

MARKWEST

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November 1, 2018

Mr. Fred Durham, Director
West Virginia Department of Environmental Protection
Division of Air Quality
Charleston, WV 25304

**Re: MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant
Application for Title V Operating (45CSR30) Permit**

Dear Mr. Durham:

MarkWest Liberty Midstream & Resources L.L.C. (MarkWest) is submitting the enclosed Title V Operating Permit application in accordance with the West Virginia Air Pollution Control Act and Title 45 Series 30 (45CSR30) for the Majorsville Gas Plant in Marshall County. The facility is currently operating under permit R13-2818H. With this application MarkWest is providing the necessary documentation to obtain an initial Title V permit for the facility.

There are a few minor changes from the R13-2818H permit that are referenced in this application. The first is that the emergency engine M7-G-8 has not and will not be installed at this facility so it has been removed throughout. The second change is that emergency generators M7-G-9 and M2-G-10 have been changed from what was in the R13 permit. In both instances the change is to a lower horsepower engine and higher tier emission profile so all emissions are less than originally permitted. This application gives all pertinent information for the new engines.

This package contains the required application forms for the referenced facility.

If you have any questions or comments, please call myself at (303) 542-0686 or email nwheldon@markwest.com at your convenience.

Sincerely,



Nathan M. Wheldon, P.E.
Sr. Manager – Air Programs
Enclosures (Original + 2 Hard copies)



MARKWEST LIBERTY MIDSTREAM & RESOURCES L.L.C.

MAJORSVILLE GAS PLANT

45CSR30 TITLE V OPERATING PERMIT APPLICATION

**SUBMITTED TO WVDEP DIVISION OF AIR QUALITY
November, 2018**



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Introduction

MarkWest Liberty Midstream and Resources, L.L.C (MarkWest) owns and operates the Majorsville Gas Plant. With the commencement of operation of recently installed equipment the facility has become Title V major for Nitrogen Oxides (NO_x). MarkWest is hereby submitting a Title V Operating Permit application in accordance with 45 CSR 30.

The Majorsville Gas Plant is a processing and fractionation plant for gas gathered in wells throughout West Virginia. Emission sources at the facility include three (3) 2,370 horsepower (hp) Caterpillar G3608LE engines, two (2) 5.6 million British thermal unit per hour (mmBtu/hr) regenerator heaters, five (5) 7.69 mmBtu/hr regeneration heaters, one (1) 15.40 mmBtu/hr hot medium oil (HMO) heater, three (3) 16.07 mmBtu/hr HMO heaters, two (2) 119.2 mmBtu/hr deethanization HMO heaters, two (2) 14.25 mmBtu/hr deethanization regeneration heaters, one (1) 10.65 mmBtu/hr stabilization heater, ten (10) emergency generators of various sizes, two (2) process flares, blowdown emissions and fugitive component emissions.

This facility is located at 1700 Majorsville Road, Dallas, Marshall County, West Virginia. This submittal includes the following:

- Title V Permit Application Checklist
- Title V Application – General Forms
- Emissions Calculations
- Attachment A – Area Map
- Attachment B – Plot Plan
- Attachment C – Process Flow Diagram
- Attachment D – Title V Equipment Form
- Attachment E – Emission Unit Form
- Attachment G – Air Pollution Control Device Form

If there are any questions concerning this submittal the following may be contacted:

Nathan M. Wheldon
Sr. Manager – Air Programs
MarkWest Liberty Midstream and Resources, L.L.C.
1515 Arapahoe Street, Tower 1, Suite 1600
Denver, CO 80202-2137
Phone: (303) 542-0686

Title V Application Checklist

Title V Permit Application Checklist For Administrative Completeness

A complete application is demonstrated when all of the information required below is properly prepared, completed and attached. The items listed below are required information which must be submitted with a Title V permit application. Any submittal will be considered incomplete if the required information is not included.*

<input checked="" type="checkbox"/>	Two signed copies of the application (at least one <u>must</u> contain the original "Certification" page signed and dated in blue ink)
<input checked="" type="checkbox"/>	Correct number of copies of the application on separate CDs or diskettes, (i.e. at least one disc per copy)
<input checked="" type="checkbox"/>	*Table of Contents (needs to be included but not for administrative completeness)
<input checked="" type="checkbox"/>	Facility information
<input checked="" type="checkbox"/>	Description of process and products, including NAICS and SIC codes, and including alternative operating scenarios
<input checked="" type="checkbox"/>	Area map showing plant location
<input checked="" type="checkbox"/>	Plot plan showing buildings and process areas
<input checked="" type="checkbox"/>	Process flow diagram(s), showing all emission units, control equipment, emission points, and their relationships
<input checked="" type="checkbox"/>	Identification of all applicable requirements with a description of the compliance status, the methods used for demonstrating compliance, and a Schedule of Compliance Form (ATTACHMENT F) for all requirements for which the source is not in compliance
<input checked="" type="checkbox"/>	Listing of all active permits and consent orders (if applicable)
<input checked="" type="checkbox"/>	Facility-wide emissions summary
<input checked="" type="checkbox"/>	Identification of Insignificant Activities
<input checked="" type="checkbox"/>	ATTACHMENT D - Title V Equipment Table completed for all emission units at the facility except those designated as insignificant activities
<input checked="" type="checkbox"/>	ATTACHMENT E - Emission Unit Form completed for each emission unit listed in the Title V Equipment Table (ATTACHMENT D) and a Schedule of Compliance Form (ATTACHMENT F) for all requirements for which the emission unit is not in compliance
<input checked="" type="checkbox"/>	ATTACHMENT G - Air Pollution Control Device Form completed for each control device listed in the Title V Equipment Table (ATTACHMENT D)
<input type="checkbox"/>	ATTACHMENT H – Compliance Assurance Monitoring (CAM) Plan Form completed for each control device for which the "Is the device subject to CAM?" question is answered "Yes" on the Air Pollution Control Device Form (ATTACHMENT G)
<input checked="" type="checkbox"/>	General Application Forms signed by a Responsible Official
<input type="checkbox"/>	Confidential Information submitted in accordance with 45CSR31

Title V Application General Forms



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street SE
Charleston, WV 25304
Phone: (304) 926-0475
www.dep.wv.gov/daq



INITIAL/RENEWAL TITLE V PERMIT APPLICATION - GENERAL FORMS

Section 1: General Information

Form with 10 numbered sections: 1. Name of Applicant (MarkWest Liberty Midstream and Resources, L.L.C.), 2. Facility Name (Majorsville Gas Plant), 3. DAQ Plant ID No. (051-00125), 4. Federal Employer ID No. (30-0528059), 5. Permit Application Type (Initial Permit), 6. Type of Business Entity (LLC), 7. Is the Applicant the: (Both), 8. Number of onsite employees (21), 9. Governmental Code (Privately owned and operated; 0), 10. Business Confidentiality Claims (No).

11. Mailing Address		
Street or P.O. Box: 1515 Arapahoe Street		
City: Denver	State: CO	Zip: 80202-2137
Telephone Number: (303) 925-9200	Fax Number: (303) 290-8769	

12. Facility Location		
Street: 1700 Majorsville Road	City: Dallas	County: Marshall
UTM Easting: 540.95 km	UTM Northing: 4,423.83 km	Zone: <input checked="" type="checkbox"/> 17 or <input type="checkbox"/> 18
Directions: From Dallas, head south on Dallas Pike Rd toward Dallas St. Turn right onto Number 2 Ridge Rd (1.4 mi), turn left onto Warton Hill Rd (341 ft), take the first right to stay on Warton Hill Rd (2.6 mi), turn right onto Calis Majorsville Rd (0.2 mi), destination is on the right.		
Portable Source? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Is facility located within a nonattainment area? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, for what air pollutants? SO2	
Is facility located within 50 miles of another state? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, name the affected state(s). Pennsylvania, Ohio	
Is facility located within 100 km of a Class I Area ¹ ? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, name the area(s).	
If no, do emissions impact a Class I Area ¹ ? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
¹ Class I areas include Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and Shenandoah National Park and James River Face Wilderness Area in Virginia.		

13. Contact Information		
Responsible Official: Leanne Meyer		Title: VP of EH&S
Street or P.O. Box: 1515 Arapahoe Street, Tower 1, Suite 1600		
City: Denver	State: CO	Zip: 80202-2137
Telephone Number: (303) 925-9200	Fax Number: (303) 542-8708	
E-mail address: lmeyer@markwest.com		
Environmental Contact: Nathan Wheldon		Title: Sr. Manager –Air Programs
Street or P.O. Box: 1515 Arapahoe Street, Tower 1, Suite 1600		
City: Denver	State: CO	Zip: 80202-2137
Telephone Number: (303) 542-0686	Fax Number: (303) 573-4954	
E-mail address: nwheldon@markwest.com		
Application Preparer: Nathan Wheldon		Title: Sr. Manager –Air Programs
Company: MarkWest Liberty Midstream and Resources, L.L.C		
Street or P.O. Box: 1515 Arapahoe Street, Tower 1, Suite 1600		
City: Denver	State: CO	Zip: 80203-2137
Telephone Number: (303) 542-0686	Fax Number: (303) 573-4954	
E-mail address: nwheldon@markwest.com		

14. Facility Description

List all processes, products, NAICS and SIC codes for normal operation, in order of priority. Also list any process, products, NAICS and SIC codes associated with any alternative operating scenarios if different from those listed for normal operation.

Process	Products	NAICS	SIC
Natural Gas Processing	Pipeline grade natural gas and natural gas liquids	211112	1311

Provide a general description of operations.

Natural gas from surrounding area wells enters the facility through an inlet separator which removes any free liquids entrained in the gas. The gas is subsequently sent through a molecular sieve to remove any remaining liquids from the gas stream. The gas is then cooled through a cryogenic process which serves to remove ethane and heavier hydrocarbons from the gas stream. The remaining gas stream (mostly methane) is compressed and transferred offsite via pipeline. The mixed hydrocarbon or natural gas liquid (NGL) stream then passes through the de-ethanizer to separate the ethane. Ethane is transferred off site via pipeline. The remaining de-ethanized NGL stream is transferred off site via pipeline.

15. Provide an **Area Map** showing plant location as **ATTACHMENT A**.

16. Provide a **Plot Plan(s)**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is located as **ATTACHMENT B**. For instructions, refer to "Plot Plan - Guidelines."

17. Provide a detailed **Process Flow Diagram(s)** showing each process or emissions unit as **ATTACHMENT C**. Process Flow Diagrams should show all emission units, control equipment, emission points, and their relationships.

Section 2: Applicable Requirements

18. Applicable Requirements Summary	
Instructions: Mark all applicable requirements.	
<input type="checkbox"/> SIP	<input type="checkbox"/> FIP
<input checked="" type="checkbox"/> Minor source NSR (45CSR13)	<input type="checkbox"/> PSD (45CSR14)
<input type="checkbox"/> NESHAP (45CSR34)	<input type="checkbox"/> Nonattainment NSR (45CSR19)
<input checked="" type="checkbox"/> Section 111 NSPS	<input type="checkbox"/> Section 112(d) MACT standards
<input type="checkbox"/> Section 112(g) Case-by-case MACT	<input checked="" type="checkbox"/> 112(r) RMP
<input type="checkbox"/> Section 112(i) Early reduction of HAP	<input type="checkbox"/> Consumer/commercial prod. reqts., section 183(e)
<input type="checkbox"/> Section 129 Standards/Reqs.	<input type="checkbox"/> Stratospheric ozone (Title VI)
<input type="checkbox"/> Tank vessel reqt., section 183(f)	<input type="checkbox"/> Emissions cap 45CSR§30-2.6.1
<input type="checkbox"/> NAAQS, increments or visibility (temp. sources)	<input type="checkbox"/> 45CSR27 State enforceable only rule
<input checked="" type="checkbox"/> 45CSR4 State enforceable only rule	<input type="checkbox"/> Acid Rain (Title IV, 45CSR33)
<input type="checkbox"/> Emissions Trading and Banking (45CSR28)	<input type="checkbox"/> Compliance Assurance Monitoring (40CFR64)
<input type="checkbox"/> CAIR NO _x Annual Trading Program (45CSR39)	<input type="checkbox"/> CAIR NO _x Ozone Season Trading Program (45CSR40)
<input type="checkbox"/> CAIR SO ₂ Trading Program (45CSR41)	

19. Non Applicability Determinations

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

State Implementation Plan: This application does not involve a stationary source to be located in a non-attainment area subject to a SIP.

Federal Implementation Plan: No Federal Implementation Plan is in effect where this stationary source is located.

45 CSR 14 – Prevention of Significant Deterioration: The facility is not a major stationary source as defined by the PSD rule, and is therefore not subject to the provisions of this rule.

45 CSR 19 – Nonattainment New Source Review: The facility is located in Marshall County, an area that is non-attainment for SO₂. The facility is not a major source of SO₂, therefore this rule does not apply.

45 CSR 27 – Toxic Air Pollutants: The facility is not a chemical process unit as defined in the rule, therefore this rule does not apply.

45 CSR 28 – Emissions Trading and Banking: MarkWest does not voluntarily choose to participate in an emission reduction credit trading program.

45 CSR 30-2.6.1: The facility is not subject to any emissions caps as provided by this rule.

45 CSR 33 – Acid Rain Program: The facility is not an affected source under the provisions of the Acid Rain Program, therefore this rule does not apply.

45 CSR 39 – CAIR NO_x Annual Trading Program: There are no CAIR NO_x Annual units present at the facility, therefore the requirements of this rule do not apply.

45 CSR 40 – CAIR NO_x Ozone Season Trading Program: There are no CAIR NO_x Ozone Season units present at the facility, therefore the requirements of this rule do not apply.

45 CSR 41 – CAIR SO₂ Annual Trading Program: There are no CAIR SO₂ Annual units present at the facility, therefore the requirements of this rule do not apply.

Section 112(d) MACT standards: The facility is not a major source of hazardous air pollutants, therefore this rule does not apply.

Section 112(g) MACT standards: The facility is not a major source of hazardous air pollutants, therefore this rule does not apply.

Section 112(i) MACT standards: The facility is not a major source of hazardous air pollutants, therefore this rule does not apply.

Section 183(e) Consumer/commercial Product Requirements: Operation of the facility does not involve the manufacture or sale of consumer or commercial products and will not be subject to this regulatory provision.

Section 129 Standards/Requirements: Operation of this facility does not involve solid waste combustion or incineration; therefore, this rule does not apply.

Section 183(f) – Tank Vessel Requirements: There are no marine tank vessels present at the facility, therefore this rule does not apply.

NAAQS, increment or visibility (temp. sources): There are no temporary sources present at the facility, therefore this rule does not apply.

Stratospheric Ozone (Title IV): The facility does not use Class I ozone-depleting substances (ODS) including chlorofluorocarbons (CFC) and Class II ODS, which are hydrochlorofluorocarbons (HCFC), so this provision does not apply.

Permit Shield

19. Non Applicability Determinations (Continued) - Attach additional pages as necessary.

List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies.

40 CFR 60 Subpart LLL – Standards of Performance for SO₂ Emissions from Onshore Natural Gas Processing for Which Construction, Reconstruction, or Modification Commenced After January 20, 1984, and on or Before August 23, 2011: There are no sweetening units, as defined in this subpart, present at the facility. Therefore, this subpart does not apply.

40 CFR 64 – Compliance Assurance Monitoring: Under General Applicability, CAM applies to pollutant-specific emissions units at a major source that are required to obtain a Part 70 permit, if three criteria are satisfied. The first criteria requires that the unit is subject to an emission limitation or standard for the applicable regulated air pollutant, other than an emission limitation or standard that is exempt under paragraph (b)(1).

Per section (b)(1)(i), emission limitations or standards proposed by the Administrator after November 15, 1990 pursuant to Section 111 or 112 of the Act are exempt emission limitations or standards.

The compressor engines (C-102, C103, and C-104) and their control devices operating at the facility are subject to the emission limitations and standards of 40 CFR 60 Subpart JJJJ, which are contained in Section 111 of the Act and were promulgated after November 15, 1990. This rule does not apply to the compressor engines.

The flares (FL-991, FL-1991) control maintenance blowdowns and process venting. Maintenance blowdowns and emergency process venting are not subject to emission limitations or standards. The first of three criteria is not satisfied for CAM applicability, therefore this rule does not apply to the flares.

Permit Shield

20. Facility-Wide Applicable Requirements

List all facility-wide applicable requirements. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*).

Permit R13-2818H Conditions:

- 3.1.1 Open burning [45CSR§6-3.1]
- 3.1.2 Open burning exemptions [45CSR§6-3.2]
- 3.1.3 Asbestos [40CFR§61.145(b) and 45CSR§34]
- 3.1.4 Odor [45CSR§4-3.1]
- 3.1.5 Permanent shutdown [45CSR§13-10.5.]
- 3.1.6 Standby plan for reducing emissions [45CSR§11-5.2.]
- 3.3.1 Stack Testing [WV Code § 22-5-4(a)(14-15) and 45CSR13]
- 3.4.1 Retention of Records
- 3.4.2 Odors [45CSR§4]
- 3.5.1 Responsible Official
- 3.5.2 Confidential Information
- 3.5.3 Correspondence
- 3.5.4 Operating Permit Program [45 CSR 30]
- 3.5.5 Emission Inventory

Permit Shield

For all facility-wide applicable requirements listed above, provide monitoring/testing / recordkeeping / reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
3.1.1	NA	NA	NA	Notification	45CSR§6-3.1
3.1.2	NA	NA	NA	NA	45CSR§6-3.2
3.1.3	NA	NA	Asbestos inspection	Notification	40CFR§61.145(b), 45CSR§34
3.1.4	NA	NA	NA	Deviations	45CSR§4-3.1
3.1.5	NA	NA	NA	Permit application	45CSR§13-10.5
3.1.6	NA	NA	Prepare standby plans when requested by the Secretary	NA	45CSR§11-5.2
3.3.1	NA	Stack testing	NA	Results of stack test	WV Code§22-5-4(a)(14-15), 45CSR§13
3.4.1	NA	Na	Maintain all required records for 5 years. Maintain most recent two years of records on site.	NA	3.4.1
3.4.2	NA	NA	Odor complaints	NA	45CSR§30
3.5.1	NA	NA	NA	Certification by responsible official for any application form, report, or compliance certification required by the permit	3.5.1
3.5.2	NA	NA	NA	NA	3.5.2
3.5.3	NA	NA	NA	NA	3.5.3
3.5.4	NA	NA	Emissions inventory receipt	Certified emissions statement	3.5.4, 45CSR30
3.5.5	NA	NA	NA	Emissions inventory	3.5.5

Are you in compliance with all facility-wide applicable requirements? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

Section 3: Facility-Wide Emissions

23. Facility-Wide Emissions Summary [Tons per Year]	
Criteria Pollutants	Potential Emissions
Carbon Monoxide (CO)	117.62
Nitrogen Oxides (NO _x)	116.69
Lead (Pb)	0.00
Particulate Matter (PM _{2.5}) ¹	15.79
Particulate Matter (PM ₁₀) ¹	15.79
Total Particulate Matter (TSP)	15.79
Sulfur Dioxide (SO ₂)	1.82
Volatile Organic Compounds (VOC)	88.16
Hazardous Air Pollutants²	Potential Emissions
Formaldehyde	5.62
n-Hexane	3.42
Benzene	0.10
Toluene	0.09
Xylenes	0.04
Total HAPs	13.23
Regulated Pollutants other than Criteria and HAP	Potential Emissions
Greenhouse Gases (GHGs)	Potential Emissions
Carbon Dioxide (CO ₂)	255,209.99
Nitrous Oxide (N ₂ O)	0.602
Methane (CH ₄)	196.09
Hydrofluorocarbons (HFCs)	
Perfluorocarbons (PFCs)	
Sulfur hexafluoride (SF ₆)	
CO ₂ equivalent (CO ₂ e)	259,514.47
¹ PM _{2.5} and PM ₁₀ are components of TSP. ² For HAPs that are also considered PM or VOCs, emissions should be included in both the HAPs section and the Criteria Pollutants section.	

Section 4: Insignificant Activities

24. Insignificant Activities (Check all that apply)	
<input checked="" type="checkbox"/>	1. Air compressors and pneumatically operated equipment, including hand tools.
<input checked="" type="checkbox"/>	2. Air contaminant detectors or recorders, combustion controllers or shutoffs.
<input checked="" type="checkbox"/>	3. Any consumer product used in the same manner as in normal consumer use, provided the use results in a duration and frequency of exposure which are not greater than those experienced by consumer, and which may include, but not be limited to, personal use items; janitorial cleaning supplies, office supplies and supplies to maintain copying equipment.
<input checked="" type="checkbox"/>	4. Bathroom/toilet vent emissions.
<input checked="" type="checkbox"/>	5. Batteries and battery charging stations, except at battery manufacturing plants.
<input checked="" type="checkbox"/>	6. Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents. Many lab fume hoods or vents might qualify for treatment as insignificant (depending on the applicable SIP) or be grouped together for purposes of description.
<input type="checkbox"/>	7. Blacksmith forges.
<input type="checkbox"/>	8. Boiler water treatment operations, not including cooling towers.
<input type="checkbox"/>	9. Brazing, soldering or welding equipment used as an auxiliary to the principal equipment at the source.
<input type="checkbox"/>	10. CO ₂ lasers, used only on metals and other materials which do not emit HAP in the process.
<input type="checkbox"/>	11. Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources.
<input checked="" type="checkbox"/>	12. Combustion units designed and used exclusively for comfort heating that use liquid petroleum gas or natural gas as fuel.
<input checked="" type="checkbox"/>	13. Comfort air conditioning or ventilation systems not used to remove air contaminants generated by or released from specific units of equipment.
<input type="checkbox"/>	14. Demineralized water tanks and demineralizer vents.
<input type="checkbox"/>	15. Drop hammers or hydraulic presses for forging or metalworking.
<input type="checkbox"/>	16. Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substances being processed in the ovens or autoclaves or the boilers delivering the steam.
<input type="checkbox"/>	17. Emergency (backup) electrical generators at residential locations.
<input type="checkbox"/>	18. Emergency road flares.
<input type="checkbox"/>	19. Emission units which do not have any applicable requirements and which emit criteria pollutants (CO, NO _x , SO ₂ , VOC and PM) into the atmosphere at a rate of less than 1 pound per hour and less than 10,000 pounds per year aggregate total for each criteria pollutant from all emission units. Please specify all emission units for which this exemption applies along with the quantity of criteria pollutants emitted on an hourly and annual basis: _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

24. Insignificant Activities (Check all that apply)	
<input type="checkbox"/>	<p>20. Emission units which do not have any applicable requirements and which emit hazardous air pollutants into the atmosphere at a rate of less than 0.1 pounds per hour and less than 1,000 pounds per year aggregate total for all HAPs from all emission sources. This limitation cannot be used for any source which emits dioxin/furans nor for toxic air pollutants as per 45CSR27.</p> <p>Please specify all emission units for which this exemption applies along with the quantity of hazardous air pollutants emitted on an hourly and annual basis:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
<input type="checkbox"/>	21. Environmental chambers not using hazardous air pollutant (HAP) gases.
<input type="checkbox"/>	22. Equipment on the premises of industrial and manufacturing operations used solely for the purpose of preparing food for human consumption.
<input type="checkbox"/>	23. Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment.
<input checked="" type="checkbox"/>	24. Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis.
<input type="checkbox"/>	25. Equipment used for surface coating, painting, dipping or spray operations, except those that will emit VOC or HAP.
<input checked="" type="checkbox"/>	26. Fire suppression systems.
<input checked="" type="checkbox"/>	27. Firefighting equipment and the equipment used to train firefighters.
<input type="checkbox"/>	28. Flares used solely to indicate danger to the public.
<input checked="" type="checkbox"/>	29. Fugitive emission related to movement of passenger vehicle provided the emissions are not counted for applicability purposes and any required fugitive dust control plan or its equivalent is submitted.
<input type="checkbox"/>	30. Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation.
<input checked="" type="checkbox"/>	31. Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic.
<input type="checkbox"/>	32. Humidity chambers.
<input checked="" type="checkbox"/>	33. Hydraulic and hydrostatic testing equipment.
<input type="checkbox"/>	34. Indoor or outdoor kerosene heaters.
<input checked="" type="checkbox"/>	35. Internal combustion engines used for landscaping purposes.
<input type="checkbox"/>	36. Laser trimmers using dust collection to prevent fugitive emissions.
<input type="checkbox"/>	37. Laundry activities, except for dry-cleaning and steam boilers.
<input checked="" type="checkbox"/>	38. Natural gas pressure regulator vents, excluding venting at oil and gas production facilities.
<input type="checkbox"/>	39. Oxygen scavenging (de-aeration) of water.
<input type="checkbox"/>	40. Ozone generators.
<input checked="" type="checkbox"/>	41. Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification. (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements. Asphalt batch plant

24. Insignificant Activities (Check all that apply)	
	owners/operators must still get a permit if otherwise requested.)
<input checked="" type="checkbox"/>	42. Portable electrical generators that can be moved by hand from one location to another. "Moved by Hand" means that it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance, or device.
<input type="checkbox"/>	43. Process water filtration systems and demineralizers.
<input checked="" type="checkbox"/>	44. Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification.
<input checked="" type="checkbox"/>	45. Repairs or maintenance where no structural repairs are made and where no new air pollutant emitting facilities are installed or modified.
<input checked="" type="checkbox"/>	46. Routing calibration and maintenance of laboratory equipment or other analytical instruments.
<input type="checkbox"/>	47. Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants. Shock chambers.
<input type="checkbox"/>	48. Shock chambers.
<input type="checkbox"/>	49. Solar simulators.
<input type="checkbox"/>	50. Space heaters operating by direct heat transfer.
<input type="checkbox"/>	51. Steam cleaning operations.
<input type="checkbox"/>	52. Steam leaks.
<input type="checkbox"/>	53. Steam sterilizers.
<input type="checkbox"/>	54. Steam vents and safety relief valves.
<input type="checkbox"/>	55. Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized.
<input checked="" type="checkbox"/>	56. Storage tanks, vessels, and containers holding or storing liquid substances that will not emit any VOC or HAP. Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list.
<input type="checkbox"/>	57. Such other sources or activities as the Director may determine.
<input checked="" type="checkbox"/>	58. Tobacco smoking rooms and areas.
<input type="checkbox"/>	59. Vents from continuous emissions monitors and other analyzers.

