Default Whole Gas Emission Factors for Onshore Production* , 40 CFR 98, Subpart W (table W-6 for compressor).

[2] Calculated in accordance with Equations W-32a, W-35 and W-36 in Subpart W of 40 CFR 98. See footnote 4 above for sample calculation.

[3] Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)
Mole fractions of CH_4 and CO_2 based on gas analysis:

CH_4: 82%
CO_2: 0.10%

[4] Carbon equivalent emissions (CO_2e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:

CO_2: 1
CH_4: 25

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Fugitive Emissions

Fugitive Emissions from Venting

Source	Number of Events (events per yr)	Gas Vented Per Event (scf/event)	Total Volume Vented (scf/yr)	Total Natural Gas Emissions (ton/yr)	VOC Emissions (tpy)	HAP Emissions (tpy)
Compressor Blowdown	60	4,500	270,000	7.24	1.40	0.12
Compressor Startup	60	1,000	60,000	1.61	0.31	0.03
Plant Shutdown	1	100,000	100,000	2.68	0.52	0.04
Total	**---**	**---**	430,000	11.52	**2.23**	**0.19**

Fugitive Emissions from Venting - HAP & GHG

Source	Benzene Emissions (tpy)	Toluene Emissions (tpy)	Ethylbenzene Emissions (tpy)	Xylene Emissions (tpy)	n-Hexane Emissions (tpy)	HAP Emissions (tpy)	CH_4 Emissions (tpy)	CO_2 Emissions (tpy)	CO_2e Emissions (tpy)
Compressor Blowdown	1.5E-03	2.2E-03	1.1E-04	4.5E-04	0.12	0.12	4.71	0.02	118
Compressor Startup	3.4E-04	4.9E-04	2.5E-05	1.0E-04	0.03	0.03	1.05	0.00	26
Plant Shutdown	5.7E-04	8.1E-04	4.2E-05	1.7E-04	0.04	0.04	1.74	0.01	44
Total	**2.4E-03**	**3.5E-03**	**1.8E-04**	**7.2E-04**	**0.18**	**0.19**	**7.50**	**0.02**	**187**

[1] VOC and HAP emissions are based on sum of the fractions of the pollutants in the site-specific gas analysis in those classifications, and are calculated in accordance with standard conversion methodology and factors.

[2] CH_4 and CO_2 emissions are based on fractions of these pollutants in the site-specific gas analysis, and are calculated in accordance with Equations W-35 and W-36 in Subpart W of 40 CFR 98.

[3] GHG (CO_2e) is carbon dioxide equivalent, which is the summation of CO_2 (GWP = 1) + CH_4 (GWP = 25) + N_2O (GWP = 298).

[4] Total gas volume emitted (and thus subsequent emissions values) is estimated based on engineering judgement and is conservative.

[5] Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

[6] Potential emissions CH_4/CO_2 (tpy) = Gas volume vented (scf/yr) * Mole % CH_4/CO_2 ÷ 100 * Density CH_4/CO_2 (kg/scf) * 1,000 (g/kg) ÷ 453.6 (g/lb) ÷ 2,000 (lb/ton)

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Haul Roads

Estimated Potential Road Fugitive Emissions

Unpaved Road Emissions

Unpaved Roads: $E\ (lb/VMT) = k(s/12)^a(W/3)^b)*[(365-p)/365]$

	PM	PM_{10}	$PM_{2.5}$	
k Factor (lb/VMT)	4.9	1.5	0.15	AP-42 Table 13.2.2-2 (Final, 11/06)
Silt content, s (%)	4.8			AP-42 Table 13.2.2-1 (11/06), for Sand and Gravel Processing
Number of Rain Days, p	150			AP-42 Figure 13.2.1-2
a	0.7	0.9	0.9	AP-42 Table 13.2.2-2 (Final, 11/06)
b	0.45	0.45	0.45	AP-42 Table 13.2.2-2 (Final, 11/06)

Description	Weight of Empty Truck (tons)	Weight of Truck w/ Max Load (tons)	Mean Vehicle Weight (tons)	Length of Unpaved Road Traveled (mile)	Trips Per Year	Mileage Per Year	Control (%)	Emissions (tpy) PM	PM_{10}	$PM_{2.5}$
Liquids Hauling	20	40	30	2.84	34	192	0	0.41	0.10	0.01
Employee Vehicles	3	3	3	2.84	200	1,136	0	0.86	0.22	0.02
Total Potential Emissions								**1.28**	**0.33**	**0.03**

Company Name: Core Appalachia Midstream LLC
Facility Name: N-7 Compressor Station
Project Description: G35-D Application

Gas Analysis

Sample Location: N-7 Compressor Station
HHV (Btu/scf): 1,237

Constituent	Natural Gas Stream Speciation (Mole %)	Molecular Weight	Molar Weight	Average Weight Fraction	Natural Gas Stream Speciation (Wt. %)
Carbon Dioxide	0.0966	44.01	0.04	0.00	0.209
Nitrogen	0.3652	28.01	0.10	0.01	0.504
Methane	82.3620	16.04	13.21	0.65	65.031
Ethane	10.0507	30.07	3.02	0.15	14.877
Propane	3.8735	44.10	1.71	0.08	8.409
Isobutane	0.6736	58.12	0.39	0.02	1.927
n-Butane	1.1541	58.12	0.67	0.03	3.302
Isopentane	0.4529	72.15	0.33	0.02	1.609
n-Pentane	0.3232	72.15	0.23	0.01	1.148
Cyclopentane	<0.001	70.10	0.00	0.00	0.000
Hexanes	0.3781	86.18	0.33	0.02	1.604
Heptanes	0.2019	100.21	0.20	0.01	0.996
Benzene*	0.0055	78.11	0.00	0.00	0.021
Toluene*	0.0067	92.14	0.01	0.00	0.030
Ethylbenzene*	0.0003	106.17	0.00	0.00	0.002
Xylenes*	0.0012	106.16	0.00	0.00	0.006
C8 + Heavies	0.0506	130.80	0.07	0.00	0.326
Oxygen	0.0039		0.000	0.000	0.000
Totals	100.000		20.31	1.00	100

TOC (Total)	99.53			0.99	99.29
VOC (Total)	7.1216			0.1938	19.3792
HAP (Total)	0.3918			0.0166	1.6634

EICS Emissions Performance Specification Summary

Engine Data

Engine Manufacturer:	Caterpillar
Model Number:	G3304 NA, 4-stroke-cycle
Power Output:	95 bhp
Load:	100%
Rated Speed:	1800 RPM
Type of Fuel:	Natural Gas @ 7875 BTU/bhp-hr (LHV)
Exhaust Flow Rate (Wet):	447 ft^3/min
Exhaust Temperature:	1089°F
Engine Data Source Information:	Caterpillar, Gas Engine Pro Software Version 4.07.00 3304, Gas Compression Ref. Data Set DM5262-04-002 (Attached)

NSCR Catalytic Converter Details

Murphy Part Number:	E2379011
Material:	Stainless Steel
Diameter:	9.5"
Overall Length:	24"
Inlet Pipe Size & Connection:	5" FF Flange, 125/150# ANSI standard bolt pattern
Outlet Pipe Size & Connection:	5" FF Flange, 125/150# ANSI standard bolt pattern
Weight: (± 2 lbs.)	43 lbs +/- 2 lbs
System Pressure Loss (estimated):	6.0 inches of WC (Fresh)
Exhaust Temperature Limits:	
Inlet Min:	750°F
Inlet Max:	1250°F
Lubrication Oil Requirements:	0.6 wt% sulfated ash or less

EICS Catalyst Emissions Calculations		
	Raw Engine Emissions[1, 2]	Targeted Outlet Emissions[3]
	g/bhp-hr	g/bhp-hr
NOx	13.11	**2**
CO	13.11	**2**
NMNEHC	0.29	**1**
HCHO	0.27	**59% Reduction**
Oxygen %	0.5	---

[1] As provided by the Engine Data Source Information above: Calculated with LHV fuel quality of 905 BTU/scf.

[2] Raw engine out emissions may vary with different fuel quality.

[3] The Murphy EICS product line is an Engine Integrated Control System offered for specific engine models. When operated with the optional emission package (which includes a Murphy catalyst), the system is designed to keep the engine at or below the above targeted outlet emissions. Components and equipment must be in proper operating condition in accordance with accepted standards.

Prepared by: Darrell Schmitt
Technical Sales Manager - Emissions & Ignition Systems
Murphy by Enovation Controls

G3304

GAS COMPRESSION APPLICATION

GAS ENGINE SITE SPECIFIC TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1800	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	10.5:1	RATING LEVEL:	CONTINUOUS
JACKET WATER OUTLET (°F):	210	FUEL SYSTEM:	LPG IMPCO
ASPIRATION:	NA		WITH CUSTOMER SUPPLIED AIR FUEL RATIO CONTROL
COOLING SYSTEM:	JW+OC	**SITE CONDITIONS:**	
CONTROL SYSTEM:	MAG	FUEL:	Nat Gas
EXHAUST MANIFOLD:	WC	FUEL PRESSURE RANGE(psig):	1.5-10.0
COMBUSTION:	CATALYST SETTING	FUEL METHANE NUMBER:	84.8
EXHAUST OXYGEN (% O2):	0.5	FUEL LHV (Btu/scf):	905
SET POINT TIMING:	30	ALTITUDE(ft):	500
		MAXIMUM INLET AIR TEMPERATURE(°F):	77
		STANDARD RATED POWER:	95 bhp@1800rpm

RATING	NOTES	LOAD	MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
			100%	100%	75%	50%
ENGINE POWER (WITHOUT FAN)	(1)	bhp	95	95	71	48
INLET AIR TEMPERATURE		°F	77	77	77	77
ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	7875	7875	8159	9510
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	8735	8735	9051	10549
AIR FLOW (@inlet air temp, 14.7 psia) (WET)	(3)(4)	ft3/min	138	138	109	85
AIR FLOW (WET)	(3)(4)	lb/hr	613	613	484	375
FUEL FLOW (60ºF, 14.7 psia)		scfm	14	14	11	8
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	27.4	27.4	23.7	19.4
EXHAUST TEMPERATURE - ENGINE OUTLET	(6)	°F	1089	1089	1063	1010
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(7)(4)	ft3/min	447	447	346	259
EXHAUST GAS MASS FLOW (WET)	(7)(4)	lb/hr	651	651	513	398
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)	(8)(9)	g/bhp-hr	13.11	13.11	11.51	9.22
CO	(8)(9)	g/bhp-hr	13.11	13.11	10.83	9.04
THC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	2.87	2.87	3.35	4.35
NMHC (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.43	0.43	0.50	0.65
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)(10)	g/bhp-hr	0.29	0.29	0.34	0.43
HCHO (Formaldehyde)	(8)(9)	g/bhp-hr	0.27	0.27	0.29	0.31
CO2	(8)(9)	g/bhp-hr	492	492	525	619
EXHAUST OXYGEN	(8)(11)	% DRY	0.5	0.5	0.5	0.5
HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(12)	Btu/min	4076	4076	3277	2915
HEAT REJ. TO ATMOSPHERE	(12)	Btu/min	500	500	388	302
HEAT REJ. TO LUBE OIL (OC)	(12)	Btu/min	667	667	536	477
COOLING SYSTEM SIZING CRITERIA						
TOTAL JACKET WATER CIRCUIT (JW+OC)	(13)	Btu/min	5284			
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.						

CONDITIONS AND DEFINITIONS

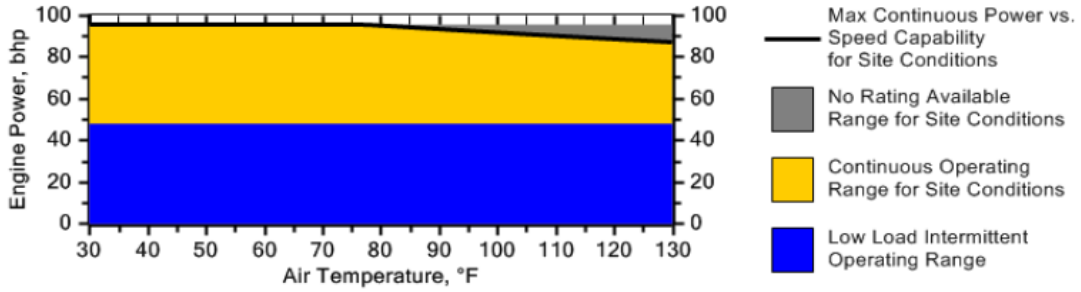
Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

PREPARED BY:
Data generated by Gas Engine Rating Pro Version 4.07.00
Ref. Data Set DM5262-04-002, Printed 26Jun2014

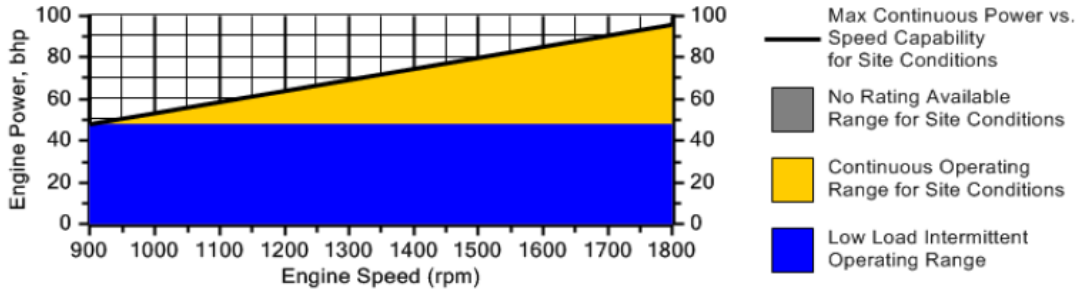
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 500 ft and 1800 rpm



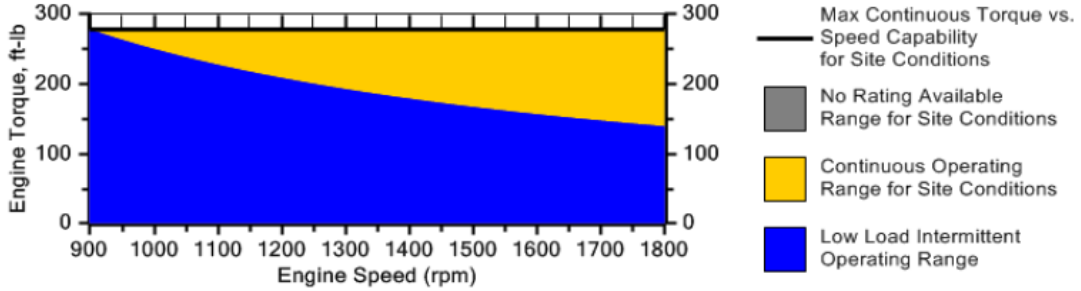
Engine Power vs. Engine Speed

Data represents speed sweep at 500 ft and 77 ºF



Engine Torque vs. Engine Speed

Data represents speed sweep at 500 ft and 77 ºF



Note: At site conditions of 500 ft and 77°F inlet air temp., constant torque can be maintained down to 900 rpm. The minimum speed for loading at these conditions is 900 rpm.

