



MarkWest Liberty Midstream and Resources, L.L.C.
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(303) 925-9200
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October 27, 2017

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.
Sherwood Gas Plant
Application for Title V Operating (45CSR30) Permit**

Dear Mr. Benedict:

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 Sherwood Gas Plant in Doddridge County. The facility is currently operating under permit R13-2914E. With this application MarkWest is providing the necessary documentation to obtain an initial Title V permit for the facility.

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

If you have any questions or comments, please call myself at (303) 542-1212 or email wade.janecek@markwest.com at your convenience.

Sincerely,

Wade Janecek
Senior Environmental Engineer
Enclosures (Original + 2 Hard copies)

MARKWEST LIBERTY MIDSTREAM & RESOURCES L.L.C.

SHERWOOD GAS PLANT

45CSR30 TITLE V OPERATING PERMIT APPLICATION

**SUBMITTED TO WVDEP DIVISION OF AIR QUALITY
October 2017**

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Introduction

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

The Sherwood Gas Plant is a natural gas gathering and processing plant for gas wells throughout West Virginia. Emission sources at the facility include two (2) 4,735 horsepower (hp) Caterpillar G3616LE engines, one (1) 2,370 hp Caterpillar G3608LE engine, two (2) 7.85 million British thermal unit per hour (mmBtu/hr) regenerator heaters, one (1) 6.35 mmBtu/hr stabilizer heater, one (1) 15.58 mmBtu/hr regenerator heater, six (6) 18.0 mmBtu/hr regenerator heaters, one (1) 30.04 mmBtu/hr hot oil heater, two (2) 6.6 mmBtu/hr hot oil heaters, one (1) 12.23 mmBtu/hr regenerator heater, one (1) 7.19 mmBtu/hr hot oil heater, one (1) 119.20 mmBtu/hr deethanizer heater, one (1) 2.0 mmBtu/hr dehydrator reboiler, one (1) natural gas dehydrator, one (1) dehydrator flare, one (1) plant flare, fugitive sources, and liquid loading.

This facility is located off of Swisher Lane, in Doddridge 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:

Wade Janecek
Senior Environmental Engineer
MarkWest Liberty Midstream and Resources, L.L.C.
1515 Arapahoe Street, Tower 1, Suite 1600
Denver, CO 80202-2137
Phone: (303) 542-1212

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

<p>1. Name of Applicant (As registered with the WV Secretary of State's Office): MarkWest Liberty Midstream and Resources, L.L.C.</p>	<p>2. Facility Name or Location: Sherwood Gas Plant</p>
<p>3. DAQ Plant ID No.: 017-00034</p>	<p>4. Federal Employer ID No. (FEIN): 30-0528059</p>
<p>5. Permit Application Type:</p> <p><input checked="" type="checkbox"/> Initial Permit When did operations commence? 3/8/2017</p> <p><input type="checkbox"/> Permit Renewal What is the expiration date of the existing permit? MM/DD/YYYY</p> <p><input type="checkbox"/> Update to Initial/Renewal Permit Application</p>	
<p>6. Type of Business Entity:</p> <p><input type="checkbox"/> Corporation <input type="checkbox"/> Governmental Agency <input checked="" type="checkbox"/> LLC</p> <p><input type="checkbox"/> Partnership <input type="checkbox"/> Limited Partnership</p>	<p>7. Is the Applicant the:</p> <p><input type="checkbox"/> Owner <input type="checkbox"/> Operator <input checked="" type="checkbox"/> Both</p> <p>If the Applicant is not both the owner and operator, please provide the name and address of the other party.</p> <p>_____</p> <p>_____</p> <p>_____</p>
<p>8. Number of onsite employees:</p>	
<p>9. Governmental Code:</p> <p><input checked="" type="checkbox"/> Privately owned and operated; 0 <input type="checkbox"/> County government owned and operated; 3</p> <p><input type="checkbox"/> Federally owned and operated; 1 <input type="checkbox"/> Municipality government owned and operated; 4</p> <p><input type="checkbox"/> State government owned and operated; 2 <input type="checkbox"/> District government owned and operated; 5</p>	
<p>10. Business Confidentiality Claims</p> <p>Does this application include confidential information (per 45CSR31)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If yes, identify each segment of information on each page that is submitted as confidential, and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "PRECAUTIONARY NOTICE-CLAIMS OF CONFIDENTIALITY" guidance.</p>	

11. Mailing Address		
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) 290-8769	

12. Facility Location		
Street: 218 Swisher Lane	City: West Union	County: Doddridge
UTM Easting: 526.921 km	UTM Northing: 4,346.885 km	Zone: <input checked="" type="checkbox"/> 17 or <input type="checkbox"/> 18
Directions: From Smithburg take US-50 east and go 2.8 miles, turn right at Co. Route 50/35 and go 0.1 miles, take the first right onto Blacklick Rd/Co Route 15/Sherwood-Grenbriar Rd and continue 0.4 miles. The site will be 0.5 miles west of Co Route 15.		
Portable Source? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Is facility located within a nonattainment area? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If yes, for what air pollutants?	
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 Area¹? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If yes, name the area(s). Otter Creek Wilderness Area Dolly Sods Wilderness Area	
If no, do emissions impact a Class I Area¹? <input type="checkbox"/> Yes <input 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 Corporate EH&S
Street or P.O. Box: 1515 Arapahoe Street, Tower 1, Suite 1600		
City: Denver	State: CO	Zip: 80202-2137
Telephone Number: (303) 925-9299	Fax Number: () -	
E-mail address: lmeyer@markwest.com		
Environmental Contact: Nathan Wheldon		Title: Senior Manager of 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: () -	
E-mail address: nwheldon@markwest.com		
Application Preparer: Wade Janecek		Title: Senior Environmental Engineer
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: 80202-2137
Telephone Number: (303) 542-1212	Fax Number: () -	
E-mail address: wade.janecek@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 and undergoes separation, filtration, and dehydration. Separation serves to remove any free liquids entrained in the gas. Filtration serves to remove any impurities. Dehydration removes any additional moisture remaining in the gas prior to processing. The gas is subsequently sent through a cryogenic process and deethanization process which serves to remove any natural gas liquids (propane and heavier components) as well as ethane from the gas stream. At this point the gas is saleable, and is compressed prior to leaving the facility via pipeline. The natural gas liquids are transported 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/Reqts.	<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 not located in a non-attainment area, therefore this rule does 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.

45 CSR 45 – National Emission Standards for Hazardous Air Pollutants: The facility is not subject to the requirements of any 40 CFR Part 61 subpart.

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

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 R13-2914E 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 [W.Va. Code § 22-5-10 and 45CSR31]

3.5.3 Correspondence

3.5.4 Operating Fee [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	Presence of open burning	NA	NA	Notification	45CSR§6-3.1
3.1.2	NA	NA	NA	Notification	45CSR§6-3.2
3.1.3	NA	NA	Asbestos inspection	Notification	40CFR§61.145 (b), 45CSR§34
3.1.4	Odors	NA	NA	NA	45CSR§4-3.1
3.1.5	NA	NA	NA	Permit application as necessary	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§4
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	May request confidential treatment for the submission of reports	WV Code§22-5-10 and 45CSR§31
3.5.3	NA	NA	NA	Submissions must be made in writing to the listed addresses for DAQ and US EPA	3.5.3
3.5.4	NA	NA	Emissions inventory receipt	Certified emissions statement	45CSR30
3.5.5	NA	NA	NA	Emission 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)	118.67
Nitrogen Oxides (NO _x)	115.03
Lead (Pb)	
Particulate Matter (PM _{2.5}) ¹	14.80
Particulate Matter (PM ₁₀) ¹	14.80
Total Particulate Matter (TSP)	14.80
Sulfur Dioxide (SO ₂)	1.17
Volatile Organic Compounds (VOC)	84.63
Hazardous Air Pollutants²	Potential Emissions
Acetaldehyde	
Acrolein	
Benzene	0.35
Formaldehyde	4.44
Methanol	
n-Hexane	4.30
Total HAPS	18.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions
CO2(e)	222,261.96

¹PM_{2.5} and PM₁₀ are components of TSP.
²For 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>
<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.

24. Insignificant Activities (Check all that apply)	
<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 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	
<i>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.</i>	
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 M. Meyer	Title: VP of Corporate EH&S
Responsible official's signature:	
Signature: 	Signature Date: <u>10-23-17</u>
<small>(Must be signed and dated in blue ink)</small>	

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/dag, requested by phone (304) 926-0475, and/or obtained through the mail.