Section 5: Emission Units, Control Devices, and Emission Points

25. Equipment Table
Fill out the Title V Equipment Table and provide it as ATTACHMENT D .
26. Emission Units
For each emission unit listed in the Title V Equipment Table , fill out and provide an Emission Unit Form as ATTACHMENT E .
For each emission unit not in compliance with an applicable requirement, fill out a Schedule of Compliance Form as ATTACHMENT F .
27. Control Devices
For each control device listed in the Title V Equipment Table , fill out and provide an Air Pollution Control Device Form as ATTACHMENT G .
For any control device that is required on an emission unit in order to meet a standard or limitation for which the potential pre-control device emissions of an applicable regulated air pollutant is greater than or equal to the Title V Major Source Threshold Level, refer to the Compliance Assurance Monitoring (CAM) Form(s) for CAM applicability. Fill out and provide these forms, if applicable, for each Pollutant Specific Emission Unit (PSEU) as ATTACHMENT H .

Section 6: Certification of Information

28. Certification of Truth, Accuracy and Completeness and Certification of Compliance

*Note: This Certification must be signed by a responsible official. The **original**, signed in **blue ink**, must be submitted with the application. Applications without an **original** signed certification will be considered as incomplete.*

a. Certification of Truth, Accuracy and Completeness

I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment.

b. Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

Responsible official (type or print)

Name: Leanne Meyer	Title: VP Corporate HES
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Responsible official's signature:
 Signature: *Matt M. Whilds* *for Leanne Meyer* Signature Date: 11/1/2018
 (Must be signed and dated in blue ink)

Note: Please check all applicable attachments included with this permit application:

<input checked="" type="checkbox"/>	ATTACHMENT A: Area Map
<input checked="" type="checkbox"/>	ATTACHMENT B: Plot Plan(s)
<input checked="" type="checkbox"/>	ATTACHMENT C: Process Flow Diagram(s)
<input checked="" type="checkbox"/>	ATTACHMENT D: Equipment Table
<input checked="" type="checkbox"/>	ATTACHMENT E: Emission Unit Form(s)
<input type="checkbox"/>	ATTACHMENT F: Schedule of Compliance Form(s)
<input checked="" type="checkbox"/>	ATTACHMENT G: Air Pollution Control Device Form(s)
<input type="checkbox"/>	ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s)

All of the required forms and additional information can be found and downloaded from, the DEP website at www.dep.wv.gov/daq, requested by phone (304) 926-0475, and/or obtained through the mail.

Emissions Calculations

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

Summary of Potential Emissions

Criteria Pollutant Potential Emissions

Process/Facility	Potential Emissions (lb/hr)					
	NOx	CO	VOC	SO ₂	PM ¹	HAPs
Compressor Engine (C-102)	2.61	0.99	2.09	0.01	0.16	0.72
Compressor Engine (C-103)	2.61	0.99	2.09	0.01	0.16	0.72
Compressor Engine (C-104)	2.61	0.99	2.09	0.01	0.16	0.72
Regeneration Heater (H-741)	0.30	0.46	0.03	0.00	0.04	0.01
Regeneration Heater (H-2741)	0.30	0.46	0.03	0.00	0.04	0.01
Regeneration Heater (H-3741)	0.41	0.32	0.04	0.00	0.06	0.01
Regeneration Heater (H-4741)	0.41	0.32	0.04	0.00	0.06	0.01
Regeneration Heater (H-5741)	0.41	0.32	0.04	0.00	0.06	0.01
Regeneration Heater (H-6741)	0.41	0.32	0.04	0.00	0.06	0.01
Regeneration Heater (H-7741)	0.41	0.32	0.04	0.00	0.06	0.01
Hot Oil Heater (H-781)	1.33	1.27	0.08	0.01	0.11	0.03
Hot Oil Heater (H-3781)	1.61	1.32	0.09	0.01	0.12	0.03
Hot Oil Heater (H-4781)	1.61	1.32	0.09	0.01	0.12	0.03
Hot Oil Heater (H-7781)	1.61	1.32	0.09	0.01	0.12	0.03
DeEthanizer HMO (H-D1782)	3.58	4.77	0.64	0.07	0.89	0.22
DeEthanizer HMO (H-D2782)	3.58	4.77	0.64	0.07	0.89	0.22
DeEthanizer Regeneration Heater (H-D1741)	0.57	0.58	0.27	0.01	0.19	0.03
DeEthanizer Regeneration Heater (H-D2741)	0.57	0.58	0.27	0.01	0.19	0.03
Stabilization Heater (H-4782)	0.62	0.88	0.06	0.01	0.08	0.02
Majorsville I & II Emergency Gen (M1-G-1)	1.12	1.68	0.56	0.00	0.02	0.04
Majorsville III Emergency Gen (M3-G-2)	0.70	0.18	0.02	0.58	0.23	0.01
Majorsville III MCC Emergency Gen (M3-G-3)	0.70	0.18	0.02	0.58	0.23	0.01
Majorsville IV MCC Emergency Gen (M4-G-6)	0.70	0.18	0.02	0.58	0.23	0.01
Majorsville IV Emergency Gen (M4-G-7)	0.70	0.18	0.02	0.58	0.23	0.01
Majorsville VII MCC Emergency Gen (M7-G-9)	0.40	0.23	0.15	0.14	0.03	0.00
DeEth I Control Room Emergency Gen (MD1-G-4)	0.41	0.43	0.41	0.11	0.00	0.00
DeEth I Emergency Gen (MD1-G-5)	0.25	0.29	0.25	0.07	0.00	0.00
DeEth II Control Room Emergency Gen (MD2-G-10)	0.20	0.02	0.01	0.05	0.01	0.00
DeEth II Emergency Gen (MD2-G-11)	0.25	0.29	0.25	0.07	0.00	0.00
Plant Flare (FL-991) - MI, II, III, V	0.34	1.35	0.70	0.00	0.00	0.01
Plant Flare (FL-1991) - DeEth, MIV, MVI, MVII	0.64	2.77	1.41	0.00	0.00	0.03
Blowdown Emissions	--	--	0.40	--	--	0.02
Fugitive Emissions (FUG-001)	--	--	8.76	--	--	0.07
Site Wide Emissions (lb/hr)	31.99	30.07	21.72	3.00	4.53	3.12

¹ PM = PM₁₀ = PM_{2.5}

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

Summary of Potential Emissions

Process/Facility	Potential Emissions (tpy)					
	NOx	CO	VOC	SO ₂	PM ¹	HAPs
Compressor Engine (C-102)	11.44	4.35	9.15	0.04	0.69	3.17
Compressor Engine (C-103)	11.44	4.35	9.15	0.04	0.69	3.17
Compressor Engine (C-104)	11.44	4.35	9.15	0.04	0.69	3.17
Regeneration Heater (H-741)	1.32	2.02	0.13	0.01	0.18	0.05
Regeneration Heater (H-2741)	1.32	2.02	0.13	0.01	0.18	0.05
Regeneration Heater (H-3741)	1.80	1.38	0.18	0.02	0.25	0.06
Regeneration Heater (H-4741)	1.80	1.38	0.18	0.02	0.25	0.06
Regeneration Heater (H-5741)	1.80	1.38	0.18	0.02	0.25	0.06
Regeneration Heater (H-6741)	1.80	1.38	0.18	0.02	0.25	0.06
Regeneration Heater (H-7741)	1.80	1.38	0.18	0.02	0.25	0.06
Hot Oil Heater (H-781)	5.85	5.55	0.36	0.04	0.50	0.12
Hot Oil Heater (H-3781)	7.04	5.80	0.38	0.04	0.52	0.13
Hot Oil Heater (H-4781)	7.04	5.80	0.38	0.04	0.52	0.13
Hot Oil Heater (H-7781)	7.04	5.80	0.38	0.04	0.52	0.13
DeEthanizer HMO (H-D1782)	15.66	20.88	2.82	0.31	3.89	0.97
DeEthanizer HMO (H-D2782)	15.66	20.88	2.82	0.31	3.89	0.97
DeEthanizer Regeneration Heater (H-D1741)	2.50	2.56	1.19	0.04	0.81	0.12
DeEthanizer Regeneration Heater (H-D2741)	2.50	2.56	1.19	0.04	0.81	0.12
Stabilization Heater (H-4782)	2.74	3.84	0.25	0.03	0.35	0.09
Majorsville I & II Emergency Gen (M1-G-1)	0.28	0.42	0.14	0.00	0.01	0.01
Majorsville III Emergency Gen (M3-G-2)	0.18	0.04	0.00	0.14	0.06	0.00
Majorsville III MCC Emergency Gen (M3-G-3)	0.18	0.04	0.00	0.14	0.06	0.00
Majorsville IV MCC Emergency Gen (M4-G-6)	0.18	0.04	0.00	0.14	0.06	0.00
Majorsville IV Emergency Gen (M4-G-7)	0.18	0.04	0.00	0.14	0.06	0.00
Majorsville VII MCC Emergency Gen (M7-G-9)	0.10	0.06	0.04	0.04	0.01	0.00
DeEth I Control Room Emergency Gen (MD1-G-4)	0.10	0.11	0.10	0.03	0.00	0.00
DeEth I Emergency Gen (MD1-G-5)	0.06	0.07	0.06	0.02	0.00	0.00
DeEth II Control Room Emergency Gen (MD2-G-10)	0.05	0.00	0.00	0.01	0.00	0.00
DeEth II Emergency Gen (MD2-G-11)	0.06	0.07	0.06	0.02	0.00	0.00
Plant Flare (FL-991) - MI, II, III, V	1.48	5.92	3.06	0.00	0.02	0.06
Plant Flare (FL-1991) - DeEth, MIV, MVI, MVII	2.81	12.15	6.16	0.00	0.01	0.11
Blowdown Emissions	--	--	1.75	--	--	0.08
Fugitive Emissions (FUG-001)	--	--	38.38	--	--	0.29
Site Wide Emissions (tpy)	117.62	116.65	88.16	1.82	15.79	13.23

¹ PM = PM₁₀ = PM_{2.5}

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

Summary of Potential Emissions

Hazardous Air Pollutant Potential Emissions

Process/Facility	HAPs - Potential Emissions (lb/hr)					
	Benzene	Ethylbenzene	Toluene	Xylenes	n-Hexane	Formaldehyde
Compressor Engine (C-102)	6.91E-03	6.24E-04	6.41E-03	2.89E-03	1.74E-02	4.18E-01
Compressor Engine (C-103)	6.91E-03	6.24E-04	6.41E-03	2.89E-03	1.74E-02	4.18E-01
Compressor Engine (C-104)	6.91E-03	6.24E-04	6.41E-03	2.89E-03	1.74E-02	4.18E-01
Regeneration Heater (H-741)	1.15E-05	--	1.87E-05	--	9.88E-03	4.12E-04
Regeneration Heater (H-2741)	1.15E-05	--	1.87E-05	--	9.88E-03	4.12E-04
Regeneration Heater (H-3741)	1.58E-05	--	2.56E-05	--	1.36E-02	5.65E-04
Regeneration Heater (H-4741)	1.58E-05	--	2.56E-05	--	1.36E-02	5.65E-04
Regeneration Heater (H-5741)	1.58E-05	--	2.56E-05	--	1.36E-02	5.65E-04
Regeneration Heater (H-6741)	1.58E-05	--	2.56E-05	--	1.36E-02	5.65E-04
Regeneration Heater (H-7741)	1.58E-05	--	2.56E-05	--	1.36E-02	5.65E-04
Hot Oil Heater (H-781)	3.17E-05	--	5.13E-05	--	2.72E-02	1.13E-03
Hot Oil Heater (H-3781)	3.31E-05	--	5.36E-05	--	2.84E-02	1.18E-03
Hot Oil Heater (H-4781)	3.31E-05	--	5.36E-05	--	2.84E-02	1.18E-03
Hot Oil Heater (H-7781)	3.31E-05	--	5.36E-05	--	2.84E-02	1.18E-03
DeEthanizer HMO (H-D1782)	2.45E-04	--	3.97E-04	--	2.10E-01	8.76E-03
DeEthanizer HMO (H-D2782)	2.45E-04	--	3.97E-04	--	2.10E-01	8.76E-03
DeEthanizer Regeneration Heater (H-D1741)	2.93E-05	--	4.75E-05	--	2.51E-02	1.05E-03
DeEthanizer Regeneration Heater (H-D2741)	2.93E-05	--	4.75E-05	--	2.51E-02	1.05E-03
Stabilization Heater (H-4782)	2.19E-05	--	3.55E-05	--	1.88E-02	7.83E-04
Majorsville I & II Emergency Gen (M1-G-1)	9.25E-04	8.35E-05	8.58E-04	3.87E-04	--	5.36E-03
Majorsville III Emergency Gen (M3-G-2)	3.59E-03	--	1.57E-03	1.10E-03	--	4.54E-03
Majorsville III MCC Emergency Gen (M3-G-3)	3.59E-03	--	1.57E-03	2.74E-04	--	4.54E-03
Majorsville IV MCC Emergency Gen (M4-G-6)	3.59E-03	--	1.57E-03	1.10E-03	--	4.54E-03
Majorsville IV Emergency Gen (M4-G-7)	3.59E-03	--	1.57E-03	1.10E-03	--	4.54E-03
Majorsville VII MCC Emergency Gen (M7-G-9)	4.05E-04	--	1.78E-04	1.24E-04	--	5.12E-04
DeEth I Control Room Emergency Gen (MD1-G-4)	3.85E-04	--	1.69E-04	1.17E-04	--	4.86E-04
DeEth I Emergency Gen (MD1-G-5)	2.31E-04	--	1.01E-04	7.05E-05	--	2.92E-04
DeEth II Control Room Emergency Gen (MD2-G-10)	1.79E-04	--	7.87E-05	5.48E-05	--	2.27E-04
DeEth II Emergency Gen (MD2-G-11)	2.31E-04	--	1.01E-04	7.05E-05	--	2.92E-04
Plant Flare (FL-991) - MI, II, III, V	1.05E-06	0.00E+00	1.70E-06	0.00E+00	1.30E-02	3.75E-05
Plant Flare (FL-1991) - DeEth, MIV, MVI, MVII	8.76E-07	0.00E+00	1.42E-06	0.00E+00	2.51E-02	3.13E-05
Blowdown Emissions	--	--	--	--	--	--
Fugitive Emissions (FUG-001)	--	--	--	--	--	--
Site Wide Emissions (lb/hr)	0.04	0.00	0.03	0.01	0.78	1.31

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

Summary of Potential Emissions

Process/Facility	HAPs - Potential Emissions (tpy)					
	Benzene	Ethylbenzene	Toluene	Xylenes	n-Hexane	Formaldehyde
Compressor Engine (C-102)	3.03E-02	2.73E-03	2.81E-02	1.27E-02	7.64E-02	1.83E+00
Compressor Engine (C-103)	3.03E-02	2.73E-03	2.81E-02	1.27E-02	7.64E-02	1.83E+00
Compressor Engine (C-104)	3.03E-02	2.73E-03	2.81E-02	1.27E-02	7.64E-02	1.83E+00
Regeneration Heater (H-741)	5.05E-05	--	8.18E-05	--	4.33E-02	1.80E-03
Regeneration Heater (H-2741)	5.05E-05	--	8.18E-05	--	4.33E-02	1.80E-03
Regeneration Heater (H-3741)	6.93E-05	--	1.12E-04	--	5.94E-02	2.48E-03
Regeneration Heater (H-4741)	6.93E-05	--	1.12E-04	--	5.94E-02	2.48E-03
Regeneration Heater (H-5741)	6.93E-05	--	1.12E-04	--	5.94E-02	2.48E-03
Regeneration Heater (H-6741)	6.93E-05	--	1.12E-04	--	5.94E-02	2.48E-03
Regeneration Heater (H-7741)	6.93E-05	--	1.12E-04	--	5.94E-02	2.48E-03
Hot Oil Heater (H-781)	1.39E-04	--	2.25E-04	--	1.19E-01	4.96E-03
Hot Oil Heater (H-3781)	1.45E-04	--	2.35E-04	--	1.24E-01	5.18E-03
Hot Oil Heater (H-4781)	1.45E-04	--	2.35E-04	--	1.24E-01	5.18E-03
Hot Oil Heater (H-7781)	1.45E-04	--	2.35E-04	--	1.24E-01	5.18E-03
DeEthanizer HMO (H-D1782)	1.07E-03	--	1.74E-03	--	9.21E-01	3.84E-02
DeEthanizer HMO (H-D2782)	1.07E-03	--	1.74E-03	--	9.21E-01	3.84E-02
DeEthanizer Regeneration Heater (H-D1741)	1.29E-04	--	2.08E-04	--	1.10E-01	4.59E-03
DeEthanizer Regeneration Heater (H-D2741)	1.29E-04	--	2.08E-04	--	1.10E-01	4.59E-03
Stabilization Heater (H-4782)	9.61E-05	--	1.56E-04	--	8.23E-02	3.43E-03
Majorsville I & II Emergency Gen (M1-G-1)	2.31E-04	2.09E-05	2.14E-04	9.67E-05	--	1.34E-03
Majorsville III Emergency Gen (M3-G-2)	8.97E-04	--	3.93E-04	2.74E-04	--	1.13E-03
Majorsville III MCC Emergency Gen (M3-G-3)	8.97E-04	--	3.93E-04	2.74E-04	--	1.13E-03
Majorsville IV MCC Emergency Gen (M4-G-6)	8.97E-04	--	3.93E-04	2.74E-04	--	1.13E-03
Majorsville IV Emergency Gen (M4-G-7)	8.97E-04	--	3.93E-04	2.74E-04	--	1.13E-03
Majorsville VII MCC Emergency Gen (M7-G-9)	1.01E-04	--	4.44E-05	3.09E-05	--	1.28E-04
DeEth I Control Room Emergency Gen (MD1-G-4)	9.61E-05	--	4.21E-05	2.74E-04	--	1.22E-04
DeEth I Emergency Gen (MD1-G-5)	5.77E-05	--	1.97E-05	1.37E-05	--	5.67E-05
DeEth II Control Room Emergency Gen (MD2-G-10)	4.49E-05	--	4.21E-05	1.37E-05	--	1.22E-04
DeEth II Emergency Gen (MD2-G-11)	5.77E-05	--	2.53E-05	1.76E-05	--	7.29E-05
Plant Flare (FL-991) - MI, II, III, V	4.60E-06	0.00E+00	7.45E-06	0.00E+00	5.68E-02	1.64E-04
Plant Flare (FL-1991) - DeEth, MIV, MVI, MVII	3.84E-06	0.00E+00	6.21E-06	0.00E+00	1.10E-01	1.37E-04
Blowdown Emissions	--	--	--	--	--	--
Fugitive Emissions (FUG-001)	--	--	--	--	--	--
Site Wide Emissions (tpy)	0.10	0.01	0.09	0.04	3.42	5.62

GHG Calculations

MarkWest Liberty Midstream & Resources L.L.C.

Majorsville Gas Plant

Source	CO₂(e) CO₂ Emission Rate (tpy)	CO₂(e) CH₄ Emission Rate (tpy)	CO₂(e) N₂O Emission Rate (tpy)
Reboiler/Heaters & Flares	227,142.83	700.37	168.76
Natural gas Engines	27,376.74	10.84	16.01
Diesel Engines	689.36	0.59	1.73
Fugitives	0.13	553.27	-
Blowdown Emissions	0.80	2,841.50	-
Pigging	0.13	11.40	-
Total Emissions	255,209.99	4,117.98	186.50

Total CO₂ Equivalent	259,514.47
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GHG Calculations

**MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant**

Fugitive GHG Calculation

Equipment type	Stream Type (Gas/Liquid etc)	Total Emissions (tpy)	CH ₄ * Wt%	CO ₂ * Wt%	CO ₂ (tpy)	CO ₂ (e) from CH ₄
Compressors	Gas	0.4081	61.82	0.29	0.00	5.30
Compressors	Light Oil	0.0109	0.494	0.002	0.00	0.00
Flange	Gas	7.6681	61.82	0.29	0.02	99.55
Flange	Gas	4.8615	61.82	0.29	0.01	63.11
Flange	Gas	0.1873	61.82	0.29	0.00	2.43
Flange	Light Oil	1.8124	0.494	0.002	0.00	0.19
Flange	Light Oil	0.0275	0.494	0.002	0.00	0.00
Flange	Heavy Oil	0.0000	0.494	0.002	0.00	0.00
Connector	Gas	10.9151	61.82	0.29	0.03	141.70
Connector	Gas	8.7345	61.82	0.29	0.03	113.39
Connector	Gas	0.2016	61.82	0.29	0.00	2.62
Connector	Light Oil	6.7680	0.494	0.002	0.00	0.70
Connector	Light Oil	0.2571	0.494	0.002	0.00	0.03
PRD	Gas	0.1582	61.82	0.29	0.00	2.05
PRD	Gas	0.3622	61.82	0.29	0.00	4.70
PRD	Gas	0.0204	61.82	0.29	0.00	0.26
PRD	Light Oil	0.0913	0.494	0.002	0.00	0.01
Pump	Gas	0.0974	61.82	0.29	0.00	1.26
Pump	Light Oil	0.7160	0.494	0.002	0.00	0.07
Valve	Gas	4.4219	61.82	0.29	0.01	57.41
Valve	Gas	4.1219	61.82	0.29	0.01	53.51
Valve	Gas	0.3652	61.82	0.29	0.00	4.74
Valve	Heavy Oil	0.0000	0.494	0.002	0.00	0.00
Valve	Heavy Oil	0.0000	0.494	0.002	0.00	0.00
Valve	Light Oil	2.0928	0.494	0.002	0.00	0.22
CO ₂ (e) from CH ₄					0.13	553.27

*Taken from Gas Analysis and Condensate Analysis

GHG Vented Blowdown Emissions

Blowdown Emissions Sources	Number of Units	Vented Gas Volume Per Blowdown Event (scf)	Number of Blowdown Events per year	Total Volume NG Emitted (scf/yr)	Potential CH ₄ Emissions ¹ (tpy)	Potential CO ₂ Emissions ¹ (tpy)	Potential CO ₂ e Emissions (tpy)
Engines	3	2,200	36	237,600	3.1	0.018	65
Majorsville I&II	2	182,525	4	1,460,200	19.0	0.113	400
Majorsville III & IV	2	250,000	4	2,000,000	26.1	0.155	548
Majorsville V, VI, VII	3	250,000	4	3,000,000	39.1	0.233	822
Deethanzier	2	459,000	4	3,672,000	47.9	0.285	1006
Total					135.3	0.804	2842

1. Calculated in accordance with Equations W-35 and W-36 in Subpart W of 40 CFR 98.

GHG Calculations

MarkWest Liberty Midstream & Resources L.L.C.