NOTES

1. Engine rating is with one engine driven jacket water pump. Tolerance is ± 3% of full load.

2. Fuel consumption tolerance is ± 5.0% of full load data.

3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

8. Emissions data is at engine exhaust flange prior to any after treatment.

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. Part Load data requires customer supplied air fuel ratio control.

10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

11. Exhaust Oxygen tolerance is ± 0.2.

12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit.

13. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0000	0.0000
Methane	CH4	92.2700	92.2700
Ethane	C2H6	2.5000	2.5000
Propane	C3H8	0.5000	0.5000
Isobutane	iso-C4H1O	0.0000	0.0000
Norbutane	nor-C4H1O	0.2000	0.2000
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.1000	0.1000
Hexane	C6H14	0.0500	0.0500
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	3.4800	3.4800
Carbon Dioxide	CO2	0.9000	0.9000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup:	Nat Gas
Unit of Measure:	English

Calculated Fuel Properties

Caterpillar Methane Number:	84.8
Lower Heating Value (Btu/scf):	905
Higher Heating Value (Btu/scf):	1004
WOBBE Index (Btu/scf):	1168
THC: Free Inert Ratio:	21.83
Total % Inerts (% N2, CO2, He):	4.38%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.45
Stoich A/F Ratio (Mass/Mass):	15.75
Specific Gravity (Relative to Air):	0.600
Specific Heat Constant (K):	1.313

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

Gas Analytical Labs

South Charleston, West Virginia
1740 Union Carbide Drive
South Charleston, WV 25303

Report Date: Nov 9, 2017 9:55a

Client:	CORE APPALACHIA OPERATING LLC	Date Sampled:	Nov 7, 2017
Client Code:	2489	Analysis Date:	Nov 8, 2017
Site:	N-7 COMPRESSOR INLET GAS	Collected By:	PJ
Field:	423 - MARMET	Date Effective:	Dec 1, 2017 12:00a
Meter:	1692564303	Source Pressure (PSI):	7.0
Source Laboratory:	Charleston, WV	Source Temp (°F):	60
Lab File No:	**516744865**	Field H2O (lb/MMSCFD):	0.0
Cylinder No:	098		
Analysis Status:	good		
Sample Type:	Spot		
Measurement Analyst:	Ashley Free		

Component	Mol %	Liquid Recovery GPM
Helium (He)		
Nitrogen (N2)	0.3652	0.0000
Oxygen (O2)	0.0039	0.0000
Carbon Dioxide (CO2)	0.0966	0.0000
Hydrogen Sulfide (H2S)		
Methane (C1)	82.3620	0.0000
Ethane (C2)	10.0507	2.6965
Propane (C3)	3.8735	1.0705
IsoButane (IC4)	0.6736	0.2211
n-Butane (NC4)	1.1541	0.3650
IsoPentane (IC5)	0.4529	0.1662
n-Pentane (NC5)	0.3232	0.1175
Hexanes Plus (C6+)	0.6443	0.0879
TOTAL	100.0000	4.7247

Analytical Results at Base Conditions (Real)

BTU/SCF (Dry):	1,234.59 BTU/ft³
BTU/SCF (Saturated):	1,213.54 BTU/ft³
PSIA:	14.696 PSI
Temperature (°F):	60.0 °F
Z Factor (Dry):	0.99658
Z Factor (Saturated):	0.99621

Analytical Results at Contract Conditions (Real)

BTU/SCF (Dry):	1,237.45 BTU/ft³
BTU/SCF (Saturated):	1,216.40 BTU/ft³
PSIA:	14.730 PSI
Temperature (°F):	60.0 °F
Z Factor (Dry):	0.99658
Z Factor (Saturated):	0.99621

Calculated Specific Gravities

Ideal Gravity:	0.7012	Real Gravity:	0.7033
Molecular Wt:	20.3118 lb/lbmol		

Methods, standards, and uncertainties based on GPA 2286-14.
Analytical Calculations performed in accordance with GPA 2172-09.

Gas Analytical Labs

South Charleston, West Virginia
1740 Union Carbide Drive
South Charleston, WV 25303

Report Date: Nov 9, 2017 9:55a

Client:	CORE APPALACHIA OPERATING LLC	Date Sampled:	Nov 7, 2017
Client Code:	2489	Analysis Date:	Nov 8, 2017
Site:	N-7 COMPRESSOR INLET GAS	Collected By:	PJ
Field:	423 - MARMET	Date Effective:	Dec 1, 2017 12:00a
Meter:	1692564303	Source Pressure (PSI):	7.0
Source Laboratory:	Charleston, WV	Source Temp (°F):	60
Lab File No:	**516744865**	Field H2O (lb/MMSCFD):	0.0
Cylinder No:	098		
Analysis Status:	good		
Sample Type:	Spot		
Measurement Analyst:	Ashley Free		

Properties Of C6+ Fraction

Component	Mol %	Liquid Recovery GPM
Nitrogen (N2)	0.3652	0.0000
Oxygen (O2)	0.0039	0.0000
Carbon Dioxide (CO2)	0.0966	0.0000
Methane (C1)	82.3620	0.0000
Ethane (C2)	10.0507	2.6965
Propane (C3)	3.8735	1.0705
IsoButane (IC4)	0.6736	0.2211
n-Butane (NC4)	1.1541	0.3650
IsoPentane (IC5)	0.4529	0.1662
n-Pentane (NC5)	0.3232	0.1175
Hexanes (C6's)	0.3781	0.0495
Heptanes (C7's)	0.2019	0.0272
Octanes (C8's)	0.0340	0.0042
Nonanes (C9's)	0.0148	0.0023
Decanes (C10's)	0.0016	0.0002
Undecanes (C11's)	0.0001	0.0001
Dodecanes (C12's)	0.0001	0.0001
Tridecanes (C13's)	0.0000	0.0000

BTEX

Component	Mol %	Liquid Recovery GPM
Benzene	0.0055	0.0015
Toluene	0.0067	0.0022
EthylBenzene	0.0003	0.0001
M+P Xylene	0.0010	0.0004
O Xylene	0.0002	0.0001

Bryan Research & Engineering, Inc.

ProMax ®4.0

Simulation Report

Project: 2017-1115_N7 Compressor_ProMax Calculations.pmx

Licensed to Trinity Consultants, Inc. and Affiliates

Client Name: Core App Midstream
Location: N-7 Compressor Station
Job:

ProMax Filename: P:\Client\CORE\Corporate\Projects\173901.0181 G35D Greenfield CS\04 Draft\Attach U - Calcs\2017-1115_N7 Compressor_ProMax Calculations.pmx
ProMax Version: 4.0.16071.0
Simulation Initiated: 11/28/2017 9:22:40 AM

Bryan Research & Engineering, Inc.
Chemical Engineering Consultants
P.O. Box 4747 Bryan, Texas 77805
Office: (979) 776-5220
FAX: (979) 776-4818
mailto:sales@bre.com
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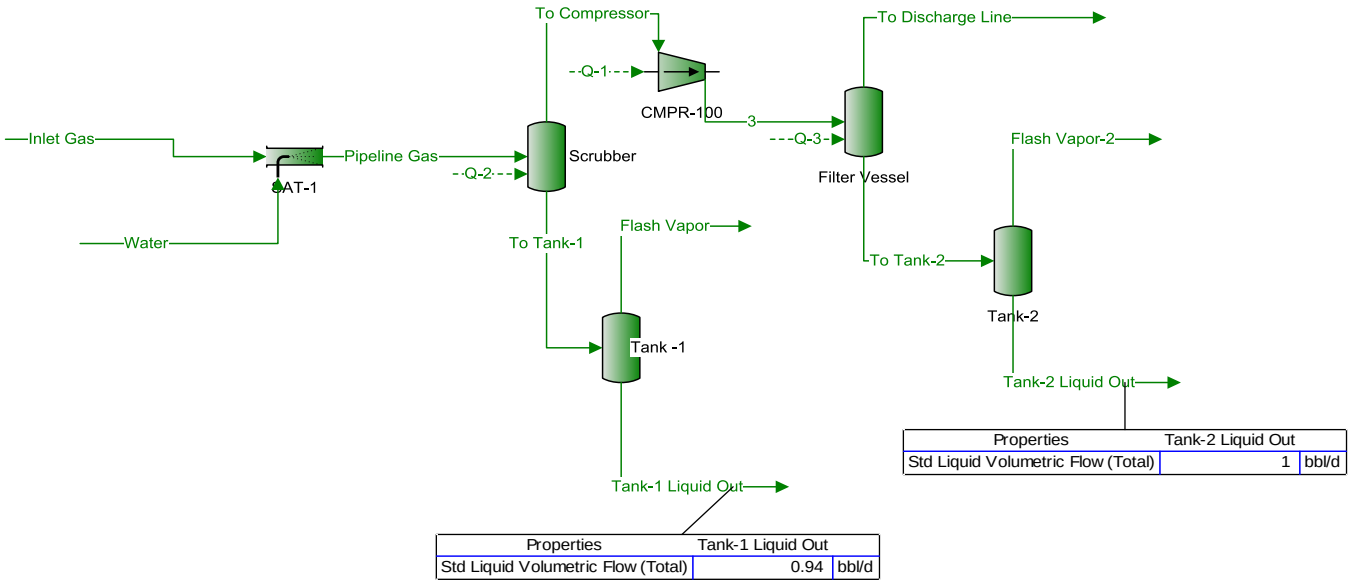
Report Navigator can be activated via the ProMax Navigator Toolbar.
An asterisk (*), throughout the report, denotes a user specified value.
A question mark (?) after a value, throughout the report, denotes an extrapolated or approximate value.

N7 Compressor Station Calculations



Properties	Tank-2 Liquid Out	
Std Liquid Volumetric Flow (Total)	1	bbl/d

Properties	Tank-1 Liquid Out	
Std Liquid Volumetric Flow (Total)	0.94	bbl/d

Process Streams		Flash Tank-1	Flashing Tank-2	Inlet Gas	Loading Tank -2	Loading Tank-1	Tank-1 Liquid Out	Tank-2 Liquid Out	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Composition	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: **Total**	**rom Bloc**	--	--	--	--	--	Tank -1	Tank-2	Scrubber	Filter Vessel	--	--
	To Block:	--	--	SAT-1	--	--	--	--	Tank -1	Tank-2	--	--
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%
Nitrogen		0.0915253	0.0448817	0.3652*	0.00318678	0.00268193	3.33141E-06	3.17815E-05	2.40414E-05	0.000973539	0.00268193	0.00318678
Oxygen		0.00189923	0.000927231	0.0039*	0.000184616	0.000161637	1.35450E-07	1.29370E-06	5.37106E-07	2.05003E-05	0.000161637	0.000184616
Carbon Dioxide		0.267690	0.116490	0.0966*	0.134859	0.340318	0.000185353	0.000899807	0.000218407	0.00303379	0.340318	0.134859
Methane		49.6265	34.4935	82.362*	11.1513	5.21948	0.00450365	0.0867875	0.0147594	0.786511	5.21948	11.1513
Ethane		18.6252	21.5391	10.0507*	34.4487	6.54646	0.00617340	0.323069	0.00897740	0.674291	6.54646	34.4487
Propane		12.4543	17.5525	3.8735*	22.3580	3.18381	0.0115319	0.806261	0.0129236	1.01443	3.18381	22.3580
Isobutane		2.76441	4.14696	0.6736*	4.85790	0.619379	0.00579569	0.440747	0.00605313	0.477446	0.619379	4.85790
n-Butane		5.06955	7.70645	1.1541*	9.02858	1.12805	0.0151406	1.16500	0.0155865	1.22340	1.12805	9.02858
Isopentane		2.28816	3.43088	0.4529*	3.67011	0.474508	0.0169664	1.24451	0.0171415	1.25585	0.474508	3.67011
n-Pentane		1.71260	2.54685	0.3232*	2.72917	0.351390	0.0169967	1.24786	0.0171211	1.25053	0.351390	2.72917
Hexane		2.34184	3.28747	0.3781*	3.51975	0.479586	0.0815391	5.61886	0.0816745	5.55847	0.479586	3.51975
Heptane		1.40290	1.79433	0.2019*	1.76614	0.262711	0.155857	9.81757	0.155911	9.68160	0.262711	1.76614
Octane		0.264976	0.279258	0.034*	0.264073	0.0476949	0.0963118	4.99301	0.0963095	4.91944	0.0476949	0.264073
Nonane		0.128109	0.0873904	0.0148*	0.0793615	0.0222495	0.152705	5.09889	0.152686	5.02250	0.0222495	0.0793615
Decane		0.0142525	0.00459751	0.0016*	0.00382823	0.00228892	0.0529503	0.828968	0.0529424	0.816494	0.00228892	0.00382823
Undecane		0.000784391	8.49437E-05	0.0001*	6.66837E-05	0.000118625	0.00947354	0.0498482	0.00947206	0.0490971	0.000118625	6.66837E-05
Dodecane		0.000501095	1.73244E-05	0.0001*	1.25086E-05	7.00449E-05	0.0183144	0.0306135	0.0183115	0.0301521	7.00449E-05	1.25086E-05
Tridecane		0	0	0*	0	0	0	0	0	0	0	0
Benzene		0.0333099	0.0475471	0.0055*	0.0316497	0.00464636	0.00128607	0.0822850	0.00128803	0.0814018	0.00464636	0.0316497
Toluene		0.0461543	0.0593697	0.0067*	0.0393714	0.00610139	0.00588687	0.355924	0.00588855	0.350960	0.00610139	0.0393714
Ethylbenzene		0.00232075	0.00245447	0.0003*	0.00165074	0.000317299	0.000918831	0.0447597	0.000918800	0.0441000	0.000317299	0.00165074
m-Xylene		0.00773631	0.00806084	0.001*	0.00693314	0.00135747	0.00330130	0.157876	0.00330115	0.155545	0.00135747	0.00693314
o-Xylene		0.00156952	0.00156692	0.0002*	0.000877616	0.000179284	0.000789929	0.0362043	0.000789880	0.0356680	0.000179284	0.000877616
Water		2.85378	2.84928	0*	5.90433	81.3064	99.3434	67.5700	99.3277	66.5681	81.3064	5.90433
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Nitrogen		1.61158E-07	2.63185E-06	0.801966*	2.87843E-09	2.23922E-10	2.42689E-08	8.64940E-08	1.75166E-07	2.69006E-06	2.29429E-09	8.61879E-09
Oxygen		3.34416E-09	5.43725E-08	0.00856426*	1.66753E-10	1.34955E-11	9.86740E-10	3.52084E-09	3.91338E-09	5.66460E-08	1.38274E-10	4.99302E-10
Carbon Dioxide		4.71348E-07	6.83095E-06	0.212130*	1.21810E-07	2.84141E-08	1.35027E-06	2.44884E-06	1.59132E-06	8.38290E-06	2.91129E-07	3.64731E-07
Methane		8.73822E-05	0.00202269	180.864*	1.00723E-05	4.35788E-07	3.28086E-05	0.000236194	0.000107538	0.00217327	4.46506E-06	3.01593E-05
Ethane		3.27952E-05	0.00126305	22.0710*	3.11154E-05	5.46582E-07	4.49725E-05	0.000879238	6.54097E-05	0.00186319	5.60024E-06	9.31679E-05
Propane		2.19295E-05	0.00102928	8.50607*	2.01947E-05	2.65825E-07	8.40083E-05	0.00219426	9.41620E-05	0.00280304	2.72362E-06	6.04682E-05
Isobutane		4.86757E-06	0.000243177	1.47920*	4.38785E-06	5.17136E-08	4.22209E-05	0.00119950	4.41033E-05	0.00131927	5.29854E-07	1.31384E-05
n-Butane		8.92646E-06	0.000451904	2.53436*	8.15498E-06	9.41840E-08	0.000110298	0.00317057	0.000113564	0.00338047	9.65002E-07	2.44182E-05
Isopentane		4.02899E-06	0.000201186	0.994552*	3.31500E-06	3.96180E-08	0.000123598	0.00338695	0.000124893	0.00347015	4.05923E-07	9.92598E-06
n-Pentane		3.01555E-06	0.000149347	0.709736*	2.46510E-06	2.93385E-08	0.000123819	0.00339609	0.000124745	0.00345543	3.00600E-07	7.38116E-06
Hexane		4.12351E-06	0.000192776	0.830294*	3.17918E-06	4.00419E-08	0.000594002	0.0152918	0.000595083	0.0153590	4.10267E-07	9.51931E-06
Heptane		2.47023E-06	0.000105219	0.443365*	1.59525E-06	2.19345E-08	0.00113540	0.0267187	0.00113597	0.0267520	2.24739E-07	4.77660E-06
Octane		4.66570E-07	1.63756E-05	0.0746628*	2.38522E-07	3.98217E-09	0.000701620	0.0135886	0.000701715	0.0135933	4.08011E-08	7.14198E-07
Nonane		2.25574E-07	5.12455E-06	0.0325003*	7.16826E-08	1.85767E-09	0.00111244	0.0138767	0.00111248	0.0138781	1.90336E-08	2.14637E-07
Decane		2.50958E-08	2.69597E-07	0.00351354*	3.45781E-09	1.91108E-10	0.000385736	0.00225605	0.000385740	0.00225612	1.95808E-09	1.03536E-08
Undecane		1.38116E-09	4.98108E-09	0.000219596*	6.02315E-11	9.90429E-12	6.90136E-05	0.000135663	6.90138E-05	0.000135664	1.01479E-10	1.80349E-10
Dodecane		8.82327E-10	1.01590E-09	0.000219596*	1.12983E-11	5.84824E-12	0.000133418	8.33153E-05	0.000133418	8.33155E-05	5.99206E-11	3.38301E-11
Tridecane		0	0	0*	0	0	0	0	0	0	0	0
Benzene		5.86520E-08	2.78815E-06	0.0120778*	2.85873E-08	3.87937E-10	9.36884E-06	0.000223940	9.38461E-06	0.000224928	3.97478E-09	8.55979E-08
Toluene		8.12685E-08	3.48142E-06	0.0147130*	3.55618E-08	5.09422E-10	4.28851E-05	0.000968653	4.29042E-05	0.000969764	5.21950E-09	1.06482E-07
Ethylbenzene		4.08638E-09	1.43930E-07	0.000658789*	1.49102E-09	2.64922E-11	6.69357E-06	0.000121814	6.69441E-06	0.000121856	2.71437E-10	4.46451E-09
m-Xylene		1.36221E-08	4.72686E-07	0.00219596*	6.26229E-09	1.13339E-10	2.40495E-05	0.000429663	2.40523E-05	0.000429799	1.16126E-09	1.87510E-08
o-Xylene		2.76361E-09	9.18836E-08	0.000439193*	7.92699E-10	1.49689E-11	5.75454E-06	9.85307E-05	5.75510E-06	9.85570E-05	1.53371E-10	2.37355E-09
Water		5.02493E-06	0.000167081	0*	5.33303E-06	6.78850E-06	0.723705	0.183893	0.723705	0.183939	6.95544E-05	1.59685E-05