Emissions Calculations

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

Summary of Facility-Wide Potential Emissions

Criteria Pollutant Potential Emissions

Process/Facility	Potential Emissions (lb/hr)					
	NOx	CO	VOC	SO ₂	PM ¹	HAPs
Compressor Engine #1 (CM-1001)	5.22	1.46	1.67	0.02	0.35	1.10
Compressor Engine #2 (CM-1002)	5.22	1.46	1.67	0.02	0.35	1.10
Compressor Engine (CM-2001)	2.61	0.73	1.46	0.01	0.16	0.46
Generator Engine (G-1)	0.61	0.90	0.03	0.12	0.05	0.00
Generator Engine (G-2)	0.97	1.43	0.05	0.15	0.06	0.00
Generator Engine (G-3)	0.97	1.43	0.05	0.15	0.06	0.00
Regeneration Heater (H-711)	0.24	0.47	0.042	0.0046	0.06	0.013
Regeneration Heater (H-2711)	0.24	0.47	0.042	0.0046	0.06	0.013
Regeneration Heater (H-3711)	0.47	0.93	0.084	0.0092	0.12	0.026
Regeneration Heater (H-4711)	0.72	0.72	0.097	0.0106	0.13	0.030
Regeneration Heater (H-5711)	0.72	0.72	0.097	0.0106	0.13	0.030
Regeneration Heater (H-6711)	0.72	0.72	0.097	0.0106	0.13	0.030
Regeneration Heater (H-7711)	0.72	0.72	0.097	0.0106	0.13	0.030
Regeneration Heater (H-8711)	0.72	0.72	0.097	0.0106	0.13	0.030
Regeneration Heater (H-9711)	0.72	0.72	0.097	0.0106	0.13	0.030
Hot Oil Heater (H-771)	0.90	1.80	0.162	0.0177	0.22	0.050
Stabilizer Heater (H-751)	0.25	0.25	0.034	0.0034	0.05	0.011
Hot Oil Heater (H-4712)	0.26	0.26	0.035	0.0039	0.05	0.011
Hot Oil Heater (H-6712)	0.26	0.26	0.035	0.0039	0.05	0.011
Hot Oil Heater (H-8712)	0.29	0.29	0.039	0.0042	0.05	0.012
DeEth HMO (D1-H-782)	3.47	4.63	0.625	0.0681	0.86	0.195
DeEth Regen (D1-H-741)	0.50	0.51	0.067	0.0074	0.16	0.021
TEG Dehydration Unit (DH-001)	--	--	2.017	--	--	0.336
Dehydration Unit Reboiler (RB-001)	0.20	0.16	0.011	0.0012	0.01	0.003
Storage Tanks	--	--	3.55	--	--	0.26
Main Process/Emergency Flare (FS-762)	1.64	8.80	--	0.00	0.00	--
Dehydration Unit Flare (FL-DH)	0.03	0.04	--	0.00	0.00	--
Facility Blowdowns	--	--	--	--	--	--
Fugitive Emissions (FUG-001)	--	--	4.865	--	--	0.301
Crankcase Emissions	--	--	0.567	--	--	0.011
Rod Packing Emissions	--	--	0.040	--	--	0.003
Site Wide Emissions (lb/hr)	28.68	30.64	17.75	0.66	3.54	4.14

¹ PM = PM₁₀ = PM_{2.5}

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

Summary of Facility-Wide Potential Emissions

Criteria Pollutant Potential Emissions

Process/Facility	Potential Emissions (tpy)					
	NOx	CO	VOC	SO ₂	PM ¹	HAPs
Compressor Engine #1 (CM-1001)	22.86	6.40	7.32	0.09	1.55	4.84
Compressor Engine #2 (CM-1002)	22.86	6.40	7.32	0.09	1.55	4.84
Compressor Engine (CM-2001)	11.44	3.20	6.41	0.04	0.69	2.02
Generator Engine (G-1)	0.15	0.22	0.01	0.03	0.01	0.00
Generator Engine (G-2)	0.24	0.36	0.01	0.04	0.02	0.00
Generator Engine (G-3)	0.24	0.36	0.01	0.04	0.02	0.00
Regeneration Heater (H-711)	1.03	2.06	0.19	0.020	0.26	0.058
Regeneration Heater (H-2711)	1.03	2.06	0.19	0.020	0.26	0.058
Regeneration Heater (H-3711)	2.05	4.09	0.37	0.040	0.51	0.115
Regeneration Heater (H-4711)	3.15	3.15	0.43	0.046	0.59	0.132
Regeneration Heater (H-5711)	3.15	3.15	0.43	0.046	0.59	0.132
Regeneration Heater (H-6711)	3.15	3.15	0.43	0.046	0.59	0.132
Regeneration Heater (H-7711)	3.15	3.15	0.43	0.046	0.59	0.132
Regeneration Heater (H-8711)	3.15	3.15	0.43	0.046	0.59	0.132
Regeneration Heater (H-9711)	3.15	3.15	0.43	0.046	0.59	0.132
Hot Oil Heater (H-771)	3.95	7.90	0.710	0.0774	0.98	0.221
Stabilizer Heater (H-751)	1.11	1.11	0.150	0.0148	0.21	0.047
Hot Oil Heater (H-4712)	1.15	1.15	0.155	0.0170	0.21	0.048
Hot Oil Heater (H-6712)	1.15	1.15	0.16	0.017	0.21	0.048
Hot Oil Heater (H-8712)	1.26	1.26	0.17	0.019	0.23	0.053
DeEth HMO (D1-H-782)	15.22	20.29	2.736	0.2984	3.78	0.852
DeEth Regen (D1-H-741)	2.19	2.24	0.295	0.0322	0.71	0.092
TEG Dehydration Unit (DH-001)	--	--	8.836	--	--	1.470
Dehydration Unit Reboiler (RB-001)	0.86	0.72	0.047	0.0052	0.07	0.015
Storage Tanks	--	--	9.58	--	--	0.92
Main Process/Emergency Flare (FS-762)	7.17	38.56	--	0.00	0.01	--
Dehydration Unit Flare (FL-DH)	0.12	0.19	--	0.00	0.01	--
Facility Blowdowns	--	--	13.381	--	--	0.259
Fugitive Emissions (FUG-001)	--	--	21.31	--	--	1.317
Facility Loadout	--	--	0.08	--	--	0.005
Crankcase Emissions	--	--	2.48	--	--	0.048
Rod Packing Emissions	--	--	0.17	--	--	0.003
Site Wide Emissions (tpy)	115.03	118.67	84.63	1.17	14.80	18.13

¹ PM = PM₁₀ = PM_{2.5}

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

Summary of Facility-Wide Potential Emissions

Hazardous Air Pollutant Potential Emissions

Process/Facility	HAPs - Potential Emissions (lb/hr)					
	Benzene	Ethylbenzene	Toluene	Xylenes	n-Hexane	Formaldehyde
Compressor Engine #1 (CM-1001)	1.56E-02	1.41E-03	1.45E-02	6.52E-03	3.93E-02	4.18E-01
Compressor Engine #2 (CM-1002)	1.56E-02	1.41E-03	1.45E-02	6.52E-03	3.93E-02	4.18E-01
Compressor Engine (CM-2001)	6.91E-03	6.24E-04	6.41E-03	2.89E-03	1.74E-02	1.57E-01
Generator Engine (G-1)	7.18E-04	--	3.15E-04	2.19E-04	--	9.08E-04
Generator Engine (G-2)	9.48E-04	--	4.16E-04	2.90E-04	--	1.20E-03
Generator Engine (G-3)	9.48E-04	--	4.16E-04	2.90E-04	--	1.20E-03
Regeneration Heater (H-711)	1.47E-05	--	2.37E-05	--	1.26E-02	5.24E-04
Regeneration Heater (H-2711)	1.47E-05	--	2.37E-05	--	1.26E-02	5.24E-04
Regeneration Heater (H-3711)	2.91E-05	--	4.71E-05	--	2.49E-02	1.04E-03
Regeneration Heater (H-4711)	3.36E-05	--	5.44E-05	--	2.88E-02	1.20E-03
Regeneration Heater (H-5711)	3.36E-05	--	5.44E-05	--	2.88E-02	1.20E-03
Regeneration Heater (H-6711)	3.36E-05	--	5.44E-05	--	2.88E-02	1.20E-03
Regeneration Heater (H-7711)	3.36E-05	--	5.44E-05	--	2.88E-02	1.20E-03
Regeneration Heater (H-8711)	3.36E-05	--	5.44E-05	--	2.88E-02	1.20E-03
Regeneration Heater (H-9711)	3.36E-05	--	5.44E-05	--	2.88E-02	1.20E-03
Hot Oil Heater (H-771)	5.61E-05	--	9.09E-05	--	4.81E-02	2.00E-03
Stabilizer Heater (H-751)	1.19E-05	--	1.92E-05	--	1.02E-02	4.24E-04
Hot Oil Heater (H-4712)	1.23E-05	--	1.99E-05	--	1.05E-02	4.39E-04
Hot Oil Heater (H-6712)	1.23E-05	--	1.99E-05	--	1.05E-02	4.39E-04
Hot Oil Heater (H-8712)	1.34E-05	--	1.99E-05	--	1.05E-02	4.39E-04
DeEth HMO (D1-H-782)	2.16E-04	--	3.50E-04	--	1.85E-01	7.73E-03
DeEth Regen (D1-H-741)	2.33E-05	--	3.78E-05	--	2.00E-02	8.34E-04
TEG Dehydration Unit (DH-001)	4.00E-02	--	1.19E-01	5.55E-02	1.21E-01	--
Dehydration Unit Reboiler (RB-001)	3.74E-06	--	6.05E-06	--	3.20E-03	1.33E-04
Storage Tanks	--	--	--	--	2.64E-01	--
Main Process/Emergency Flare (FS-762)	--	--	--	--	--	--
Dehydration Unit Flare (FL-DH)	--	--	--	--	--	--
Facility Blowdowns	--	--	--	--	--	--
Fugitive Emissions (FUG-001)	--	--	--	--	--	--
Crankcase Emissions	2.97E-04	0.00E+00	1.75E-04	2.02E-04	1.03E-02	--
Rod Packing Emissions	2.07E-05	0.00E+00	1.22E-05	1.41E-05	7.21E-04	--
Site Wide Emissions (lb/hr)	0.08	0.00	0.16	0.07	1.01	1.02