Majorsville Gas Plant

Reboiler/Heaters & Flares

Equipment	Heat Input (LHV) (mmbtu/hr)	Heat Input (HHV) (mmbtu/hr)	Emission Factors			CO ₂ (e) CO ₂ Emission Rate (tpy)	CO ₂ (e) CH ₄ Emission Rate (tpy)	CO ₂ (e) N ₂ O Emission Rate (tpy)
			CO ₂ (lb/mmbtu)	CH ₄ (lb/mmbtu)	N ₂ O (lb/mmbtu)			
Flare FL-991	See Calculation Sheets					2,440.72	203.48	13.87
Flare FL-1991						4,609.89	409.72	26.20
Heater H-741	5.60	6.1600	116.887892	0.0022046	0.00022046	3,153.73	1.25	1.84
Heater H-2741	5.60	6.1600	116.887892	0.0022046	0.00022046	3,153.73	1.25	1.84
Heater H-3741	7.69	8.4590	116.887892	0.0022046	0.00022046	4,330.75	1.72	2.53
Heater H-4741	7.69	8.4590	116.887892	0.0022046	0.00022046	4,330.75	1.72	2.53
Heater H-5741	7.69	8.4590	116.887892	0.0022046	0.00022046	4,330.75	1.72	2.53
Heater H-6741	7.69	8.4590	116.887892	0.0022046	0.00022046	4,330.75	1.72	2.53
Heater H-7741	7.69	8.4590	116.887892	0.0022046	0.00022046	4,330.75	1.72	2.53
Heater H-781	15.40	16.9400	116.887892	0.0022046	0.00022046	8,672.75	3.44	5.07
Heater H-3781	16.07	17.6770	116.887892	0.0022046	0.00022046	9,050.08	3.58	5.29
Heater H-4781	16.07	17.6770	116.887892	0.0022046	0.00022046	9,050.08	3.58	5.29
Heater H-7781	16.07	17.6770	116.887892	0.0022046	0.00022046	9,050.08	3.58	5.29
Heater H-D1782	119.20	131.1200	116.887892	0.0022046	0.00022046	67,129.37	26.59	39.25
Heater H-D2782	119.20	131.1200	116.887892	0.0022046	0.00022046	67,129.37	26.59	39.25
Heater H-D1741	14.25	15.6750	116.887892	0.0022046	0.00022046	8,025.11	3.18	4.69
Heater H-D2741	14.25	15.6750	116.887892	0.0022046	0.00022046	8,025.11	3.18	4.69
Heater H-4782	10.65	11.7177	116.887892	0.0022046	0.00022046	5,999.09	2.38	3.51
Total						227,142.83	700.37	168.76

Natural gas Engines

Equipment	HP	Fuel Use (HHV) (btu/bhp-hr)	Fuel Use (HHV) (mmbtu/yr)	Emission Factors			CO ₂ (e) CO ₂ Emission Rate (tpy)	CO ₂ (e) CH ₄ Emission Rate (tpy)	CO ₂ (e) N ₂ O Emission Rate (tpy)
				CO ₂ (lb/mmbtu)	CH ₄ (lb/mmbtu)	N ₂ O (lb/mmbtu)			
C-102	2,370	7504	155792.045	116.887892	0.0022046	0.00022046	9,105.10	3.61	5.32
C-103	2,370	7504	155792.045	116.887892	0.0022046	0.00022046	9,105.10	3.61	5.32
C-104	2,370	7504	155792.045	116.887892	0.0022046	0.00022046	9,105.10	3.61	5.32
M1-G-1	254	472	1051.11	116.887892	0.0022046	0.00022046	61.43	0.02	0.04
Total							27,376.74	10.84	16.01

Diesel Engines

Equipment	HP	Fuel Use (gal/hr)	Heat Content (HHV) (btu/gal)	Fuel Use (HHV) (mmbtu/yr)	Emission Factors			CO ₂ (e) CO ₂ Emission Rate (tpy)	CO ₂ (e) CH ₄ Emission Rate (tpy)	CO ₂ (e) N ₂ O Emission Rate (tpy)
					CO ₂ (lb/mmbtu)	CH ₄ (lb/mmbtu)	N ₂ O (lb/mmbtu)			
M3-G-2	145	28	137,380	1923	163.052216	0.0066138	0.00132276	156.80	0.13	0.39
M3-G-3	145	28	137,380	1923	163.052216	0.0066138	0.00132276	156.80	0.13	0.39
M4-G-6	145	28	137,380	1923	163.052216	0.0066138	0.00132276	156.80	0.13	0.39
M4-G-7	145	28	137,380	1923	163.052216	0.0066138	0.00132276	156.80	0.13	0.39
M7-G-9	69	3.1	137,380	213	163.052216	0.0066138	0.00132276	17.36	0.01	0.04
MD1-G-4	53	3	137,380	206	163.052216	0.0066138	0.00132276	16.80	0.01	0.04
MD1-G-5	32	1.8	137,380	124	163.052216	0.0066138	0.00132276	10.08	0.01	0.03
MD2-G-10	25	1.4	137,380	96	163.052216	0.0066138	0.00132276	7.84	0.01	0.02
MD2-G-11	32	1.8	137,380	124	163.052216	0.0066138	0.00132276	10.08	0.01	0.03
Total								689.36	0.59	1.73

**Compressor Engine Emissions (Per Engine)
(C102, C103, C104)**

Source Designation:	
Manufacturer:	Caterpillar
Model No.:	G3608 LE
Stroke Cycle:	4-stroke
Type of Burn:	Lean
Year Installed/Date Manufactured	TBD
Fuel Used:	Natural Gas
Fuel High Heating Value (HHV) (Btu/scf):	1,124
Rated Horsepower (bhp):	2,370
Specific Fuel Consumption (Btu/bhp-hr)	6,629
Maximum Fuel Consumption at 100% Load (scf/hr):	13,978
Heat Input (MMBtu/hr)	15.71
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	8,760
Potential Fuel Consumption (MMscf/yr):	122.44

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NO _x	0.50	g/bhp-hr
CO (uncontrolled)	2.75	g/bhp-hr
CO (controlled)	0.19	g/bhp-hr
SO ₂	5.88E-04	lb/MMBtu
PM ₁₀ (Filterable)	7.71E-05	lb/MMBtu
PM _{2.5} (Filterable)	7.71E-05	lb/MMBtu
PM Condensable	9.91E-03	lb/MMBtu
PM Total	9.99E-03	lb/MMBtu
VOC (uncontrolled)	0.63	g/bhp-hr
VOC (controlled)	0.32	g/bhp-hr
Formaldehyde (HCHO) (uncontrolled)	0.40	g/bhp-hr
Formaldehyde (HCHO) (controlled)	0.08	g/bhp-hr

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	2.61	11.44
CO (uncontrolled)	14.37	62.93
CO (controlled)	0.99	4.35
SO ₂	0.01	0.04
PM ₁₀ (Filterable)	0.001	0.01
PM _{2.5} (Filterable)	0.001	0.01
PM Condensable	0.16	0.68
PM Total	0.16	0.69
VOC (uncontrolled)	5.38	23.57
VOC (controlled)	2.09	9.15
Formaldehyde (HCHO) (uncontrolled)	2.09	9.15
Formaldehyde (HCHO) (controlled)	0.42	1.83

**Compressor Engine Emissions (Per Engine)
(C102, C103, C104)**

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acenaphthene	1.25E-06	1.96E-05	8.60E-05
Acenaphthylene	5.53E-06	8.69E-05	3.81E-04
Acetaldehyde	8.36E-03	1.31E-01	5.75E-01
Acrolein	5.14E-03	8.08E-02	3.54E-01
Benzene	4.40E-04	6.91E-03	3.03E-02
Benzo(b)fluoranthene	1.66E-07	2.61E-06	1.14E-05
Benzo(e)pyrene	4.15E-07	6.52E-06	2.86E-05
Benzo(g,h,i)perylene	4.14E-07	6.50E-06	2.85E-05
Biphenyl	2.12E-04	3.33E-03	1.46E-02
1,3-Butadiene	2.67E-04	4.19E-03	1.84E-02
Carbon Tetrachloride	3.67E-05	5.77E-04	2.53E-03
Chlorobenzene	3.04E-05	4.78E-04	2.09E-03
Chloroform	2.85E-05	4.48E-04	1.96E-03
Chrysene	6.93E-07	1.09E-05	4.77E-05
1,3-Dichloropropene	2.64E-05	4.15E-04	1.82E-03
Ethylbenzene	3.97E-05	6.24E-04	2.73E-03
Ethylene Dibromide	4.43E-05	6.96E-04	3.05E-03
Fluoranthene	1.11E-06	1.74E-05	7.64E-05
Fluorene	5.67E-06	8.91E-05	3.90E-04
Methanol	2.50E-03	3.93E-02	1.72E-01
Methylene Chloride	2.00E-05	3.14E-04	1.38E-03
n-Hexane	1.11E-03	1.74E-02	7.64E-02
Phenanthrene	1.04E-05	1.63E-04	7.16E-04
Phenol	2.40E-05	3.77E-04	1.65E-03
Pyrene	1.36E-06	2.14E-05	9.36E-05
Styrene	2.36E-05	3.71E-04	1.62E-03
Toluene	4.08E-04	6.41E-03	2.81E-02
1,1,2,2-Tetrachloroethane	4.00E-05	6.28E-04	2.75E-03
Tetrachloroethane	2.48E-06	3.90E-05	1.71E-04
1,1,2-Trichloroethane	3.18E-05	5.00E-04	2.19E-03
2,2,4-Trimethylpentane	2.50E-04	3.93E-03	1.72E-02
Vinyl Chloride	1.49E-05	2.34E-04	1.03E-03
Xylene	1.84E-04	2.89E-03	1.27E-02
Polycyclic Organic Matter:			
Naphthalene	7.44E-05	1.17E-03	5.12E-03
2-Methylnaphthalene	3.32E-05	5.22E-04	2.28E-03
PAH	2.69E-05	4.23E-04	1.85E-03
Total HAP		0.72	3.17

^a SO₂, PM, and HAP emission factors from AP-42 Section 3.2, Table 3.2-2 "Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines."

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr or bhp) × Emission Factor (lb/MMBtu or lb/bhp-hr).

^c Annual Emissions (tons/yr)_{potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8,760 hr/yr) × (1 ton/2000 lb).

Emergency Generator Engine Emissions (Per Engine)
(M3-G-2, M3-G-3, M4-G-6, M4-G-7, M7-G-8, & M7-G-9)

Source Designation:	
Manufacturer:	Cummins
Model No.:	60 DSFAD
Stroke Cycle:	4-stroke
Type of Burn:	Diesel
Year Installed	2014
Fuel Used:	Diesel
Fuel High Heating Value (HHV) (Btu/gal):	137,380
Rated Horsepower (bhp):	145
Specific Fuel Consumption (gal/hr)	28.0
Maximum Fuel Consumption at 100% Load (gal/hr):	28.0
Heat Input (MMBtu/hr)	3.85
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	500
Potential Fuel Consumption (gal/yr):	14,000

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NOx	2.20	g/bhp-hr
CO (uncontrolled)	0.56	g/bhp-hr
CO (controlled)	0.56	g/bhp-hr
SO ₂	1.50E-01	lb/hp-hr
PM ₁₀ (Filterable)	6.00E-02	lb/hp-hr
PM _{2.5} (Filterable)	6.00E-02	lb/hp-hr
PM Condensable	6.00E-02	g/bhp-hr
PM Total	6.00E-02	g/bhp-hr
VOC (uncontrolled)	0.05	g/bhp-hr
VOC (controlled)	0.05	g/bhp-hr

Emergency Generator Engine Emissions (Per Engine)
(M3-G-2, M3-G-3, M4-G-6, M4-G-7, M7-G-8, & M7-G-9)

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	0.70	0.18
CO (uncontrolled)	0.18	0.04
CO (controlled)	0.18	0.04
SO ₂	0.58	0.14
PM ₁₀ (Filterable)	0.231	0.06
PM _{2.5} (Filterable)	0.231	0.06
PM Condensable	0.23	0.06
PM Total	0.23	0.06
VOC (uncontrolled)	0.02	0.00
VOC (controlled)	0.02	0.00

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acetaldehyde	7.67E-04	2.95E-03	7.38E-04
Acrolein	9.25E-05	3.56E-04	8.90E-05
Benzene	9.33E-04	3.59E-03	8.97E-04
1,3-Butadiene	3.91E-05	1.50E-04	3.76E-05
Formaldehyde	1.18E-03	4.54E-03	1.13E-03
Toluene	4.09E-04	1.57E-03	3.93E-04
Xylene	2.85E-04	1.10E-03	2.74E-04
Polycyclic Organic Matter:			
Naphthalene	8.48E-05	3.26E-04	8.15E-05
Total HAP		0.01	0.00

^a HAP emission factors from AP-42 Section 3.2, Table 3.3-2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines,"

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr or bhp) × Emission Factor (lb/MMBtu or lb/bhp-hr).

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours/yr) × (1 ton/2000 lb).

Emergency Generator Engine Emissions (Per Engine)
(M1-G-001)

Source Designation:	
Manufacturer:	Generac
Model No.:	QT13068KNAC
Stroke Cycle:	4-stroke
Type of Burn:	Lean
Year Installed	2014
Fuel Used:	Natural Gas
Fuel High Heating Value (HHV) (Btu/ft ³):	1,020
Rated Horsepower (bhp):	254
Specific Fuel Consumption (ft ³ /hr)	2,061
Maximum Fuel Consumption at 100% Load (ft ³ /hr):	2,061
Heat Input (MMBtu/hr)	2.10
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	500
Potential Fuel Consumption (ft ³ /yr):	1,030,500

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NOx	2.00	g/bhp-hr
CO (uncontrolled)	3.00	g/bhp-hr
CO (controlled)	3.00	g/bhp-hr
SO ₂	5.88E-04	lb/MMBtu
PM ₁₀ (Filterable)	7.71E-05	lb/MMBtu
PM _{2.5} (Filterable)	7.71E-05	lb/MMBtu
PM Condensable	9.91E-03	lb/MMBtu
PM Total	9.99E-03	lb/MMBtu
VOC (uncontrolled)	1.00	g/bhp-hr
VOC (controlled)	1.00	g/bhp-hr

Emergency Generator Engine Emissions (Per Engine)
(M1-G-001)

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	1.12	0.28
CO (uncontrolled)	1.68	0.42
CO (controlled)	1.68	0.42
SO ₂	0.001	0.00
PM ₁₀ (Filterable)	0.000	0.00
PM _{2.5} (Filterable)	0.000	0.00
PM Condensable	0.021	0.01
PM Total	0.021	0.01
VOC (uncontrolled)	0.56	0.14
VOC (controlled)	0.56	0.14

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
1,1,2,2-Tetrachloroethane	4.00E-05	8.41E-05	2.10E-05
1,1,2-Trichloroethane	3.18E-05	6.69E-05	1.67E-05
1,3-Butadiene	2.67E-04	5.61E-04	1.40E-04
1,3-Dichloropropene	2.64E-05	5.55E-05	1.39E-05
Acetaldehyde	8.36E-03	1.76E-02	4.39E-03
Acrolein	5.14E-03	1.08E-02	2.70E-03
Benzene	4.40E-04	9.25E-04	2.31E-04
Carbon Tetrachloride	3.67E-05	7.72E-05	1.93E-05
Chlorobenzene	3.04E-05	6.39E-05	1.60E-05
Chloroform	2.85E-05	5.99E-05	1.50E-05
Ethylbenzene	3.97E-05	8.35E-05	2.09E-05
Ethylene Dibromide	4.43E-05	9.31E-05	2.33E-05
Formaldehyde	2.55E-03	5.36E-03	1.34E-03
Methanol	2.50E-03	5.26E-03	1.31E-03
Methylene Chloride	2.00E-05	4.20E-05	1.05E-05
Naphthalene	7.44E-05	1.56E-04	3.91E-05
PAH	2.69E-05	5.65E-05	1.41E-05
Styrene	2.36E-05	4.96E-05	1.24E-05
Toluene	4.08E-04	8.58E-04	2.14E-04
Vinyl Chloride	1.49E-05	3.13E-05	7.83E-06
Xylene	1.84E-04	3.87E-04	9.67E-05
Total HAP		0.04	0.01

^a SO₂, PM, and HAP emission factors (excluding HCHO) from AP-42 Section 3.2, Table 3.2-2"Uncontrolled Emission Factors for 4-Stroke

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr or bhp) × Emission Factor (lb/MMBtu or lb/bhp-hr).

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8,760 hr/yr) × (1 ton/2000 lb).

Emergency Generator Engine Emissions (Per Engine)
(MD1-G-4)

Source Designation:	
Manufacturer:	Generac
Model No.:	MMG45
Stroke Cycle:	4-stroke
Type of Burn:	Diesel
Year Installed	2014
Fuel Used:	Diesel
Fuel High Heating Value (HHV) (Btu/gal):	137,380
Rated Horsepower (bhp):	53
Specific Fuel Consumption (gal/hr)	3.0
Maximum Fuel Consumption at 100% Load (gal/hr):	3.0
Heat Input (MMBtu/hr)	0.41
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	500
Potential Fuel Consumption (gal/yr):	1,500

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors^a	Units
NOx	3.50	g/bhp-hr
CO (uncontrolled)	3.70	g/bhp-hr
CO (controlled)	3.70	g/bhp-hr
SO ₂	2.05E-03	g/bhp-hr
PM ₁₀ (Filterable)	2.20E-02	g/bhp-hr
PM _{2.5} (Filterable)	2.20E-02	g/bhp-hr
PM Condensable	2.20E-02	g/bhp-hr
PM Total	2.20E-02	g/bhp-hr
VOC (uncontrolled)	3.50	g/bhp-hr
VOC (controlled)	3.50	g/bhp-hr

Emergency Generator Engine Emissions (Per Engine)
(MD1-G-4)

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	0.41	0.10
CO (uncontrolled)	0.43	0.11
CO (controlled)	0.43	0.11
SO ₂	0.11	0.03
PM ₁₀ (Filterable)	0.00	0.00
PM _{2.5} (Filterable)	0.00	0.00
PM Condensable	0.00	0.00
PM Total	0.00	0.00
VOC (uncontrolled)	0.41	0.10
VOC (controlled)	0.41	0.10

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acetaldehyde	7.67E-04	3.16E-04	7.90E-05
Acrolein	9.25E-05	3.81E-05	9.53E-06
Benzene	9.33E-04	3.85E-04	9.61E-05
1,3-Butadiene	3.91E-05	1.61E-05	4.03E-06
Formaldehyde	1.18E-03	4.86E-04	1.22E-04
Toluene	4.09E-04	1.69E-04	4.21E-05
Xylene	2.85E-04	1.17E-04	2.94E-05
Polycyclic Organic Matter:			
Naphthalene	8.48E-05	3.49E-05	8.74E-06
Total HAP		0.00	0.00

^a HAP emission factors from AP-42 Section 3.2, Table 3.3-2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines," Supplement F, October 1996. Criteria pollutant factors are based on EPA Tier IV standards.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr or bhp) × Emission Factor (lb/MMBtu or lb/bhp-hr).

^c Annual Emissions (tons/yr)_{potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours/yr) × (1 ton/2000 lb).

Emergency Generator Engine Emissions (Per Engine)
(M7-G-9)

Source Designation:

Manufacturer:	Cummins
Model No.:	C35 D6 - 4BT3.3-G5
Stroke Cycle:	4-stroke
Type of Burn:	Diesel
Year Installed	2017
Fuel Used:	Diesel
Fuel High Heating Value (HHV) (Btu/gal):	137,380
Rated Horsepower (bhp):	69
Specific Fuel Consumption (gal/hr)	3.2
Maximum Fuel Consumption at 100% Load (gal/hr):	3.2
Heat Input (MMBtu/hr)	0.43
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	500
Potential Fuel Consumption (gal/yr):	1,580

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NOx	2.64	g/bhp-hr
CO (uncontrolled)	1.50	g/bhp-hr
CO (controlled)	1.50	g/bhp-hr
SO ₂	2.05E-03	g/bhp-hr
PM ₁₀ (Filterable)	1.90E-01	g/bhp-hr
PM _{2.5} (Filterable)	1.90E-01	g/bhp-hr
PM Condensable	1.90E-01	g/bhp-hr
PM Total	1.90E-01	g/bhp-hr
VOC (uncontrolled)	0.99	g/bhp-hr
VOC (controlled)	0.99	g/bhp-hr

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	0.40	0.10
CO (uncontrolled)	0.23	0.06
CO (controlled)	0.23	0.06
SO ₂	0.14	0.04
PM ₁₀ (Filterable)	0.03	0.01
PM _{2.5} (Filterable)	0.03	0.01
PM Condensable	0.03	0.01
PM Total	0.03	0.01
VOC (uncontrolled)	0.15	0.04
VOC (controlled)	0.15	0.04

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acetaldehyde	7.67E-04	3.33E-04	8.32E-05
Acrolein	9.25E-05	4.02E-05	1.00E-05
Benzene	9.33E-04	4.05E-04	1.01E-04
1,3-Butadiene	3.91E-05	1.70E-05	4.24E-06
Formaldehyde	1.18E-03	5.12E-04	1.28E-04
Toluene	4.09E-04	1.78E-04	4.44E-05
Xylene	2.85E-04	1.24E-04	3.09E-05
Polycyclic Organic Matter:			
Naphthalene	8.48E-05	3.68E-05	9.20E-06
Total HAP		0.00	0.00

^a HAP emission factors from AP-42 Section 3.2, Table 3.3-2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines," Supplement F, October 1996. Criteria pollutant factors are based on EPA Tier IV standards.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr or bhp) × Emission Factor (lb/MMBtu or lb/bhp-hr).

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours/yr) × (1 ton/2000 lb).

Emergency Generator Engine Emissions (Per Engine)
(MD2-G-10)

Source Designation:	
Manufacturer:	Cummins
Model No.:	C15 D6
Stroke Cycle:	4-stroke
Type of Burn:	Diesel
Year Installed	2017
Fuel Used:	Diesel
Fuel High Heating Value (HHV) (Btu/gal):	137,380
Rated Horsepower (bhp):	25
Specific Fuel Consumption (gal/hr)	1.4
Maximum Fuel Consumption at 100% Load (gal/hr):	1.4
Heat Input (MMBtu/hr)	0.19
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	500
Potential Fuel Consumption (gal/yr):	700

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NOx	3.70	g/bhp-hr
CO (uncontrolled)	0.30	g/bhp-hr
CO (controlled)	0.30	g/bhp-hr
SO ₂	2.05E-03	g/bhp-hr
PM ₁₀ (Filterable)	1.30E-01	g/bhp-hr
PM _{2.5} (Filterable)	1.30E-01	g/bhp-hr
PM Condensable	1.30E-01	g/bhp-hr
PM Total	1.30E-01	g/bhp-hr
VOC (uncontrolled)	0.11	g/bhp-hr
VOC (controlled)	0.11	g/bhp-hr

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	0.20	0.05
CO (uncontrolled)	0.02	0.00
CO (controlled)	0.02	0.00
SO ₂	0.05	0.01
PM ₁₀ (Filterable)	0.01	0.00
PM _{2.5} (Filterable)	0.01	0.00
PM Condensable	0.01	0.00
PM Total	0.01	0.00
VOC (uncontrolled)	0.01	0.00
VOC (controlled)	0.01	0.00

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acetaldehyde	7.67E-04	1.48E-04	3.69E-05
Acrolein	9.25E-05	1.78E-05	4.45E-06
Benzene	9.33E-04	1.79E-04	4.49E-05
1,3-Butadiene	3.91E-05	7.52E-06	1.88E-06
Formaldehyde	1.18E-03	2.27E-04	5.67E-05
Toluene	4.09E-04	7.87E-05	1.97E-05
Xylene	2.85E-04	5.48E-05	1.37E-05
Polycyclic Organic Matter:			
Naphthalene	8.48E-05	1.63E-05	4.08E-06
Total HAP		0.00	0.00

^a HAP emission factors from AP-42 Section 3.2, Table 3.3-2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines," Supplement F, October 1996. Criteria pollutant factors are based on EPA Tier IV standards.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr or bhp) × Emission Factor (lb/MMBtu or lb/bhp-hr).

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours/yr) × (1 ton/2000 lb).

Emergency Generator Engine Emissions (Per Engine)
(MD1-G-5 & MD2-G-11)

Source Designation:	
Manufacturer:	Generac
Model No.:	MMG25
Stroke Cycle:	4-stroke
Type of Burn:	Diesel
Year Installed	2014
Fuel Used:	Diesel
Fuel High Heating Value (HHV) (Btu/gal):	137,380
Rated Horsepower (bhp):	32
Specific Fuel Consumption (gal/hr)	1.8
Maximum Fuel Consumption at 100% Load (gal/hr):	1.8
Heat Input (MMBtu/hr)	0.25
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	500
Potential Fuel Consumption (gal/yr):	900

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors^a	Units
NOx	3.50	g/bhp-hr
CO (uncontrolled)	4.10	g/bhp-hr
CO (controlled)	4.10	g/bhp-hr
SO ₂	2.05E-03	lb/bhp-hr
PM ₁₀ (Filterable)	2.20E-02	g/bhp-hr
PM _{2.5} (Filterable)	2.20E-02	g/bhp-hr
PM Condensable	2.20E-02	g/bhp-hr
PM Total	2.20E-02	g/bhp-hr
VOC (uncontrolled)	3.50	g/bhp-hr
VOC (controlled)	3.50	g/bhp-hr

Emergency Generator Engine Emissions (Per Engine)
(MD1-G-5 & MD2-G-11)

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	0.25	0.06
CO (uncontrolled)	0.29	0.07
CO (controlled)	0.29	0.07
SO ₂	0.07	0.02
PM ₁₀ (Filterable)	0.00	0.00
PM _{2.5} (Filterable)	0.00	0.00
PM Condensable	0.00	0.00
PM Total	0.00	0.00
VOC (uncontrolled)	0.25	0.06
VOC (controlled)	0.25	0.06

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMBtu) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
Acetaldehyde	7.67E-04	1.90E-04	4.74E-05
Acrolein	9.25E-05	2.29E-05	5.72E-06
Benzene	9.33E-04	2.31E-04	5.77E-05
1,3-Butadiene	3.91E-05	9.67E-06	2.42E-06
Formaldehyde	1.18E-03	2.92E-04	7.29E-05
Toluene	4.09E-04	1.01E-04	2.53E-05
Xylene	2.85E-04	7.05E-05	1.76E-05
Polycyclic Organic Matter:			
Naphthalene	8.48E-05	2.10E-05	5.24E-06
Total HAP		0.00	0.00

^a HAP emission factors from AP-42 Section 3.2, Table 3.3-2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines," Supplement F, October 1996. Criteria pollutant factors are based on EPA Tier IV standards.

^b Emission Rate (lb/hr) = Rated Capacity (MMBtu/hr or bhp) × Emission Factor (lb/MMBtu or lb/bhp-hr).

^c Annual Emissions (tons/yr)_{potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours/yr) × (1 ton/2000 lb).

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

**Regeneration Heaters
(H-741 & H-2741)**

Source Designation:

Manufacturer:	Heatec
Year Installed	2010
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,020
Heat Input (MMBtu/hr)	5.60
Fuel Consumption (mmscf/hr):	5.49E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/MMscf) ^{a,b}	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
NO _x	55	0.302	1.323
CO	84	0.461	2.020
SO ₂	0.6	0.003	0.0144
PM Total	7.6	0.042	0.1828
PM Condensable	5.7	0.031	0.137
PM ₁₀ (Filterable)	1.9	0.010	0.046
PM _{2.5} (Filterable)	1.9	0.010	0.046
VOC	5.5	0.030	0.132

**Regeneration Heaters
(H-741 & H-2741)**

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
HAPs:			
3-Methylchloranthrene	1.80E-06	9.88E-09	4.33E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	8.78E-08	3.85E-07
Acenaphthene	1.80E-06	9.88E-09	4.33E-08
Acenaphthylene	1.80E-06	9.88E-09	4.33E-08
Anthracene	2.40E-06	1.32E-08	5.77E-08
Benz(a)anthracene	1.80E-06	9.88E-09	4.33E-08
Benzene	2.10E-03	1.15E-05	5.05E-05
Benzo(a)pyrene	1.20E-06	6.59E-09	2.89E-08
Benzo(b)fluoranthene	1.80E-06	9.88E-09	4.33E-08
Benzo(g,h,i)perylene	1.20E-06	6.59E-09	2.89E-08
Benzo(k)fluoranthene	1.80E-06	9.88E-09	4.33E-08
Chrysene	1.80E-06	9.88E-09	4.33E-08
Dibenzo(a,h)anthracene	1.20E-06	6.59E-09	2.89E-08
Dichlorobenzene	1.20E-03	6.59E-06	2.89E-05
Fluoranthene	3.00E-06	1.65E-08	7.21E-08
Fluorene	2.80E-06	1.54E-08	6.73E-08
Formaldehyde	7.50E-02	4.12E-04	1.80E-03
Hexane	1.80E+00	9.88E-03	4.33E-02
Indo(1,2,3-cd)pyrene	1.80E-06	9.88E-09	4.33E-08
Phenanthrene	1.70E-05	9.33E-08	4.09E-07
Pyrene	5.00E-06	2.75E-08	1.20E-07
Toluene	3.40E-03	1.87E-05	8.18E-05
Arsenic	2.00E-04	1.10E-06	4.81E-06
Beryllium	1.20E-05	6.59E-08	2.89E-07
Cadmium	1.10E-03	6.04E-06	2.65E-05
Chromium	1.40E-03	7.69E-06	3.37E-05
Cobalt	8.40E-05	4.61E-07	2.02E-06
Lead	5.00E-04	2.75E-06	1.20E-05
Manganese	3.80E-04	2.09E-06	9.14E-06
Mercury	2.60E-04	1.43E-06	6.25E-06
Nickel	2.10E-03	1.15E-05	5.05E-05
Selenium	2.40E-05	1.32E-07	5.77E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.32E-07	5.77E-07
Naphthalene	6.10E-04	3.35E-06	1.47E-05
Total HAP		1.04E-02	4.54E-02

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

^b NO_x emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf) × (Actual Fuel HHV/1020).