Mass Fraction	%	%	%	%	%	%	%	%	%	%	%
Nitrogen	0.0823211	0.0342555	0.503667*	0.00217202	0.00351178	5.01559E-06	2.01203E-05	3.61933E-05	0.000619174	0.00351178	0.00217202
Oxygen	0.00195126	0.000808382	0.00614392*	0.000143730	0.000241762	2.32939E-07	9.35541E-07	9.23629E-07	1.48932E-05	0.000241762	0.000143730
Carbon Dioxide	0.378254	0.139679	0.209301*	0.144401	0.700076	0.000438403	0.000894932	0.000516555	0.00303128	0.700076	0.144401
Methane	25.5617	15.0766	65.0496*	4.35254	3.91392	0.00388297	0.0314646	0.0127246	0.286464	3.91392	4.35254
Ethane	17.9814	17.6458	14.8786*	25.2021	9.20111	0.00997637	0.219537	0.0145069	0.460321	9.20111	25.2021
Propane	17.6327	21.0878	8.40903*	23.9869	6.56230	0.0273290	0.803462	0.0306255	1.01557	6.56230	23.9869
Isobutane	5.15881	6.56700	1.92749*	6.86966	1.68272	0.0181040	0.578929	0.0189071	0.630029	1.68272	6.86966
n-Butane	9.46054	12.2037	3.30242*	12.7675	3.06467	0.0472949	1.53025	0.0486850	1.61437	3.06467	12.7675
Isopentane	5.30054	6.74420	1.60871*	6.44249	1.60025	0.0657880	2.02918	0.0664631	2.05713	1.60025	6.44249
n-Pentane	3.96726	5.00643	1.14801*	4.79076	1.18504	0.0659056	2.03465	0.0663843	2.04841	1.18504	4.79076
Hexane	6.47956	7.71862	1.60412*	7.37971	1.93181	0.377639	10.9427	0.378245	10.8751	1.93181	7.37971
Heptane	4.51344	4.89861	0.996000*	4.30572	1.23046	0.839326	22.2318	0.839567	22.0251	1.23046	4.30572
Octane	0.971820	0.869111	0.191206*	0.733912	0.254660	0.591265	12.8894	0.591218	12.7580	0.254660	0.733912
Nonane	0.527544	0.305375	0.0934509*	0.247645	0.133386	1.05258	14.7790	1.05239	14.6247	0.133386	0.247645
Decane	0.0651095	0.0178224	0.0112077*	0.0132523	0.0152228	0.404898	2.66551	0.404815	2.63752	0.0152228	0.0132523
Undecane	0.00393658	0.000361750	0.000769536*	0.000253599	0.000866703	0.0795834	0.176086	0.0795665	0.174233	0.000866703	0.000253599
Dodecane	0.00274049	8.04000E-05	0.000838591*	5.18391E-05	0.000557691	0.167658	0.117845	0.167622	0.116604	0.000557691	5.18391E-05
Tridecane	0	0	0*	0	0	0	0	0	0	0	0
Benzene	0.0835400	0.101190	0.0211508*	0.0601494	0.0169646	0.00539894	0.145255	0.00540687	0.144359	0.0169646	0.0601494
Toluene	0.136539	0.149039	0.0303922*	0.0882605	0.0262775	0.0291510	0.741125	0.0291577	0.734161	0.0262775	0.0882605
Ethylbenzene	0.00791070	0.00709962	0.00156801*	0.00426389	0.00157458	0.00524258	0.107390	0.00524211	0.106295	0.00157458	0.00426389
m-Xylene	0.0263706	0.0233162	0.00522671*	0.0179084	0.00673634	0.0188362	0.378784	0.0188344	0.374914	0.00673634	0.0179084
o-Xylene	0.00534999	0.00453234	0.00104534*	0.00226689	0.000889688	0.00450711	0.0868632	0.00450657	0.0859713	0.000889688	0.00226689
Water	1.65069	1.39853	0*	2.58795	68.4668	96.1852	27.5099	96.1646	27.2271	68.4668	2.58795
Mass Flow	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Nitrogen	4.51457E-06	7.37271E-05	22.4658*	8.06346E-08	6.27281E-09	6.79855E-07	2.42299E-06	4.90700E-06	7.53577E-05	6.42708E-08	2.41442E-07
Oxygen	1.07009E-07	1.73986E-06	0.274046*	5.33589E-09	4.31839E-10	3.15745E-08	1.12663E-07	1.25223E-07	1.81260E-06	4.42459E-09	1.59771E-08
Carbon Dioxide	2.07438E-05	0.000300627	9.33574*	5.36079E-06	1.25049E-06	5.94248E-05	0.000107772	7.00332E-05	0.000368927	1.28124E-05	1.60516E-05
Methane	0.00140183	0.0324489	2901.50*	0.000161585	6.99112E-06	0.000526330	0.00378913	0.00172517	0.0348646	7.16305E-05	0.000483829
Ethane	0.000986120	0.0379786	663.653*	0.000935611	1.64352E-05	0.00135228	0.0264379	0.00196681	0.0560242	0.000168394	0.00280147
Propane	0.000966993	0.0453866	375.080*	0.000890496	1.17217E-05	0.00370440	0.0967571	0.00415213	0.123602	0.000120100	0.00266638
Isobutane	0.000282914	0.0141340	85.9745*	0.000255032	3.00571E-06	0.00245397	0.0697176	0.00256338	0.0766788	3.07963E-05	0.000763632
n-Butane	0.000518825	0.0262657	147.303*	0.000473986	5.47418E-06	0.00641075	0.184281	0.00660059	0.196480	5.60880E-05	0.00141924
Isopentane	0.000290687	0.0145153	71.7557*	0.000239173	2.85839E-06	0.00891745	0.244364	0.00901091	0.250367	2.92868E-05	0.000716148
n-Pentane	0.000217568	0.0107752	51.2066*	0.000177854	2.11674E-06	0.00893339	0.245023	0.00900022	0.249305	2.16880E-05	0.000532542
Hexane	0.000355345	0.0166126	71.5509*	0.000273967	3.45063E-06	0.0511884	1.31778	0.0512815	1.32357	3.53549E-05	0.000820330
Heptane	0.000247522	0.0105431	44.4261*	0.000159847	2.19787E-06	0.113769	2.67727	0.113826	2.68060	2.25193E-05	0.000478625
Octane	5.32956E-05	0.00187056	8.52862*	2.72460E-05	4.54878E-07	0.0801450	1.55220	0.0801558	1.55274	4.66064E-06	8.15818E-05
Nonane	2.89310E-05	0.000657249	4.16833*	9.19365E-06	2.38256E-07	0.142676	1.77976	0.142681	1.77993	2.44116E-06	2.75282E-05
Decane	3.57067E-06	3.83587E-05	0.499913*	4.91984E-07	2.71912E-08	0.0548832	0.320995	0.0548838	0.321004	2.78599E-07	1.47313E-06
Undecane	2.15886E-07	7.78583E-07	0.0343247*	9.41468E-09	1.54812E-09	0.0107874	0.0212052	0.0107874	0.0212054	1.58619E-08	2.81900E-08
Dodecane	1.50291E-07	1.73043E-07	0.0374049*	1.92449E-09	9.96159E-10	0.0227257	0.0141915	0.0227257	0.0141915	1.02066E-08	5.76244E-09
Tridecane	0	0	0*	0	0	0	0	0	0	0	0
Benzene	4.58142E-06	0.000217787	0.943420*	2.23300E-06	3.03025E-08	0.000731817	0.0174924	0.000733050	0.0175695	3.10477E-07	6.68621E-06
Toluene	7.48795E-06	0.000320773	1.35563*	3.27661E-06	4.69373E-08	0.00395137	0.0892502	0.00395312	0.0893525	4.80916E-07	9.81105E-06
Ethylbenzene	4.33831E-07	1.52803E-05	0.0699404*	1.58294E-07	2.81254E-09	0.000710623	0.0129324	0.000710712	0.0129369	2.88171E-08	4.73975E-07
m-Xylene	1.44619E-06	5.01827E-05	0.233135*	6.64836E-07	1.20326E-08	0.00255322	0.0456151	0.00255352	0.0456297	1.23285E-07	1.99070E-06
o-Xylene	2.93399E-07	9.75482E-06	0.0466269*	8.41569E-08	1.58918E-09	0.000610931	0.0104605	0.000610990	0.0104633	1.62826E-08	2.51988E-07
Water	9.05255E-05	0.00301001	0*	9.60760E-05	0.000122297	13.0377	3.31289	13.0378	3.31372	0.00125304	0.000287677