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

Summary of Facility-Wide Potential Emissions

Hazardous Air Pollutant Potential Emissions

Process/Facility	HAPs - Potential Emissions (tpy)					
	Benzene	Ethylbenzene	Toluene	Xylenes	n-Hexane	Formaldehyde
Compressor Engine #1 (CM-1001)	6.83E-02	6.16E-03	6.33E-02	2.86E-02	1.72E-01	1.83E+00
Compressor Engine #2 (CM-1002)	6.83E-02	6.16E-03	6.33E-02	2.86E-02	1.72E-01	1.83E+00
Compressor Engine (CM-2001)	3.03E-02	2.73E-03	2.81E-02	1.27E-02	7.64E-02	6.87E-01
Generator Engine (G-1)	1.79E-04	--	7.87E-05	5.48E-05	--	2.27E-04
Generator Engine (G-2)	2.37E-04	--	1.04E-04	7.24E-05	--	3.00E-04
Generator Engine (G-3)	2.37E-04	--	1.04E-04	7.24E-05	--	3.00E-04
Regeneration Heater (H-711)	6.42E-05	--	1.04E-04	--	5.51E-02	2.29E-03
Regeneration Heater (H-2711)	6.42E-05	--	1.04E-04	--	5.51E-02	2.29E-03
Regeneration Heater (H-3711)	1.27E-04	--	2.06E-04	--	1.09E-01	4.55E-03
Regeneration Heater (H-4711)	1.47E-04	--	2.38E-04	--	1.26E-01	5.26E-03
Regeneration Heater (H-5711)	1.47E-04	--	2.38E-04	--	1.26E-01	5.26E-03
Regeneration Heater (H-6711)	1.47E-04	--	2.38E-04	--	1.26E-01	5.26E-03
Regeneration Heater (H-7711)	1.47E-04	--	2.38E-04	--	1.26E-01	5.26E-03
Regeneration Heater (H-8711)	1.47E-04	--	2.38E-04	--	1.26E-01	5.26E-03
Regeneration Heater (H-9711)	2.46E-04	--	3.98E-04	--	2.11E-01	8.78E-03
Hot Oil Heater (H-771)	2.46E-04	--	3.98E-04	--	2.11E-01	8.78E-03
Stabilizer Heater (H-751)	5.20E-05	--	8.41E-05	--	4.45E-02	1.86E-03
Hot Oil Heater (H-4712)	5.38E-05	--	8.72E-05	--	4.61E-02	1.92E-03
Hot Oil Heater (H-6712)	5.38E-05	--	8.72E-05	--	4.61E-02	1.92E-03
Hot Oil Heater (H-8712)	5.88E-05	--	9.52E-05	--	5.04E-02	2.10E-03
DeEth HMO (D1-H-782)	9.48E-04	--	1.53E-03	--	8.12E-01	3.39E-02
DeEth Regen (D1-H-741)	1.02E-04	--	1.66E-04	--	8.77E-02	3.65E-03
TEG Dehydration Unit (DH-001)	1.75E-01	--	5.21E-01	2.43E-01	5.32E-01	--
Dehydration Unit Reboiler (RB-001)	1.64E-05	--	2.65E-05	--	1.40E-02	5.85E-04
Storage Tanks	--	--	--	--	9.23E-01	--
Main Process/Emergency Flare (FS-762)	--	--	--	--	--	--
Dehydration Unit Flare (FL-DH)	--	--	--	--	--	--
Facility Blowdowns	--	--	--	--	--	--
Fugitive Emissions (FUG-001)	--	--	--	--	--	--
Facility Loadout	1.37E-04	0.00E+00	8.17E-05	7.52E-05	4.41E-03	--
Crankcase Emissions	1.30E-03	0.00E+00	7.67E-04	8.84E-04	4.52E-02	--
Rod Packing Emissions	9.09E-05	0.00E+00	5.36E-05	6.17E-05	3.16E-03	--
Site Wide Emissions (tpy)	0.35	0.02	0.68	0.31	4.30	4.44

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

Summary of Facility-Wide Potential Emissions

GreenHouse Gas Emissions

Process/Facility	GHG
	CO ₂ (e) tpy
Compressor Engines	4.54E+04
Heaters	1.69E+05
Dehydration Unit	3.05E+03
Storage Tanks	3.51E+02
Facility Blowdowns	3.96E+03
Loadout	4.01E-01
Fugitive Emissions (FUG-001)	5.96E+02
Site Wide Emissions (lb/hr)	222261.96

GHG Calculations

MarkWest Liberty Midstream & Resources L.L.C.

Sherwood Gas Plant

Reboiler/Heaters

Equipment	Heat Input (LHV) (mmbtu/hr)	Heat Input (HHV) (mmbtu/hr)	Emission Factors			CO2(e) CO2 Emission Rate (tpy)	CO2(e) CH4 Emission Rate (tpy)	CO2(e) N2O Emission Rate (tpy)
			CO2 (lb/mmbtu)	CH4 (lb/mmbtu)	N2O (lb/mmbtu)			
Reboiler	2.0000	2.0000	116.887892	0.0022046	0.00022046	1023.94	0.48	0.60
Flare Pilot	0.0184	0.0203	116.887892	0.0022046	0.00022046	10.38	0.00	0.01
Dehy Flare Pilot	0.0184	0.0203	116.887892	0.0022046	0.00022046	10.38	0.00	0.01
Heater H-711	5.42	7.85	116.887892	0.0022046	0.00022046	4019.33	1.90	2.35
Heater H-771	20.73	30.04	116.887892	0.0022046	0.00022046	15381.33	7.25	8.99
Heater H-2711	5.42	7.85	116.887892	0.0022046	0.00022046	4019.33	1.90	2.35
Heater H-3711	12.42	15.58	116.887892	0.0022046	0.00022046	7975.51	3.76	4.66
Heater H-4711	14.22	18.00	116.887892	0.0022046	0.00022046	9215.44	4.35	5.39
Heater H-5711	14.22	18.00	116.887892	0.0022046	0.00022046	9215.44	4.35	5.39
Heater H-6711	14.22	18.00	116.887892	0.0022046	0.00022046	9215.44	4.35	5.39
Heater H-7711	14.22	18.00	116.887892	0.0022046	0.00022046	9215.44	4.35	5.39
Heater H-8711	14.22	18.00	116.887892	0.0022046	0.00022046	9215.44	4.35	5.39
Heater H-9711	14.22	18.00	116.887892	0.0022046	0.00022046	9215.44	4.35	5.39
Heater H-4712	5.00	6.58	116.887892	0.0022046	0.00022046	3368.22	1.59	1.97
Heater H-6712	5.00	6.58	116.887892	0.0022046	0.00022046	3368.22	1.59	1.97
Heater H-8712	5.75	7.19	116.887892	0.0022046	0.00022046	3679.78	1.74	2.15
Heater H-751	5.00	6.35	116.887892	0.0022046	0.00022046	3251.00	1.53	1.90
Heater D1-H-782	88.63	119.20	116.887892	0.0022046	0.00022046	61026.70	28.78	35.68
Heater D1-H-741	7.81	12.23	116.887892	0.0022046	0.00022046	6263.48	2.95	3.66
Total						168690.22	79.54	98.63

Engines

HP	Fuel Use (HHV) (btu/bhp-hr)	Fuel Use (HHV) (mmbtu/yr)	Emission Factors			CO2(e) CO2 Emission Rate (tpy)	CO2(e) CH4 Emission Rate (tpy)	CO2(e) N2O Emission Rate (tpy)
			CO2 (lb/mmbtu)	CH4 (lb/mmbtu)	N2O (lb/mmbtu)			
3616	7,484	310425.842	116.887892	0.0022046	0.00022046	18142.51117	8.5545602	10.6076546
3616	7,484	310425.842	116.887892	0.0022046	0.00022046	18142.51117	8.5545602	10.6076546
3608	7,504	155792.045	116.887892	0.0022046	0.00022046	9105.101854	4.2932393	5.3236167
Total						45390.12419	21.40235958	26.53892588

GHG Calculations

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

Dehydrator GHG Calculation

Constituent	Uncontrolled Emission Rate (tpy)	Controlled Emission Rate (tpy)	MW	# of Carbons	CO2 by Oxidation + CH4 (tpy)
Methane	421.1032	8.4221	16	1	1134.87
Ethane	181.2238	3.6245	30	2	520.96
Propane	111.4820	2.2296	44	3	327.76
i-butane	20.5260	0.4111	58	4	61.04
n-butane	60.4405	1.2088	58	4	179.74
i-pentane	17.5528	0.3511	72	5	52.56
n-pentane	27.0379	0.5408	72	5	80.96
n-hexane	26.5754	0.5315	86	6	79.95
Cyclohexane	9.8095	0.1962	84	6	30.21
Other Hexanes	24.7355	0.4947	100	6	64.00
Heptanes	35.8797	0.7176	100	7	108.30
Benzene	8.7595	0.1752	78	6	29.05
Toluene	26.0361	0.5207	92	7	85.42
Xylenes	12.1482	0.2430	106	8	39.53
C8+ Heavies	25.6412	1.2155	114	8	75.42
Total CO2					2869.77
CO2(e) from CH4					176.86