^d Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

**HMO Heater
(H-781)**

Source Designation:	
Manufacturer:	Heatec
Year Installed	2011
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,020
Heat Input (MMBtu/hr)	15.40
Fuel Consumption (mmscf/hr):	1.51E-02
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/MMscf)^{a,b}	Potential Emissions	
		(lb/hr)^c	(tons/yr)^d
NO _x	88.4	1.335	5.846
CO	84	1.268	5.555
SO ₂	0.6	0.009	0.0397
PM Total	7.6	0.115	0.5026
PM Condensable	5.7	0.086	0.377
PM ₁₀ (Filterable)	1.9	0.029	0.126
PM _{2.5} (Filterable)	1.9	0.029	0.126
VOC	5.5	0.083	0.364

**HMO Heater
(H-781)**

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
HAPs:			
3-Methylchloranthrene	1.80E-06	2.72E-08	1.19E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	2.42E-07	1.06E-06
Acenaphthene	1.80E-06	2.72E-08	1.19E-07
Acenaphthylene	1.80E-06	2.72E-08	1.19E-07
Anthracene	2.40E-06	3.62E-08	1.59E-07
Benzo(a)anthracene	1.80E-06	2.72E-08	1.19E-07
Benzene	2.10E-03	3.17E-05	1.39E-04
Benzo(a)pyrene	1.20E-06	1.81E-08	7.94E-08
Benzo(b)fluoranthene	1.80E-06	2.72E-08	1.19E-07
Benzo(g,h,i)perylene	1.20E-06	1.81E-08	7.94E-08
Benzo(k)fluoranthene	1.80E-06	2.72E-08	1.19E-07
Chrysene	1.80E-06	2.72E-08	1.19E-07
Dibenzo(a,h) anthracene	1.20E-06	1.81E-08	7.94E-08
Dichlorobenzene	1.20E-03	1.81E-05	7.94E-05
Fluoranthene	3.00E-06	4.53E-08	1.98E-07
Fluorene	2.80E-06	4.23E-08	1.85E-07
Formaldehyde	7.50E-02	1.13E-03	4.96E-03
Hexane	1.80E+00	2.72E-02	1.19E-01
Indo(1,2,3-cd)pyrene	1.80E-06	2.72E-08	1.19E-07
Phenanthrene	1.70E-05	2.57E-07	1.12E-06
Pyrene	5.00E-06	7.55E-08	3.31E-07
Toluene	3.40E-03	5.13E-05	2.25E-04
Arsenic	2.00E-04	3.02E-06	1.32E-05
Beryllium	1.20E-05	1.81E-07	7.94E-07
Cadmium	1.10E-03	1.66E-05	7.27E-05
Chromium	1.40E-03	2.11E-05	9.26E-05
Cobalt	8.40E-05	1.27E-06	5.55E-06
Lead	5.00E-04	7.55E-06	3.31E-05
Manganese	3.80E-04	5.74E-06	2.51E-05
Mercury	2.60E-04	3.93E-06	1.72E-05
Nickel	2.10E-03	3.17E-05	1.39E-04
Selenium	2.40E-05	3.62E-07	1.59E-06
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	3.62E-07	1.59E-06
Naphthalene	6.10E-04	9.21E-06	4.03E-05
Total HAP		2.85E-02	1.25E-01

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

^b NO_x emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf) × (Actual Fuel HHV/1020).

^d Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

Regeneration Heaters
(H-3741, 4741, 5741, 6741, 7741)

Source Designation:	
Manufacturer:	Heatec
Year Installed	TBD
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,020
Heat Input (MMBtu/hr)	7.69
Fuel Consumption (mmscf/hr):	7.54E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/MMscf)^{a,b}	Potential Emissions	
		(lb/hr)^c	(tons/yr)^d
NO _x	54.4	0.410	1.796
CO	41.82	0.315	1.381
SO ₂	0.6	0.005	0.0198
PM Total	7.6	0.057	0.2510
PM Condensable	5.7	0.043	0.188
PM ₁₀ (Filterable)	1.9	0.014	0.063
PM _{2.5} (Filterable)	1.9	0.014	0.063
VOC	5.5	0.041	0.182

Regeneration Heaters
(H-3741, 4741, 5741, 6741, 7741)

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
HAPs:			
3-Methylchloranthrene	1.80E-06	1.36E-08	5.94E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.21E-07	5.28E-07
Acenaphthene	1.80E-06	1.36E-08	5.94E-08
Acenaphthylene	1.80E-06	1.36E-08	5.94E-08
Anthracene	2.40E-06	1.81E-08	7.93E-08
Benz(a)anthracene	1.80E-06	1.36E-08	5.94E-08
Benzene	2.10E-03	1.58E-05	6.93E-05
Benzo(a)pyrene	1.20E-06	9.05E-09	3.96E-08
Benzo(b)fluoranthene	1.80E-06	1.36E-08	5.94E-08
Benzo(g,h,i)perylene	1.20E-06	9.05E-09	3.96E-08
Benzo(k)fluoranthene	1.80E-06	1.36E-08	5.94E-08
Chrysene	1.80E-06	1.36E-08	5.94E-08
Dibenzo(a,h)anthracene	1.20E-06	9.05E-09	3.96E-08
Dichlorobenzene	1.20E-03	9.05E-06	3.96E-05
Fluoranthene	3.00E-06	2.26E-08	9.91E-08
Fluorene	2.80E-06	2.11E-08	9.25E-08
Formaldehyde	7.50E-02	5.65E-04	2.48E-03
Hexane	1.80E+00	1.36E-02	5.94E-02
Indo(1,2,3-cd)pyrene	1.80E-06	1.36E-08	5.94E-08
Phenanthrene	1.70E-05	1.28E-07	5.61E-07
Pyrene	5.00E-06	3.77E-08	1.65E-07
Toluene	3.40E-03	2.56E-05	1.12E-04
Arsenic	2.00E-04	1.51E-06	6.60E-06
Beryllium	1.20E-05	9.05E-08	3.96E-07
Cadmium	1.10E-03	8.29E-06	3.63E-05
Chromium	1.40E-03	1.06E-05	4.62E-05
Cobalt	8.40E-05	6.33E-07	2.77E-06
Lead	5.00E-04	3.77E-06	1.65E-05
Manganese	3.80E-04	2.86E-06	1.25E-05
Mercury	2.60E-04	1.96E-06	8.59E-06
Nickel	2.10E-03	1.58E-05	6.93E-05
Selenium	2.40E-05	1.81E-07	7.93E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.81E-07	7.93E-07
Naphthalene	6.10E-04	4.60E-06	2.01E-05
Total HAP		1.42E-02	6.24E-02

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

^b NO_x and CO emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf) × (Actual Fuel HHV/1020).

^d Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

MarkWest Liberty Midstream & Resources L.L.C.
 Majorsville Gas Plant

**Hot Oil Heaters
 (H-3781, 4781, 7781)**

Source Designation:	
Manufacturer:	Heatec
Year Installed	TBD
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,020
Heat Input (MMBtu/hr)	16.07
Fuel Consumption (mmscf/hr):	1.58E-02
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/MMscf) ^{a,b}	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
NO _x	102	1.607	7.039
CO	84	1.323	5.797
SO ₂	0.6	0.009	0.0414
PM Total	7.6	0.120	0.5244
PM Condensable	5.7	0.090	0.393
PM ₁₀ (Filterable)	1.9	0.030	0.131
PM _{2.5} (Filterable)	1.9	0.030	0.131
VOC	5.5	0.087	0.380

**Hot Oil Heaters
(H-3781, 4781, 7781)**

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
HAPs:			
3-Methylchloranthrene	1.80E-06	2.84E-08	1.24E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	2.52E-07	1.10E-06
Acenaphthene	1.80E-06	2.84E-08	1.24E-07
Acenaphthylene	1.80E-06	2.84E-08	1.24E-07
Anthracene	2.40E-06	3.78E-08	1.66E-07
Benz(a)anthracene	1.80E-06	2.84E-08	1.24E-07
Benzene	2.10E-03	3.31E-05	1.45E-04
Benzo(a)pyrene	1.20E-06	1.89E-08	8.28E-08
Benzo(b)fluoranthene	1.80E-06	2.84E-08	1.24E-07
Benzo(g,h,i)perylene	1.20E-06	1.89E-08	8.28E-08
Benzo(k)fluoranthene	1.80E-06	2.84E-08	1.24E-07
Chrysene	1.80E-06	2.84E-08	1.24E-07
Dibenzo(a,h)anthracene	1.20E-06	1.89E-08	8.28E-08
Dichlorobenzene	1.20E-03	1.89E-05	8.28E-05
Fluoranthene	3.00E-06	4.73E-08	2.07E-07
Fluorene	2.80E-06	4.41E-08	1.93E-07
Formaldehyde	7.50E-02	1.18E-03	5.18E-03
Hexane	1.80E+00	2.84E-02	1.24E-01
Indo(1,2,3-cd)pyrene	1.80E-06	2.84E-08	1.24E-07
Phenanthrene	1.70E-05	2.68E-07	1.17E-06
Pyrene	5.00E-06	7.88E-08	3.45E-07
Toluene	3.40E-03	5.36E-05	2.35E-04
Arsenic	2.00E-04	3.15E-06	1.38E-05
Beryllium	1.20E-05	1.89E-07	8.28E-07
Cadmium	1.10E-03	1.73E-05	7.59E-05
Chromium	1.40E-03	2.21E-05	9.66E-05
Cobalt	8.40E-05	1.32E-06	5.80E-06
Lead	5.00E-04	7.88E-06	3.45E-05
Manganese	3.80E-04	5.99E-06	2.62E-05
Mercury	2.60E-04	4.10E-06	1.79E-05
Nickel	2.10E-03	3.31E-05	1.45E-04
Selenium	2.40E-05	3.78E-07	1.66E-06
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	3.78E-07	1.66E-06
Naphthalene	6.10E-04	9.61E-06	4.21E-05
Total HAP		2.98E-02	1.30E-01

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

^b NO_x and CO emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf) × (Actual Fuel HHV/1020).

^d Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

**Hot Oil Heater
(H-D1741 & H-D2741)**

Source Designation:

Manufacturer:	Tulsa Heaters Inc.
Year Installed	TBD
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,020
Heat Input (MMBtu/hr)	14.25
Fuel Consumption (mmscf/hr):	1.40E-02
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/MMscf) ^{a,b}	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
NO _x	40.8	0.570	2.497
CO	41.82	0.584	2.559
SO ₂	0.6	0.008	0.0367
PM Total	13.26	0.185	0.8114
PM Condensable	5.7	0.080	0.349
PM ₁₀ (Filterable)	1.9	0.027	0.116
PM _{2.5} (Filterable)	1.9	0.027	0.116
VOC	19.38	0.271	1.186

**Hot Oil Heater
(H-D1741 & H-D2741)**

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
HAPs:			
3-Methylchloranthrene	1.80E-06	2.51E-08	1.10E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	2.24E-07	9.79E-07
Acenaphthene	1.80E-06	2.51E-08	1.10E-07
Acenaphthylene	1.80E-06	2.51E-08	1.10E-07
Anthracene	2.40E-06	3.35E-08	1.47E-07
Benz(a)anthracene	1.80E-06	2.51E-08	1.10E-07
Benzene	2.10E-03	2.93E-05	1.29E-04
Benzo(a)pyrene	1.20E-06	1.68E-08	7.34E-08
Benzo(b)fluoranthene	1.80E-06	2.51E-08	1.10E-07
Benzo(g,h,i)perylene	1.20E-06	1.68E-08	7.34E-08
Benzo(k)fluoranthene	1.80E-06	2.51E-08	1.10E-07
Chrysene	1.80E-06	2.51E-08	1.10E-07
Dibenzo(a,h)anthracene	1.20E-06	1.68E-08	7.34E-08
Dichlorobenzene	1.20E-03	1.68E-05	7.34E-05
Fluoranthene	3.00E-06	4.19E-08	1.84E-07
Fluorene	2.80E-06	3.91E-08	1.71E-07
Formaldehyde	7.50E-02	1.05E-03	4.59E-03
Hexane	1.80E+00	2.51E-02	1.10E-01
Indo(1,2,3-cd)pyrene	1.80E-06	2.51E-08	1.10E-07
Phenanthrene	1.70E-05	2.38E-07	1.04E-06
Pyrene	5.00E-06	6.99E-08	3.06E-07
Toluene	3.40E-03	4.75E-05	2.08E-04
Arsenic	2.00E-04	2.79E-06	1.22E-05
Beryllium	1.20E-05	1.68E-07	7.34E-07
Cadmium	1.10E-03	1.54E-05	6.73E-05
Chromium	1.40E-03	1.96E-05	8.57E-05
Cobalt	8.40E-05	1.17E-06	5.14E-06
Lead	5.00E-04	6.99E-06	3.06E-05
Manganese	3.80E-04	5.31E-06	2.33E-05
Mercury	2.60E-04	3.63E-06	1.59E-05
Nickel	2.10E-03	2.93E-05	1.29E-04
Selenium	2.40E-05	3.35E-07	1.47E-06
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	3.35E-07	1.47E-06
Naphthalene	6.10E-04	8.52E-06	3.73E-05
Total HAP		2.64E-02	1.16E-01

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

^b NO_x, CO, Pmtotal, and VOC emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf) × (Actual Fuel HHV/1020).

^d Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

**Hot Oil Heater
(H-D1782, H-D2782)**

Source Designation:

Manufacturer:	Optimized Process Furnaces
Year Installed	TBD
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,020
Heat Input (MMBtu/hr)	119.20
Fuel Consumption (mmscf/hr):	1.17E-01
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/MMscf) ^{a,b}	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
NO _x	30.60	3.576	15.663
CO	40.8	4.768	20.884
SO ₂	0.6	0.070	0.3071
PM Total	7.6	0.888	3.8901
PM Condensable	5.7	0.666	2.918
PM ₁₀ (Filterable)	1.9	0.222	0.973
PM _{2.5} (Filterable)	1.9	0.222	0.973
VOC	5.5	0.643	2.815

**Hot Oil Heater
(H-D1782, H-D2782)**

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
HAPs:			
3-Methylchloranthrene	1.80E-06	2.10E-07	9.21E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.87E-06	8.19E-06
Acenaphthene	1.80E-06	2.10E-07	9.21E-07
Acenaphthylene	1.80E-06	2.10E-07	9.21E-07
Anthracene	2.40E-06	2.80E-07	1.23E-06
Benz(a)anthracene	1.80E-06	2.10E-07	9.21E-07
Benzene	2.10E-03	2.45E-04	1.07E-03
Benzo(a)pyrene	1.20E-06	1.40E-07	6.14E-07
Benzo(b)fluoranthene	1.80E-06	2.10E-07	9.21E-07
Benzo(g,h,i)perylene	1.20E-06	1.40E-07	6.14E-07
Benzo(k)fluoranthene	1.80E-06	2.10E-07	9.21E-07
Chrysene	1.80E-06	2.10E-07	9.21E-07
Dibenzo(a,h) anthracene	1.20E-06	1.40E-07	6.14E-07
Dichlorobenzene	1.20E-03	1.40E-04	6.14E-04
Fluoranthene	3.00E-06	3.51E-07	1.54E-06
Fluorene	2.80E-06	3.27E-07	1.43E-06
Formaldehyde	7.50E-02	8.76E-03	3.84E-02
Hexane	1.80E+00	2.10E-01	9.21E-01
Indo(1,2,3-cd)pyrene	1.80E-06	2.10E-07	9.21E-07
Phenanthrene	1.70E-05	1.99E-06	8.70E-06
Pyrene	5.00E-06	5.84E-07	2.56E-06
Toluene	3.40E-03	3.97E-04	1.74E-03
Arsenic	2.00E-04	2.34E-05	1.02E-04
Beryllium	1.20E-05	1.40E-06	6.14E-06
Cadmium	1.10E-03	1.29E-04	5.63E-04
Chromium	1.40E-03	1.64E-04	7.17E-04
Cobalt	8.40E-05	9.82E-06	4.30E-05
Lead	5.00E-04	5.84E-05	2.56E-04
Manganese	3.80E-04	4.44E-05	1.95E-04
Mercury	2.60E-04	3.04E-05	1.33E-04
Nickel	2.10E-03	2.45E-04	1.07E-03
Selenium	2.40E-05	2.80E-06	1.23E-05
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	2.80E-06	1.23E-05
Naphthalene	6.10E-04	7.13E-05	3.12E-04
Total HAP		2.21E-01	9.67E-01

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

^b NO_x and CO emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf) × (Actual Fuel HHV/1020).

^d Annual Emissions (tons/yr)_{potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

**Stabilization Heater
(H-4782)**

Source Designation:

Manufacturer:	Heatec
Year Installed	2014
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,020
Heat Input (MMBtu/hr)	10.65
Fuel Consumption (mmscf/hr):	1.04E-02
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/MMscf) ^{a,b}	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
NO _x	59.84	0.625	2.737
CO	84	0.877	3.842
SO ₂	0.6	0.006	0.0274
PM Total	7.6	0.079	0.3476
PM Condensable	5.7	0.060	0.261
PM ₁₀ (Filterable)	1.9	0.020	0.087
PM _{2.5} (Filterable)	1.9	0.020	0.087
VOC	5.5	0.057	0.252

**Stabilization Heater
(H-4782)**

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^c	(tons/yr) ^d
HAPs:			
3-Methylchloranthrene	1.80E-06	1.88E-08	8.23E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.67E-07	7.32E-07
Acenaphthene	1.80E-06	1.88E-08	8.23E-08
Acenaphthylene	1.80E-06	1.88E-08	8.23E-08
Anthracene	2.40E-06	2.51E-08	1.10E-07
Benz(a)anthracene	1.80E-06	1.88E-08	8.23E-08
Benzene	2.10E-03	2.19E-05	9.61E-05
Benzo(a)pyrene	1.20E-06	1.25E-08	5.49E-08
Benzo(b)fluoranthene	1.80E-06	1.88E-08	8.23E-08
Benzo(g,h,i)perylene	1.20E-06	1.25E-08	5.49E-08
Benzo(k)fluoranthene	1.80E-06	1.88E-08	8.23E-08
Chrysene	1.80E-06	1.88E-08	8.23E-08
Dibenzo(a,h) anthracene	1.20E-06	1.25E-08	5.49E-08
Dichlorobenzene	1.20E-03	1.25E-05	5.49E-05
Fluoranthene	3.00E-06	3.13E-08	1.37E-07
Fluorene	2.80E-06	2.92E-08	1.28E-07
Formaldehyde	7.50E-02	7.83E-04	3.43E-03
Hexane	1.80E+00	1.88E-02	8.23E-02
Indo(1,2,3-cd)pyrene	1.80E-06	1.88E-08	8.23E-08
Phenanthrene	1.70E-05	1.78E-07	7.78E-07
Pyrene	5.00E-06	5.22E-08	2.29E-07
Toluene	3.40E-03	3.55E-05	1.56E-04
Arsenic	2.00E-04	2.09E-06	9.15E-06
Beryllium	1.20E-05	1.25E-07	5.49E-07
Cadmium	1.10E-03	1.15E-05	5.03E-05
Chromium	1.40E-03	1.46E-05	6.40E-05
Cobalt	8.40E-05	8.77E-07	3.84E-06
Lead	5.00E-04	5.22E-06	2.29E-05
Manganese	3.80E-04	3.97E-06	1.74E-05
Mercury	2.60E-04	2.72E-06	1.19E-05
Nickel	2.10E-03	2.19E-05	9.61E-05
Selenium	2.40E-05	2.51E-07	1.10E-06
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	2.51E-07	1.10E-06
Naphthalene	6.10E-04	6.37E-06	2.79E-05
Total HAP		1.97E-02	8.64E-02

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3

^b NO_x and CO emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf) × (Actual Fuel HHV/1020).

^d Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

**MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant**

Fugitive Emissions from Component Leaks

Component	Service Type	Component Count ²	TOC Emission Factor ³ (kg/hr/component)	Average NG Leak Rate (lb/hr)	VOC Wt% ⁴	HAP Wt %	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)
Compressors	Gas	32	1.32E-03	0.09	0.50%	0.00%	0.00	0.00
Compressors	Light Oil	1	1.13E-03	0.00	100.00%	1.49%	0.01	0.00
Flange	Gas	2,907	2.73E-04	1.75	100.00%	0.27%	7.67	0.02
Flange	Gas	1,843	2.73E-04	1.11	20.00%	0.27%	0.97	0.01
Flange	Gas	71	2.73E-04	0.04	0.50%	0.00%	0.00	0.00
Flange	Light Oil	2,436	7.70E-05	0.41	100.00%	1.49%	1.81	0.03
Flange	Light Oil	37	7.70E-05	0.01	0.50%	1.49%	0.00	0.00
Flange	Heavy Oil	2	2.73E-07	0.00	100.00%	1.49%	0.00	0.00
Connector	Gas	8,069	1.40E-04	2.49	100.00%	0.27%	10.92	0.03
Connector	Gas	6,457	1.40E-04	1.99	20.00%	0.27%	1.75	0.02
Connector	Gas	149	1.40E-04	0.05	0.50%	0.00%	0.00	0.00
Connector	Light Oil	4,765	1.47E-04	1.55	100.00%	1.49%	6.77	0.10
Connector	Light Oil	181	1.47E-04	0.06	0.50%	1.49%	0.00	0.00
PRD	Gas	62	2.64E-04	0.04	100.00%	0.27%	0.16	0.00
PRD	Gas	142	2.64E-04	0.08	20.00%	0.27%	0.07	0.00
PRD	Gas	8	2.64E-04	0.00	0.50%	0.00%	0.00	0.00
PRD	Light Oil	42	2.25E-04	0.02	100.00%	1.49%	0.09	0.00
Pump	Gas	28	3.60E-04	0.02	100.00%	0.27%	0.10	0.00
Pump	Light Oil	38	1.95E-03	0.16	100.00%	1.49%	0.72	0.01
Valve	Gas	3,390	1.35E-04	1.01	100.00%	0.27%	4.42	0.01
Valve	Gas	3,160	1.35E-04	0.94	20.00%	0.27%	0.82	0.01
Valve	Gas	280	1.35E-04	0.08	0.50%	0.00%	0.00	0.00
Valve	Heavy Oil	2	2.52E-07	0.00	100.00%	1.49%	0.00	0.00
Valve	Heavy Oil	17	2.52E-07	0.00	0.50%	1.49%	0.00	0.00
Valve	Light Oil	2,888	7.50E-05	0.48	100.00%	1.49%	2.09	0.03
Valve	Light Oil	161	7.50E-05	0.03	0.50%	1.49%	0.00	0.00
Total				12.4			38.376	0.287

1. "Other" equipment types include compressor seals and relief valves.
2. Component counts are actual counts from LDAR contractor and estimations for Majorsville VII and DeEth II based on Majorsville VI and DeEth I component counts.
3. Table 2-4 :Oil & Gas Production Operations Average Emission Factors , Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995 with applied reduction percentages from NSPS Subpart OOOO monitoring program per TCEQ Air Permit Technical Guidance for Chemical Sources: Equipment Leak Fugitives October 2000. Emission factors based on average measured TOC from component types indicated in gas service at O&G Production Operations.
4. VOC and HAP weight percent based on most conservative monthly gas analysis 2016. For HAPs the C6+ were speciated using a typical lumped C6+ gas analysis from GRI-GLYCalc estimations to determine hazardous constituents.

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

Fugitive Emissions from Component Leaks

Component	Service Type	Component Count ²	TOC Emission Factor ³ (kg/hr/component)	Average NG Leak Rate (lb/hr)	VOC Wt% ⁴	HAP Wt %	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)
Connectors	Gas	1,564	2.00E-04	6.90E-01	17.39%	0.83%	5.25E-01	2.52E-02
Flanges	Gas	1,243	3.90E-04	1.07E+00	17.39%	0.83%	8.14E-01	3.90E-02
Open-Ended Lines	Gas	0	2.00E-03	0.00E+00	17.39%	0.83%	0.00E+00	0.00E+00
Pump Seals	Gas	0	2.40E-03	0.00E+00	17.39%	0.83%	0.00E+00	0.00E+00
Valves	Gas	1,697	4.50E-03	1.68E+01	17.39%	0.83%	1.28E+01	6.14E-01
Other ¹	Gas	49	8.80E-03	9.51E-01	17.39%	0.83%	7.24E-01	3.47E-02
Connectors	Light Oil	1,043	2.10E-04	4.83E-01	95.40%	0.83%	2.02E+00	1.76E-02
Flanges	Light Oil	902	1.10E-04	2.19E-01	95.40%	0.83%	9.14E-01	7.98E-03
Open-Ended Lines	Light Oil	0	1.40E-03	0.00E+00	95.40%	0.83%	0.00E+00	0.00E+00
Pump Seals	Light Oil	14	1.30E-02	4.01E-01	95.40%	0.83%	1.68E+00	1.46E-02
Valves	Light Oil	1,113	2.50E-03	6.13E+00	95.40%	0.83%	2.56E+01	2.24E-01
Other ¹	Light Oil	0	7.50E-03	0.00E+00	95.40%	0.83%	0.00E+00	0.00E+00
Total				26.8			45.126	0.977

1. "Other" equipment types include compressor seals, relief valves, diaphragms, drains, meters, etc.