Volumetric Flow	ft^3/h	ft^3/h	ft^3/h	ft^3/h	ft^3/h	gpm	gpm	gpm	gpm	ft^3/h	ft^3/h
Nitrogen	6.49352E-05	0.00106299	113.014	2.40620E-06	2.56634E-06	1.83066E-09	7.38631E-09	1.32752E-08	2.36972E-07	2.62946E-05	7.20481E-06
Oxygen	1.34516E-06	2.19182E-05	1.20314	1.39238E-07	1.54629E-07	5.70126E-11	2.06353E-10	2.27221E-10	3.46766E-09	1.58432E-06	4.16916E-07
Carbon Dioxide	0.000188449	0.00273438	29.4236	0.000101336	0.000325523	8.68422E-08	1.27989E-07	1.02476E-07	4.57257E-07	0.00333529	0.000303426
Methane	0.0350521	0.812703	25257.4	0.00839652	0.00499403	2.64907E-06	2.11014E-05	8.72687E-06	0.000199081	0.0511684	0.0251414
Ethane	0.0130492	0.502676	3032.20	0.0258072	0.00626274	5.03179E-06	0.000104401	7.34968E-06	0.000224537	0.0641676	0.0772737
Propane	0.00866798	0.406428	1153.35	0.0166788	0.00304530	1.28293E-05	0.000344891	1.44155E-05	0.000444401	0.0312019	0.0499407
Isobutane	0.00191294	0.0953721	198.235	0.00361081	0.000592361	8.17849E-06	0.000236339	8.55359E-06	0.000261273	0.00606928	0.0108117
n-Butane	0.00350402	0.176988	338.857	0.00670612	0.00107881	2.07726E-05	0.000606825	2.14150E-05	0.000650297	0.0110534	0.0200799
Isopentane	0.00157153	0.0782343	130.960	0.00271623	0.000453719	2.76222E-05	0.000764736	2.79260E-05	0.000785811	0.00464877	0.00813310
n-Pentane	0.00117556	0.0580189	93.5353	0.00201844	0.000335981	2.74697E-05	0.000761109	2.76911E-05	0.000776725	0.00344244	0.00604374
Hexane	0.00159610	0.0742447	108.005	0.00259081	0.000458477	0.000150999	0.00391497	0.000151293	0.00393851	0.00469753	0.00775757
Heptane	0.000949592	0.0401974	56.8447	0.00129454	0.000251079	0.000326580	0.00772374	0.000326682	0.00773820	0.00257254	0.00387620
Octane	0.000178140	0.00620445	9.44766	0.000192716	4.55782E-05	0.000223188	0.00433843	0.000223130	0.00433981	0.000466991	0.000577042
Nonane	8.54324E-05	0.00192291	4.04485	5.76216E-05	2.12568E-05	0.000388147	0.00485485	0.000387947	0.00485282	0.000217796	0.000172535
Decane	9.42989E-06	0.000100253	0.429018	2.76705E-06	2.18646E-06	0.000147067	0.000861816	0.000146969	0.000861069	2.24023E-05	8.28527E-06
Undecane	5.15699E-07	1.83704E-06	0.0265788	4.79766E-08	1.13285E-07	2.84711E-05	5.60538E-05	2.84499E-05	5.59914E-05	1.16071E-06	1.43655E-07
Dodecane	3.26878E-07	3.71145E-07	0.0261604	8.95421E-09	6.68789E-08	5.93616E-05	3.71110E-05	5.93126E-05	3.70610E-05	6.85236E-07	2.68113E-08
Tridecane	0	0	0	0	0	0	0	0	0	0	0
Benzene	2.28306E-05	0.00108137	1.58793	2.33841E-05	4.44087E-06	1.57370E-06	3.83940E-05	1.57757E-06	3.86471E-05	4.55009E-05	7.00181E-05
Toluene	3.14149E-05	0.00133900	1.90894	2.89575E-05	5.83031E-06	8.76791E-06	0.000199491	8.77266E-06	0.000199818	5.97369E-05	8.67063E-05
Ethylbenzene	1.56804E-06	5.48899E-05	0.0840622	1.20883E-06	3.03139E-07	1.59174E-06	2.90535E-05	1.59139E-06	2.90451E-05	3.10594E-06	3.61955E-06
m-Xylene	5.22345E-06	0.000180116	0.279804	5.07484E-06	1.29686E-06	5.72744E-06	0.000102641	5.72664E-06	0.000102632	1.32875E-05	1.51954E-05
o-Xylene	1.05981E-06	3.50165E-05	0.0559650	6.42438E-07	1.71281E-07	1.34241E-06	2.30476E-05	1.34208E-06	2.30356E-05	1.75493E-06	1.92363E-06
Water	0.00201230	0.0670178	0	0.00444086	0.0777389	0.0260033	0.00661137	0.0260028	0.00661439	0.796507	0.0132971

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-1	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Total	**rom Bloc**	--	--	--	--	--	Tank -1	Tank-2	Scrubber	Filter Vessel	--	--
	To Block:	--	--	SAT-1	--	--	--	--	Tank -1	Tank-2	--	--
Property	**Units**											
Temperature	°F	73.2549	73.2549	60*	73.2549	73.2549	40.0267	47.5770	40	50	73.2549	73.2549
Pressure	psia	14.2535	14.2535	39.6959*	6.87055	0.499165	14.6959	14.6959	37.6959	74.6959	0.499165	6.87055
Mole Fraction Vapor	%	100	100	100	100	100	0	0	0	0	100	100
Mole Fraction Light Liquid	%	0	0	0	0	0	0.652754	32.4347	0.663343	33.4293	0	0
Mole Fraction Heavy Liquid	%	0	0	0	0	0	99.3472	67.5653	99.3367	66.5707	0	0
Molecular Weight	lb/lbmol	31.1455	36.7033	20.3120	41.1012	21.3937	18.6068	44.2493	18.6079	44.0460	21.3937	41.1012
Mass Density	lb/ft^3	0.0782526	0.0925063	0.146096	0.0497135	0.00186802	61.5631	47.4670	61.5517	47.1620	0.00186802	0.0497135
Molar Flow	lbmol/h	0.000176080	0.00586397	219.596	9.03241E-05	8.34927E-06	0.728488	0.272152	0.728604	0.276318	8.55460E-05	0.000270454
Mass Flow	lb/h	0.00548410	0.215227	4460.45	0.00371243	0.000178622	13.5548	12.0425	13.5578	12.1707	0.00183015	0.0111160
Vapor Volumetric Flow	ft^3/h	0.0700820	2.32662	30530.9	0.0746766	0.0956209	0.220178	0.253703	0.220266	0.258061	0.979724	0.223602
Liquid Volumetric Flow	gpm	0.00873749	0.290072	3806.45	0.00931033	0.0119216	0.0274507	0.0316305	0.0274617	0.0321739	0.122147	0.0278776
Std Vapor Volumetric Flow	MMSCFD	1.60367E-06	5.34068E-05	2*	8.22637E-07	7.60420E-08	0.00663479	0.00247866	0.00663584	0.00251660	7.79120E-07	2.46319E-06
Std Liquid Volumetric Flow	sgpm	2.53951E-05	0.000925151	26.2133	1.53060E-05	4.96850E-07	0.0275413	0.0320462	0.0275566	0.0326565	5.09069E-06	4.58303E-05
Compressibility		0.991948	0.988839	0.989622	0.993214	0.999583	0.000828283	0.00251668	0.00212522	0.0127544	0.999583	0.993214
API Gravity							12.2357	55.6655	12.2637	56.6593		
Net Ideal Gas Heating Value	Btu/ft^3	1628.10	1909.85	1115.66	2100.35	349.712	36.0047	1630.07	36.2143	1630.08	349.712	2100.35
Net Liquid Heating Value	Btu/lb	19705.6	19600.1	20790.1	19218.9	5435.03	-291.078	13572.5	-286.643	13640.2	5435.03	19218.9
Specific Gravity		1.07537	1.26726	0.701319	1.41911	0.738667	0.987079	0.761067	0.986896	0.756177	0.738667	1.41911
Mass Fraction Vapor	%	100	100	100	100	100	0	0	0	0	100	100
Volume Fraction Vapor	%	100	100	100	100	100	0	0	0	0	100	100
Mass Fraction Heavy Liquid	%	0	0	0	0	0	96.1914	27.5089	96.1756	27.2291	0	0
Mass Fraction Light Liquid	%	0	0	0	0	0	3.80857	72.4911	3.82437	72.7709	0	0

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Composition	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Vapor	**rom Bloc**	--	--	--	--	--	Tank -1	Tank-2	Scrubber	Filter Vessel	--	--
	To Block:	--	--	SAT-1	--	--	--	--	Tank -1	Tank-2	--	--
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%
Nitrogen		0.0915253	0.0448817	0.3652	0.00318678	0.00268193					0.00268193	0.00318678
Oxygen		0.00189923	0.000927231	0.0039	0.000184616	0.000161637					0.000161637	0.000184616
Carbon Dioxide		0.267690	0.116490	0.0966	0.134859	0.340318					0.340318	0.134859
Methane		49.6265	34.4935	82.362	11.1513	5.21948					5.21948	11.1513
Ethane		18.6252	21.5391	10.0507	34.4487	6.54646					6.54646	34.4487
Propane		12.4543	17.5525	3.8735	22.3580	3.18381					3.18381	22.3580
Isobutane		2.76441	4.14696	0.6736	4.85790	0.619379					0.619379	4.85790
n-Butane		5.06955	7.70645	1.1541	9.02858	1.12805					1.12805	9.02858
Isopentane		2.28816	3.43088	0.4529	3.67011	0.474508					0.474508	3.67011
n-Pentane		1.71260	2.54685	0.3232	2.72917	0.351390					0.351390	2.72917
Hexane		2.34184	3.28747	0.3781	3.51975	0.479586					0.479586	3.51975
Heptane		1.40290	1.79433	0.2019	1.76614	0.262711					0.262711	1.76614
Octane		0.264976	0.279258	0.034	0.264073	0.0476949					0.0476949	0.264073
Nonane		0.128109	0.0873904	0.0148	0.0793615	0.0222495					0.0222495	0.0793615
Decane		0.0142525	0.00459751	0.0016	0.00382823	0.00228892					0.00228892	0.00382823
Undecane		0.000784391	8.49437E-05	0.0001	6.66837E-05	0.000118625					0.000118625	6.66837E-05
Dodecane		0.000501095	1.73244E-05	0.0001	1.25086E-05	7.00449E-05					7.00449E-05	1.25086E-05
Tridecane		0	0	0	0	0					0	0
Benzene		0.0333099	0.0475471	0.0055	0.0316497	0.00464636					0.00464636	0.0316497
Toluene		0.0461543	0.0593697	0.0067	0.0393714	0.00610139					0.00610139	0.0393714
Ethylbenzene		0.00232075	0.00245447	0.0003	0.00165074	0.000317299					0.000317299	0.00165074
m-Xylene		0.00773631	0.00806084	0.001	0.00693314	0.00135747					0.00135747	0.00693314
o-Xylene		0.00156952	0.00156692	0.0002	0.000877616	0.000179284					0.000179284	0.000877616
Water		2.85378	2.84928	0	5.90433	81.3064					81.3064	5.90433
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Nitrogen		1.61158E-07	2.63185E-06	0.801966	2.87843E-09	2.23922E-10					2.29429E-09	8.61879E-09
Oxygen		3.34416E-09	5.43725E-08	0.00856426	1.66753E-10	1.34955E-11					1.38274E-10	4.99302E-10
Carbon Dioxide		4.71348E-07	6.83095E-06	0.212130	1.21810E-07	2.84141E-08					2.91129E-07	3.64731E-07
Methane		8.73822E-05	0.00202269	180.864	1.00723E-05	4.35788E-07					4.46506E-06	3.01593E-05
Ethane		3.27952E-05	0.00126305	22.0710	3.11154E-05	5.46582E-07					5.60024E-06	9.31679E-05
Propane		2.19295E-05	0.00102928	8.50607	2.01947E-05	2.65825E-07					2.72362E-06	6.04682E-05
Isobutane		4.86757E-06	0.000243177	1.47920	4.38785E-06	5.17136E-08					5.29854E-07	1.31384E-05
n-Butane		8.92646E-06	0.000451904	2.53436	8.15498E-06	9.41840E-08					9.65002E-07	2.44182E-05
Isopentane		4.02899E-06	0.000201186	0.994552	3.31500E-06	3.96180E-08					4.05923E-07	9.92598E-06
n-Pentane		3.01555E-06	0.000149347	0.709736	2.46510E-06	2.93385E-08					3.00600E-07	7.38116E-06
Hexane		4.12351E-06	0.000192776	0.830294	3.17918E-06	4.00419E-08					4.10267E-07	9.51931E-06
Heptane		2.47023E-06	0.000105219	0.443365	1.59525E-06	2.19345E-08					2.24739E-07	4.77660E-06
Octane		4.66570E-07	1.63756E-05	0.0746628	2.38522E-07	3.98217E-09					4.08011E-08	7.14198E-07
Nonane		2.25574E-07	5.12455E-06	0.0325003	7.16826E-08	1.85767E-09					1.90336E-08	2.14637E-07
Decane		2.50958E-08	2.69597E-07	0.00351354	3.45781E-09	1.91108E-10					1.95808E-09	1.03536E-08
Undecane		1.38116E-09	4.98108E-09	0.000219596	6.02315E-11	9.90429E-12					1.01479E-10	1.80349E-10
Dodecane		8.82327E-10	1.01590E-09	0.000219596	1.12983E-11	5.84824E-12					5.99206E-11	3.38301E-11
Tridecane		0	0	0	0	0					0	0
Benzene		5.86520E-08	2.78815E-06	0.0120778	2.85873E-08	3.87937E-10					3.97478E-09	8.55979E-08
Toluene		8.12685E-08	3.48142E-06	0.0147130	3.55618E-08	5.09422E-10					5.21950E-09	1.06482E-07
Ethylbenzene		4.08638E-09	1.43930E-07	0.000658789	1.49102E-09	2.64922E-11					2.71437E-10	4.46451E-09
m-Xylene		1.36221E-08	4.72686E-07	0.00219596	6.26229E-09	1.13339E-10					1.16126E-09	1.87510E-08
o-Xylene		2.76361E-09	9.18836E-08	0.000439193	7.92699E-10	1.49689E-11					1.53371E-10	2.37355E-09
Water		5.02493E-06	0.000167081	0	5.33303E-06	6.78850E-06					6.95544E-05	1.59685E-05