Storage Tanks

Constituent	Emission Rate (tpy)	MW	# of Carbons	CO2 by Oxidation + CH4 (tpy)
Methane	12.8305	16	1	35.28
Ethane	5.8480	30	2	17.15
Propane	3.7553	44	3	11.27
i-Butane	0.7507	58	4	2.28
n-Butane	1.7169	58	4	5.21
i-Pentane	0.6937	72	5	2.12
n-Pentane	0.6020	72	5	1.84
3-Mpentane	0.4011	86	6	1.23
n-Hexane	0.9227	84	6	2.90
n-Heptane	0.2435	100	7	0.75
n-Octane	0.2636	114	8	0.81
n-Nonane	0.1478	128	9	0.46
n-Decane	0.0845	142	10	0.26
CO2	0.1457	44	1	0.15
Total CO2				81.71
Total CO ₂ (e) as CH4				269.44

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	4.05	0.03	84.99
Sherwood I-IX	9	250,000	4	9,000,000	153.25	1.04	3,219.20
Deethanzier	1	459,000	4	1,836,000	31.26	0.21	656.72
Total					188.55	1.28	3,960.90

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

**Compressor Engine Emissions (Per Engine)
 (CM-1001 CM-1002)**

Source Designation:	
Manufacturer:	Caterpillar
Model No.:	G3616 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):	4,735
Specific Fuel Consumption (Btu/bhp-hr)	7,484
Maximum Fuel Consumption at 100% Load (scf/hr):	31,527
Heat Input (MMBtu/hr)	35.44
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	8,760
Potential Fuel Consumption (MMscf/yr):	276.18

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)	0.14	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)	0.16	g/bhp-hr
Formaldehyde (HCHO) (uncontrolled)	0.40	g/bhp-hr
Formaldehyde (HCHO) (controlled)	0.04	g/bhp-hr

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	5.22	22.86
CO (uncontrolled)	28.71	125.73
CO (controlled)	1.46	6.40
SO ₂	0.02	0.09
PM ₁₀ (Filterable)	0.003	0.01
PM _{2.5} (Filterable)	0.003	0.01
PM Condensable	0.35	1.54
PM Total	0.35	1.55
VOC (uncontrolled)	6.58	28.80
VOC (controlled)	1.67	7.32
Formaldehyde (HCHO) (uncontrolled)	4.18	18.29
Formaldehyde (HCHO) (controlled)	0.42	1.83

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	4.43E-05	1.94E-04
Acenaphthylene	5.53E-06	1.96E-04	8.58E-04
Acetaldehyde	8.36E-03	2.96E-01	1.30E+00
Acrolein	5.14E-03	1.82E-01	7.98E-01
Benzene	4.40E-04	1.56E-02	6.83E-02
Benzo(b)fluoranthene	1.66E-07	5.88E-06	2.58E-05
Benzo(e)pyrene	4.15E-07	1.47E-05	6.44E-05
Benzo(g,h,i)perylene	4.14E-07	1.47E-05	6.43E-05
Biphenyl	2.12E-04	7.51E-03	3.29E-02
1,3-Butadiene	2.67E-04	9.46E-03	4.14E-02
Carbon Tetrachloride	3.67E-05	1.30E-03	5.70E-03
Chlorobenzene	3.04E-05	1.08E-03	4.72E-03
Chloroform	2.85E-05	1.01E-03	4.42E-03
Chrysene	6.93E-07	2.46E-05	1.08E-04
1,3-Dichloropropene	2.64E-05	9.36E-04	4.10E-03
Ethylbenzene	3.97E-05	1.41E-03	6.16E-03
Ethylene Dibromide	4.43E-05	1.57E-03	6.88E-03
Fluoranthene	1.11E-06	3.93E-05	1.72E-04
Fluorene	5.67E-06	2.01E-04	8.80E-04
Methanol	2.50E-03	8.86E-02	3.88E-01
Methylene Chloride	2.00E-05	7.09E-04	3.10E-03
n-Hexane	1.11E-03	3.93E-02	1.72E-01
Phenanthrene	1.04E-05	3.69E-04	1.61E-03
Phenol	2.40E-05	8.50E-04	3.73E-03
Pyrene	1.36E-06	4.82E-05	2.11E-04
Styrene	2.36E-05	8.36E-04	3.66E-03
Toluene	4.08E-04	1.45E-02	6.33E-02
1,1,2,2-Tetrachloroethane	4.00E-05	1.42E-03	6.21E-03
Tetrachloroethane	2.48E-06	8.79E-05	3.85E-04
1,1,2-Trichloroethane	3.18E-05	1.13E-03	4.94E-03
2,2,4-Trimethylpentane	2.50E-04	8.86E-03	3.88E-02
Vinyl Chloride	1.49E-05	5.28E-04	2.31E-03
Xylene	1.84E-04	6.52E-03	2.86E-02
Polycyclic Organic Matter:			
Naphthalene	7.44E-05	2.64E-03	1.15E-02
2-Methylnaphthalene	3.32E-05	1.18E-03	5.15E-03
PAH	2.69E-05	9.53E-04	4.18E-03
Total HAP		1.10	4.84

^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," Supplement F, August 2000. NO_x, VOC, CO, and formaldehyde emission factors are based on manufacturer's data.

^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).

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

**Compressor Engine Emissions (Per Engine)
 (CM-2001)**

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)	0.14	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)	1.10	g/bhp-hr
VOC (controlled)	0.28	g/bhp-hr
Formaldehyde (HCHO) (uncontrolled)	0.26	g/bhp-hr
Formaldehyde (HCHO) (controlled)	0.03	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)	0.73	3.20
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)	5.75	25.17
VOC (controlled)	1.46	6.41
Formaldehyde (HCHO) (uncontrolled)	1.36	5.95
Formaldehyde (HCHO) (controlled)	0.16	0.69

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		0.46	2.02

^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
 (G-1)**

Source Designation:	
Manufacturer:	Generac
Model No.:	MMG80
Stroke Cycle:	4-Cycle
Type of Burn:	Diesel
Year Installed:	2012
Fuel Used:	Diesel
Fuel High Heating Value (HHV) (Btu/gal):	137,380
Rated Horsepower (bhp):	102
Specific Fuel Consumption (gal/hr)	5.6
Maximum Fuel Consumption at 100% Load (gal/hr):	5.6
Heat Input (MMBtu/hr)	0.77
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	500
Potential Fuel Consumption (gal/yr):	2,800

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors ^a	Units
NO _x	2.72	g/bhp-hr
CO (uncontrolled)	4.00	g/bhp-hr
CO (controlled)	4.00	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)	0.15	g/bhp-hr
VOC (controlled)	0.15	g/bhp-hr

**Emergency Generator Engine Emissions
(G-1)**

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	0.61	0.15
CO (uncontrolled)	0.90	0.22
CO (controlled)	0.90	0.22
SO ₂	0.12	0.03
PM ₁₀ (Filterable)	0.046	0.01
PM _{2.5} (Filterable)	0.046	0.01
PM Condensable	0.05	0.01
PM Total	0.05	0.01
VOC (uncontrolled)	0.03	0.01
VOC (controlled)	0.03	0.01

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	5.90E-04	1.48E-04
Acrolein	9.25E-05	7.12E-05	1.78E-05
Benzene	9.33E-04	7.18E-04	1.79E-04
1,3-Butadiene	3.91E-05	3.01E-05	7.52E-06
Formaldehyde	1.18E-03	9.08E-04	2.27E-04
Toluene	4.09E-04	3.15E-04	7.87E-05
Xylene	2.85E-04	2.19E-04	5.48E-05
Polycyclic Organic Matter:			
Naphthalene	8.48E-05	6.52E-05	1.63E-05
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,"

^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)
(G-2 & G-3)

Source Designation:	
Manufacturer:	Generac
Model No.:	MMG130D
Stroke Cycle:	4-stroke
Type of Burn:	Diesel
Year Installed	2012
Fuel Used:	Diesel
Fuel High Heating Value (HHV) (Btu/gal):	137,380
Rated Horsepower (bhp):	152
Specific Fuel Consumption (gal/hr)	7.4
Maximum Fuel Consumption at 100% Load (gal/hr):	7.4
Heat Input (MMBtu/hr)	1.02
Stack Designation:	TBD

Operational Details:

Potential Annual Hours of Operation (hr/yr):	500
Potential Fuel Consumption (gal/yr):	3,700

Criteria and Manufacturer Specific Pollutant Emission Factors:

Pollutant	Emission Factors^a	Units
NOx	2.91	g/bhp-hr
CO (uncontrolled)	4.28	g/bhp-hr
CO (controlled)	4.28	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)	0.16	g/bhp-hr
VOC (controlled)	0.16	g/bhp-hr

Emergency Generator Engine Emissions (per engine)
(G-2 & G-3)

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Potential Emissions	
	(lb/hr) ^b	(tons/yr) ^c
NO _x	0.97	0.24
CO (uncontrolled)	1.43	0.36
CO (controlled)	1.43	0.36
SO ₂	0.15	0.04
PM ₁₀ (Filterable)	0.061	0.02
PM _{2.5} (Filterable)	0.061	0.02
PM Condensable	0.06	0.02
PM Total	0.06	0.02
VOC (uncontrolled)	0.05	0.01
VOC (controlled)	0.05	0.01