2. The component count is a preliminary estimate based on the proposed design of the Majorsville Gathering Station.

3. Table 2-4 : Oil & Gas Production Operations Average Emission Factors, Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995. Emission factors based on average measured TOC from component types indicated in gas service at O&G Production Operations.

4. VOC and HAP weight percent based on representative gas analysis dated 9-9-09. All C6+ components assumed to be hazardous air pollutants for a conservative emissions estimate.

**Plant Flare
(FL-991)**

Source Designation:	
Manufacturer:	Superior Fabrication
Year Installed	2010
Operating Hours: (hr/yr)	8,760
Flow Rate per Pilot (scfm)	1.39
Number of Pilots	6.00
Pilot Gas Volume (scfm)	8.34
Purge Gas Volume (scfm)	0.00
Annual Fuel Use (MMBtu/yr)	4,471
Annual Fuel Use (mmscf/yr)	4.4
Fuel Consumption (mmscf/hr):	5.0E-04
Fuel HHV (Btu/scf)	1,020

Emissions Resulting From Combustion of Pilot/Purge Gas

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
NO _x	100	0.050	0.219
CO	84	0.042	0.184
SO ₂	0.6	0.000	0.001
PM Total	7.6	0.004	0.017
PM Condensable	1.9	0.001	0.004
PM ₁₀ (Filterable)	5.7	0.003	0.012
PM _{2.5} (Filterable)	5.7	0.003	0.012
VOC	5.5	0.003	0.012
Formaldehyde	7.50E-02	0.000	0.000
Benzene	2.10E-03	0.000	0.000
Toluene	3.40E-03	0.000	0.000
n-Hexane	1.80E+00	0.001	0.004
Total HAPs	-	0.001	0.004
CO ₂	120,000.00	60.048	263.010
CH ₄	2.30	0.001	0.005
N ₂ O	2.20	0.001	0.005
Total GHG	-	60.413	264.611

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1.

^b Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

**Plant Flare
(FL-991)**

Combustion of Hydrocarbons

Source Designation:	
Hourly Gas Flow (scf/hr) ^b	3,317
Annual Gas Flow (mmscf/yr)	29.05
Molecular Weight (lb/lbmole)	20.68
Hourly Gas Flow (lb/hr)	180.97
Annual Gas Flow (ton/yr)	792.63
Heating value (btu/scf)	1,274.26
Maximum Heat Release of Flare (mmbtu/hr)	4.2
Maximum Heat Release of Flare (mmbtu/yr)	37,021
NO _x Emission Rate (lb/mmbtu) ^a	0.068
CO Emission Rate (lb/mmbtu) ^a	0.31
CO ₂ Emission Rate (lb/mmscf) ^c	149,912.94
N ₂ O Emission Rate (lb/mmscf) ^c	2.75

^a Emission factors from AP-42 Section 13.5 "Industrial Flares" Table 13.5-1

^b Includes emissions from pump maintenance and pigging

^c Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1.

Emissions From Combustion of Hydrocarbons

Pollutant	lb/hr	tpy
NO _x	0.2874	1.2587
CO	1.3101	5.7383
VOC	0.6967	3.0516
Benzene	0.0000	0.0000
Toluene	0.0000	0.0000
Ethylbenzene	0.0000	0.0000
Xylene	0.0000	0.0000
n-Hexane	0.0121	0.0529
Total HAPs	0.0121	0.0529
CO ₂	497,1941	2,177.7103
CH ₄	2,2110	9.6844
N ₂ O	0.0091	0.0399
Total GHG	546.4518	2,393.4590

Total Emissions

Pollutant	lb/hr	tpy
NO _x	0.3374	1.4779
CO	1.3521	5.9224
SO ₂	0.0003	0.0013
PM Total	0.0038	0.0167
PM Condensable	0.0010	0.0042
PM ₁₀ (Filterable)	0.0029	0.0125
PM _{2.5} (Filterable)	0.0029	0.0125
VOC	0.6995	3.0636
Formaldehyde	0.0000	0.0002
Benzene	0.0000	0.0000
Toluene	0.0000	0.0000
Ethylbenzene	0.0000	0.0000
Xylene	0.0000	0.0000
n-Hexane	0.0130	0.0568
Total HAPs	0.0130	0.0570
CO ₂	557.2421	2,440.7206
CH ₄	2,2122	9.6894
N ₂ O	0.0102	0.0447
Total GHG	606.8653	2,658.0699

**Plant Flare
(FL-1991)**

Source Designation:	
Manufacturer:	Callidus
Year Installed:	2012/2013
Operating Hours: (hr/yr)	8,760
Flow Rate per Pilot (scfm)	1.39
Number of Pilots	5.00
Pilot Gas Volume (scfm)	6.95
Purge Gas Volume (scfm)	0.00
Annual Fuel Use (MMBtu/yr)	3,726
Annual Fuel Use (mmscf/yr)	3.65
Fuel Consumption (mmscf/hr):	4.2E-04
Fuel HHV (Btu/scf)	1,020

Emissions Resulting From Combustion of Pilot/Purge Gas

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
NO _x	100	0.042	0.183
CO	84	0.035	0.153
SO ₂	0.6	0.000	0.001
PM Total	7.6	0.003	0.014
PM Condensable	1.9	0.001	0.003
PM ₁₀ (Filterable)	5.7	0.002	0.010
PM _{2.5} (Filterable)	5.7	0.002	0.010
VOC	5.5	0.002	0.010
Formaldehyde	7.50E-02	0.000	0.000
Benzene	2.10E-03	0.000	0.000
Toluene	3.40E-03	0.000	0.000
n-Hexane	1.80E+00	0.001	0.003
Total HAPs	-	0.001	0.003
CO ₂	120,000.00	50.040	219.175
CH ₄	2.30	0.001	0.004
N ₂ O	2.20	0.001	0.004
Total GHG	-	50.345	220.509

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1.

^b Emission Rate (lb/hr) = Rated Capacity (MMscf/hr) × Emission Factor (lb/MMscf).

^c Annual Emissions (tons/yr)_{Potential} = (lb/hr)_{Emissions} × (Maximum Allowable Operating Hours, 8760 hr/yr) × (1 ton/2000 lb).

**Plant Flare
(FL-1991)**

Combustion of Hydrocarbons

Source Designation:	
Hourly Gas Flow (scf/hr) ^b	344
Annual Gas Flow (mmscf/yr)	3.01
Heating value (btu/scf)	2,190.40
Hourly Gas Flow (scf/hr)	6,336.25
Annual Gas Flow (mmscf/yr)	55.51
Molecular Weight	20.68
Hourly Gas Flow (lb/hr)	364.50
Annual Gas Flow (ton/yr)	1,596.52
Heating value (btu/scf)	1,275.53
Maximum Heat Release of Flare (mmbtu/hr)	8.8
Maximum Heat Release of Flare (mmbtu/yr)	77,399
NO _x Emission Rate (lb/mmbtu) ^a	0.068
CO Emission Rate (lb/mmbtu) ^a	0.31
CO ₂ Emission Rate (lb/mmsecf) ^a	150,062.35
N ₂ O Emission Rate (lb/mmsecf) ^a	2.75

^a Emission factors from AP-42 Section 13.5 "Industrial Flares"
Table 13.5-1

^b Includes emissions from pump maintenance and pigging

^c Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1.

Emissions From Combustion of Hydrocarbons

Pollutant	lb/hr	tpy
NO _x	0.6008	2.6316
CO	2.7390	11.9968
VOC	1.4033	6.1465
Benzene	0.0000	0.0000
Toluene	0.0000	0.0000
Ethylbenzene	0.0000	0.0000
Xylene	0.0000	0.0000
n-Hexane	0.0243	0.1065
Total HAPs	0.0243	0.1065
CO ₂	1,002.4459	4,390.7132
CH ₄	4.4535	19.5063
N ₂ O	0.0184	0.0805
Total GHG	1,101.6664	4,825.2987

Total Emissions

Pollutant	lb/hr	tpy
NO _x	0.6425	2.8142
CO	2.7740	12.1502
SO ₂	0.0003	0.0011
PM Total	0.0032	0.0139
PM Condensable	0.0008	0.0035
PM ₁₀ (Filterable)	0.0024	0.0104
PM _{2.5} (Filterable)	0.0024	0.0104
VOC	1.4056	6.1565
Formaldehyde	0.0000	0.0001
Benzene	0.0000	0.0000
Toluene	0.0000	0.0000
Ethylbenzene	0.0000	0.0000
Xylene	0.0000	0.0000
n-Hexane	0.0251	0.1098
Total HAPs	0.0251	0.1099
CO ₂	1,052.4859	4,609.8884
CH ₄	4.4544	19.5105
N ₂ O	0.0193	0.0845
Total GHG	1,152.0109	5,045.8078

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

Blowdowns

VOC and HAP Vented Blowdown Emissions

Blowdown Emissions Sources	Number of Units	Vented Gas Volume Per Blowdown Event (scf)	Number of Blowdown Events per year	Total Volume NG Emitted (scf/yr)	Flare Control Efficiency (%)	Potential VOC Emissions (tpy)	Potential HAP Emissions (tpy)
Engines	3	2,200	36	237,600	0	1.03	0.049
Majorsville I&II	2	182,525	4	1,460,200	98	0.13	0.006
Majorsville III & IV	2	250,000	4	2,000,000	98	0.17	0.008
Majorsville V, VI, VII	3	250,000	4	3,000,000	98	0.26	0.012
Deethanizer	1	459,000	4	1,836,000	98	0.16	0.008
Total						1.75	0.084

Density of natural gas: 0.05 lb/ft³ @ STP (www.engineeringtoolbox.com)

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant
Pump Maintenance

Standard Volume (scf) 2000
Moles Emitted (moles/event) 5.28
MW 20.44
Event Emissions (lb/event) 107.84
Control Percentage 98%
Annual Events 24

Pollutant	Mass %	Emissions	
		lb/hr	tpy
VOC	17.39%	0.38	0.00
Total HAPs	0.83%	0.02	0.00
Benzene	0.83%	0.02	0.00
Toluene	0.27%	0.01	0.00
Ethylbenzene	0.27%	0.01	0.00
Xylenes	0.09%	0.00	0.00
n-Hexane	0.83%	0.02	0.00

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant
Pig Receiver

Receiver Diameter (inches)	20
Receiver Length (ft)	30.83
Receiver Volume (ft3)	67.25
Pressure (psig)	960.65
Temperature (°F)	60
Standard Pressure (psia)	14.7
Standard Temperature (°F)	60
Standard Volume (scf)	4462.06
Moles Emitted (moles/event)	11.77
MW	20.44
Event Emissions (lb/event)	240.59
Control Percentage	98%
Annual Events	365

Pollutant	Mass %	Emissions	
		lb/hr	tpy
VOC	17.39%	0.84	0.15
Total HAPs	0.83%	0.04	0.01
Benzene	0.83%	0.04	0.01
Toluene	0.27%	0.01	0.00
Ethylbenzene	0.27%	0.01	0.00
Xylenes	0.09%	0.00	0.00
n-Hexane	0.83%	0.04	0.01
Carbon Dioxide	0.29%	0.71	0.13
Methane	61.82%	2.97	0.54

MarkWest Liberty Midstream & Resources L.L.C.
Majorsville Gas Plant

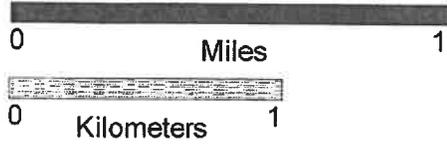
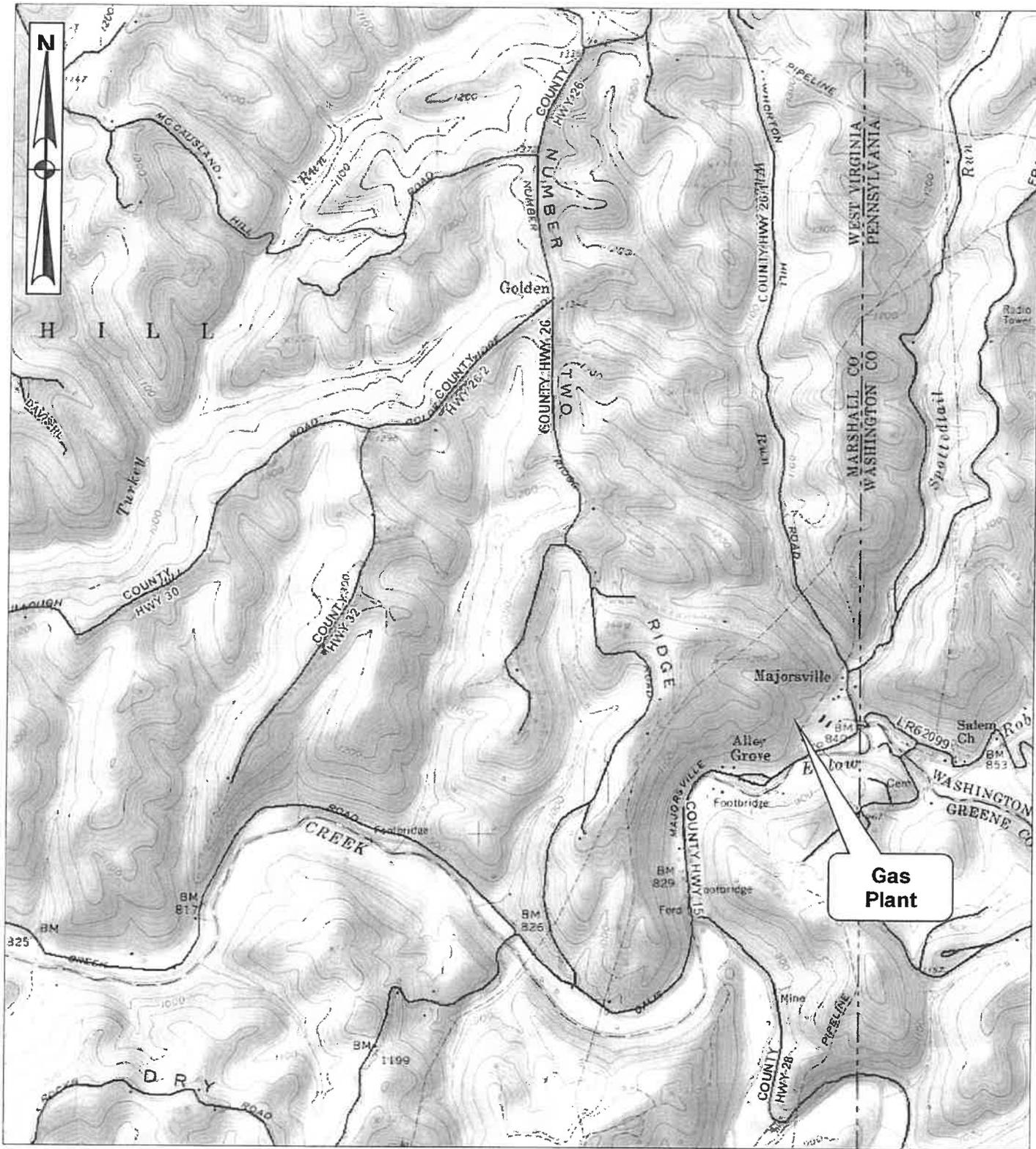
Gas Analysis

Component	Composition (Mol %)	Relative Weight	HC Weight (Wt %)
Hydrogen Sulfide	0.00	0.00	0.00%
Carbon Dioxide	0.14	0.06	0.29%
Nitrogen	0.35	0.10	0.48%
Methane	78.96	12.63	61.82%
Ethane	13.63	4.09	20.01%
Propane	4.46	1.96	9.59%
Isobutane	0.55	0.32	1.55%
n-Butane	1.12	0.65	3.17%
Isopentane	0.26	0.19	0.93%
n-Pentane	0.27	0.20	0.95%
Hexane	0.20	0.17	0.83%
Heptane	0.06	0.06	0.27%
Octane	0.02	0.02	0.09%
Totals	100.00	20.44	100.00%

TOC (Total)		99.23%
VOC (Total)		17.39%
HAP (Total)		0.83%

^a Note: C6+ components assumed to be hazardous air pollutants (HAP) for a conservative emissions estimate.

Attachment A - Area Map

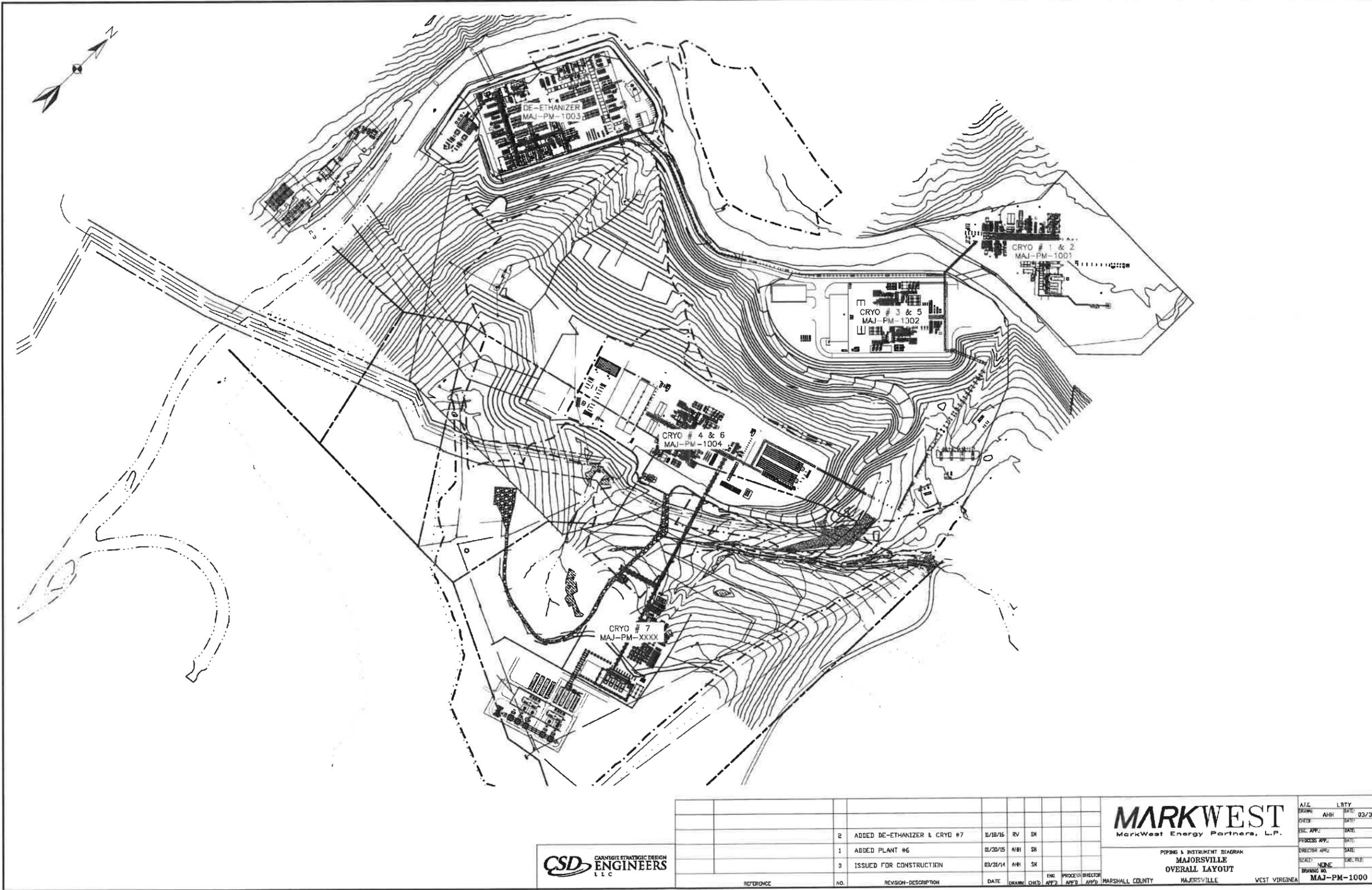


02/09/2009 – NAD83 – Zone 17



Attachment B- Site Map
 MarkWest Liberty Midstream
 & Resources, L.L.C.
Majorsville Gas Plant

Attachment B – Plot Plan



CSD CARNEGIE SCIENTIFIC DESIGN
ENGINEERS
L.L.C.

NO.	REVISION-DESCRIPTION	DATE	DRWN	CHKD	APP'D	ENR	PROCES	DIRECTOR
2	ADDED DE-ETHANIZER & CRYO #7	11/18/16	RV	SH				
1	ADDED PLANT #6	01/20/15	AH	SH				
0	ISSUED FOR CONSTRUCTION	03/31/14	AH	SH				

MARKWEST
MarkWest Energy Partners, L.P.

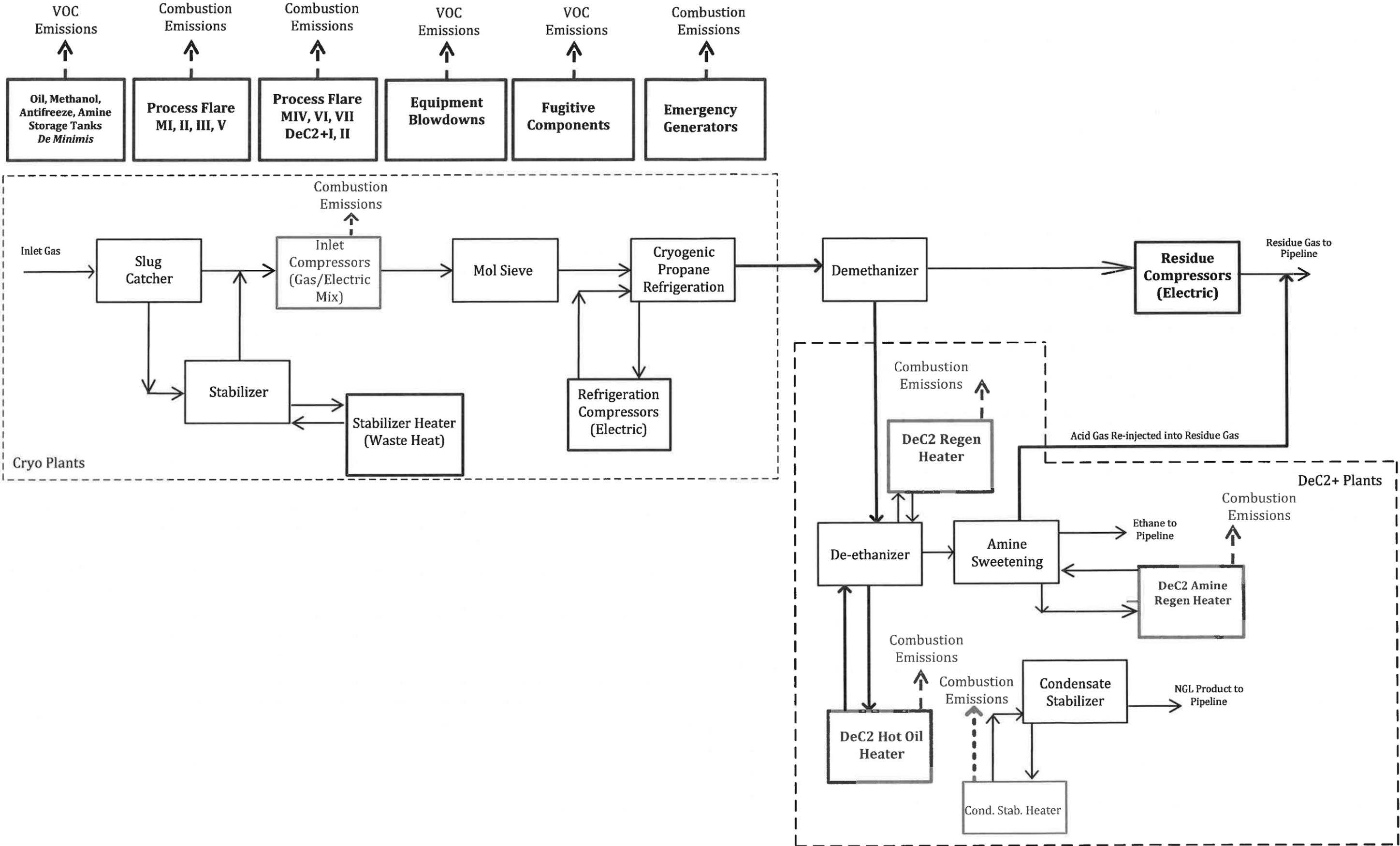
PIPING & INSTRUMENT DIAGRAM
MAJORSVILLE
OVERALL LAYOUT
MARSHALL COUNTY MAJORSVILLE WEST VIRGINIA

A.E.C.	LBTY
DRWNG	DATE: 03/31/14
CHEK	DATE:
ENR APP'D	DATE:
PROCES APP'D	DATE:
DIRECTOR APP'D	DATE:
SCALE: NONE	SCALE: NONE
DRAWING NO. MAJ-PM-1000	REV. 2

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Attachment C – Process Flow Diagram

PROCESS FLOW DIAGRAM FOR THE MAJORSVILLE GAS PLANT



Attachment D – Title V Equipment Table

ATTACHMENT D - Title V Equipment Table
(includes all emission units at the facility except those designated as
insignificant activities in Section 4, Item 24 of the General Forms)