Mass Fraction	%	%	%	%	%	%	%	%	%	%	%
Nitrogen	0.0823211	0.0342555	0.503667	0.00217202	0.00351178					0.00351178	0.00217202
Oxygen	0.00195126	0.000808382	0.00614392	0.000143730	0.000241762					0.000241762	0.000143730
Carbon Dioxide	0.378254	0.139679	0.209301	0.144401	0.700076					0.700076	0.144401
Methane	25.5617	15.0766	65.0496	4.35254	3.91392					3.91392	4.35254
Ethane	17.9814	17.6458	14.8786	25.2021	9.20111					9.20111	25.2021
Propane	17.6327	21.0878	8.40903	23.9869	6.56230					6.56230	23.9869
Isobutane	5.15881	6.56700	1.92749	6.86966	1.68272					1.68272	6.86966
n-Butane	9.46054	12.2037	3.30242	12.7675	3.06467					3.06467	12.7675
Isopentane	5.30054	6.74420	1.60871	6.44249	1.60025					1.60025	6.44249
n-Pentane	3.96726	5.00643	1.14801	4.79076	1.18504					1.18504	4.79076
Hexane	6.47956	7.71862	1.60412	7.37971	1.93181					1.93181	7.37971
Heptane	4.51344	4.89861	0.996000	4.30572	1.23046					1.23046	4.30572
Octane	0.971820	0.869111	0.191206	0.733912	0.254660					0.254660	0.733912
Nonane	0.527544	0.305375	0.0934509	0.247645	0.133386					0.133386	0.247645
Decane	0.0651095	0.0178224	0.0112077	0.0132523	0.0152228					0.0152228	0.0132523
Undecane	0.00393658	0.000361750	0.000769536	0.000253599	0.000866703					0.000866703	0.000253599
Dodecane	0.00274049	8.04000E-05	0.000838591	5.18391E-05	0.000557691					0.000557691	5.18391E-05
Tridecane	0	0	0	0	0					0	0
Benzene	0.0835400	0.101190	0.0211508	0.0601494	0.0169646					0.0169646	0.0601494
Toluene	0.136539	0.149039	0.0303922	0.0882605	0.0262775					0.0262775	0.0882605
Ethylbenzene	0.00791070	0.00709962	0.00156801	0.00426389	0.00157458					0.00157458	0.00426389
m-Xylene	0.0263706	0.0233162	0.00522671	0.0179084	0.00673634					0.00673634	0.0179084
o-Xylene	0.00534999	0.00453234	0.00104534	0.00226689	0.000889688					0.000889688	0.00226689
Water	1.65069	1.39853	0	2.58795	68.4668					68.4668	2.58795
Mass Flow	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Nitrogen	4.51457E-06	7.37271E-05	22.4658	8.06346E-08	6.27281E-09					6.42708E-08	2.41442E-07
Oxygen	1.07009E-07	1.73986E-06	0.274046	5.33589E-09	4.31839E-10					4.42459E-09	1.59771E-08
Carbon Dioxide	2.07438E-05	0.000300627	9.33574	5.36079E-06	1.25049E-06					1.28124E-05	1.60516E-05
Methane	0.00140183	0.0324489	2901.50	0.000161585	6.99112E-06					7.16305E-05	0.000483829
Ethane	0.000986120	0.0379786	663.653	0.000935611	1.64352E-05					0.000168394	0.00280147
Propane	0.000966993	0.0453866	375.080	0.000890496	1.17217E-05					0.000120100	0.00266638
Isobutane	0.000282914	0.0141340	85.9745	0.000255032	3.00571E-06					3.07963E-05	0.000763632
n-Butane	0.000518825	0.0262657	147.303	0.000473986	5.47418E-06					5.60880E-05	0.00141924
Isopentane	0.000290687	0.0145153	71.7557	0.000239173	2.85839E-06					2.92868E-05	0.000716148
n-Pentane	0.000217568	0.0107752	51.2066	0.000177854	2.11674E-06					2.16880E-05	0.000532542
Hexane	0.000355345	0.0166126	71.5509	0.000273967	3.45063E-06					3.53549E-05	0.000820330
Heptane	0.000247522	0.0105431	44.4261	0.000159847	2.19787E-06					2.25193E-05	0.000478625
Octane	5.32956E-05	0.00187056	8.52862	2.72460E-05	4.54878E-07					4.66064E-06	8.15818E-05
Nonane	2.89310E-05	0.000657249	4.16833	9.19365E-06	2.38256E-07					2.44116E-06	2.75282E-05
Decane	3.57067E-06	3.83587E-05	0.499913	4.91984E-07	2.71912E-08					2.78599E-07	1.47313E-06
Undecane	2.15886E-07	7.78583E-07	0.0343247	9.41468E-09	1.54812E-09					1.58619E-08	2.81900E-08
Dodecane	1.50291E-07	1.73043E-07	0.0374049	1.92449E-09	9.96159E-10					1.02066E-08	5.76244E-09
Tridecane	0	0	0	0	0					0	0
Benzene	4.58142E-06	0.000217787	0.943420	2.23300E-06	3.03025E-08					3.10477E-07	6.68621E-06
Toluene	7.48795E-06	0.000320773	1.35563	3.27661E-06	4.69373E-08					4.80916E-07	9.81105E-06
Ethylbenzene	4.33831E-07	1.52803E-05	0.0699404	1.58294E-07	2.81254E-09					2.88171E-08	4.73975E-07
m-Xylene	1.44619E-06	5.01827E-05	0.233135	6.64836E-07	1.20326E-08					1.23285E-07	1.99070E-06
o-Xylene	2.93399E-07	9.75482E-06	0.0466269	8.41569E-08	1.58918E-09					1.62826E-08	2.51988E-07
Water	9.05255E-05	0.00301001	0	9.60760E-05	0.000122297					0.00125304	0.000287677

Volumetric Flow	ft^3/h	ft^3/h	ft^3/h	ft^3/h	ft^3/h	ft^3/h	ft^3/h	ft^3/h	ft^3/h	ft^3/h	ft^3/h
Nitrogen	6.49352E-05	0.00106299	113.014	2.40620E-06	2.56634E-06					2.62946E-05	7.20481E-06
Oxygen	1.34516E-06	2.19182E-05	1.20314	1.39238E-07	1.54629E-07					1.58432E-06	4.16916E-07
Carbon Dioxide	0.000188449	0.00273438	29.4236	0.000101336	0.000325523					0.00333529	0.000303426
Methane	0.0350521	0.812703	25257.4	0.00839652	0.00499403					0.0511684	0.0251414
Ethane	0.0130492	0.502676	3032.20	0.0258072	0.00626274					0.0641676	0.0772737
Propane	0.00866798	0.406428	1153.35	0.0166788	0.00304530					0.0312019	0.0499407
Isobutane	0.00191294	0.0953721	198.235	0.00361081	0.000592361					0.00606928	0.0108117
n-Butane	0.00350402	0.176988	338.857	0.00670612	0.00107881					0.0110534	0.0200799
Isopentane	0.00157153	0.0782343	130.960	0.00271623	0.000453719					0.00464877	0.00813310
n-Pentane	0.00117556	0.0580189	93.5353	0.00201844	0.000335981					0.00344244	0.00604374
Hexane	0.00159610	0.0742447	108.005	0.00259081	0.000458477					0.00469753	0.00775757
Heptane	0.000949592	0.0401974	56.8447	0.00129454	0.000251079					0.00257254	0.00387620
Octane	0.000178140	0.00620445	9.44766	0.000192716	4.55782E-05					0.000466991	0.000577042
Nonane	8.54324E-05	0.00192291	4.04485	5.76216E-05	2.12568E-05					0.000217796	0.000172535
Decane	9.42989E-06	0.000100253	0.429018	2.76705E-06	2.18646E-06					2.24023E-05	8.28527E-06
Undecane	5.15699E-07	1.83704E-06	0.0265788	4.79766E-08	1.13285E-07					1.16071E-06	1.43655E-07
Dodecane	3.26878E-07	3.71145E-07	0.0261604	8.95421E-09	6.68789E-08					6.85236E-07	2.68113E-08
Tridecane	0	0	0	0	0					0	0
Benzene	2.28306E-05	0.00108137	1.58793	2.33841E-05	4.44087E-06					4.55009E-05	7.00181E-05
Toluene	3.14149E-05	0.00133900	1.90894	2.89575E-05	5.83031E-06					5.97369E-05	8.67063E-05
Ethylbenzene	1.56804E-06	5.48899E-05	0.0840622	1.20883E-06	3.03139E-07					3.10594E-06	3.61955E-06
m-Xylene	5.22345E-06	0.000180116	0.279804	5.07484E-06	1.29686E-06					1.32875E-05	1.51954E-05
o-Xylene	1.05981E-06	3.50165E-05	0.0559650	6.42438E-07	1.71281E-07					1.75493E-06	1.92363E-06
Water	0.00201230	0.0670178	0	0.00444086	0.0777389					0.796507	0.0132971

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-1	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Vapor	**rom Bloc**	--	--	--	--	--	Tank -1	Tank-2	Scrubber	Filter Vessel	--	--
	To Block:	--	--	SAT-1	--	--	--	--	Tank -1	Tank-2	--	--
Property	**Units**											
Temperature	°F	73.2549	73.2549	60	73.2549	73.2549					73.2549	73.2549
Pressure	psia	14.2535	14.2535	39.6959	6.87055	0.499165					0.499165	6.87055
Mole Fraction Vapor	%	100	100	100	100	100					100	100
Mole Fraction Light Liquid	%	0	0	0	0	0					0	0
Mole Fraction Heavy Liquid	%	0	0	0	0	0					0	0
Molecular Weight	lb/lbmol	31.1455	36.7033	20.3120	41.1012	21.3937					21.3937	41.1012
Mass Density	lb/ft^3	0.0782526	0.0925063	0.146096	0.0497135	0.00186802					0.00186802	0.0497135
Molar Flow	lbmol/h	0.000176080	0.00586397	219.596	9.03241E-05	8.34927E-06					8.55460E-05	0.000270454
Mass Flow	lb/h	0.00548410	0.215227	4460.45	0.00371243	0.000178622					0.00183015	0.0111160
Vapor Volumetric Flow	ft^3/h	0.0700820	2.32662	30530.9	0.0746766	0.0956209					0.979724	0.223602
Liquid Volumetric Flow	gpm	0.00873749	0.290072	3806.45	0.00931033	0.0119216					0.122147	0.0278776
Std Vapor Volumetric Flow	MMSCFD	1.60367E-06	5.34068E-05	2	8.22637E-07	7.60420E-08					7.79120E-07	2.46319E-06
Std Liquid Volumetric Flow	sgpm	2.53951E-05	0.000925151	26.2133	1.53060E-05	4.96850E-07					5.09069E-06	4.58303E-05
Compressibility		0.991948	0.988839	0.989622	0.993214	0.999583					0.999583	0.993214
API Gravity												
Net Ideal Gas Heating Value	Btu/ft^3	1628.10	1909.85	1115.66	2100.35	349.712					349.712	2100.35
Net Liquid Heating Value	Btu/lb	19705.6	19600.1	20790.1	19218.9	5435.03					5435.03	19218.9
Specific Gravity		1.07537	1.26726	0.701319	1.41911	0.738667					0.738667	1.41911
Mass Fraction Vapor	%	100	100	100	100	100					100	100
Volume Fraction Vapor	%	100	100	100	100	100					100	100
Mass Fraction Heavy Liquid	%	0	0	0	0	0					0	0
Mass Fraction Light Liquid	%	0	0	0	0	0					0	0

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Composition	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Light Liquid	**rom Bloc**	--	--	--	--	--	Tank -1	Tank-2	Scrubber	Filter Vessel	--	--
	To Block:	--	--	SAT-1	--	--	--	--	Tank -1	Tank-2	--	--
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%
Nitrogen							0.000202537	9.60930E-05	0.00145432	0.00285983		
Oxygen							7.78188E-06	3.90597E-06	3.07016E-05	6.01368E-05		
Carbon Dioxide							0.00399357	0.00256871	0.00469385	0.00843822		
Methane							0.378659	0.264694	1.23076	2.32887		
Ethane							0.791710	0.993531	1.13588	2.01223		
Propane							1.71049	2.48466	1.88723	3.03322		
Isobutane							0.878501	1.35868	0.903021	1.42804		
n-Butane							2.30311	3.59148	2.33333	3.65931		
Isopentane							2.59367	3.83684	2.57869	3.75664		
n-Pentane							2.60273	3.84728	2.57995	3.74079		
Hexane							12.4906	17.3236	12.3116	16.6275		
Heptane							23.8763	30.2687	23.5033	28.9614		
Octane							14.7546	15.3940	14.5188	14.7159		
Nonane							23.3939	15.7205	23.0177	15.0242		
Decane							8.11182	2.55580	7.98114	2.44245		
Undecane							1.45132	0.153688	1.42793	0.146868		
Dodecane							2.80571	0.0943849	2.76048	0.0901965		
Tridecane							0	0	0	0		
Benzene							0.180979	0.253382	0.178520	0.243213		
Toluene							0.887555	1.09709	0.873775	1.04961		
Ethylbenzene							0.140100	0.137989	0.137866	0.131911		
m-Xylene							0.504565	0.486732	0.496503	0.465279		
o-Xylene							0.120382	0.111613	0.118460	0.106688		
Water							0.0190095	0.0227506	0.0189280	0.0242024		
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Nitrogen							9.63112E-09	8.48230E-08	7.02893E-08	2.64166E-06		
Oxygen							3.70047E-10	3.44787E-09	1.48385E-09	5.55490E-08		
Carbon Dioxide							1.89904E-07	2.26745E-06	2.26860E-07	7.79447E-06		
Methane							1.80062E-05	0.000233650	5.94843E-05	0.00215120		
Ethane							3.76477E-05	0.000877008	5.48987E-05	0.00185871		
Propane							8.13380E-05	0.00219325	9.12127E-05	0.00280182		
Isobutane							4.17748E-05	0.00119933	4.36443E-05	0.00131910		
n-Butane							0.000109518	0.00317026	0.000112773	0.00338014		
Isopentane							0.000123335	0.00338685	0.000124632	0.00347005		
n-Pentane							0.000123766	0.00339606	0.000124693	0.00345541		
Hexane							0.000593955	0.0152918	0.000595037	0.0153590		
Heptane							0.00113538	0.0267187	0.00113595	0.0267520		
Octane							0.000701618	0.0135886	0.000701713	0.0135933		
Nonane							0.00111244	0.0138767	0.00111248	0.0138781		
Decane							0.000385736	0.00225605	0.000385740	0.00225612		
Undecane							6.90136E-05	0.000135663	6.90138E-05	0.000135664		
Dodecane							0.000133418	8.33153E-05	0.000133418	8.33155E-05		
Tridecane							0	0	0	0		
Benzene							8.60596E-06	0.000223665	8.62812E-06	0.000224659		
Toluene							4.22054E-05	0.000968425	4.22308E-05	0.000969538		
Ethylbenzene							6.66210E-06	0.000121806	6.66328E-06	0.000121848		
m-Xylene							2.39933E-05	0.000429647	2.39967E-05	0.000429784		
o-Xylene							5.72447E-06	9.85228E-05	5.72534E-06	9.85492E-05		
Water							9.03945E-07	2.00824E-05	9.14817E-07	2.23560E-05		