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	7.80E-04	1.95E-04
Acrolein	9.25E-05	9.40E-05	2.35E-05
Benzene	9.33E-04	9.48E-04	2.37E-04
1,3-Butadiene	3.91E-05	3.97E-05	9.94E-06
Formaldehyde	1.18E-03	1.20E-03	3.00E-04
Toluene	4.09E-04	4.16E-04	1.04E-04
Xylene	2.85E-04	2.90E-04	7.24E-05
Polycyclic Organic Matter:			
Naphthalene	8.48E-05	8.62E-05	2.16E-05
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,"

^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.
 Sherwood Gas Plant

**Regeneration Heater
 (H-711, H-2711)**

Source Designation:	
Manufacturer:	Devco
Year Installed	2012/2013
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heater Duty (MMBtu/hr)	5.42
Available Excess Duty	10.00%
Burner Efficiency	75.90%
Heat Input (MMBtu/hr)	7.85
Fuel Consumption (mmscf/hr):	6.98E-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	33.72	0.24	1.03
CO	67.44	0.47	2.06
SO ₂	0.66	0.00	0.02
PM Total	8.37	0.06	0.26
PM Condensable	6.28	0.04	0.19
PM ₁₀ (Filterable)	2.09	0.01	0.06
PM _{2.5} (Filterable)	2.09	0.01	0.06
VOC	6.06	0.04	0.19

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	1.26E-08	5.51E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.12E-07	4.89E-07
Acenaphthene	1.80E-06	1.26E-08	5.51E-08
Acenaphthylene	1.80E-06	1.26E-08	5.51E-08
Anthracene	2.40E-06	1.68E-08	7.34E-08
Benzo(a)anthracene	1.80E-06	1.26E-08	5.51E-08
Benzene	2.10E-03	1.47E-05	6.42E-05
Benzo(a)pyrene	1.20E-06	8.38E-09	3.67E-08
Benzo(b)fluoranthene	1.80E-06	1.26E-08	5.51E-08
Benzo(g,h,i)perylene	1.20E-06	8.38E-09	3.67E-08
Benzo(k)fluoranthene	1.80E-06	1.26E-08	5.51E-08
Chrysene	1.80E-06	1.26E-08	5.51E-08
Dibenzo(a,h)anthracene	1.20E-06	8.38E-09	3.67E-08
Dichlorobenzene	1.20E-03	8.38E-06	3.67E-05
Fluoranthene	3.00E-06	2.10E-08	9.18E-08
Fluorene	2.80E-06	1.96E-08	8.57E-08
Formaldehyde	7.50E-02	5.24E-04	2.29E-03
Hexane	1.80E+00	1.26E-02	5.51E-02
Indol(1,2,3-cd)pyrene	1.80E-06	1.26E-08	5.51E-08
Phenanthrene	1.70E-05	1.19E-07	5.20E-07
Pyrene	5.00E-06	3.49E-08	1.53E-07
Toluene	3.40E-03	2.37E-05	1.04E-04
Arsenic	2.00E-04	1.40E-06	6.12E-06
Beryllium	1.20E-05	8.38E-08	3.67E-07
Cadmium	1.10E-03	7.68E-06	3.37E-05
Chromium	1.40E-03	9.78E-06	4.28E-05
Cobalt	8.40E-05	5.87E-07	2.57E-06
Lead	5.00E-04	3.49E-06	1.53E-05
Manganese	3.80E-04	2.65E-06	1.16E-05
Mercury	2.60E-04	1.82E-06	7.95E-06
Nickel	2.10E-03	1.47E-05	6.42E-05
Selenium	2.40E-05	1.68E-07	7.34E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.68E-07	7.34E-07
Naphthalene	6.10E-04	4.26E-06	1.87E-05
Total HAP		1.32E-02	5.78E-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).

^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.
 Sherwood Gas Plant

Stabilizer Heater (H-751)

Source Designation:	
Manufacturer:	Devco
Year Installed	2017
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heater Duty (MMBtu/hr)	5.00
Available Excess Duty	10.00%
Burner Efficiency	86.61%
Heat Input (MMBtu/hr)	6.35
Fuel Consumption (mmscf/hr):	5.65E-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	44.96	0.25	1.11
CO	44.96	0.25	1.11
SO ₂	0.60	0.00	0.01
PM Total	8.37	0.05	0.21
PM Condensable	6.28	0.04	0.16
PM ₁₀ (Filterable)	2.09	0.01	0.05
PM _{2.5} (Filterable)	2.09	0.01	0.05
VOC	6.06	0.03	0.15

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	1.02E-08	4.45E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	9.04E-08	3.96E-07
Acenaphthene	1.80E-06	1.02E-08	4.45E-08
Acenaphthylene	1.80E-06	1.02E-08	4.45E-08
Anthracene	2.40E-06	1.36E-08	5.94E-08
Benz(a)anthracene	1.80E-06	1.02E-08	4.45E-08
Benzene	2.10E-03	1.19E-05	5.20E-05
Benzo(a)pyrene	1.20E-06	6.78E-09	2.97E-08
Benzo(b)fluoranthene	1.80E-06	1.02E-08	4.45E-08
Benzo(g,h,i)perylene	1.20E-06	6.78E-09	2.97E-08
Benzo(k)fluoranthene	1.80E-06	1.02E-08	4.45E-08
Chrysene	1.80E-06	1.02E-08	4.45E-08
Dibenzo(a,h)anthracene	1.20E-06	6.78E-09	2.97E-08
Dichlorobenzene	1.20E-03	6.78E-06	2.97E-05
Fluoranthene	3.00E-06	1.69E-08	7.42E-08
Fluorene	2.80E-06	1.58E-08	6.93E-08
Formaldehyde	7.50E-02	4.24E-04	1.86E-03
Hexane	1.80E+00	1.02E-02	4.45E-02
Indo(1,2,3-cd)pyrene	1.80E-06	1.02E-08	4.45E-08
Phenanthrene	1.70E-05	9.60E-08	4.21E-07
Pyrene	5.00E-06	2.82E-08	1.24E-07
Toluene	3.40E-03	1.92E-05	8.41E-05
Arsenic	2.00E-04	1.13E-06	4.95E-06
Beryllium	1.20E-05	6.78E-08	2.97E-07
Cadmium	1.10E-03	6.21E-06	2.72E-05
Chromium	1.40E-03	7.91E-06	3.46E-05
Cobalt	8.40E-05	4.75E-07	2.08E-06
Lead	5.00E-04	2.82E-06	1.24E-05
Manganese	3.80E-04	2.15E-06	9.40E-06
Mercury	2.60E-04	1.47E-06	6.43E-06
Nickel	2.10E-03	1.19E-05	5.20E-05
Selenium	2.40E-05	1.36E-07	5.94E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.36E-07	5.94E-07
Naphthalene	6.10E-04	3.45E-06	1.51E-05
Total HAP		1.07E-02	4.67E-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).

^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.
 Sherwood Gas Plant

**Regeneration Heater
(H-3711)**

Source Designation:	
Manufacturer:	Zeeco
Year Installed	2013
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heater Duty (MMBtu/hr)	12.42
Available Excess Duty	10.00%
Burner Efficiency	87.70%
Heat Input (MMBtu/hr)	15.58
Fuel Consumption (mmscf/hr):	1.39E-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	33.72	0.47	2.05
CO	67.44	0.93	4.09
SO ₂	0.66	0.01	0.04
PM Total	8.37	0.12	0.51
PM Condensable	6.28	0.09	0.38
PM ₁₀ (Filterable)	2.09	0.03	0.13
PM _{2.5} (Filterable)	2.09	0.03	0.13
VOC	6.06	0.08	0.37

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	2.49E-08	1.09E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	2.22E-07	9.71E-07
Acenaphthene	1.80E-06	2.49E-08	1.09E-07
Acenaphthylene	1.80E-06	2.49E-08	1.09E-07
Anthracene	2.40E-06	3.33E-08	1.46E-07
Benzo(a)anthracene	1.80E-06	2.49E-08	1.09E-07
Benzene	2.10E-03	2.91E-05	1.27E-04
Benzo(a)pyrene	1.20E-06	1.66E-08	7.28E-08
Benzo(b)fluoranthene	1.80E-06	2.49E-08	1.09E-07
Benzo(g,h,i)perylene	1.20E-06	1.66E-08	7.28E-08
Benzo(k)fluoranthene	1.80E-06	2.49E-08	1.09E-07
Chrysene	1.80E-06	2.49E-08	1.09E-07
Dibenzo(a,h)anthracene	1.20E-06	1.66E-08	7.28E-08
Dichlorobenzene	1.20E-03	1.66E-05	7.28E-05
Fluoranthene	3.00E-06	4.16E-08	1.82E-07
Fluorene	2.80E-06	3.88E-08	1.70E-07
Formaldehyde	7.50E-02	1.04E-03	4.55E-03
Hexane	1.80E+00	2.49E-02	1.09E-01
Indo(1,2,3-cd)pyrene	1.80E-06	2.49E-08	1.09E-07
Phenanthrene	1.70E-05	2.36E-07	1.03E-06
Pyrene	5.00E-06	6.93E-08	3.04E-07
Toluene	3.40E-03	4.71E-05	2.06E-04
Arsenic	2.00E-04	2.77E-06	1.21E-05
Beryllium	1.20E-05	1.66E-07	7.28E-07
Cadmium	1.10E-03	1.52E-05	6.68E-05
Chromium	1.40E-03	1.94E-05	8.50E-05
Cobalt	8.40E-05	1.16E-06	5.10E-06
Lead	5.00E-04	6.93E-06	3.04E-05
Manganese	3.80E-04	5.27E-06	2.31E-05
Mercury	2.60E-04	3.60E-06	1.58E-05
Nickel	2.10E-03	2.91E-05	1.27E-04
Selenium	2.40E-05	3.33E-07	1.46E-06
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	3.33E-07	1.46E-06
Naphthalene	6.10E-04	8.45E-06	3.70E-05
Total HAP		2.62E-02	1.15E-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).