Emission Point ID ¹	Control Device ¹	Emission Unit ID ¹	Emission Unit Description	Design Capacity	Year Installed/ Modified
2E	Oxid. Cat.	C-102	Compressor Engine	2370 hp	2010
3E	Oxid. Cat	C-103	Compressor Engine	2370 hp	2010
4E	Oxid. Cat	C-104	Compressor Engine	2370 hp	2010
5E	N/A	H-741	Heater	5.60 mmBtu/hr	2010
6E	N/A	H-781	Heater	15.40 mmBtu/hr	2010
7E	N/A	FUG-001	Fugitive Leaks	NA	2011
9E	N/A	H-2741	Heater	5.60 mmbtu/hr	2011
	N/A	FL-991	Flare	3.70 mmscf/hr	2014
10E	N/A	H-3741	Heater M III Regen Heater	7.69 mmbtu/hr	2013
11E	N/A	H-4741	Heater M IV Regen Heater	7.69 mmbtu/hr	2013
12E	N/A	H-3781	Heater M III HMO Heater	16.07 mmbtu/hr	2013
13E	N/A	H-D1782	DeEthanizer I HMO Heater	119.20 mmbtu/hr	2013
23E	N/A	H-D2782	DeEthanizer II HMO Heater	119.20 mmbtu/hr	2017
14E	N/A	H-D1741	DeEthanizer I Regen Heater	14.25 mmbtu/hr	2013
24E	N/A	H-D2741	DeEthanizer II Regen Heater	14.25 mmbtu/hr	2017
	N/A	FL-1991	Flare DeEth, MIV, MVI, MVII	3.70 mmscf/hr	2013
15E	N/A	H-5741	Heater M V Regen Heater	7.69 mmbtu/hr	2013
16E	N/A	H-6741	Heater M VI Regen Heater	7.69 mmbtu/hr	2015
17E	N/A	H-7741	Heater M VII Regen Heater	7.69 mmbtu/hr	2018
18E	N/A	H-4781	Heater M IV HMO Heater	16.07 mmbtu/hr	2014
19E	N/A	H-7781	Heater M VII HMO Heater	16.07 mmbtu/hr	2018
20E	N/A	H-4782	Stabilization Heater	10.65 mmbtu/hr	2014
21E	N/A	M1-G-1	Majorsville 1 & 2 Emergency Gen	254 hp	2010
22E	N/A	M3-G-2	Majorsville 3 Emergency Gen	145 hp	2013
25E	N/A	M3-G-3	Majorsville 3 MCC Emergency Gen	145 hp	2013
26E	N/A	M4-G-6	Majorsville 4 MCC Emergency Gen	145 hp	2014

27E	N/A	M4-G-7	Majorsville 4 Emergency Gen	145 hp	2014
29E	N/A	M7-G-9	Majorsville 7 MCC Emergency Gen	145 hp	2019
30E	N/A	MD1-G-4	DeEthanizer 1 Control Room Emergency Gen	53 hp	2013
31E	N/A	MD1-G-5	DeEthanizer 1 Emergency Gen	32 hp	2013
32E	N/A	MD2-G-10	DeEthanizer 2 Control Room Emergency Gen	53 hp	2017
33E	N/A	MD2-G-11	DeEthanizer 2 Emergency Gen	32 hp	2019
34E	N/A	MT-1	Plant 1 Methanol Tank	520 Gal	
35E	N/A	MT-2	Plant 2 Methanol Tank	520 Gal	
36E	N/A	MT-3	Plant 3 Methanol Tank	520 Gal	
37E	N/A	MT-4	Plant 4 Methanol Tank	520 Gal	
38E	N/A	MT-5	Plant 5 Methanol Tank	520 Gal	
39E	N/A	MT-6	Plant 6 Methanol Tank	520 Gal	
40E	N/A	MT-7	Plant 7 Methanol Tank	520 Gal	
41E	N/A	GT-1	Gasoline Dispensing Tank	520 Gal	
42E	N/A	DT-1	Diesel Dispensing Tank	520 Gal	
43E	N/A	TK-1740	Lube Oil Day Tank	520 Gal	
44E	N/A	UOT-1	Used Oil Tank	1,000 Gal	
45E	N/A	TK-7411	Lube Oil Tank	2,133 Gal	
46E	N/A	TK-7419	Amine Tank		
47E	N/A	TK-7421	Amine Tank		
48E	N/A	TK-4825	Compressor Drain Tank	2,326 Gal	
49E	N/A	TK-4826	Lube Oil Tank	2,133 Gal	
50E	N/A	TK-4824	Closed Drain Tank	4,200 Gal	
51E	N/A	TK-4725	Closed Drain Tank	4,200 Gal	

¹For 45CSR13 permitted sources, the numbering system used for the emission points, control devices, and emission units should be consistent with the numbering system used in the 45CSR13 permit. For grandfathered sources, the numbering system should be consistent with registrations or emissions inventory previously submitted to DAQ. For emission points, control devices, and emissions units which have not been previously labeled, use the following 45CSR13 numbering system: 1S, 2S, 3S,... or other appropriate description for emission units; 1C, 2C, 3C,... or other appropriate designation for control devices; 1E, 2E, 3E, ... or other appropriate designation for emission points.

Attachment E – Emission Unit Form

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: C-102	Emission unit name: Caterpillar G3608 LE Compressor Engine	List any control devices associated with this emission unit: Oxidation Catalyst
--	---	--

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
2,370 hp natural gas fired 4-stroke lean-burn compressor engine

Manufacturer: Caterpillar	Model number: G3608 LE	Serial number: BEN0644
-------------------------------------	----------------------------------	----------------------------------

Construction date: 01/28/2010	Installation date: 09/13/2010	Modification date(s): NA
---	---	------------------------------------

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 2,370 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
-----------------------------------	-----------------------------------	--

Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 15.71 mmbtu/hr 2,370 hp	Type and Btu/hr rating of burners: NA
--	---

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
13,978 scf/hr
122.44 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,124 btu/scf

<i>Emissions Data</i>		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.99	4.35
Nitrogen Oxides (NO _x)	2.61	11.44
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.16	0.69
Particulate Matter (PM ₁₀)	0.16	0.69
Total Particulate Matter (TSP)	0.16	0.69
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	1.67	7.32
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Acetaldehyde	0.13	0.58
Acrolein	0.08	0.35
Formaldehyde	0.42	1.83
Methanol	0.04	0.17
Total HAPs	0.72	3.17
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,080.83	9,114.03
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, VOC, HCHO: Engine and catalyst manufacturer specified emission factors (g/hp-hr) -PM_{2.5}, PM₁₀, TSP, SO₂, HAPs (excluding HCHO): AP-42 Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines -CO₂(e): 40 CFR 98 Table C-1. Default CO₂ Emission Factors and High Heat Values for Various Types of Fuel and Table C-2. Default CH₄ and N₂O Emission Factors for Various Types of Fuel</p>		
<i>Applicable Requirements</i>		

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Permit R13-2818H

5.1.1

5.1.2

5.1.3

5.2.1

5.4.1

8.3.1.b.2 (40 CFR 60.4233)

8.4

8.5.1.a

8.5.1.b

8.5.1.d

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.1	Engine operational time will be monitored.		Fuel usage will be maintained with operating hours and manufacturer fuel usage estimates.		
5.1.2		Testing will be conducted once every 8,760 hours of operation or once every three years whichever comes first.	Records of testing will be maintained in accordance with condition 3.4.1		40 CFR §60.4244, Condition 3.3.1, and Condition 3.4.1
5.1.3	Monitor inlet temperature to the catalyst. Annually inspect catalyst.		Records of all pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
5.2.1			Records of all pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
8.3.1.b.2			Keep a maintenance plan and records of conducted maintenance		
8.3.1.b.2		Testing will be conducted once every 8,760 hours of operation or	Records of testing will be maintained in accordance with condition 3.4.1	Records of engine testing will be submitted to the USEPA and WVDEP.	

		once every three years whichever comes first.			
8.4		Testing will be conducted as required per the methods described.		An engine test plan will be submitted prior to engine testing to assure the test is performed using proper protocols.	
8.5.1.a			Maintenance records will be kept and maintained.	Notifications will be sent as required.	
8.5.1.b		Stack testing in accordance with Section 3.3	Hours of operation will be kept on a monthly basis.	Reporting in accordance with Section 3.3	
8.5.1.d		NA		Reporting of engine test results will be submitted within 60 days after the test has been completed.	5.4

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:

C-103

Emission unit name:

Caterpillar G3608 LE
Compressor Engine

List any control devices associated with this emission unit: Oxidation Catalyst

Provide a description of the emission unit (type, method of operation, design parameters, etc.):

2,370 hp natural gas fired 4-stroke lean-burn compressor engine

Manufacturer:

Caterpillar

Model number:

G3608 LE

Serial number:

BEN0646

Construction date:

02/18/2010

Installation date:

09/13/2010

Modification date(s):

NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 2,370 hp

Maximum Hourly Throughput:

Maximum Annual Throughput:

Maximum Operating Schedule:
8,760 hrs/year

Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? Yes No

If yes, is it?

Indirect Fired Direct Fired

Maximum design heat input and/or maximum horsepower rating:

15.71 mmbtu/hr
2,370 hp

Type and Btu/hr rating of burners:

NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
13,978 scf/hr
122.44 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,124 btu/scf

<i>Emissions Data</i>		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.99	4.35
Nitrogen Oxides (NO _x)	2.61	11.44
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.16	0.69
Particulate Matter (PM ₁₀)	0.16	0.69
Total Particulate Matter (TSP)	0.16	0.69
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	1.67	7.32
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Acetaldehyde	0.13	0.58
Acrolein	0.08	0.35
Formaldehyde	0.42	1.83
Methanol	0.04	0.17
Total HAPs	0.72	3.17
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,083.83	9,114.03
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, VOC, HCHO: Engine and catalyst manufacturer specified emission factors (g/hp-hr) -PM_{2.5}, PM₁₀, TSP, SO₂, HAPs (excluding HCHO): AP-42 Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines -CO₂(e): 40 CFR 98 Table C-1. Default CO₂ Emission Factors and High Heat Values for Various Types of Fuel and Table C-2. Default CH₄ and N₂O Emission Factors for Various Types of Fuel</p>		
<i>Applicable Requirements</i>		

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.1

5.1.2

5.1.3

5.2.1

5.4.1

8.3.1.b.2 (40 CFR 60.4233)

8.4

8.5.1.a

8.5.1.b

8.5.1.d

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.1	Engine operational time will be monitored.		Fuel usage will be maintained with operating hours and manufacturer fuel usage estimates.		
5.1.2		Testing will be conducted once every 8,760 hours of operation or once every three years whichever comes first.	Records of testing will be maintained in accordance with condition 3.4.1		40 CFR §60.4244, Condition 3.3.1, and Condition 3.4.1
5.1.3	Monitor inlet temperature to the catalyst. Annually inspect catalyst.		Records of all pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
5.2.1			Records of all pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
8.3.1.b.2			Keep a maintenance plan and records of conducted maintenance		
8.3.1.b.2		Testing will be conducted once every 8,760 hours of operation or	Records of testing will be maintained in accordance with condition 3.4.1	Records of engine testing will be submitted to the USEPA and WVDEP.	

		once every three years whichever comes first.			
8.4		Testing will be conducted as required per the methods described.		An engine test plan will be submitted prior to engine testing to assure the test is performed using proper protocols.	
8.5.1.a			Maintenance records will be kept and maintained.	Notifications will be sent as required.	
8.5.1.b		Stack testing in accordance with Section 3.3	Hours of operation will be kept on a monthly basis.	Reporting in accordance with Section 3.3	
8.5.1.d		NA		Reporting of engine test results will be submitted within 60 days after the test has been completed.	5.4

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: C-104	Emission unit name: Caterpillar G3608 LE Compressor Engine	List any control devices associated with this emission unit: Oxidation Catalyst
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
2,370 hp natural gas fired 4-stroke lean-burn compressor engine

Manufacturer: Caterpillar	Model number: G3608 LE	Serial number: BEN0645
-------------------------------------	----------------------------------	----------------------------------

Construction date: 02/16/2010	Installation date: 09/13/2010	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 2,370 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 15.71 mmbtu/hr 2,370 hp	Type and Btu/hr rating of burners: NA
--	---

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
13,978 scf/hr
122.44 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,124 btu/scf

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Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.99	4.35
Nitrogen Oxides (NO _x)	2.61	11.44
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.16	0.69
Particulate Matter (PM ₁₀)	0.16	0.69
Total Particulate Matter (TSP)	0.16	0.69
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	1.67	7.32
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Acetaldehyde	0.13	0.58
Acrolein	0.08	0.35
Formaldehyde	0.42	1.83
Methanol	0.04	0.17
Total HAPs	0.72	3.17
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,083.83	9,114.03

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

-NO_x, CO, VOC, HCHO: Engine and catalyst manufacturer specified emission factors (g/hp-hr)
-PM_{2.5}, PM₁₀, TSP, SO₂, HAPs (excluding HCHO): AP-42 Table 3.2-2 Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines
-CO₂(e): 40 CFR 98 Table C-1. Default CO₂ Emission Factors and High Heat Values for Various Types of Fuel and Table C-2. Default CH₄ and N₂O Emission Factors for Various Types of Fuel

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or **construction permit** with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.1

5.1.2

5.1.3

5.2.1

5.4.1

8.3.1.b.2 (40 CFR 60.4233)

8.4

8.5.1.a

8.5.1.b

8.5.1.d

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.1	Engine operational time will be monitored.		Fuel usage will be maintained with operating hours and manufacturer fuel usage estimates.		
5.1.2		Testing will be conducted once every 8,760 hours of operation or once every three years whichever comes first.	Records of testing will be maintained in accordance with condition 3.4.1		40 CFR §60.4244, Condition 3.3.1, and Condition 3.4.1
5.1.3	Monitor inlet temperature to the catalyst. Annually inspect catalyst.		Records of all pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
5.2.1			Records of all pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
8.3.1.b.2			Keep a maintenance plan and records of conducted maintenance		

8.3.1.b.2		Testing will be conducted once every 8,760 hours of operation or once every three years whichever comes first.	Records of testing will be maintained in accordance with condition 3.4.1	Records of engine testing will be submitted to the USEPA and WVDEP.	
8.4		Testing will be conducted as required per the methods described.		An engine test plan will be submitted prior to engine testing to assure the test is performed using proper protocols.	
8.5.1.a			Maintenance records will be kept and maintained.	Notifications will be sent as required.	
8.5.1.b		Stack testing in accordance with Section 3.3	Hours of operation will be kept on a monthly basis.	Reporting in accordance with Section 3.3	
8.5.1.d		NA		Reporting of engine test results will be submitted within 60 days after the test has been completed.	5.4

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-741	Emission unit name: Heatec Regeneration Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
5.60 mmbtu/hr natural gas-fired regeneration heater

Manufacturer: Heatec	Model number:	Serial number:
Construction date: MM/DD/YYYY	Installation date: 2010	Modification date(s): NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 5.60 mmbtu/hr

Maximum Hourly Throughput: 5.60 mmbtu/hr	Maximum Annual Throughput: 49,056 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 5.60 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 5.60 mmbtu/hr
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
5,490.20 scf/hr
48.09 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.46	2.02
Nitrogen Oxides (NO _x)	0.30	1.32
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.04	0.18
Particulate Matter (PM ₁₀)	0.04	0.18
Total Particulate Matter (TSP)	0.04	0.18
Sulfur Dioxide (SO ₂)	0.00	0.01
Volatile Organic Compounds (VOC)	0.03	0.13
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.04
Total HAPs	0.01	0.05
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	720.74	3,156.82
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x emission factor from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-781	Emission unit name: Heatec Process Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
15.40 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Heatec	Model number:	Serial number:
Construction date: MM/DD/YYYY	Installation date: 2010	Modification date(s): NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 15.40 mmbtu/hr

Maximum Hourly Throughput: 15.40 mmbtu/hr	Maximum Annual Throughput: 134,904 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
Maximum design heat input and/or maximum horsepower rating: 15.40 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 15.40 mmbtu/hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
15,098.04 scf/hr
132.26 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.27	5.56
Nitrogen Oxides (NO _x)	1.34	5.85
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.11	0.50
Particulate Matter (PM ₁₀)	0.11	0.50
Total Particulate Matter (TSP)	0.11	0.50
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	0.08	0.36
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.03	0.12
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	1,982.02	8,681.26
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x emission factor from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-2741	Emission unit name: Heatec Process Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
5.60 mmbtu/hr natural gas-fired regeneration heater

Manufacturer: Heatec	Model number:	Serial number:
Construction date: MM/DD/YYYY	Installation date: 2011	Modification date(s): NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 5.60 mmbtu/hr

Maximum Hourly Throughput: 5.60 mmbtu/hr	Maximum Annual Throughput: 49,056 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
Maximum design heat input and/or maximum horsepower rating: 5.60 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 5.60 mmbtu/hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
5,490.20 scf/hr
48.09 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.46	2.02
Nitrogen Oxides (NO _x)	0.30	1.32
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.04	0.18
Particulate Matter (PM ₁₀)	0.04	0.18
Total Particulate Matter (TSP)	0.04	0.18
Sulfur Dioxide (SO ₂)	0.00	0.01
Volatile Organic Compounds (VOC)	0.03	0.13
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.04
Total HAPs	0.01	0.05
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	720.74	3,156.82
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x emission factor from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-3741	Emission unit name: Majorsville III Regeneration Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
7.69 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Heatec	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2013	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.69 mmbtu/hr

Maximum Hourly Throughput: 7.69 mmbtu/hr	Maximum Annual Throughput: 67,364.40 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 7.69 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 7.69 mmbtu/hr
---	--

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
7,539.22 scf/hr
66.04 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

<i>Emissions Data</i>		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.32	1.38
Nitrogen Oxides (NO _x)	0.41	1.80
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.06	0.25
Particulate Matter (PM ₁₀)	0.06	0.25
Total Particulate Matter (TSP)	0.06	0.25
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.18
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.06
Total HAPs	0.01	0.06
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	989.72	4,334.99
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier I Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-4741	Emission unit name: Majorsville IV Regeneration Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
7.69 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Heatec	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2013	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.69 mmbtu/hr

Maximum Hourly Throughput: 7.69 mmbtu/hr	Maximum Annual Throughput: 67,364.40 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 7.69 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 7.69 mmbtu/hr
---	--

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
7,539.22 scf/hr
66.04 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.32	1.38
Nitrogen Oxides (NO _x)	0.41	1.80
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.06	0.25
Particulate Matter (PM ₁₀)	0.06	0.25
Total Particulate Matter (TSP)	0.06	0.25
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.18
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.06
Total HAPs	0.01	0.06
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	989.72	4,334.99
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-3781	Emission unit name: Majorsville III HMO Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
16.07 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Heatec	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2013	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 16.07 mmbtu/hr

Maximum Hourly Throughput: 16.07 mmbtu/hr	Maximum Annual Throughput: 140,773.20 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 16.07 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 16.07 mmbtu/hr
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
15,755 scf/hr
138.01 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

<i>Emissions Data</i>		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.32	5.80
Nitrogen Oxides (NO _x)	1.61	7.04
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.12	0.52
Particulate Matter (PM ₁₀)	0.12	0.52
Total Particulate Matter (TSP)	0.12	0.52
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	0.09	0.38
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.12
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,068.25	9,058.95
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-D1782	Emission unit name: De-Ethanizer I HMO Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
119.20 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Optimized Process Furnaces	Model number:	Serial number:
Construction date: MM/DD/YYYY	Installation date: 2013	Modification date(s): NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 119.20 mmbtu/hr

Maximum Hourly Throughput: 119.20 mmbtu/hr	Maximum Annual Throughput: 1,044,192.00 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
Maximum design heat input and/or maximum horsepower rating: 119.20 mmbtu/hr	Type and Btu/hr rating of burners: Vertical cylindrical heater 8 burners @ 14.9 mmbtu/hr each

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
116,862.75 scf/hr
1,023.72 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	4.77	20.88
Nitrogen Oxides (NO _x)	3.58	15.66
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.89	3.89
Particulate Matter (PM ₁₀)	0.89	3.89
Total Particulate Matter (TSP)	0.89	3.89
Sulfur Dioxide (SO ₂)	0.07	0.31
Volatile Organic Compounds (VOC)	0.64	2.82
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.01	0.04
n-Hexane	0.21	0.92
Total HAPs	0.22	0.97
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	15,341.37	67,195.21
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-D2782	Emission unit name: De-Ethanizer II HMO Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
119.20 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Optimized Process Furnaces	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2013	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 119.20 mmbtu/hr

Maximum Hourly Throughput: 119.20 mmbtu/hr	Maximum Annual Throughput: 1,044,192.00 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 119.20 mmbtu/hr	Type and Btu/hr rating of burners: Vertical cylindrical heater 8 burners @ 14.9 mmbtu/hr each
---	--

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
116,862.75 scf/hr
1,023.72 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	4.77	20.88
Nitrogen Oxides (NO _x)	3.58	15.66
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.89	3.89
Particulate Matter (PM ₁₀)	0.89	3.89
Total Particulate Matter (TSP)	0.89	3.89
Sulfur Dioxide (SO ₂)	0.07	0.31
Volatile Organic Compounds (VOC)	0.64	2.82
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.01	0.04
n-Hexane	0.21	0.92
Total HAPs	0.22	0.97
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	15,341.37	67,195.21
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:

H-D1741

Emission unit name:

De-Ethanizer I Regen Heater

List any control devices associated with this emission unit: NA

Provide a description of the emission unit (type, method of operation, design parameters, etc.):

14.25 mmbtu/hr natural gas-fired regeneration heater

Manufacturer:

Tulsa Heaters Inc.

Model number:

Serial number:

Construction date:

MM/DD/YYYY

Installation date:

2013

Modification date(s):

NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 14.25 mmbtu/hr

Maximum Hourly Throughput:

14.25 mmbtu/hr

Maximum Annual Throughput:

124,830 mmbtu/yr

Maximum Operating Schedule:

8,760 hrs/year

Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? Yes No

If yes, is it?

Indirect Fired Direct Fired

Maximum design heat input and/or maximum horsepower rating:

14.25 mmbtu/hr

Type and Btu/hr rating of burners:

Helical Coil
3 burners @ 4.75 mmbtu/hr each

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
13,970.59 scf/hr
122.38 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.58	2.56
Nitrogen Oxides (NO _x)	0.57	2.50
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.19	0.81
Particulate Matter (PM ₁₀)	0.19	0.81
Total Particulate Matter (TSP)	0.19	0.81
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	0.27	1.19
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.03	0.11
Total HAPs	0.03	0.12
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	1,834.02	8,032.98
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM Total, and VOC emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-D2741	Emission unit name: De-Ethanizer II Regen Heater	List any control devices associated with this emission unit: NA
--	--	--

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
14.25 mmbtu/hr natural gas-fired regeneration heater

Manufacturer: Tulsa Heaters Inc.	Model number:	Serial number:
--	----------------------	-----------------------

Construction date: MM/DD/YYYY	Installation date: 2013	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 14.25 mmbtu/hr

Maximum Hourly Throughput: 14.25 mmbtu/hr	Maximum Annual Throughput: 124,830 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 14.25 mmbtu/hr	Type and Btu/hr rating of burners: Helical Coil 3 burners @ 4.75 mmbtu/hr each
--	---

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
13,970.59 scf/hr
122.38 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.58	2.56
Nitrogen Oxides (NO _x)	0.57	2.50
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.19	0.81
Particulate Matter (PM ₁₀)	0.19	0.81
Total Particulate Matter (TSP)	0.19	0.81
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	0.27	1.19
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.03	0.11
Total HAPs	0.03	0.12
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	1,834.02	8,032.98
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM Total, and VOC emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-5741	Emission unit name: Majorsville V Regen Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
7.69 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Heatec	Model number:	Serial number:
Construction date: MM/DD/YYYY	Installation date: 2013	Modification date(s): NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.69 mmbtu/hr

Maximum Hourly Throughput: 7.69 mmbtu/hr	Maximum Annual Throughput: 67,364.40 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
Maximum design heat input and/or maximum horsepower rating: 7.69 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 7.69 mmbtu/hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
7,539.22 scf/hr
66.04 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.32	1.38
Nitrogen Oxides (NO _x)	0.41	1.80
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.06	0.25
Particulate Matter (PM ₁₀)	0.06	0.25
Total Particulate Matter (TSP)	0.06	0.25
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.18
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.06
Total HAPs	0.01	0.06
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	989.72	4,334.99
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-6741	Emission unit name: Majorsville VI Regen Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
7.69 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Heatec	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: TBD	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.69 mmbtu/hr

Maximum Hourly Throughput: 7.69 mmbtu/hr	Maximum Annual Throughput: 67,364.40 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 7.69 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 7.69 mmbtu/hr
---	--

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
7,539.22 scf/hr
66.04 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.32	1.38
Nitrogen Oxides (NO _x)	0.41	1.80
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.06	0.25
Particulate Matter (PM ₁₀)	0.06	0.25
Total Particulate Matter (TSP)	0.06	0.25
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.18
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.06
Total HAPs	0.01	0.06
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	989.72	4,334.99
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-7741	Emission unit name: Majorsville VII Regen Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
7.69 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Heatec	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: TBD	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.69 mmbtu/hr

Maximum Hourly Throughput: 7.69 mmbtu/hr	Maximum Annual Throughput: 67,364.40 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 7.69 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 7.69 mmbtu/hr
---	--

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
7,539.22 scf/hr
66.04 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.32	1.38
Nitrogen Oxides (NO _x)	0.41	1.80
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.06	0.25
Particulate Matter (PM ₁₀)	0.06	0.25
Total Particulate Matter (TSP)	0.06	0.25
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.18
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.06
Total HAPs	0.01	0.06
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	989.72	4,334.99
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:

H-4781

Emission unit name:

Majorsville IV HMO Heater

List any control devices associated with this emission unit: NA

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
16.07 mmbtu/hr natural gas-fired hot oil heater

Manufacturer:

Heatec

Model number:

Serial number:

Construction date:

MM/DD/YYYY

Installation date:

2014

Modification date(s):

NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 16.07 mmbtu/hr

Maximum Hourly Throughput:

16.07 mmbtu/hr

Maximum Annual Throughput:

140,773.20 mmbtu/yr

Maximum Operating Schedule:

8,760 hrs/year

Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? Yes No

If yes, is it?