Mass Fraction	%	%	%	%	%	%	%	%	%	%	%
Nitrogen						5.22620E-05	2.72193E-05	0.000379759	0.000835545		
Oxygen						2.29369E-06	1.26381E-06	9.15749E-06	2.00695E-05		
Carbon Dioxide						0.00161891	0.00114309	0.00192556	0.00387312		
Methane						0.0559546	0.0429373	0.184046	0.389655		
Ethane						0.219281	0.302079	0.318371	0.631044		
Propane						0.694756	1.10785	0.775716	1.39496		
Isobutane						0.470327	0.798510	0.489240	0.865657		
n-Butane						1.23302	2.11074	1.26415	2.21822		
Isopentane						1.72369	2.79913	1.73425	2.82678		
n-Pentane						1.72972	2.80674	1.73509	2.81485		
Hexane						9.91472	15.0952	9.88961	14.9443		
Heptane						22.0374	30.6683	21.9527	30.2663		
Octane						15.5246	17.7806	15.4592	17.5318		
Nonane						27.6372	20.3873	27.5181	20.0970		
Decane						10.6312	3.67702	10.5851	3.62442		
Undecane						2.08959	0.242908	2.08051	0.239427		
Dodecane						4.40212	0.162565	4.38299	0.160235		
Tridecane						0	0	0	0		
Benzene						0.130215	0.200131	0.129983	0.198138		
Toluene						0.753272	1.02213	0.750452	1.00863		
Ethylbenzene						0.137005	0.148131	0.136434	0.146058		
m-Xylene						0.493418	0.522506	0.491343	0.515180		
o-Xylene						0.117723	0.119816	0.117229	0.118130		
Water						0.00315447	0.00414432	0.00317854	0.00454740		
Mass Flow	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Nitrogen						2.69800E-07	2.37618E-06	1.96904E-06	7.40018E-05		
Oxygen						1.18410E-08	1.10328E-07	4.74814E-08	1.77750E-06		
Carbon Dioxide						8.35757E-06	9.97891E-05	9.98401E-06	0.000343031		
Methane						0.000288863	0.00374832	0.000954274	0.0345106		
Ethane						0.00113203	0.0263708	0.00165075	0.0558898		
Propane						0.00358665	0.0967129	0.00402208	0.123548		
Isobutane						0.00242804	0.0697079	0.00253670	0.0766687		
n-Butane						0.00636543	0.184262	0.00655462	0.196461		
Isopentane						0.00889848	0.244357	0.00899204	0.250360		
n-Pentane						0.00892958	0.245022	0.00899644	0.249303		
Hexane						0.0511843	1.31778	0.0512775	1.32357		
Heptane						0.113767	2.67727	0.113824	2.68060		
Octane						0.0801448	1.55220	0.0801557	1.55274		
Nonane						0.142676	1.77976	0.142681	1.77993		
Decane						0.0548832	0.320995	0.0548838	0.321004		
Undecane						0.0107874	0.0212052	0.0107874	0.0212054		
Dodecane						0.0227257	0.0141915	0.0227257	0.0141915		
Tridecane						0	0	0	0		
Benzene						0.000672228	0.0174709	0.000673958	0.0175485		
Toluene						0.00388874	0.0892291	0.00389108	0.0893317		
Ethylbenzene						0.000707282	0.0129315	0.000707407	0.0129359		
m-Xylene						0.00254725	0.0456134	0.00254761	0.0456280		
o-Xylene						0.000607738	0.0104597	0.000607831	0.0104625		
Water						1.62848E-05	0.000361789	1.64807E-05	0.000402750		

Volumetric Flow		gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm
Nitrogen							7.62621E-10	7.26364E-09	5.62327E-09	2.33412E-07		
Oxygen							1.93482E-11	2.01869E-10	7.88458E-11	3.40011E-09		
Carbon Dioxide							8.53538E-09	1.15688E-07	1.03992E-08	4.17294E-07		
Methane							1.51375E-06	2.09053E-05	5.04141E-06	0.000197377		
Ethane							4.30805E-06	0.000104180	6.31116E-06	0.000224092		
Propane							1.24975E-05	0.000344766	1.40491E-05	0.000444249		
Isobutane							8.11161E-06	0.000236314	8.48477E-06	0.000261247		
n-Butane							2.06571E-05	0.000606778	2.12978E-05	0.000650249		
Isopentane							2.75772E-05	0.000764719	2.78812E-05	0.000785794		
n-Pentane							2.74606E-05	0.000761105	2.76821E-05	0.000776721		
Hexane							0.000150990	0.00391497	0.000151284	0.00393851		
Heptane							0.000326576	0.00772374	0.000326677	0.00773820		
Octane							0.000223188	0.00433842	0.000223129	0.00433981		
Nonane							0.000388147	0.00485485	0.000387947	0.00485282		
Decane							0.000147067	0.000861816	0.000146969	0.000861069		
Undecane							2.84711E-05	5.60538E-05	2.84499E-05	5.59914E-05		
Dodecane							5.93616E-05	3.71110E-05	5.93126E-05	3.70610E-05		
Tridecane							0	0	0	0		
Benzene							1.46375E-06	3.83542E-05	1.46854E-06	3.86082E-05		
Toluene							8.65347E-06	0.000199452	8.65930E-06	0.000199779		
Ethylbenzene							1.58571E-06	2.90518E-05	1.58543E-06	2.90434E-05		
m-Xylene							5.71661E-06	0.000102638	5.71593E-06	0.000102629		
o-Xylene							1.33670E-06	2.30461E-05	1.33643E-06	2.30341E-05		
Water							-2.26987E-08	-4.23054E-07	-2.21141E-08	-4.28388E-07		

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Light Liquid	**rom Bloc**	--	--	--	--	--	**Tank -1**	**Tank-2**	**Scrubber**	**Filter Vessel**	--	--
	To Block:	--	--	**SAT-1**	--	--	--	--	**Tank -1**	**Tank-2**	--	--
Property	**Units**											
Temperature	°F						40.0267	47.5770	40	50		
Pressure	psia						14.6959	14.6959	37.6959	74.6959		
Mole Fraction Vapor	%						0	0	0	0		
Mole Fraction Light Liquid	%						100	100	100	100		
Mole Fraction Heavy Liquid	%						0	0	0	0		
Molecular Weight	lb/lbmol						108.564	98.8963	107.280	95.8819		
Mass Density	lb/ft^3						44.5521	43.5041	44.4816	43.2067		
Molar Flow	lbmol/h						0.00475524	0.0882718	0.00483314	0.0923711		
Mass Flow	lb/h						0.516246	8.72975	0.518499	8.85671		
Vapor Volumetric Flow	ft^3/h						0.0115874	0.200665	0.0116565	0.204985		
Liquid Volumetric Flow	gpm						0.00144467	0.0250180	0.00145327	0.0255565		
Std Vapor Volumetric Flow	MMSCFD						4.33089E-05	0.000803946	4.40184E-05	0.000841280		
Std Liquid Volumetric Flow	sgpm						0.00147385	0.0254232	0.00148497	0.0260293		
Compressibility							0.00667795	0.00613712	0.0169545	0.0303061		
API Gravity							69.1951	73.1171	69.5383	74.2145		
Net Ideal Gas Heating Value	Btu/ft^3						5506.78	5025.55	5443.03	4875.84		
Net Liquid Heating Value	Btu/lb						19090.0	19124.6	19095.1	19139.0		
Specific Gravity							0.714331	0.697528	0.713200	0.692760		
Mass Fraction Vapor	%						0	0	0	0		
Volume Fraction Vapor	%						0	0	0	0		
Mass Fraction Heavy Liquid	%						0	0	0	0		
Mass Fraction Light Liquid	%						100	100	100	100		

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-1	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Composition	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Heavy Liquid	**rom Bloc**	--	--	--	--	--	Tank -1	Tank-2	Scrubber	Filter Vessel	--	--
	To Block:	--	--	SAT-1	--	--	--	--	Tank -1	Tank-2	--	--
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%
Nitrogen							2.02254E-06	9.08720E-07	1.44904E-05	2.63136E-05		
Oxygen							8.52101E-08	3.96821E-08	3.35676E-07	5.96355E-07		
Carbon Dioxide							0.000160331	9.86502E-05	0.000188521	0.000319889		
Methane							0.00204529	0.00138353	0.00663931	0.0119956		
Ethane							0.00101209	0.00121297	0.00145225	0.00243070		
Propane							0.000368961	0.000544404	0.000407501	0.000663907		
Isobutane							6.16367E-05	9.07275E-05	6.34167E-05	9.42111E-05		
n-Butane							0.000107727	0.000170426	0.000109290	0.000175763		
Isopentane							3.63190E-05	5.49549E-05	3.61214E-05	5.39449E-05		
n-Pentane							7.29013E-06	1.19136E-05	7.23877E-06	1.20039E-05		
Hexane							6.50881E-06	1.00275E-05	6.43002E-06	1.00105E-05		
Heptane							2.99437E-06	4.14981E-06	2.95632E-06	4.12780E-06		
Octane							1.82487E-07	2.21459E-07	1.80258E-07	2.25144E-07		
Nonane							1.38292E-07	9.82311E-08	1.36515E-07	9.65519E-08		
Decane							3.49603E-09	1.24476E-09	3.44790E-09	1.24363E-09		
Undecane							2.68303E-10	2.97024E-11	2.65442E-10	2.92245E-11		
Dodecane							7.83697E-10	2.64589E-11	7.74927E-10	2.56116E-11		
Tridecane							0	0	0	0		
Benzene							0.000105409	0.000149670	0.000104521	0.000146286		
Toluene							9.39241E-05	0.000124413	9.30327E-05	0.000122836		
Ethylbenzene							4.34790E-06	4.71740E-06	4.30159E-06	4.62987E-06		
m-Xylene							7.77440E-06	8.66871E-06	7.68894E-06	8.61394E-06		
o-Xylene							4.15488E-06	4.30552E-06	4.11161E-06	4.24541E-06		
Water							99.9960	99.9961	99.9909	99.9839		
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Nitrogen							1.46378E-08	1.67096E-09	1.04877E-07	4.84030E-08		
Oxygen							6.16693E-10	7.29675E-11	2.42953E-09	1.09697E-09		
Carbon Dioxide							1.16037E-06	1.81398E-07	1.36446E-06	5.88426E-07		
Methane							1.48024E-05	2.54404E-06	4.80534E-05	2.20656E-05		
Ethane							7.32481E-06	2.23041E-06	1.05110E-05	4.47120E-06		
Propane							2.67029E-06	1.00105E-06	2.94937E-06	1.22123E-06		
Isobutane							4.46085E-07	1.66830E-07	4.58992E-07	1.73298E-07		
n-Butane							7.79658E-07	3.13379E-07	7.91007E-07	3.23309E-07		
Isopentane							2.62852E-07	1.01051E-07	2.61436E-07	9.92298E-08		
n-Pentane							5.27610E-08	2.19068E-08	5.23921E-08	2.20807E-08		
Hexane							4.71064E-08	1.84386E-08	4.65386E-08	1.84140E-08		
Heptane							2.16712E-08	7.63068E-09	2.13970E-08	7.59295E-09		
Octane							1.32072E-09	4.07220E-10	1.30465E-09	4.14145E-10		
Nonane							1.00087E-09	1.80628E-10	9.88052E-10	1.77604E-10		
Decane							2.53019E-11	2.28888E-12	2.49549E-11	2.28762E-12		
Undecane							1.94180E-12	5.46168E-14	1.92119E-12	5.37576E-14		
Dodecane							5.67187E-12	4.86527E-14	5.60870E-12	4.71117E-14		
Tridecane							0	0	0	0		
Benzene							7.62877E-07	2.75214E-07	7.56493E-07	2.69088E-07		
Toluene							6.79759E-07	2.28771E-07	6.73344E-07	2.25952E-07		
Ethylbenzene							3.14672E-08	8.67437E-09	3.11336E-08	8.51649E-09		
m-Xylene							5.62659E-08	1.59400E-08	5.56503E-08	1.58451E-08		
o-Xylene							3.00702E-08	7.91699E-09	2.97586E-08	7.80929E-09		
Water							0.723704	0.183873	0.723705	0.183917		

Mass Fraction	%	%	%	%	%	%	%	%	%	%	%
Nitrogen						3.14493E-06	1.41299E-06	2.25316E-05	4.09157E-05		
Oxygen						1.51346E-07	7.04809E-08	5.96214E-07	1.05921E-06		
Carbon Dioxide						0.000391662	0.000240984	0.000460526	0.000781428		
Methane						0.00182126	0.00123198	0.00591210	0.0106816		
Ethane						0.00168922	0.00202448	0.00242387	0.00405690		
Propane						0.000903074	0.00133248	0.000997406	0.00162497		
Isobutane						0.000198852	0.000292701	0.000204595	0.000303939		
n-Butane						0.000347549	0.000549820	0.000352590	0.000567037		
Isopentane						0.000145449	0.000220079	0.000144658	0.000216034		
n-Pentane						2.91952E-05	4.77108E-05	2.89896E-05	4.80720E-05		
Hexane						3.11338E-05	4.79646E-05	3.07570E-05	4.78831E-05		
Heptane						1.66544E-05	2.30806E-05	1.64428E-05	2.29582E-05		
Octane						1.15706E-06	1.40415E-06	1.14292E-06	1.42751E-06		
Nonane						9.84511E-07	6.99306E-07	9.71855E-07	6.87351E-07		
Decane						2.76104E-08	9.83059E-09	2.72303E-08	9.82162E-09		
Undecane						2.32785E-09	2.57701E-10	2.30303E-09	2.53555E-10		
Dodecane						7.40968E-09	2.50160E-10	7.32677E-09	2.42149E-10		
Tridecane						0	0	0	0		
Benzene						0.000457026	0.000648926	0.000453178	0.000634254		
Toluene						0.000480359	0.000636284	0.000475800	0.000628215		
Ethylbenzene						2.56218E-05	2.77989E-05	2.53489E-05	2.72831E-05		
m-Xylene						4.58138E-05	5.10834E-05	4.53102E-05	5.07605E-05		
o-Xylene						2.44843E-05	2.53717E-05	2.42293E-05	2.50175E-05		
Water						99.9934	99.9926	99.9884	99.9802		
Mass Flow	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Nitrogen						4.10055E-07	4.68092E-08	2.93796E-06	1.35593E-06		
Oxygen						1.97334E-08	2.33487E-09	7.77419E-08	3.51019E-08		
Carbon Dioxide						5.10672E-05	7.98324E-06	6.00492E-05	2.58963E-05		
Methane						0.000237467	4.08127E-05	0.000770894	0.000353986		
Ethane						0.000220250	6.70662E-05	0.000316055	0.000134445		
Propane						0.000117748	4.41420E-05	0.000130054	5.38511E-05		
Isobutane						2.59274E-05	9.69652E-06	2.66776E-05	1.00725E-05		
n-Butane						4.53155E-05	1.82143E-05	4.59750E-05	1.87915E-05		
Isopentane						1.89645E-05	7.29072E-06	1.88623E-05	7.15931E-06		
n-Pentane						3.80664E-06	1.58055E-06	3.78003E-06	1.59309E-06		
Hexane						4.05941E-06	1.58896E-06	4.01048E-06	1.58683E-06		
Heptane						2.17150E-06	7.64609E-07	2.14402E-06	7.60829E-07		
Octane						1.50864E-07	4.65161E-08	1.49028E-07	4.73072E-08		
Nonane						1.28366E-07	2.31664E-08	1.26723E-07	2.27786E-08		
Decane						3.60000E-09	3.25665E-10	3.55062E-09	3.25486E-10		
Undecane						3.03519E-10	8.53705E-12	3.00298E-10	8.40275E-12		
Dodecane						9.66118E-10	8.28724E-12	9.55356E-10	8.02477E-12		
Tridecane						0	0	0	0		
Benzene						5.95897E-05	2.14974E-05	5.90911E-05	2.10190E-05		
Toluene						6.26320E-05	2.10786E-05	6.20408E-05	2.08189E-05		
Ethylbenzene						3.34071E-06	9.20914E-07	3.30530E-06	9.04153E-07		
m-Xylene						5.97347E-06	1.69227E-06	5.90811E-06	1.68219E-06		
o-Xylene						3.19241E-06	8.40508E-07	3.15932E-06	8.29073E-07		
Water						13.0377	3.31253	13.0377	3.31332		