^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.
 Sherwood Gas Plant

**Regeneration Heater
 (H-4711 - H-9711)**

Source Designation:	
Manufacturer:	Tulsa Heater Inc
Year Installed	2013 - 2017
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heater Duty (MMBtu/hr)	14.22
Available Excess Duty	10%
Burner Efficiency	86.9%
Heat Input (MMBtu/hr)	18.00
Fuel Consumption (mmscf/hr):	1.60E-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	44.96	0.720	3.154
CO	44.96	0.720	3.154
SO ₂	0.66	0.011	0.046
PM Total	8.37	0.134	0.587
PM Condensable	6.28	0.101	0.441
PM ₁₀ (Filterable)	2.09	0.034	0.147
PM _{2.5} (Filterable)	2.09	0.034	0.147
VOC	6.06	0.097	0.425

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	2.88E-08	1.26E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	2.56E-07	1.12E-06
Acenaphthene	1.80E-06	2.88E-08	1.26E-07
Acenaphthylene	1.80E-06	2.88E-08	1.26E-07
Anthracene	2.40E-06	3.84E-08	1.68E-07
Benz(a)anthracene	1.80E-06	2.88E-08	1.26E-07
Benzene	2.10E-03	3.36E-05	1.47E-04
Benzo(a)pyrene	1.20E-06	1.92E-08	8.42E-08
Benzo(b)fluoranthene	1.80E-06	2.88E-08	1.26E-07
Benzo(g,h,i)perylene	1.20E-06	1.92E-08	8.42E-08
Benzo(k)fluoranthene	1.80E-06	2.88E-08	1.26E-07
Chrysene	1.80E-06	2.88E-08	1.26E-07
Dibenzo(a,h) anthracene	1.20E-06	1.92E-08	8.42E-08
Dichlorobenzene	1.20E-03	1.92E-05	8.42E-05
Fluoranthene	3.00E-06	4.80E-08	2.10E-07
Fluorene	2.80E-06	4.48E-08	1.96E-07
Formaldehyde	7.50E-02	1.20E-03	5.26E-03
Hexane	1.80E+00	2.88E-02	1.26E-01
Indo(1,2,3-cd)pyrene	1.80E-06	2.88E-08	1.26E-07
Phenanthrene	1.70E-05	2.72E-07	1.19E-06
Pyrene	5.00E-06	8.01E-08	3.51E-07
Toluene	3.40E-03	5.44E-05	2.38E-04
Arsenic	2.00E-04	3.20E-06	1.40E-05
Beryllium	1.20E-05	1.92E-07	8.42E-07
Cadmium	1.10E-03	1.76E-05	7.72E-05
Chromium	1.40E-03	2.24E-05	9.82E-05
Cobalt	8.40E-05	1.35E-06	5.89E-06
Lead	5.00E-04	8.01E-06	3.51E-05
Manganese	3.80E-04	6.09E-06	2.67E-05
Mercury	2.60E-04	4.16E-06	1.82E-05
Nickel	2.10E-03	3.36E-05	1.47E-04
Selenium	2.40E-05	3.84E-07	1.68E-06
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	3.84E-07	1.68E-06
Naphthalene	6.10E-04	9.77E-06	4.28E-05
Total HAP		3.02E-02	1.32E-01

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

^b Nox, CO, VOC, PM emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMbtu/hr) × Emission Factor (lb/MMbtu).

^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.
 Sherwood Gas Plant

**Hot Oil Heater
(H-771)**

Source Designation:	
Manufacturer:	Devco
Year Installed	2012
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heater Duty (MMBtu/hr)	20.7
Available Excess Duty	10%
Burner Efficiency	75.90%
Heat Input (MMBtu/hr)	30.04
Fuel Consumption (mmscf/hr):	2.67E-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	33.72	0.901	3.948
CO	67.44	1.803	7.895
SO ₂	0.66	0.0177	0.0774
PM Total	8.37	0.2239	0.9805
PM Condensable	6.28	0.168	0.735
PM ₁₀ (Filterable)	2.09	0.056	0.245
PM _{2.5} (Filterable)	2.09	0.056	0.245
VOC	6.06	0.162	0.710

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	4.81E-08	2.11E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	4.28E-07	1.87E-06
Acenaphthene	1.80E-06	4.81E-08	2.11E-07
Acenaphthylene	1.80E-06	4.81E-08	2.11E-07
Anthracene	2.40E-06	6.41E-08	2.81E-07
Benz(a)anthracene	1.80E-06	4.81E-08	2.11E-07
Benzene	2.10E-03	5.61E-05	2.46E-04
Benzo(a)pyrene	1.20E-06	3.21E-08	1.40E-07
Benzo(b)fluoranthene	1.80E-06	4.81E-08	2.11E-07
Benzo(g,h,i)perylene	1.20E-06	3.21E-08	1.40E-07
Benzo(k)fluoranthene	1.80E-06	4.81E-08	2.11E-07
Chrysene	1.80E-06	4.81E-08	2.11E-07
Dibenzo(a,h)anthracene	1.20E-06	3.21E-08	1.40E-07
Dichlorobenzene	1.20E-03	3.21E-05	1.40E-04
Fluoranthene	3.00E-06	8.02E-08	3.51E-07
Fluorene	2.80E-06	7.48E-08	3.28E-07
Formaldehyde	7.50E-02	2.00E-03	8.78E-03
Hexane	1.80E+00	4.81E-02	2.11E-01
Indo(1,2,3-cd)pyrene	1.80E-06	4.81E-08	2.11E-07
Phenanthrene	1.70E-05	4.54E-07	1.99E-06
Pyrene	5.00E-06	1.34E-07	5.85E-07
Toluene	3.40E-03	9.09E-05	3.98E-04
Arsenic	2.00E-04	5.35E-06	2.34E-05
Beryllium	1.20E-05	3.21E-07	1.40E-06
Cadmium	1.10E-03	2.94E-05	1.29E-04
Chromium	1.40E-03	3.74E-05	1.64E-04
Cobalt	8.40E-05	2.25E-06	9.83E-06
Lead	5.00E-04	1.34E-05	5.85E-05
Manganese	3.80E-04	1.02E-05	4.45E-05
Mercury	2.60E-04	6.95E-06	3.04E-05
Nickel	2.10E-03	5.61E-05	2.46E-04
Selenium	2.40E-05	6.41E-07	2.81E-06
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	6.41E-07	2.81E-06
Naphthalene	6.10E-04	1.63E-05	7.14E-05
Total HAP		5.05E-02	2.21E-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).

^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.
 Sherwood Gas Plant

**Hot Oil Heaters
 (H-4712, H-6712)**

Source Designation:	
Manufacturer:	Zeeco USA, L.L.C.
Year Installed	2014
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heater Duty (MMBtu/hr)	5.00
Available Excess Duty	10%
Burner Efficiency	83.6%
Maximum Heat Input (mmbtu/hr)	6.6
Fuel Consumption (mmscf/hr):	5.85E-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	44.96	0.263	1.153
CO	44.96	0.263	1.153
SO ₂	0.66	0.004	0.017
PM Total	8.37	0.049	0.215
PM Condensable	6.28	0.037	0.161
PM ₁₀ (Filterable)	2.09	0.012	0.054
PM _{2.5} (Filterable)	2.09	0.012	0.054
VOC	6.06	0.035	0.155

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	1.05E-08	4.61E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	9.37E-08	4.10E-07
Acenaphthene	1.80E-06	1.05E-08	4.61E-08
Acenaphthylene	1.80E-06	1.05E-08	4.61E-08
Anthracene	2.40E-06	1.40E-08	6.15E-08
Benz(a)anthracene	1.80E-06	1.05E-08	4.61E-08
Benzene	2.10E-03	1.23E-05	5.38E-05
Benzo(a)pyrene	1.20E-06	7.02E-09	3.08E-08
Benzo(b)fluoranthene	1.80E-06	1.05E-08	4.61E-08
Benzo(g,h,i)perylene	1.20E-06	7.02E-09	3.08E-08
Benzo(k)fluoranthene	1.80E-06	1.05E-08	4.61E-08
Chrysene	1.80E-06	1.05E-08	4.61E-08
Dibenzo(a,h)anthracene	1.20E-06	7.02E-09	3.08E-08
Dichlorobenzene	1.20E-03	7.02E-06	3.08E-05
Fluoranthene	3.00E-06	1.76E-08	7.69E-08
Fluorene	2.80E-06	1.64E-08	7.18E-08
Formaldehyde	7.50E-02	4.39E-04	1.92E-03
Hexane	1.80E+00	1.05E-02	4.61E-02
Indo(1,2,3-cd)pyrene	1.80E-06	1.05E-08	4.61E-08
Phenanthrene	1.70E-05	9.95E-08	4.36E-07
Pyrene	5.00E-06	2.93E-08	1.28E-07
Toluene	3.40E-03	1.99E-05	8.72E-05
Arsenic	2.00E-04	1.17E-06	5.13E-06
Beryllium	1.20E-05	7.02E-08	3.08E-07
Cadmium	1.10E-03	6.44E-06	2.82E-05
Chromium	1.40E-03	8.19E-06	3.59E-05
Cobalt	8.40E-05	4.92E-07	2.15E-06
Lead	5.00E-04	2.93E-06	1.28E-05
Manganese	3.80E-04	2.22E-06	9.74E-06
Mercury	2.60E-04	1.52E-06	6.67E-06
Nickel	2.10E-03	1.23E-05	5.38E-05
Selenium	2.40E-05	1.40E-07	6.15E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.40E-07	6.15E-07
Naphthalene	6.10E-04	3.57E-06	1.56E-05
Total HAP		1.11E-02	4.84E-02

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

^b Nox, CO, PM, and VOC emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMbtu/hr) × Emission Factor (lb/MMbtu).