Indirect Fired Direct Fired

Maximum design heat input and/or maximum horsepower rating:

16.07 mmbtu/hr

Type and Btu/hr rating of burners:

Helical coil
16.07 mmbtu/hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
15,755 scf/hr
138.01 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

<i>Emissions Data</i>		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.32	5.80
Nitrogen Oxides (NO _x)	1.61	7.04
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.12	0.52
Particulate Matter (PM ₁₀)	0.12	0.52
Total Particulate Matter (TSP)	0.12	0.52
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	0.09	0.38
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.12
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,068.25	9,058.95
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-7781	Emission unit name: Majorsville VII HMO Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
16.07 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Heatec	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: TBD	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 16.07 mmbtu/hr

Maximum Hourly Throughput: 16.07 mmbtu/hr	Maximum Annual Throughput: 140,773.20 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating: 16.07 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 16.07 mmbtu/hr
--	---

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
15,755 scf/hr
138.01 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.32	5.80
Nitrogen Oxides (NO _x)	1.61	7.04
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.12	0.52
Particulate Matter (PM ₁₀)	0.12	0.52
Total Particulate Matter (TSP)	0.12	0.52
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	0.09	0.38
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.12
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,068.25	9,058.95
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: H-4782	Emission unit name: Stabilization Heater	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
10.65 mmbtu/hr natural gas-fired stabilization heater

Manufacturer: Heatec	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: TBD	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 10.65 mmbtu/hr

Maximum Hourly Throughput: 10.65 mmbtu/hr	Maximum Annual Throughput: 93,315.37 mmbtu/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 10.65 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 10.65 mmbtu/hr
--	---

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Natural Gas
10,443.57 scf/hr
91.49 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.88	3.84
Nitrogen Oxides (NO _x)	0.63	2.74
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.08	0.35
Particulate Matter (PM ₁₀)	0.08	0.35
Total Particulate Matter (TSP)	0.08	0.35
Sulfur Dioxide (SO ₂)	0.01	0.03
Volatile Organic Compounds (VOC)	0.06	0.25
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.003
n-Hexane	0.02	0.08
Total HAPs	0.02	0.09
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	1,370.69	6,003.60
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x and CO emission factors from vendor guarantee -All other criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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6.1.1

6.1.2

6.1.3 [45CSR§2-3.1]

6.2.1 [40 CFR 60 Appendix A, Method 9]

6.2.2

6.3 [45CSR§2-3.2]

6.4 [40 CFR 60 Appendix A]

6.5

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
6.1.1			Maximum heater rating will be maintained.		
6.1.2			Records sufficient to demonstrate compliance with the emission limits will be maintained.		
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		45CSR§2-3.1
6.2.1	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		40 CFR 60 Appendix A, Method 9
6.2.2	Operating hours will be maintained.		Records showing operating hours and calculated fuel usage will be maintained.		40 CFR §60.48(g)(2) 45 CSR §2A-7.1.a.1
6.3	When required Method 9 monitoring will be performed.		Records of each monitoring event will be maintained.		45CSR§2-3.2
6.4			Records of all data required by Section 6.2.1 will be maintained.		
6.5				Report deviations to the Director within 10 calendar days of the occurrence	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: FL-991	Emission unit name: Process Flare – MI, II, III, V	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.)
 Combustion of vapors sent to flare.

Manufacturer: Callidus	Model number:	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2010	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput: 3,317 scf/hr	Maximum Annual Throughput: 29.05 mmscf/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating:	Type and Btu/hr rating of burners: 6 pilots @ 85,000 btu/hr
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
 Natural Gas (Pilot)
 500 scf/hr
 4.38 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.35	5.92
Nitrogen Oxides (NO _x)	0.34	1.48
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.00	0.02
Particulate Matter (PM ₁₀)	0.00	0.02
Total Particulate Matter (TSP)	0.00	0.02
Sulfur Dioxide (SO ₂)	0.00	0.00
Volatile Organic Compounds (VOC)	0.70	3.06
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.01	0.06
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	606.87	2658
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-Criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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7.1.1 [40 CFR§60.5400(a), 40 CFR§60.482-10a, 40 CFR§60.5409(a)]

7.1.2 a [40 CFR Appendix A, Method 22]

7.1.2 b

7.1.2 c

7.1.2 d

7.1.2 e

7.1.3 [40 CFR Appendix A]

7.1.4

7.1.5 [45CSR§6-4.3] [40 CFR 60 Appendix A, Method 22]

7.1.6 [45CSR§6-4.4]

7.1.7 [45CSR§6-4.6]

7.1.8 [45CSR§6-4.1]

7.1.9

7.1.10

7.1.11

7.2.1

7.2.2

7.3.1

7.3.2

7.4.1

7.4.2

7.4.6

7.5.1

7.5.2

7.5.3

7.5.4

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
7.1.1	Monitoring of components to the flare will be done in accordance with NSPS Subpart OOOO.				40 CFR §60.5400(a) 40 CFR §60.482.10(a) 40 CFR §60.5409(a)
7.1.2 a			Records of flare construction will be kept.		
7.1.2 b		EPA Method 22 within one year of permit issuance or initial startup whichever is later	Records of EPA Method 22 testing		7.3.1, 7.4.4, 40 CFR 60 Appendix A Method 22

7.1.2 c	Monitor presence of a flame with a thermocouple except during SSM events		Records of times and duration of all periods which the pilot flame was absent		7.2.1, 7.4.1
7.1.2 d			Records of net heating value calculations will be maintained		7.1.2 d
7.1.2 e			Records of parameters for exit velocity calculations will be maintained.		7.1.2 e
7.1.3	NA	Testing as requested by the Director.	Records of flare design evaluation and flare compliance assessment. Records of any testing	Compliance assessment as requested by the Director.	7.3.2, 7.4.2, 40 CFR 60 Appendix A Test Methods 2, 2A, 2C, or 2D. Also Method 4/18.
7.1.4	Monitor total volumes sent to flare.		Record gas volumes sent to flare and maintain calculations.		
7.1.5		EPA Method 22	Records of EPA Method 22 testing		45CSR§6-4.3, 40 CFR 60 Appendix A Method 22
7.1.6	Monitor percent opacity during start-up				45CSR§6-4.4
7.1.7				If malodors are present it will be reported.	45CSR§6-4.6
7.1.8			Records of PM emission calculations		45CSR§6-4.1
7.1.9			Records of flare pilot light design will be maintained.		
7.1.10			Records of gas throughput shall be maintained. Flare F-991 shall not exceed 29.05 mmscf/yr and F-1991 shall not exceed 55.51 mscmf/yr		7.1.10 – this condition in permit H lists the wrong values. The correct values to match the emissions in Section 7.1.4 are listed here in the recordkeeping column.
7.1.11			Affirmative defense		2.1.2
7.2.1	Presence of flare pilot flame will be monitored				7.2.1
7.2.2	Throughput of wet natural gas fed to the flare		Records of wet natural gas throughput fed to the flare on a monthly basis. Maintain records for 5 years.		7.4.3, 7.4.6
7.3.1	Method 22 opacity test will be performed.		Records of all opacity test will be maintained for 5 years.		7.3.1
7.3.2	Test will be performed as requested by Director.		Records of all flare testing will be maintained for 5 years.		7.3.2
7.4.1			Records will kept for any time the pilot flame was absent		7.4.1

7.4.2			Records of flare design will be maintained.		7.4.2
7.4.6			Monthly flare throughput shall be maintained.		7.4.6
7.5.1	NA	NA	NA	If compliance demonstration with 7.1.1 is required, submit testing protocol 30 days prior to testing. Submit notification 15 days prior to testing. Submit testing results and all supporting calculations and testing data within 60 days of testing.	7.5.1
7.5.2	NA	NA	NA	Report deviations from allowable visible emission requirements discovered using Method 9 or Method 22 within 10 days.	7.5.2
7.5.3	NA	NA	NA	Report deviations from the flare design and operation criteria in writing within 10 days of discovery of such deviation	7.5.3
7.5.4	NA	NA	NA	Report to the Director the time, cause of event, estimate of emissions and corrective actions taken when the flare was used for an emergency	7.5.4

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: F-1991	Emission unit name: Process Flare – MIV, VI, VII, DeEth I, DeEth II	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Combustion of vapors sent to flare.

Manufacturer: Callidus	Model number:	Serial number:
Construction date: MM/DD/YYYY	Installation date: 2013	Modification date(s): NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput: 6,337 scf/hr	Maximum Annual Throughput: 55.51 mmscf/yr	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
Maximum design heat input and/or maximum horsepower rating:	Type and Btu/hr rating of burners: 5 pilots @ 85,000 btu/hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas (Pilot)
417 scf/hr
3.65 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	2.77	12.15
Nitrogen Oxides (NO _x)	0.64	2.81
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.00	0.01
Particulate Matter (PM ₁₀)	0.00	0.01
Total Particulate Matter (TSP)	0.00	0.01
Sulfur Dioxide (SO ₂)	0.00	0.00
Volatile Organic Compounds (VOC)	1.41	6.16
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.03	0.11
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	1,152	5,045
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-Criteria pollutants and HAP emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1, 1.4-2, & 1.4-3 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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7.1.1 [40 CFR§60.5400(a), 40 CFR§60.482-10a, 40 CFR§60.5409(a)]

7.1.2 a [40 CFR Appendix A, Method 22]

7.1.2 b

7.1.2 c

7.1.2 d

7.1.2 e

7.1.3 [40 CFR Appendix A]

7.1.4

7.1.5 [45CSR§6-4.3] [40 CFR 60 Appendix A, Method 22]

7.1.6 [45CSR§6-4.4]

7.1.7 [45CSR§6-4.6]

7.1.8 [45CSR§6-4.1]

7.1.9

7.1.10

7.1.11

7.2.1

7.2.2

7.3.1

7.3.2

7.4.1

7.4.2

7.4.6

7.5.1

7.5.2

7.5.3

7.5.4

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
7.1.1	Monitoring of components to the flare will be done in accordance with NSPS Subpart OOOO.				40 CFR §60.5400(a) 40 CFR §60.482.10(a) 40 CFR §60.5409(a)
7.1.2 a			Records of flare construction will be kept.		
7.1.2 b		EPA Method 22 within one year of permit issuance or initial startup whichever is later	Records of EPA Method 22 testing		7.3.1, 7.4.4, 40 CFR 60 Appendix A Method 22

7.1.2 c	Monitor presence of a flame with a thermocouple except during SSM events		Records of times and duration of all periods which the pilot flame was absent		7.2.1, 7.4.1
7.1.2 d			Records of net heating value calculations will be maintained		7.1.2 d
7.1.2 e			Records of parameters for exit velocity calculations will be maintained.		7.1.2 e
7.1.3	NA	Testing as requested by the Director.	Records of flare design evaluation and flare compliance assessment. Records of any testing	Compliance assessment as requested by the Director.	7.3.2, 7.4.2, 40 CFR 60 Appendix A Test Methods 2, 2A, 2C, or 2D. Also Method 4/18.
7.1.4	Monitor total volumes sent to flare.		Record gas volumes sent to flare and maintain calculations.		
7.1.5		EPA Method 22	Records of EPA Method 22 testing		45CSR§6-4.3, 40 CFR 60 Appendix A Method 22
7.1.6	Monitor percent opacity during start-up				45CSR§6-4.4
7.1.7				If malodors are present it will be reported.	45CSR§6-4.6
7.1.8			Records of PM emission calculations		45CSR§6-4.1
7.1.9			Records of flare pilot light design will be maintained.		
7.1.10			Records of gas throughput shall be maintained. Flare F-991 shall not exceed 29.05 mmscf/yr and F-1991 shall not exceed 55.51 mscf/yr		7.1.10 – this condition in permit H lists the wrong values. The correct values to match the emissions in Section 7.1.4 are listed here in the recordkeeping column.
7.1.11			Affirmative defense		2.1.2
7.2.1	Presence of flare pilot flame will be monitored				7.2.1
7.2.2	Throughput of wet natural gas fed to the flare		Records of wet natural gas throughput fed to the flare on a monthly basis. Maintain records for 5 years.		7.4.3, 7.4.6
7.3.1	Method 22 opacity test will be performed.		Records of all opacity test will be maintained for 5 years.		7.3.1
7.3.2	Test will be performed as requested by Director.		Records of all flare testing will be maintained for 5 years.		7.3.2
7.4.1			Records will kept for any time the pilot flame was absent		7.4.1

7.4.2			Records of flare design will be maintained.		7.4.2
7.4.6			Monthly flare throughput shall be maintained.		7.4.6
7.5.1	NA	NA	NA	If compliance demonstration with 7.1.1 is required, submit testing protocol 30 days prior to testing. Submit notification 15 days prior to testing. Submit testing results and all supporting calculations and testing data within 60 days of testing.	7.5.1
7.5.2	NA	NA	NA	Report deviations from allowable visible emission requirements discovered using Method 9 or Method 22 within 10 days.	7.5.2
7.5.3	NA	NA	NA	Report deviations from the flare design and operation criteria in writing within 10 days of discovery of such deviation	7.5.3
7.5.4	NA	NA	NA	Report to the Director the time, cause of event, estimate of emissions and corrective actions taken when the flare was used for an emergency	7.5.4

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: M1-G-1	Emission unit name: Majorsville I and II Emergency Generator	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Emergency Generator for Majorsville Plants I and II.

Manufacturer: Generac	Model number: QT13068KNAC	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2014	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 254 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating: 254 hp	Type and Btu/hr rating of burners:
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
2,061 scf/hr
1.03 mmscf/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	0%	0%	1,020 btu/scf

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.68	0.42
Nitrogen Oxides (NO _x)	1.12	0.28
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.02	0.01
Particulate Matter (PM ₁₀)	0.02	0.01
Total Particulate Matter (TSP)	0.02	0.01
Sulfur Dioxide (SO ₂)	0.00	0.00
Volatile Organic Compounds (VOC)	0.56	0.14
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.04	0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	245.97	61.49
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, and VOC from Manufacturers Specifications - SO₂, PM and HAP emission factors from AP-42 Section 3.2 "Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines" Table 3.2-2 -GHG: 40 CFR 98, Subpart C Tier I Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.5

5.1.8

5.4.1

8.3.1.b.1 (40 CFR 60.4233(d))

8.5.1.a

8.5.1.b

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.5			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
8.3.1.b.1			Maintenance plan and records will be maintained.		
8.5.1.a			Maintenance records will be kept and maintained.	Notifications will be sent as required.	
8.5.1.b		Stack testing in accordance with Section 3.3	Hours of operation will be kept on a monthly basis.	Reporting in accordance with Section 3.3	

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: M3-G-2	Emission unit name: Majorsville III Emergency Generator	List any control devices associated with this emission unit: NA	
Provide a description of the emission unit (type, method of operation, design parameters, etc.): Emergency Generator for Majorsville Plant III.			
Manufacturer: Cummins	Model number: 60 DSF AD	Serial number:	
Construction date: MM/DD/YYYY	Installation date: 2014	Modification date(s): NA	
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 145 hp			
Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year	
<i>Fuel Usage Data (fill out all applicable fields)</i>			
Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired	
Maximum design heat input and/or maximum horsepower rating: 145 hp		Type and Btu/hr rating of burners:	
List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each. Diesel 28 gal/hr 14,000 gal/yr			
Describe each fuel expected to be used during the term of the permit.			
Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.18	0.04
Nitrogen Oxides (NO _x)	0.70	0.18
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.23	0.06
Particulate Matter (PM ₁₀)	0.23	0.06
Total Particulate Matter (TSP)	0.23	0.06
Sulfur Dioxide (SO ₂)	0.58	0.14
Volatile Organic Compounds (VOC)	0.02	0.00
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.01	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	629.31	157.33
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (*Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.*)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60 .4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: M3-G-3	Emission unit name: Majorsville III MCC Emergency Generator	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
 Emergency Generator for Majorsville MCC at Plant III.

Manufacturer: Cummins	Model number: 60 DSF AD	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2014	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 145 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating: 145 hp	Type and Btu/hr rating of burners:
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
 Diesel
 28 gal/hr
 14,000 gal/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.18	0.04
Nitrogen Oxides (NO _x)	0.70	0.18
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.23	0.06
Particulate Matter (PM ₁₀)	0.23	0.06
Total Particulate Matter (TSP)	0.23	0.06
Sulfur Dioxide (SO ₂)	0.58	0.14
Volatile Organic Compounds (VOC)	0.02	0.00
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.01	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	629.31	157.33
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or **construction permit** with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (*Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.*)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60.4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: M4-G-6	Emission unit name: Majorsville IV MCC Emergency Generator	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Emergency Generator for Majorsville MCC at Plant IV.

Manufacturer: Cummins	Model number: 60 DSF AD	Serial number:
Construction date: MM/DD/YYYY	Installation date: 2014	Modification date(s): NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 145 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
Maximum design heat input and/or maximum horsepower rating: 145 hp	Type and Btu/hr rating of burners:

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Diesel
28 gal/hr
14,000 gal/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.18	0.04
Nitrogen Oxides (NO _x)	0.70	0.18
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.23	0.06
Particulate Matter (PM ₁₀)	0.23	0.06
Total Particulate Matter (TSP)	0.23	0.06
Sulfur Dioxide (SO ₂)	0.58	0.14
Volatile Organic Compounds (VOC)	0.02	0.00
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.01	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	629.31	157.33
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60 .4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: M4-G-7	Emission unit name: Majorsville IV Emergency Generator	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Emergency Generator for Majorsville Plant IV

Manufacturer: Cummins	Model number: 60 DSF AD	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2014	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 145 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
--	---

Maximum design heat input and/or maximum horsepower rating: 145 hp	Type and Btu/hr rating of burners:
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Diesel
28 gal/hr
14,000 gal/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.18	0.04
Nitrogen Oxides (NO _x)	0.70	0.18
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.23	0.06
Particulate Matter (PM ₁₀)	0.23	0.06
Total Particulate Matter (TSP)	0.23	0.06
Sulfur Dioxide (SO ₂)	0.58	0.14
Volatile Organic Compounds (VOC)	0.02	0.00
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.01	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	629.31	157.33
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or **construction permit** with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (*Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.*)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60.4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: M7-G-9	Emission unit name: Majorsville VII MCC Emergency Generator	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Emergency Generator for Majorsville MCC at Plant VII.

Manufacturer: Cummins	Model number: C35 D6	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2019	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 145 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating: 69 hp	Type and Btu/hr rating of burners:
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
 Diesel
 3.2 gal/hr
 1,600 gal/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.23	0.06
Nitrogen Oxides (NO _x)	0.40	0.10
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.03	0.01
Particulate Matter (PM ₁₀)	0.03	0.01
Total Particulate Matter (TSP)	0.03	0.01
Sulfur Dioxide (SO ₂)	0.14	0.04
Volatile Organic Compounds (VOC)	0.15	0.04
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.00	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	69.64	17.41
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60.4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: MD1 – G-4	Emission unit name: DeEthanizer I Control Room Emergency Generator	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Emergency Generator for the control room for DeEthanizer I.

Manufacturer: Generac	Model number: MMG45	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2014	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 53 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating: 53 hp	Type and Btu/hr rating of burners:
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Diesel
3.0 gal/hr
1,500 gal/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.43	0.11
Nitrogen Oxides (NO _x)	0.41	0.10
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.00	0.00
Particulate Matter (PM ₁₀)	0.00	0.00
Total Particulate Matter (TSP)	0.00	0.00
Sulfur Dioxide (SO ₂)	0.11	0.03
Volatile Organic Compounds (VOC)	0.41	0.10
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.00	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	67.43	16.86
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60 .4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: MD1-G-5	Emission unit name: DeEthanizer I Emergency Generator	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Emergency Generator for DeEthanizer I.

Manufacturer: Generac	Model number: MMG25	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2014	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 53 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating: 32 hp	Type and Btu/hr rating of burners:
---	---

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Diesel
1.8 gal/hr
900 gal/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.29	0.07
Nitrogen Oxides (NO _x)	0.25	0.06
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.00	0.00
Particulate Matter (PM ₁₀)	0.00	0.00
Total Particulate Matter (TSP)	0.00	0.00
Sulfur Dioxide (SO ₂)	0.07	0.02
Volatile Organic Compounds (VOC)	0.25	0.06
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.00	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	40.46	10.11
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60 .4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: MD2-G-10	Emission unit name: DeEthanizer II Control Room Emergency Generator	List any control devices associated with this emission unit: NA
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
 Emergency Generator for the control room for DeEthanizer II.

Manufacturer: Cummins	Model number: C15D6	Serial number:
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Construction date: MM/DD/YYYY	Installation date: 2017	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 53 hp

Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired
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Maximum design heat input and/or maximum horsepower rating: 53 hp	Type and Btu/hr rating of burners:
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List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
 Diesel

 1.4 gal/hr
 700 gal/yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.02	0.00
Nitrogen Oxides (NO _x)	0.20	0.05
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.01	0.00
Particulate Matter (PM ₁₀)	0.01	0.00
Total Particulate Matter (TSP)	0.01	0.00
Sulfur Dioxide (SO ₂)	0.05	0.00
Volatile Organic Compounds (VOC)	0.01	0.00
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.00	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	31.48	7.87
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60 .4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: MD2-G-11	Emission unit name: DeEthanizer II Emergency Generator	List any control devices associated with this emission unit: NA	
Provide a description of the emission unit (type, method of operation, design parameters, etc.): Emergency Generator for DeEthanizer II.			
Manufacturer: Generac	Model number: MMG25	Serial number:	
Construction date: MM/DD/YYYY	Installation date: 2017	Modification date(s): NA	
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 53 hp			
Maximum Hourly Throughput:	Maximum Annual Throughput:	Maximum Operating Schedule: 8,760 hrs/year	
<i>Fuel Usage Data (fill out all applicable fields)</i>			
Does this emission unit combust fuel? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		If yes, is it? <input type="checkbox"/> Indirect Fired <input checked="" type="checkbox"/> Direct Fired	
Maximum design heat input and/or maximum horsepower rating: 32 hp		Type and Btu/hr rating of burners:	
List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each. Diesel 1.8 gal/hr 900 gal/yr			
Describe each fuel expected to be used during the term of the permit.			
Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	15 ppm		137,380 btu/gal

<i>Emissions Data</i>		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.29	0.07
Nitrogen Oxides (NO _x)	0.25	0.06
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.00	0.00
Particulate Matter (PM ₁₀)	0.00	0.00
Total Particulate Matter (TSP)	0.00	0.00
Sulfur Dioxide (SO ₂)	0.07	0.02
Volatile Organic Compounds (VOC)	0.25	0.06
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.00	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	40.46	10.11
<p>List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).</p> <p>-NO_x, CO, PM, SO₂ and VOC from Manufacturers Specifications -HAP emission factors from AP-42 Section 3.2 "Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines" Table 3.3-2 -GHG: 40 CFR 98, Subpart C Tier 1 Methodology</p>		

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

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5.1.4

5.1.8

9.1.1 40 CFR 60.4205d

9.1.2 40 CFR 60.4206

9.1.3 40 CFR 60.4207b

9.1.9 40 CFR 60.4211f

9.2.1 WV Code 22-5-4(a)(15)

9.2.2

9.3.1

9.3.2

9.3.3

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (*Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.*)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
5.1.4			Emission limitations will be kept and maintained.		
5.1.8	Engine operation hours will be monitored.	operation or once every three years whichever comes first.	Records of engine operation hours will be maintained.		
5.4.1			Record type of fuel used and calculation of fuel consumed.		
9.1.1			Records will be kept of manufacturer certification to meet emission requirements.		40 CFR 60.4205d
9.1.2			Maintenance records will be kept.		40 CFR 60.4206
9.1.3			Records of fuel receipts showing compliance will be kept.		40 CFR 60.4207b
9.1.9			Records of hourly usage will be kept for both emergency and non-emergency usage.		40 CFR 60.4211f
9.2.1		Testing will be performed as requested by the Administrator.			WV Code 22-5-4(a)(15)

9.2.2				Reports of test protocols will be submitted 30 days prior and the WVDEP shall be notified 15 days prior to testing.	
9.3.1	Monitoring will be conducted as described when required		Records of all monitoring data will be kept.		
9.3.2			Maintenance records of the engines will be maintained.		
9.3.3				If compliance testing is required reports will be submitted describing the methods and results of such testing.	
<p>Are you in compliance with all applicable requirements for this emission unit? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If no, complete the Schedule of Compliance Form as ATTACHMENT F.</p>					

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:
FUG-001

Emission unit name:
Fugitive Leaks

List any control devices associated with this emission unit: NA

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Fugitive Leaks from valves, connectors, flanges, pump seals and other equipment throughout the facility. All leaks will be monitored and reported under NSPS Subpart OOOO

Manufacturer: Various

Model number:

Serial number:

Construction date:
MM/DD/YYYY

Installation date:
2010-2017

Modification date(s):
2017

Design Capacity (examples: furnaces - tons/hr, tanks - gallons):
N/A

Maximum Hourly Throughput:

Maximum Annual Throughput:

Maximum Operating Schedule:
8,760 hrs/year

Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? ___Yes ___X_ No

If yes, is it?

___ Indirect Fired ___ Direct Fired

Maximum design heat input and/or maximum horsepower rating:

Type and Btu/hr rating of burners:

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.00	0.00
Nitrogen Oxides (NO _x)	0.00	0.00
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.00	0.00
Particulate Matter (PM ₁₀)	0.00	0.00
Total Particulate Matter (TSP)	0.00	0.00
Sulfur Dioxide (SO ₂)	0.00	0.00
Volatile Organic Compounds (VOC)	8.76	38.38
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	.07	0.29
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO2(e)	126.35	553.4

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

Table 2-4: Oil & Gas Production Operations Average Emission Factors, Protocol for Equipment Leak Emission Estimates, EPA 453/R-95-017, November 1995. Emission factors based on average measured TOC from component types indicated in gas service at O&G Production Operations. A control factor is applied to the leak rates of valves in gas and light liquid service as well as pumps in light liquid service to account for LDAR program as per NSPS OOOO

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (Note: Title V permit condition numbers alone are not the underlying applicable requirements). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Permit R13-2818H – All fugitive leaks will meet NSPS Subpart OOOO requirements.