Volumetric Flow		gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm
Nitrogen							1.06804E-09	1.22672E-10	7.65195E-09	3.56032E-09		
Oxygen							3.76644E-11	4.48465E-12	1.48376E-10	6.75539E-11		
Carbon Dioxide							7.83069E-08	1.23011E-08	9.20764E-08	3.99633E-08		
Methane							1.13532E-06	1.96175E-07	3.68546E-06	1.70436E-06		
Ethane							7.23740E-07	2.21293E-07	1.03852E-06	4.44188E-07		
Propane							3.31816E-07	1.24836E-07	3.66483E-07	1.52462E-07		
Isobutane							6.68875E-08	2.50971E-08	6.88206E-08	2.60966E-08		
n-Butane							1.15476E-07	4.65632E-08	1.17153E-07	4.80862E-08		
Isopentane							4.50273E-08	1.73624E-08	4.47832E-08	1.70652E-08		
n-Pentane							9.05697E-09	3.77170E-09	8.99337E-09	3.80512E-09		
Hexane							9.18568E-09	3.60565E-09	9.07469E-09	3.60396E-09		
Heptane							4.75578E-09	1.67911E-09	4.69546E-09	1.67221E-09		
Octane							3.20078E-10	9.89515E-11	3.16175E-10	1.00716E-10		
Nonane							2.65952E-10	4.81213E-11	2.62539E-10	4.73536E-11		
Decane							7.34126E-12	6.65814E-13	7.24036E-12	6.65973E-13		
Undecane							6.10542E-13	1.72164E-14	6.04045E-13	1.69589E-14		
Dodecane							1.92361E-12	1.65423E-14	1.90212E-12	1.60309E-14		
Tridecane							0	0	0	0		
Benzene							1.09947E-07	3.97646E-08	1.09024E-07	3.89097E-08		
Toluene							1.14441E-07	3.86082E-08	1.13358E-07	3.81607E-08		
Ethylbenzene							6.02401E-09	1.66452E-09	5.95999E-09	1.63540E-09		
m-Xylene							1.08286E-08	3.07499E-09	1.07098E-08	3.05887E-09		
o-Xylene							5.70246E-09	1.50482E-09	5.64321E-09	1.48539E-09		
Water							0.0260033	0.00661179	0.0260028	0.00661482		

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Heavy Liquid	**rom Bloc**	--	--	--	--	--	**Tank -1**	**Tank-2**	**Scrubber**	**Filter Vessel**	--	--
	To Block:	--	--	**SAT-1**	--	--	--	--	**Tank -1**	**Tank-2**	--	--
Property	**Units**											
Temperature	°F						40.0267	47.5770	40	50		
Pressure	psia						14.6959	14.6959	37.6959	74.6959		
Mole Fraction Vapor	%						0	0	0	0		
Mole Fraction Light Liquid	%						0	0	0	0		
Mole Fraction Heavy Liquid	%						100	100	100	100		
Molecular Weight	lb/lbmol						18.0157	18.0159	18.0157	18.0159		
Mass Density	lb/ft^3						62.5081	62.4603	62.5055	62.4375		
Molar Flow	lbmol/h						0.723733	0.183880	0.723771	0.183947		
Mass Flow	lb/h						13.0386	3.31277	13.0393	3.31397		
Vapor Volumetric Flow	ft^3/h						0.208590	0.0530380	0.208610	0.0530766		
Liquid Volumetric Flow	gpm						0.0260061	0.00661253	0.0260085	0.00661735		
Std Vapor Volumetric Flow	MMSCFD						0.00659148	0.00167471	0.00659183	0.00167532		
Std Liquid Volumetric Flow	sgpm						0.0260674	0.00662306	0.0260716	0.00662719		
Compressibility							0.000789848	0.000778694	0.00202619	0.00394054		
API Gravity							10.0047	10.0043	10.0109	10.0180		
Net Ideal Gas Heating Value	Btu/ft^3						0.0592993	0.0673923	0.109103	0.186411		
Net Liquid Heating Value	Btu/lb						-1058.45	-1058.27	-1057.35	-1055.64		
Specific Gravity							1.00223	1.00146	1.00219	1.00110		
Mass Fraction Vapor	%						0	0	0	0		
Volume Fraction Vapor	%						0	0	0	0		
Mass Fraction Heavy Liquid	%						100	100	100	100		
Mass Fraction Light Liquid	%						0	0	0	0		

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Composition	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Mixed Liquid	**rom Bloc**	--	--	--	--	--	Tank -1	Tank-2	Scrubber	Filter Vessel	--	--
	To Block:	--	--	SAT-1	--	--	--	--	Tank -1	Tank-2	--	--
Mole Fraction		%	%	%	%	%	%	%	%	%	%	%
Nitrogen							3.33141E-06	3.17815E-05	2.40414E-05	0.000973539		
Oxygen							1.35450E-07	1.29370E-06	5.37106E-07	2.05003E-05		
Carbon Dioxide							0.000185353	0.000899807	0.000218407	0.00303379		
Methane							0.00450365	0.0867875	0.0147594	0.786511		
Ethane							0.00617340	0.323069	0.00897740	0.674291		
Propane							0.0115319	0.806261	0.0129236	1.01443		
Isobutane							0.00579569	0.440747	0.00605313	0.477446		
n-Butane							0.0151406	1.16500	0.0155865	1.22340		
Isopentane							0.0169664	1.24451	0.0171415	1.25585		
n-Pentane							0.0169967	1.24786	0.0171211	1.25053		
Hexane							0.0815391	5.61886	0.0816745	5.55847		
Heptane							0.155857	9.81757	0.155911	9.68160		
Octane							0.0963118	4.99301	0.0963095	4.91944		
Nonane							0.152705	5.09889	0.152686	5.02250		
Decane							0.0529503	0.828968	0.0529424	0.816494		
Undecane							0.00947354	0.0498482	0.00947206	0.0490971		
Dodecane							0.0183144	0.0306135	0.0183115	0.0301521		
Tridecane							0	0	0	0		
Benzene							0.00128607	0.0822850	0.00128803	0.0814018		
Toluene							0.00588687	0.355924	0.00588855	0.350960		
Ethylbenzene							0.000918831	0.0447597	0.000918800	0.0441000		
m-Xylene							0.00330130	0.157876	0.00330115	0.155545		
o-Xylene							0.000789929	0.0362043	0.000789880	0.0356680		
Water							99.3434	67.5700	99.3277	66.5681		
Molar Flow		lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h	lbmol/h
Nitrogen							2.42689E-08	8.64940E-08	1.75166E-07	2.69006E-06		
Oxygen							9.86740E-10	3.52084E-09	3.91338E-09	5.66460E-08		
Carbon Dioxide							1.35027E-06	2.44884E-06	1.59132E-06	8.38290E-06		
Methane							3.28086E-05	0.000236194	0.000107538	0.00217327		
Ethane							4.49725E-05	0.000879238	6.54097E-05	0.00186319		
Propane							8.40083E-05	0.00219426	9.41620E-05	0.00280304		
Isobutane							4.22209E-05	0.00119950	4.41033E-05	0.00131927		
n-Butane							0.000110298	0.00317057	0.000113564	0.00338047		
Isopentane							0.000123598	0.00338695	0.000124893	0.00347015		
n-Pentane							0.000123819	0.00339609	0.000124745	0.00345543		
Hexane							0.000594002	0.0152918	0.000595083	0.0153590		
Heptane							0.00113540	0.0267187	0.00113597	0.0267520		
Octane							0.000701620	0.0135886	0.000701715	0.0135933		
Nonane							0.00111244	0.0138767	0.00111248	0.0138781		
Decane							0.000385736	0.00225605	0.000385740	0.00225612		
Undecane							6.90136E-05	0.000135663	6.90138E-05	0.000135664		
Dodecane							0.000133418	8.33153E-05	0.000133418	8.33155E-05		
Tridecane							0	0	0	0		
Benzene							9.36884E-06	0.000223940	9.38461E-06	0.000224928		
Toluene							4.28851E-05	0.000968653	4.29042E-05	0.000969764		
Ethylbenzene							6.69357E-06	0.000121814	6.69441E-06	0.000121856		
m-Xylene							2.40495E-05	0.000429663	2.40523E-05	0.000429799		
o-Xylene							5.75454E-06	9.85307E-05	5.75510E-06	9.85570E-05		
Water							0.723705	0.183893	0.723705	0.183939		

Mass Fraction	%	%	%	%	%	%	%	%	%	%	%
Nitrogen						5.01559E-06	2.01203E-05	3.61933E-05	0.000619174		
Oxygen						2.32939E-07	9.35541E-07	9.23629E-07	1.48932E-05		
Carbon Dioxide						0.000438403	0.000894932	0.000516555	0.00303128		
Methane						0.00388297	0.0314646	0.0127246	0.286464		
Ethane						0.00997637	0.219537	0.0145069	0.460321		
Propane						0.0273290	0.803462	0.0306255	1.01557		
Isobutane						0.0181040	0.578929	0.0189071	0.630029		
n-Butane						0.0472949	1.53025	0.0486850	1.61437		
Isopentane						0.0657880	2.02918	0.0664631	2.05713		
n-Pentane						0.0659056	2.03465	0.0663843	2.04841		
Hexane						0.377639	10.9427	0.378245	10.8751		
Heptane						0.839326	22.2318	0.839567	22.0251		
Octane						0.591265	12.8894	0.591218	12.7580		
Nonane						1.05258	14.7790	1.05239	14.6247		
Decane						0.404898	2.66551	0.404815	2.63752		
Undecane						0.0795834	0.176086	0.0795665	0.174233		
Dodecane						0.167658	0.117845	0.167622	0.116604		
Tridecane						0	0	0	0		
Benzene						0.00539894	0.145255	0.00540687	0.144359		
Toluene						0.0291510	0.741125	0.0291577	0.734161		
Ethylbenzene						0.00524258	0.107390	0.00524211	0.106295		
m-Xylene						0.0188362	0.378784	0.0188344	0.374914		
o-Xylene						0.00450711	0.0868632	0.00450657	0.0859713		
Water						96.1852	27.5099	96.1646	27.2271		
Mass Flow	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**	**lb/h**
Nitrogen						6.79855E-07	2.42299E-06	4.90700E-06	7.53577E-05		
Oxygen						3.15745E-08	1.12663E-07	1.25223E-07	1.81260E-06		
Carbon Dioxide						5.94248E-05	0.000107772	7.00332E-05	0.000368927		
Methane						0.000526330	0.00378913	0.00172517	0.0348646		
Ethane						0.00135228	0.0264379	0.00196681	0.0560242		
Propane						0.00370440	0.0967571	0.00415213	0.123602		
Isobutane						0.00245397	0.0697176	0.00256338	0.0766788		
n-Butane						0.00641075	0.184281	0.00660059	0.196480		
Isopentane						0.00891745	0.244364	0.00901091	0.250367		
n-Pentane						0.00893339	0.245023	0.00900022	0.249305		
Hexane						0.0511884	1.31778	0.0512815	1.32357		
Heptane						0.113769	2.67727	0.113826	2.68060		
Octane						0.0801450	1.55220	0.0801558	1.55274		
Nonane						0.142676	1.77976	0.142681	1.77993		
Decane						0.0548832	0.320995	0.0548838	0.321004		
Undecane						0.0107874	0.0212052	0.0107874	0.0212054		
Dodecane						0.0227257	0.0141915	0.0227257	0.0141915		
Tridecane						0	0	0	0		
Benzene						0.000731817	0.0174924	0.000733050	0.0175695		
Toluene						0.00395137	0.0892502	0.00395312	0.0893525		
Ethylbenzene						0.000710623	0.0129324	0.000710712	0.0129369		
m-Xylene						0.00255322	0.0456151	0.00255352	0.0456297		
o-Xylene						0.000610931	0.0104605	0.000610990	0.0104633		
Water						13.0377	3.31289	13.0378	3.31372		

Volumetric Flow	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm	gpm
Nitrogen						1.83066E-09	7.38631E-09	1.32752E-08	2.36972E-07		
Oxygen						5.70126E-11	2.06353E-10	2.27221E-10	3.46766E-09		
Carbon Dioxide						8.68422E-08	1.27989E-07	1.02476E-07	4.57257E-07		
Methane						2.64907E-06	2.11014E-05	8.72687E-06	0.000199081		
Ethane						5.03179E-06	0.000104401	7.34968E-06	0.000224537		
Propane						1.28293E-05	0.000344891	1.44155E-05	0.000444401		
Isobutane						8.17849E-06	0.000236339	8.55359E-06	0.000261273		
n-Butane						2.07726E-05	0.000606825	2.14150E-05	0.000650297		
Isopentane						2.76222E-05	0.000764736	2.79260E-05	0.000785811		
n-Pentane						2.74697E-05	0.000761109	2.76911E-05	0.000776725		
Hexane						0.000150999	0.00391497	0.000151293	0.00393851		
Heptane						0.000326580	0.00772374	0.000326682	0.00773820		
Octane						0.000223188	0.00433843	0.000223130	0.00433981		
Nonane						0.000388147	0.00485485	0.000387947	0.00485282		
Decane						0.000147067	0.000861816	0.000146969	0.000861069		
Undecane						2.84711E-05	5.60538E-05	2.84499E-05	5.59914E-05		
Dodecane						5.93616E-05	3.71110E-05	5.93126E-05	3.70610E-05		
Tridecane						0	0	0	0		
Benzene						1.57370E-06	3.83940E-05	1.57757E-06	3.86471E-05		
Toluene						8.76791E-06	0.000199491	8.77266E-06	0.000199818		
Ethylbenzene						1.59174E-06	2.90535E-05	1.59139E-06	2.90451E-05		
m-Xylene						5.72744E-06	0.000102641	5.72664E-06	0.000102632		
o-Xylene						1.34241E-06	2.30476E-05	1.34208E-06	2.30356E-05		
Water						0.0260033	0.00661137	0.0260028	0.00661439		