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

MarkWest Liberty Midstream and Resources, L.L.C.
 Sherwood Gas Plant

**DeEthanizer Regen Heater
 (D1-H-741)**

Source Designation:	
Make/Model:	Tulsa Heater Inc
Year Installed	2015
Fuel Used:	Residue Gas
Lower Heating Value (LHV) (Btu/scf):	1,124
Heater Duty (MMBtu/hr)	7.81
Available Excess Duty	30%
Burner Efficiency	83%
Heat Input (MMBtu/hr)	12.23
Fuel Consumption (mmscf/hr):	1.11E-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	44.96	0.500	2.189
CO	46.08	0.512	2.244
SO ₂	0.66	0.007	0.032
PM	14.61	0.162	0.712
PM Condensable	6.28	0.070	0.306
PM ₁₀ (Filterable)	2.09	0.023	0.102
PM _{2.5} (Filterable)	2.09	0.023	0.102
VOC	6.06	0.067	0.295

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	2.00E-08	8.77E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.78E-07	7.79E-07
Acenaphthene	1.80E-06	2.00E-08	8.77E-08
Acenaphthylene	1.80E-06	2.00E-08	8.77E-08
Anthracene	2.40E-06	2.67E-08	1.17E-07
Benz(a)anthracene	1.80E-06	2.00E-08	8.77E-08
Benzene	2.10E-03	2.33E-05	1.02E-04
Benzo(a)pyrene	1.20E-06	1.33E-08	5.84E-08
Benzo(b)fluoranthene	1.80E-06	2.00E-08	8.77E-08
Benzo(g,h,i)perylene	1.20E-06	1.33E-08	5.84E-08
Benzo(k)fluoranthene	1.80E-06	2.00E-08	8.77E-08
Chrysene	1.80E-06	2.00E-08	8.77E-08
Dibenzo(a,h)anthracene	1.20E-06	1.33E-08	5.84E-08
Dichlorobenzene	1.20E-03	1.33E-05	5.84E-05
Fluoranthene	3.00E-06	3.34E-08	1.46E-07
Fluorene	2.80E-06	3.11E-08	1.36E-07
Formaldehyde	7.50E-02	8.34E-04	3.65E-03
Hexane	1.80E+00	2.00E-02	8.77E-02
Indo(1,2,3-cd)pyrene	1.80E-06	2.00E-08	8.77E-08
Phenanthrene	1.70E-05	1.89E-07	8.28E-07
Pyrene	5.00E-06	5.56E-08	2.43E-07
Toluene	3.40E-03	3.78E-05	1.66E-04
Arsenic	2.00E-04	2.22E-06	9.74E-06
Beryllium	1.20E-05	1.33E-07	5.84E-07
Cadmium	1.10E-03	1.22E-05	5.36E-05
Chromium	1.40E-03	1.56E-05	6.82E-05
Cobalt	8.40E-05	9.34E-07	4.09E-06
Lead	5.00E-04	5.56E-06	2.43E-05
Manganese	3.80E-04	4.22E-06	1.85E-05
Mercury	2.60E-04	2.89E-06	1.27E-05
Nickel	2.10E-03	2.33E-05	1.02E-04
Selenium	2.40E-05	2.67E-07	1.17E-06
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	2.67E-07	1.17E-06
Naphthalene	6.10E-04	6.78E-06	2.97E-05
Total HAP		2.10E-02	9.20E-02

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

^b Manufacturer data sheet. See attached vendor information

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

^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.
 Sherwood Gas Plant

**Hot Oil Heaters
 (H-8712)**

Source Designation:	
Manufacturer:	Zeeco USA, L.L.C.
Year Installed	2014
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heater Duty (MMBtu/hr)	5.75
Burner Efficiency	80.0%
Maximum Heat Input (mmbtu/hr)	7.19
Fuel Consumption (mmscf/hr):	6.39E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/mmbtu)^{a,b}	Potential Emissions	
		(lb/hr)^c	(tons/yr)^d
NO _x	44.96	0.288	1.259
CO	44.96	0.288	1.259
SO ₂	0.66	0.004	0.019
PM Total	8.37	0.054	0.235
PM Condensable	6.28	0.040	0.176
PM ₁₀ (Filterable)	2.09	0.013	0.059
PM _{2.5} (Filterable)	2.09	0.013	0.059
VOC	6.06	0.039	0.170

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	1.15E-08	5.04E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.02E-07	4.48E-07
Acenaphthene	1.80E-06	1.15E-08	5.04E-08
Acenaphthylene	1.80E-06	1.15E-08	5.04E-08
Anthracene	2.40E-06	1.53E-08	6.72E-08
Benz(a)anthracene	1.80E-06	1.15E-08	5.04E-08
Benzene	2.10E-03	1.34E-05	5.88E-05
Benzo(a)pyrene	1.20E-06	7.67E-09	3.36E-08
Benzo(b)fluoranthene	1.80E-06	1.15E-08	5.04E-08
Benzo(g,h,i)perylene	1.20E-06	7.67E-09	3.36E-08
Benzo(k)fluoranthene	1.80E-06	1.15E-08	5.04E-08
Chrysene	1.80E-06	1.15E-08	5.04E-08
Dibenzo(a,h) anthracene	1.20E-06	7.67E-09	3.36E-08
Dichlorobenzene	1.20E-03	7.67E-06	3.36E-05
Fluoranthene	3.00E-06	1.92E-08	8.40E-08
Fluorene	2.80E-06	1.79E-08	7.84E-08
Formaldehyde	7.50E-02	4.80E-04	2.10E-03
Hexane	1.80E+00	1.15E-02	5.04E-02
Indo(1,2,3-cd)pyrene	1.80E-06	1.15E-08	5.04E-08
Phenanthrene	1.70E-05	1.09E-07	4.76E-07
Pyrene	5.00E-06	3.20E-08	1.40E-07
Toluene	3.40E-03	2.17E-05	9.52E-05
Arsenic	2.00E-04	1.28E-06	5.60E-06
Beryllium	1.20E-05	7.67E-08	3.36E-07
Cadmium	1.10E-03	7.03E-06	3.08E-05
Chromium	1.40E-03	8.95E-06	3.92E-05
Cobalt	8.40E-05	5.37E-07	2.35E-06
Lead	5.00E-04	3.20E-06	1.40E-05
Manganese	3.80E-04	2.43E-06	1.06E-05
Mercury	2.60E-04	1.66E-06	7.28E-06
Nickel	2.10E-03	1.34E-05	5.88E-05
Selenium	2.40E-05	1.53E-07	6.72E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	1.53E-07	6.72E-07
Naphthalene	6.10E-04	3.90E-06	1.71E-05
Total HAP		1.21E-02	5.29E-02

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

^b Nox, CO, PM, and VOC emission factors from vendor guarantee.

^c Emission Rate (lb/hr) = Rated Capacity (MMbtu/hr) × Emission Factor (lb/MMbtu).

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

MarkWest Liberty Midstream and Resources, L.L.C.
 Sherwood Gas Plant

**DeEthanizer HMO Heater
 (D1-H-782)**

Source Designation:	
Make/Model:	Tulsa Heater Inc
Year Installed	2015
Fuel Used:	Residue Gas
Lower Heating Value (LHV) (Btu/scf):	1,124
Heat Input Per Burner (MMBtu/hr)	14.90
Burners	8
Heat Input (MMBtu/hr)	119.20
Fuel Consumption (mmscf/hr):	1.03E-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	33.72	3.475	15.220
CO	44.96	4.633	20.294
SO ₂	0.66	0.068	0.298
PM	8.37	0.863	3.780
PM Condensable	6.28	0.647	2.835
PM ₁₀ (Filterable)	2.09	0.216	0.945
PM _{2.5} (Filterable)	2.09	0.216	0.945
VOC	6.06	0.625	2.736