11.1.1 40 CFR 60.5390 & 5390a

13.1.3 40 CFR 60.5400

13.3.1 40 CFR 60.5415

13.4.1 40 CFR 60.5401(b)(1)

13.4.3 40 CFR 60.5422

14.1.4 40 CFR 60.5400a

14.3.1 40 CFR 60.5415a

14.4.1 40 CFR 60.5401(b)(1)a

14.4.2 40 CFR 60.5422a

Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Section	Monitoring	Testing	Recordkeeping	Reporting	Condition or Citation
11.1.1			Records of pneumatics will be kept showing the bleed rate of 0.		40 CFR 60.5390 40 CFR 60.5390a
13.1.3	Monitoring of components will be performed to meet the equipment leak standards.				40 CFR 60.5400
13.3.1	Monitoring will be performed per the requirements of the permit and NSPS Subpart OOOO.				40 CFR 60.5415
13.4.1			Records of leaks and delay of repair will be kept for at least 2 years.		40 CFR 60.5421
13.4.3				Semi-annual reports will be provided to the USEPA and WVDEP detailing leak rates and DORs.	40 CFR 60.5422
14.1.4	Monitoring of components will be performed to meet the equipment leak standards.				40 CFR 60.5400a
14.3.1	Monitoring will be performed per the requirements of the permit and NSPS Subpart OOOO.				40 CFR 60.5415a

14.4.1			Records of leaks and delay of repair will be kept for at least 2 years.		40 CFR 60.5421a
14.4.2				Semi-annual reports will be provided to the USEPA and WVDEP detailing leak rates and DORs.	40 CFR 60.5422

Are you in compliance with all applicable requirements for this emission unit? Yes No

If no, complete the Schedule of Compliance Form as ATTACHMENT F.

Attachment G – Air Pollution Control Device Form

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: Oxid. Cat.	List all emission units associated with this control device. C-102
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Manufacturer: Miratech	Model number: SP-ZESIOG-54x61-20/24- XH3.5B2	Installation date: 9/13/2010
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Type of Air Pollution Control Device:

<input type="checkbox"/> Baghouse/Fabric Filter	<input type="checkbox"/> Venturi Scrubber	<input type="checkbox"/> Multiclone
<input type="checkbox"/> Carbon Bed Adsorber	<input type="checkbox"/> Packed Tower Scrubber	<input type="checkbox"/> Single Cyclone
<input type="checkbox"/> Carbon Drum(s)	<input type="checkbox"/> Other Wet Scrubber	<input type="checkbox"/> Cyclone Bank
<input type="checkbox"/> Catalytic Incinerator	<input type="checkbox"/> Condenser	<input type="checkbox"/> Settling Chamber
<input type="checkbox"/> Thermal Incinerator	<input type="checkbox"/> Flare	<input checked="" type="checkbox"/> Other (describe): <u>Oxidation Catalyst</u>
<input type="checkbox"/> Wet Plate Electrostatic Precipitator		<input type="checkbox"/> Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
NOx		N/A
CO		93%
VOC		50%
HCHO		80%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

Catalyst inlet temperature: 550 – 1250 °F
 Catalyst outlet temperature: 1350 °F
 Exhaust flow rate: 16,144 acfm
 Exhaust temperature: 857 °F
 Pressure drop: 6.0 in. of WC

Is this device subject to the CAM requirements of 40 C.F.R. 64? Yes No

If Yes, **Complete ATTACHMENT H**

If No, **Provide justification.** Compressor engine is subject to the emission limitations of 40 CFR 60 Subpart JJJJ.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

5.2.1 a. The permittee shall regularly inspect, properly maintain and/or replace catalytic reduction devices and auxiliary air pollution control devices to ensure functional and effective operation of the engine's physical and operational design. The permittee shall ensure proper operation, maintenance and performance of catalytic reduction devices and auxiliary air pollution control devices by:

1. Maintaining proper operation of the automatic air/fuel ratio controller or automatic feedback controller.
2. Following operating and maintenance recommendations of the catalyst element manufacturer.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: Oxid. Cat.	List all emission units associated with this control device. C-103	
Manufacturer: Miratech	Model number: SP-ZESIOG-54x61-20/24- XH3.5B2	Installation date: 9/13/2010

Type of Air Pollution Control Device:

Baghouse/Fabric Filter Venturi Scrubber Multiclone
 Carbon Bed Adsorber Packed Tower Scrubber Single Cyclone
 Carbon Drum(s) Other Wet Scrubber Cyclone Bank
 Catalytic Incinerator Condenser Settling Chamber
 Thermal Incinerator Flare Other (describe): Oxidation Catalyst
 Wet Plate Electrostatic Precipitator Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
NOx		N/A
CO		93%
VOC		50%
HCHO		80%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

Catalyst inlet temperature: 550 – 1250 °F
 Catalyst outlet temperature: 1350 °F
 Exhaust flow rate: 16,144 acfm
 Exhaust temperature: 857 °F
 Pressure drop: 6.0 in. of WC

Is this device subject to the CAM requirements of 40 C.F.R. 64? Yes No

If Yes, Complete ATTACHMENT H

If No, Provide justification. Compressor engine is subject to the emission limitations of 40 CFR 60 Subpart JJJJ.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

5.2.1 a. The permittee shall regularly inspect, properly maintain and/or replace catalytic reduction devices and auxiliary air pollution control devices to ensure functional and effective operation of the engine's physical and operational design. The permittee shall ensure proper operation, maintenance and performance of catalytic reduction devices and auxiliary air pollution control devices by:

1. Maintaining proper operation of the automatic air/fuel ratio controller or automatic feedback controller.
2. Following operating and maintenance recommendations of the catalyst element manufacturer.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: Oxid. Cat.	List all emission units associated with this control device. C-104
--	--

Manufacturer: Miratech	Model number: SP-ZESI0G-54x61-20/24- XH3.5B2	Installation date: 9/13/2010
----------------------------------	---	--

Type of Air Pollution Control Device:

<input type="checkbox"/> Baghouse/Fabric Filter	<input type="checkbox"/> Venturi Scrubber	<input type="checkbox"/> Multiclone
<input type="checkbox"/> Carbon Bed Adsorber	<input type="checkbox"/> Packed Tower Scrubber	<input type="checkbox"/> Single Cyclone
<input type="checkbox"/> Carbon Drum(s)	<input type="checkbox"/> Other Wet Scrubber	<input type="checkbox"/> Cyclone Bank
<input type="checkbox"/> Catalytic Incinerator	<input type="checkbox"/> Condenser	<input type="checkbox"/> Settling Chamber
<input type="checkbox"/> Thermal Incinerator	<input type="checkbox"/> Flare	<input checked="" type="checkbox"/> Other (describe): <u>Oxidation Catalyst</u>
<input type="checkbox"/> Wet Plate Electrostatic Precipitator		<input type="checkbox"/> Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
NOx		N/A
CO		93%
VOC		50%
HCHO		80%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

Catalyst inlet temperature: 550 – 1250 °F
 Catalyst outlet temperature: 1350 °F
 Exhaust flow rate: 16,144 acfm
 Exhaust temperature: 857 °F
 Pressure drop: 6.0 in. of WC

Is this device subject to the CAM requirements of 40 C.F.R. 64? Yes No

If Yes, **Complete ATTACHMENT H**

If No, **Provide justification.** Compressor engine is subject to the emission limitations of 40 CFR 60 Subpart JJJJ.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

5.2.1 a. The permittee shall regularly inspect, properly maintain and/or replace catalytic reduction devices and auxiliary air pollution control devices to ensure functional and effective operation of the engine's physical and operational design. The permittee shall ensure proper operation, maintenance and performance of catalytic reduction devices and auxiliary air pollution control devices by:

1. Maintaining proper operation of the automatic air/fuel ratio controller or automatic feedback controller.
2. Following operating and maintenance recommendations of the catalyst element manufacturer.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: FL-991	List all emission units associated with this control device. Maintenance blowdowns and emergency process venting
--	--

Manufacturer: Callidus	Model number:	Installation date: 2010
----------------------------------	----------------------	-----------------------------------

Type of Air Pollution Control Device:

<input type="checkbox"/> Baghouse/Fabric Filter	<input type="checkbox"/> Venturi Scrubber	<input type="checkbox"/> Multiclone
<input type="checkbox"/> Carbon Bed Adsorber	<input type="checkbox"/> Packed Tower Scrubber	<input type="checkbox"/> Single Cyclone
<input type="checkbox"/> Carbon Drum(s)	<input type="checkbox"/> Other Wet Scrubber	<input type="checkbox"/> Cyclone Bank
<input type="checkbox"/> Catalytic Incinerator	<input type="checkbox"/> Condenser	<input type="checkbox"/> Settling Chamber
<input type="checkbox"/> Thermal Incinerator	<input checked="" type="checkbox"/> Flare	<input type="checkbox"/> Other (describe):
<input type="checkbox"/> Wet Plate Electrostatic Precipitator		<input type="checkbox"/> Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
NOx		
CO		
VOC	100%	98%
HCHO		

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

Continuous pilot
 No visible emissions
 Gas heating value 300 btu/scf or greater

Is this device subject to the CAM requirements of 40 C.F.R. 64? Yes No

If Yes, **Complete ATTACHMENT H**

If No, **Provide justification.** See Title V application General Forms Section 19

Describe the parameters monitored and/or methods used to indicate performance of this control device.

Presence of a flame monitored by thermocouple
 Compliance with opacity requirements using EPA Method 22
 Flare compliance assessment using Test Method 18/4 and 40 CFR Part 60 Appendix A Test Method 2, 2A, 2C, or 2D

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: FL-1991	List all emission units associated with this control device. Maintenance blowdowns and emergency process venting	
Manufacturer: Callidus	Model number:	Installation date: 2013
Type of Air Pollution Control Device:		
<input type="checkbox"/> Baghouse/Fabric Filter	<input type="checkbox"/> Venturi Scrubber	<input type="checkbox"/> Multiclone
<input type="checkbox"/> Carbon Bed Adsorber	<input type="checkbox"/> Packed Tower Scrubber	<input type="checkbox"/> Single Cyclone
<input type="checkbox"/> Carbon Drum(s)	<input type="checkbox"/> Other Wet Scrubber	<input type="checkbox"/> Cyclone Bank
<input type="checkbox"/> Catalytic Incinerator	<input type="checkbox"/> Condenser	<input type="checkbox"/> Settling Chamber
<input type="checkbox"/> Thermal Incinerator	<input checked="" type="checkbox"/> Flare	<input type="checkbox"/> Other (describe):
<input type="checkbox"/> Wet Plate Electrostatic Precipitator		<input type="checkbox"/> Dry Plate Electrostatic Precipitator
List the pollutants for which this device is intended to control and the capture and control efficiencies.		
Pollutant	Capture Efficiency	Control Efficiency
NOx		
CO		
VOC	100%	98%
HCHO		
Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).		
Continuous pilot No visible emissions Gas heating value 300 btu/scf or greater		
Is this device subject to the CAM requirements of 40 C.F.R. 64? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
If Yes, Complete ATTACHMENT H		
If No, Provide justification. See Title V application General Forms Section 19		
Describe the parameters monitored and/or methods used to indicate performance of this control device.		
Presence of a flame monitored by thermocouple Compliance with opacity requirements using EPA Method 22 Flare compliance assessment using Test Method 18/4 and 40 CFR Part 60 Appendix A Test Method 2, 2A, 2C, or 2D		



Exhaust emission data sheet

C15 D6

60 Hz Diesel generator set

EPA emission

Engine information:

Model:	Kubota D1703M	Bore:	3.43 in. (87 mm)
Type:	4 cycle, in-line, 3 cylinder diesel	Stroke:	3.64 in. (92 mm)
Aspiration:	Naturally aspirated	Displacement:	100.5 cu. in. (2 liters)
Compression ratio:	22:1		
Emission control device:			

	<u>1/4</u>	<u>1/2</u>	<u>3/4</u>	<u>Full</u>	<u>Full</u>
<u>Performance data</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Standby</u>	<u>Prime</u>
BHP @ 1800 RPM (60 Hz)	6	12	19	25	23
Fuel consumption (gal/Hr)				1.4	1.2
Exhaust gas flow (CFM)				126	118
Exhaust gas temperature (°F)				919	934
<u>Exhaust emission data</u>					
HC (Total unburned hydrocarbons)	0.86	0.25	0.17	0.1	0.11
NOx (Oxides of nitrogen as NO2)	7.9	5	4.2	3.5	3.7
CO (Carbon monoxide)	4.5	0.7	0.4	0.3	0.3
PM (Particular Matter)	0.4	0.26	0.17	0.11	0.13
SO2 (Sulfur dioxide)					
Smoke (Bosch)					

All values are Grams per HP - Hour

Test conditions

Data is representative of steady-state engine speed (± 25 RPM) at designated genset loads. Pressures, temperatures, and emission rates were stabilized.

Fuel specification:	ASTM D975 No. 2-D diesel fuel with 0.03-0.05% sulfur content (by weight), and 40-48 cetane number.
Fuel temperature:	99 \pm 9 °F (at fuel pump inlet)
Intake air temperature:	77 \pm 9 °F
Barometric pressure:	29.6 \pm 1 in. Hg
Humidity:	NOx measurement corrected to 75 grains H2O/lb dry air
Reference standard:	ISO 8178

The NOx, HC, CO and PM emission data tabulated here are representative of test data taken from a single engine under the test conditions shown above. Data for the other components are estimated. These data are subjected to instrumentation and engine-to-engine variability. Field emission test data are not guaranteed to these levels. Actual field test results may vary due to test site conditions, installation, fuel specification, test procedures and instrumentation. Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

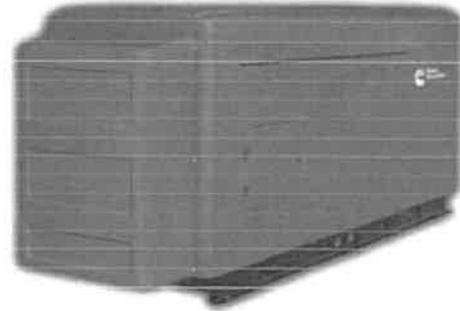


Diesel generator set

10 kW - 15 kW

EPA emissions

stationary Standby



Description

Cummins® generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary Standby applications.

Features

Kubota heavy-duty engine - Rugged 4-cycle, liquid-cooled, industrial diesel engine delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Control system - The PowerCommand® 1.1 electronic control is standard equipment and provides total generator set system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard cooling package provides reliable running at up to 50 °C (122 °F) ambient temperature.

Enclosures - The aesthetically appealing enclosure incorporates special designs that deliver one of the quietest generators of its kind. Aluminum material plus durable powder coat paint provides the best anti-corrosion performance. The generator set enclosure has been evaluated to withstand 180 MPH wind loads in accordance with ASCE7-10. The intelligent design has removable panels and service doors to provide easy access for service and maintenance.

Fuel tanks - Two dual wall sub-base fuel tank series are offered as optional features, providing economical and flexible solutions to meet extensive code requirements on diesel fuel tanks.

NFPA - The generator set accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating 60 Hz		Prime rating 60 Hz		Data sheets 60 Hz
	kW	kVA	kW	kVA	
C10 D6	10.0	12.5	9.1	11.4	NAD-5857
C15 D6	15.0	18.8	13.6	17.0	NAD-5858

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Generator set specifications

Governor regulation class	ISO8528 Part 1 Class G3
Voltage regulation, no load to full load	± 1.0%
Random voltage variation	± 1.0%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	FCC code Title 47 Part 15 Class B

Engine specifications

Bore	87.0 mm (3.43 in.)
Stroke	92.4 mm (3.64 in.)
Displacement	1.65 litres (100.5 in ³)
Configuration	Cast iron, in-line, 3 cylinder
Battery capacity	550 amps at ambient temperature of 0 °F to 32 °F (-18 °C to 0 °C)
Battery charging alternator	40 amps
Starting voltage	12 volt, negative ground
Fuel system	Indirect injection: low or ultra-low sulfur, number 2 diesel fuel
Fuel filter	Single element, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow paper filter (cartridge type)
Standard cooling system	50 °C (122 °F) ambient cooling system

Alternator specifications

Design	Brushless, 4 pole, drip proof, revolving field
Stator	2/3 pitch
Rotor	Direct coupled, flexible disc
Insulation system	Class H per NEMA MG1-1.65
Standard temperature rise	120 °C (248 °F) Standby
Exciter type	Torque match (shunt) with EBS as option
Alternator cooling	Direct drive centrifugal blower
AC waveform Total Harmonic Distortion (THDV)	< 5% no load to full linear load, < 3% for any single harmonic
Telephone Influence Factor (TIF)	< 50 per NEMA MG1-22.43
Telephone Harmonic Factor (THF)	0.03

Available voltages

Single phase	3 phase			
• 120/240	• 120/208	• 120/240 delta	• 277/480	• 347/600

Note: Consult factory for other voltages.

Generator set options

Fuel system

- Basic fuel tanks
- Regional fuel tanks

Engine

- Engine air cleaner – heavy duty
- Shut down – low oil pressure
- Extension – oil drain

Alternator

- 120 °C (248 °F) temperature rise alternator
- 105 °C (221 °F) temperature rise alternator
- Excitation Boost System (EBS)
- Alternator heater, 120 V

Control

- AC output analog meters (bargraph)
- Stop switch – emergency
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)

Electrical

- Single circuit breaker
- Dual circuit breakers
- 80% rated circuit breakers
- 100% rated circuit breakers

Enclosure

- Aluminum enclosure sound level 1 or level 2, with muffler installed, sandstone or green color
- Open set

Cooling system

- Shutdown – low coolant level
- Warning – low coolant level
- Extension – coolant drain
- Cold weather options:
 - <4 °C (40 °F) – cold weather
 - <-17 °C (0 °F) – extreme cold weather

Exhaust system

- Exhaust connector NPT
- Open set with muffler mounted

Generator set application

- Battery rack, larger battery
- Radiator outlet duct adapter

Generator set options (continued)

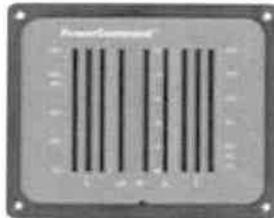
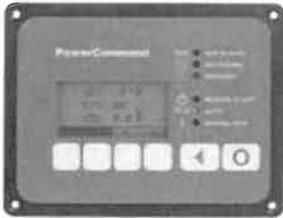
Warranty

- Base warranty – 2 year, 1000 hour, Standby
- Standby, 3 year, 1500 hour, parts
- Standby, 5 year, 2500 hour, parts
- Standby, 3 year, 1500 hour, parts and labor
- Standby, 5 year, 2500 hour, parts and labor
- Standby, 3 year, 1500 hour, parts, labor and travel
- Standby, 5 year, 2500 hour, parts, labor and travel

Generator set accessories

- Extreme cold weather kit
- Battery rack, larger battery
- Battery heater kit
- HMI211RS in-home display, including pre-configured 12" harness
- HMI211 remote display, including pre-configured 12" harness
- HMI220 remote display
- Auxiliary output relays (2)
- Auxiliary configurable signal inputs (8) and relay outputs (8)
- Annunciator – RS485
- Remote monitoring device – PowerCommand 500
- Battery charger – stand-alone, 12 V
- Circuit breakers
- Enclosure Sound Level 1 to Sound Level 2 upgrade kit
- Enclosure paint touch up kit
- Mufflers – industrial, residential or critical
- Alternator Excitation Boost System (EBS)
- Alternator heater
- Maintenance and service kit
- Engine lift kit
- Various fuel tanks and accessories

Control system PowerCommand 1.1



PowerCommand control is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

Operator/display panel

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating generator set running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -40 °C to +70 °C
- Bargraph display (optional)

AC protection

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown

Alternator data

- Line-to-Line and Line-to-Neutral AC volts
- 3-phase AC current
- Frequency

Engine data

- Total kVa
- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

Other data

- Generator set model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus[®] interface
- Data logging and fault simulation (requires InPower service tool)

Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 2-phase Line-to-Line sensing
- Configurable torque matching

Control functions

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Automatic Transfer Switch (ATS) control
- Generator set exercise, field adjustable

Options

- Auxiliary output relays (2)
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand 500/550 for remote monitoring and alarm notification (accessory)
- Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- Digital governing
- AC output analog meters (bargraph)
 - Color-coded graphical display of:
 - 3-phase AC voltage
 - 3-phase current
 - Frequency
 - kVa
- Remote operator panel

Ratings definitions

Emergency Standby Power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-Time Running Power (LTP):

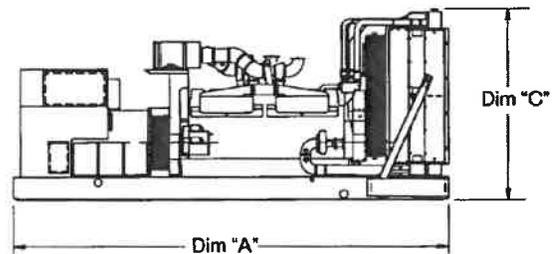
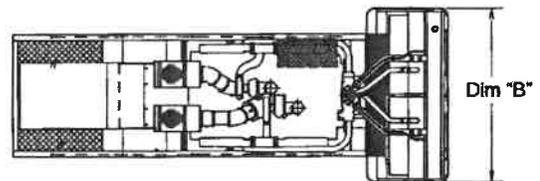
Applicable for supplying power to a constant electrical load for limited hours. Limited-Time Running Power (LTP) is in accordance with ISO 8528.

Prime Power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base Load (Continuous) Power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set weight* dry kg (lbs)	Set weight* wet kg (lbs)
Open set					
C10 D6	1670 (65.74)	864 (34)	1121 (44.13)	369 (816)	383 (847)
C15 D6	1670 (65.74)	864 (34)	1121 (44.13)	415 (918)	429 (949)
Sound attenuated enclosure Level 1					
C10 D6	1830 (72)	864 (34)	1156 (45.5)	421 (931)	435 (962)
C15 D6	1830 (72)	864 (34)	1156 (45.5)	467 (1033)	481 (1064)
Sound attenuated enclosure Level 2					
C10 D6	2075 (81.69)	864 (34)	1156 (45.5)	426 (942)	440 (973)
C15 D6	2075 (81.69)	864 (34)	1156 (45.5)	472 (1044)	486 (1075)

* Weights represent a set with standard features. See outline drawings for weights of other configurations.

Codes and standards

Codes or standards compliance may not be available with all model configurations – consult factory for availability.

	This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.		The generator set is available Listed to UL 2200, Stationary Engine Generator Assemblies.
	The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.	U.S. EPA	Engine certified to U.S. EPA SI Stationary Emission Regulation 40 CFR, Part 60.
	All low voltage models are CSA certified to product class 4215-01.	International Building Code	The generator set is certified for seismic application in accordance with International Building Code (IBC) 2012.

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.

For more information contact your local Cummins distributor or visit power.cummins.com

Our energy working for you.™





**RECORD ONLY SUBMITTAL
POWER GENERATION EQUIPMENT**

PROJECT NAME: Markwest Majorsville 7

DATE: 10/9/2018

CUSTOMER: MarkWest Liberty Midstream & Resources, LLC.
1515 Arapahoe Street, Tower 1, Suite 1600
Denver, Co 80202

SUPPLIER: Cummins Sales and Service

PROJECT #: 19165

SALES REPRESENTATIVE: Don Singer
412-820-8449
donald.r.singer@cummins.com

PROJECT MANAGER: Loretta Gould
412-820-8416
loretta.m.gould@cummins.com



2017 EPA Tier 3 exhaust emission compliance statement C35 D6 Stationary emergency 60 Hz Diesel generator set

Compliance information:

The engine used in this generator set complies with U.S. EPA New Source Performance Standards for Stationary Emergency engine under the provisions of 40 CFR Part 60 Subpart IIII when tested per ISO 8178 D2.

Engine manufacturer: Cummins Inc
 EPA certificate number: HCEXL03.3BAA-030
 Effective date: 11/17/2016
 Date issued: 11/17/2016
 EPA engine family (Cummins emissions family): HCEXL03.3BAA (B782)

Engine information:

Model: 4BT3.3-G5 Bore: 3.74 in. (95 mm)
 Engine nameplate HP: 69 Stroke: 4.53 in. (115 mm)
 Type: 4 cycle, in-line, 4 cylinder diesel Displacement: 199 cu. in. (3.3 liters)
 Aspiration: Turbocharged Compression ratio: 20.8:1
 Emission control device: Exhaust stack diameter: 3 in. (76 mm)

Diesel fuel emission limits

D2 cycle exhaust emissions

	Grams per BHP-hr			Grams per kWm-hr		
	<u>NO_x + NMHC</u>	<u>CO</u>	<u>PM</u>	<u>NO_x + NMHC</u>	<u>CO</u>	<u>PM</u>
Cert test results - diesel fuel (300-4000 ppm sulfur)	3.30	1.50	0.22	4.40	2.00	0.29
EPA emissions limit	3.50	3.70	0.30	4.70	5.00	0.40
Cert test results - CARB diesel fuel (<15 ppm sulfur)	3.00	1.50	0.19	4.00	2.00	0.25
Child rated engine	3.20	1.10	0.12*	4.30	1.50	0.16*
CARB emissions limit	3.50	3.70	0.15	4.70	5.00	0.20

* Cert Test results given above are for parent rated engine (64.3 hp at 1500 RPM). This generator uses a child rated engine (69 hp at 1800 RPM) which meets CARB's ATCM PM standard of < 0.15 g/bhp-hr PM emissions. PM emissions on this child rated engine were observed to be 0.12 g/bhp hr or 0.16 g/kW-hr as tested in the Cummins test cell.

Cert Test Results - The CARB emission values are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

Test methods: EPA/CARB emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for Constant Speed Engines (ref. ISO8178-4, D2).

Diesel fuel specifications: Cetane Number: 40-48. Reference: ASTM D975 No. 2-D.

Reference conditions: Air Inlet Temperature: 25 °C (77 °F), Fuel Inlet Temperature: 40 °C (104 °F).

Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H₂O/lb) of dry air; required for NO_x correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.