Process Streams		Flash Tank-1	lashing Tank-	Inlet Gas	oading Tank -	oading Tank-	nk-1 Liquid C	nk-2 Liquid C	To Tank-1	To Tank-2	W&B Tank-1	W&B Tank-2
Properties	**Status:**	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved	Solved
Phase: Mixed Liquid	**rom Bloc**	--	--	--	--	--	**Tank -1**	**Tank-2**	**Scrubber**	**Filter Vessel**	--	--
	To Block:	--	--	**SAT-1**	--	--	--	--	**Tank -1**	**Tank-2**	--	--
Property	**Units**											
Temperature	°F						40.0267	47.5770	40	50		
Pressure	psia						14.6959	14.6959	37.6959	74.6959		
Mole Fraction Vapor	%						0	0	0	0		
Mole Fraction Light Liquid	%						0.652754	32.4347	0.663343	33.4293		
Mole Fraction Heavy Liquid	%						99.3472	67.5653	99.3367	66.5707		
Molecular Weight	lb/lbmol						18.6068	44.2493	18.6079	44.0460		
Mass Density	lb/ft^3						61.5631	47.4670	61.5517	47.1620		
Molar Flow	lbmol/h						0.728488	0.272152	0.728604	0.276318		
Mass Flow	lb/h						13.5548	12.0425	13.5578	12.1707		
Vapor Volumetric Flow	ft^3/h						0.220178	0.253703	0.220266	0.258061		
Liquid Volumetric Flow	gpm						0.0274507	0.0316305	0.0274617	0.0321739		
Std Vapor Volumetric Flow	MMSCFD						0.00663479	0.00247866	0.00663584	0.00251660		
Std Liquid Volumetric Flow	sgpm						0.0275413	0.0320462	0.0275566	0.0326565		
Compressibility							0.000828283	0.00251668	0.00212522	0.0127544		
API Gravity							12.2357	55.6655	12.2637	56.6593		
Net Ideal Gas Heating Value	Btu/ft^3						36.0047	1630.07	36.2143	1630.08		
Net Liquid Heating Value	Btu/lb						-291.078	13572.5	-286.643	13640.2		
Specific Gravity							0.987079	0.761067	0.986896	0.756177		
Mass Fraction Vapor	%						0	0	0	0		
Volume Fraction Vapor	%						0	0	0	0		
Mass Fraction Heavy Liquid	%						96.1914	27.5089	96.1756	27.2291		
Mass Fraction Light Liquid	%						3.80857	72.4911	3.82437	72.7709		

Company Name: Core Appalachia Midstream LLC
Facility Name: Well 800970

Fugitive Emissions

Fugitive VOC/Total Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Weight Fraction VOC	Weight Fraction HAP	VOC Emissions[3] (tpy)	HAP Emissions[3] (tpy)
Valves	Gas	4.50E-03	16	0.70	1.00	0.09	0.70	0.06
Flanges	Gas	3.90E-04	60	0	0.19	0.02	0.04	3.8E-03
Compressor Seals	Gas	8.80E-03	0	0.00	0.19	0.02	0.0E+00	0.0E+00
Relief Valves	Gas	8.80E-03	0	0.00	0.19	0.02	0.0E+00	0.0E+00
Open-Ended Lines	Gas	2.00E-03	3	0.06	0.19	0.02	0.0	9.6E-04
Valves	Light Liquid	2.50E-03	0	0.00	0.19	0.02	0.0E+00	0.0E+00
Flanges	Light Liquid	1.10E-04	0	0.00	0.19	0.02	0.0E+00	0.0E+00
Pump Seals	Light Liquid	1.30E-02	0	0.00	0.19	0.02	0.0E+00	0.0E+00
Other	Light Liquid	7.50E-02	0	0.00	0.19	0.02	0.0E+00	0.0E+00
Pneumatic Pump[4]	Gas	13.30	0	0.00	0.19	0.02	0.0E+00	0.0E+00
Intermittent-Bleed Pneumatic Devices[4]	Gas	13.50	0	0.00	0.19	0.02	0.0E+00	0.0E+00
Low-Bleed Pneumatic Devices[4]	Gas	1.39	1	0.33	0.19	0.02	0.06	0.01
			Emission Totals:	**1.31**	**---**	**---**	**0.81**	**0.07**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-4. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). The low-bleed pneumatic controller value is from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr-component).

[2] Pressure relief valves count includes two for each storage tank. A 50% compliance margin is added to the component counts based on Subpart W counts.

[3] Potential emissions VOC/HAP (tpy) = Emission factor (kg/hr/source) * Number of Sources * Weight % VOC/HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

[4] Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

Company Name: Core Appalachia Midstream LLC
Facility Name: Well 800970

Fugitive Emissions

Fugitive Specific HAP Emissions from Component Leaks

Equipment Type	Service	Emission Factors[1] (kg/hr/source)	Facility Equipment Count[2] (units)	TOC Annual Fugitive Emissions (tpy)	Benzene Emissions[3] (tpy)	Toluene Emissions[3] (tpy)	Ethylbenzene Emissions[3] (tpy)	Xylene Emissions[3] (tpy)	n-Hexane Emissions[4] (tpy)
Valves	Gas	0.00450	16	0.70	1.5E-04	2.1E-04	1.1E-05	4.4E-05	0.01
Flanges	Gas	0.00039	60	0.23	4.8E-05	6.9E-05	3.5E-06	1.4E-05	3.6E-03
Compressor Seals	Gas	0.00880	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Relief Valves	Gas	0.00880	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Open-Ended Lines	Gas	0.00200	3	0.06	1.2E-05	1.8E-05	9.1E-07	3.6E-06	9.3E-04
Valves	Light Liquid	0.00250	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Flanges	Light Liquid	0.00011	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pump Seals	Light Liquid	0.01300	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Other	Light Liquid	0.07500	0	0.00	<0.01	<0.01	<0.01	<0.01	<0.01
Pneumatic Pump[4]	Gas	13.30	0	0.00	<0.01	<0.01	<0.01	<0.01	<0.01
Intermittent-Bleed Pneumatic Devices[4]	Gas	13.50	0	0.00	<0.01	<0.01	<0.01	<0.01	<0.01
Low-Bleed Pneumatic Devices[4]	Gas	1.39	1	0.33	6.9E-05	9.9E-05	5.1E-06	2.0E-05	0.01
			Emission Totals:	**1.31**	**2.8E-04**	**4.0E-04**	**2.0E-05**	**8.2E-05**	**0.02**

[1] U.S. EPA. Office of Air Quality Planning and Standards. *Protocol for Equipment Leak Emission Estimates.* Table 2-4. (Research Triangle Park, NC: U.S. EPA EPA-453/R-95-017, 1995). The low-bleed pneumatic controller value is from 40 CFR 98 Subpart W, Table W-1A (units of scf/hr-component).

[2] Pressure relief valves count includes one Emergency Pressure Relief valve and one hatch for each storage tank. A 50% compliance margin is added to the component counts based on Subpart W counts.

[3] Potential emissions HAP (tpy) = Emission factor (kg/hr/source) * Number of Sources * Weight % HAP x 2.2046 (lb/kg) x 8,760 (hr/yr) ÷ 2,000 (lb/ton)

[4] Potential emissions HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)

Company Name: Core Appalachia Midstream LLC
Facility Name: Well 800970

Fugitive Emissions

GHG Fugitive Emissions from Component Leaks

Component	Service	GHG Emission Factor[1] cf/hr/componen	Component Count	CH_4 Emissions[2,3] (tpy)	CO_2 Emissions[2,3] (tpy)	CO_2e Emissions[4] (tpy)
Valves	Gas	0.027	16	0.07	2.1E-04	1.65
Flanges	Gas	0.003	60	0.03	8.8E-05	0.69
Compressor Seals	Gas	0.0088	0	0.0E+00	0.0E+00	0.0E+00
Relief Valves	Gas	0.04	0	0.0E+00	0.0E+00	0.0E+00
Open-Ended Lines	Gas	0.061	3	0.03	9.0E-05	0.70
Valves	Light Liquid	0.05	0	0.0E+00	0.0E+00	0.0E+00
Flanges	Light Liquid	0.003	0	0.0E+00	0.0E+00	0.0E+00
Pump Seals	Light Liquid	0.01	0	0.0E+00	0.0E+00	0.0E+00
Other	Light Liquid	0.30	0	0.0E+00	0.0E+00	0.0E+00
Pneumatic Pump[4]	Gas	13.30	0	0.0E+00	0.0E+00	0.0E+00
Intermittent-Bleed Pneumatic Devices[4]	Gas	13.50	0	0.0E+00	0.0E+00	0.0E+00
Low-Bleed Pneumatic Devices[4]	Gas	1.39	1	0.21	6.8E-04	5.31
Total				**0.33**	**1.1E-03**	**8.34**

[1] Population emission factors for gas service in the Eastern U.S. from *Table W-1A of Subpart W - Default Whole Gas Emission Factors for Onshore Production* , 40 CFR 98, Subpart W (table W-6 for compressor).

[2] Calculated in accordance with Equations W-32a, W-35 and W-36 in Subpart W of 40 CFR 98. See footnote 4 above for sample calculation.

[3] Potential emissions VOC/HAP (tpy) = Gas volume vented (scf/yr) * Molar weight of natural gas (lb/lb-mol) * Weight % VOC/HAP ÷ 100 ÷ 379 (scf/lb-mol) ÷ 2,000 (lb/ton)
Mole fractions of CH_4 and CO_2 based on gas analysis:

CH_4: 82%
CO_2: 0.10%

[4] Carbon equivalent emissions (CO_2e) are based on the following Global Warming Potentials (GWP) from 40 CFR Part 98, Table A-1:

CO_2: 1
CH_4: 25

Facility-Wide Emission Summary

ATTACHMENT V – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	NO_x		CO		VOC		SO_2		PM_{10}		$PM_{2.5}$		GHG (CO_2e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	0.42	1.83	0.42	1.83	0.23	1.02	<0.01	<0.01	0.02	0.07	0.02	0.07	116	508
TK-1	---	---	---	---	<0.01	0.01	---	---	---	---	---	---	0.04	0.16
TK-2	---	---	---	---	0.15	0.65	---	---	---	---	---	---	<0.01	<0.01
EU-LOAD1	---	---	---	---	0.04	0.01	---	---	---	---	---	---	<0.01	<0.01
EU-LOAD2	---	---	---	---	0.04	0.01	---	---	---	---	---	---	<0.01	<0.01
Fugitives	---	---	---	---	---	2.74	---	---	---	---	---	---	---	208
Haul Roads	---	---	---	---	---	---	---	---	---	0.33	---	0.03	---	---
FACILITY TOTAL	0.42	1.83	0.42	1.83	0.47	4.45	<0.01	<0.01	0.02	0.40	0.02	0.10	116	715
FACILITY TOTAL (Excluding fugitives)	0.42	1.83	0.42	1.83	0.47	1.71	<0.01	<0.01	0.02	0.07	0.02	0.07	116	508

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.
According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

ATTACHMENT V – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
CE-1	0.02	0.10	1.3E-03	5.7E-03	4.6E-04	2.0E-03	2.1E-05	9.0E-05	1.6E-04	7.1E-04	---	---	0.03	0.14
TK-1	---	---	4.9E-06	2.1E-05	8.0E-06	3.5E-05	4.6E-07	2.0E-06	1.9E-06	8.2E-06	3.9E-04	1.7E-03	4.1E-04	1.8E-03
TK-2	---	---	2.2E-04	9.8E-04	3.3E-04	1.4E-03	1.6E-05	6.9E-05	6.2E-05	2.7E-04	0.02	0.08	0.02	0.08
EU-LOAD1	---	---	3.8E-05	9.9E-06	5.6E-05	1.5E-05	2.7E-06	7.1E-07	1.3E-05	3.3E-06	4.7E-03	1.2E-03	4.8E-03	1.2E-03
EU-LOAD2	---	---	3.8E-05	9.8E-06	5.5E-05	1.4E-05	2.7E-06	6.9E-07	1.3E-05	3.3E-06	4.6E-03	1.2E-03	4.7E-03	1.2E-03
Fugitives	---	---	---	3.0E-03	---	4.3E-03	---	2.2E-04	---	8.9E-04	---	0.23	---	0.24
Haul Roads	---	---	---	---	---	---	---	---	---	---	---	---	---	---
FACILITY TOTAL	0.02	0.10	1.6E-03	9.8E-03	9.1E-04	7.8E-03	4.2E-05	3.8E-04	2.5E-04	1.9E-03	0.03	0.31	0.06	0.46
FACILITY TOTAL (Excluding fugitives)	0.02	0.10	1.6E-03	6.8E-03	9.1E-04	3.5E-03	4.2E-05	1.6E-04	2.5E-04	1.0E-03	0.03	0.08	0.06	0.23

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.
According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

Class I Legal Advertisement

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Core Appalachia Midstream LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G35D permit for a natural gas compressor station (N-7 Compressor Station) located in Kanawha County, West Virginia (From Kelley's Creek Road Rt.81 turn left onto Bufflick Branch just past a Columbia Gas Corporation's compressor station. Travel up Bufflick Branch Hollow about 1300' and make a left taking it to the top of the hill. Make a hard right turn at the top of the hill onto the strip bench. Travel on the strip bench for 4950' to a crossroads and take a left. After taking the left at the crossroads, stay to the right through 3 intersections traveling a total of 3950' from the crossroads. Compressor is on the right side of the road.). Site Latitude and Longitude Coordinates are: 38.26085, -81.42824.

The applicant estimates the potential to discharge the following Regulated Air Pollutants on a facility-wide basis will be:

Nitrogen Oxides : 1.83 tpy
Carbon Monoxide: 1.83 tpy
Particulate Matter-10 (including fugitive emissions): 0.40 tpy
Particulate Matter-10 (excluding fugitive emissions):0.07 tpy
Particulate Matter-2.5 (including fugitive emissions): 0.10 tpy
Particulate Matter-2.5 (excluding fugitive emissions): 0.07 tpy
Volatile Organic Compounds (including fugitive emissions): 4.45 tpy
Volatile Organic Compounds (excluding fugitive emissions): 1.71 tpy
Sulfur Dioxide: <0.01 tpy
Formaldehyde: 0.10 tpy
Benzene (including fugitive emissions) :9.8E-03 tpy
Benzene (excluding fugitive emissions): 6.8E-03 tpy
Toluene (including fugitive emissions): 7.8E-03 tpy
Toluene (excluding fugitive emissions): 3.5E-03 tpy
Ethylbenzene (including fugitive emissions): 3.8E-04 tpy
Ethylbenzene (excluding fugitive emissions): 1.6E-04 tpy
Xylenes (including fugitive emissions):1.9E-03 tpy
Xylenes (excluding fugitive emissions): 1.0E-03 tpy
Hexane (including fugitive emissions): 0.31 tpy
Hexane (excluding fugitive emissions):0.08 tpy
Total Hazardous Air Pollutants (including fugitive emissions): 0.46 tpy
Total Hazardous Air Pollutants (excluding fugitive emissions): 0.23 tpy
Carbon Dioxide Equivalents (CO2e) (including fugitive emissions): 715.26 tpy
Carbon Dioxide Equivalents (CO2e) (excluding fugitive emissions): 507.69 tpy

Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 8th Day of December 2017.

By: Core Appalachia Midstream LLC
John B. Lawman, Jr.
Senior Vice President – Midstream Operations
414 Summers Street
Charleston, WV 25301