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	1.85E-07	8.12E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.65E-06	7.22E-06
Acenaphthene	1.80E-06	1.85E-07	8.12E-07
Acenaphthylene	1.80E-06	1.85E-07	8.12E-07
Anthracene	2.40E-06	2.47E-07	1.08E-06
Benz(a)anthracene	1.80E-06	1.85E-07	8.12E-07
Benzene	2.10E-03	2.16E-04	9.48E-04
Benzo(a)pyrene	1.20E-06	1.24E-07	5.42E-07
Benzo(b)fluoranthene	1.80E-06	1.85E-07	8.12E-07
Benzo(g,h,i)perylene	1.20E-06	1.24E-07	5.42E-07
Benzo(k)fluoranthene	1.80E-06	1.85E-07	8.12E-07
Chrysene	1.80E-06	1.85E-07	8.12E-07
Dibenzo(a,h) anthracene	1.20E-06	1.24E-07	5.42E-07
Dichlorobenzene	1.20E-03	1.24E-04	5.42E-04
Fluoranthene	3.00E-06	3.09E-07	1.35E-06
Fluorene	2.80E-06	2.89E-07	1.26E-06
Formaldehyde	7.50E-02	7.73E-03	3.39E-02
Hexane	1.80E+00	1.85E-01	8.12E-01
Indo(1,2,3-cd)pyrene	1.80E-06	1.85E-07	8.12E-07
Phenanthrene	1.70E-05	1.75E-06	7.67E-06
Pyrene	5.00E-06	5.15E-07	2.26E-06
Toluene	3.40E-03	3.50E-04	1.53E-03
Arsenic	2.00E-04	2.06E-05	9.03E-05
Beryllium	1.20E-05	1.24E-06	5.42E-06
Cadmium	1.10E-03	1.13E-04	4.97E-04
Chromium	1.40E-03	1.44E-04	6.32E-04
Cobalt	8.40E-05	8.66E-06	3.79E-05
Lead	5.00E-04	5.15E-05	2.26E-04
Manganese	3.80E-04	3.92E-05	1.72E-04
Mercury	2.60E-04	2.68E-05	1.17E-04
Nickel	2.10E-03	2.16E-04	9.48E-04
Selenium	2.40E-05	2.47E-06	1.08E-05
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	2.47E-06	1.08E-05
Naphthalene	6.10E-04	6.29E-05	2.75E-04
Total HAP		1.95E-01	8.52E-01

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

^b Manufacturer data sheet. See attached vendor information

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

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

**MarkWest Liberty Midstream and Resources, L.L.C.
 Sherwood Gas Plant
 Dehydrator Flare**

Source Designation:	
Manufacturer:	Aereon
Operating Hours: (hr/yr)	8,760
Pilot + Purge Gas Heat Input (MMBtu/hr)	0.243
Pilot + Purge Gas Annual Fuel Use (mmscf/yr)	1.752
Pilot Fuel Consumption (mmscf/hr):	1.00E-04
Purge Fuel Consumption (mmscf/hr):	1.00E-04
Fuel HHV (Btu/scf)	1,215

Pollutant	AP-42 Emission Factor	
	Factor	Corrected Factor
	(lb/mmscf)^a	
NO _x	100	119.1
CO	84	100.0
SO ₂	0.6	0.7
PM Total	7.6	9.1
PM Condensable	5.7	6.8
PM ₁₀ (Filterable)	1.9	2.3
PM _{2.5} (Filterable)	1.9	2.3

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1 corrected for site-specific gas heat content.

^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).

Combustion of Hydrocarbons

Source Designation:	
Hourly Gas Flow (scf/hr)	41.74
Annual Gas Flow (mmscf/yr)	0.37
Heating value (btu/scf)	1,556.96
Maximum Heat Release of Flare (mmbtu/hr)	0.1
Maximum Heat Release of Flare (mmbtu/yr)	569
NO _x Emission Rate (lb/mmbtu)	0.068
CO Emission Rate (lb/mmbtu)	0.37

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

Total Emissions

Pollutant	lb/hr	tpy
NO _x	0.0282	0.1237
CO	0.0441	0.1929
SO ₂	0.0001	0.0006
PM Total	0.0018	0.0079
PM Condensable	0.0014	0.0059
PM ₁₀ (Filterable)	0.0005	0.0020
PM _{2.5} (Filterable)	0.0005	0.0020

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

**Glycol Dehydrator Emissions
 (DH-001)**

GRI-GLYCalc Version 4.0 - EMISSIONS SUMMARY

EMISSION RATES

Pollutant	(lbs/hr)	(lbs/day)	(tons/yr)
Methane	1.9228	46.148	8.4221
Ethane	0.8275	19.860	3.6245
Propane	0.5091	12.217	2.2296
Isobutane	0.0938	2.252	0.4111
n-Butane	0.2760	6.624	1.2088
Isopentane	0.0801	1.924	0.3511
n-Pentane	0.1235	2.963	0.5408
n-Hexane	0.1213	2.912	0.5315
Cyclohexane	0.0448	1.075	0.1962
Other Hexanes	0.1129	2.711	0.4947
Heptanes	0.1638	3.932	0.7176
Benzene	0.0400	0.960	0.1752
Toluene	0.1189	2.853	0.5207
Xylenes	0.0555	1.331	0.2430
C8 + Heavier Hydrocarbons	0.2775	6.660	1.2155
Total Emissions	4.7676	114.423	20.8822
Total Hydrocarbon Emissions	4.7676	114.423	20.8822
Total VOC Emissions	2.0173	48.415	8.8357
Total HAP Emissions	0.3357	8.057	1.4704

* Based on GRI GlyCalc 4.0 runs at worst case emission scenario of dry gas flowrate of 120 MMscf/day and T and P of 99°F and 1,000 psig, respectively. Assumes minimum flare control efficiency of 98%.

** Unit is equipped with a flash tank. Exhaust from flash tank is recycled resulting in zero emissions from the flash tank.

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

**Dehydration Unit Reboiler
 (RB-001)**

Source Designation:	
Manufacturer:	Unknown
Year Installed	2012
Fuel Used:	Natural Gas
Higher Heating Value (HHV) (Btu/scf):	1,124
Heat Input (MMBtu/hr)	2.00
Fuel Consumption (mmscf/hr):	1.78E-03
Potential Annual Hours of Operation (hr/yr):	8,760

Criteria and Manufacturer Specific Pollutant Emission Rates

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
NO _x	110.20	0.196	0.859
CO	92.56	0.165	0.721
SO ₂	0.66	0.0012	0.0052
PM Total	8.37	0.0149	0.0653
PM Condensable	6.28	0.011	0.049
PM ₁₀ (Filterable)	2.09	0.004	0.016
PM _{2.5} (Filterable)	2.09	0.004	0.016
VOC	6.06	0.011	0.047

Hazardous Air Pollutant (HAP) Potential Emissions

Pollutant	Emission Factor (lb/MMscf) ^a	Potential Emissions	
		(lb/hr) ^b	(tons/yr) ^c
HAPs:			
3-Methylchloranthrene	1.80E-06	3.20E-09	1.40E-08
7,12-Dimethylbenz(a)anthracene	1.60E-05	2.85E-08	1.25E-07
Acenaphthene	1.80E-06	3.20E-09	1.40E-08
Acenaphthylene	1.80E-06	3.20E-09	1.40E-08
Anthracene	2.40E-06	4.27E-09	1.87E-08
Benz(a)anthracene	1.80E-06	3.20E-09	1.40E-08
Benzene	2.10E-03	3.74E-06	1.64E-05
Benzo(a)pyrene	1.20E-06	2.14E-09	9.35E-09
Benzo(b)fluoranthene	1.80E-06	3.20E-09	1.40E-08
Benzo(e,h,i)perylene	1.20E-06	2.14E-09	9.35E-09
Benzo(k)fluoranthene	1.80E-06	3.20E-09	1.40E-08
Chrysene	1.80E-06	3.20E-09	1.40E-08
Dibenzo(a,h)anthracene	1.20E-06	2.14E-09	9.35E-09
Dichlorobenzene	1.20E-03	2.14E-06	9.35E-06
Fluoranthene	3.00E-06	5.34E-09	2.34E-08
Fluorene	2.80E-06	4.98E-09	2.18E-08
Formaldehyde	7.50E-02	1.33E-04	5.85E-04
Hexane	1.80E+00	3.20E-03	1.40E-02
Indo(1,2,3-cd)pyrene	1.80E-06	3.20E-09	1.40E-08
Phenanthrene	1.70E-05	3.02E-08	1.32E-07
Pyrene	5.00E-06	8.90E-09	3.90E-08
Toluene	3.40E-03	6.05E-06	2.65E-05
Arsenic	2.00E-04	3.56E-07	1.56E-06
Beryllium	1.20E-05	2.14E-08	9.35E-08
Cadmium	1.10E-03	1.96E-06	8.57E-06
Chromium	1.40E-03	2.49E-06	1.09E-05
Cobalt	8.40E-05	1.49E-07	6.55E-07
Lead	5.00E-04	8.90E-07	3.90E-06
Manganese	3.80E-04	6.76E-07	2.96E-06
Mercury	2.60E-04	4.63E-07	2.03E-06
Nickel	2.10E-03	3.74E-06	1.64E-05
Selenium	2.40E-05	4.27E-08	1.87E-07
Polycyclic Organic Matter:			
Methylnaphthalene (2-)	2.40E-05	4.27E-08	1.87E-07
Naphthalene	6.10E-04	1.09E-06	4.75E-06
Total HAP		3.36E-03	1.47E-02

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

^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).

MarkWest Liberty Midstream and Resources, L.L.C.
Sherwood Gas Plant - Plant Flare (FS-762)

Source Designation:	
Manufacturer:	
Operating Hours: (hr/yr)	8,760
Pilot + Purge Gas Heat Input (MMBtu/hr)	0.243
Pilot + Purge Gas Annual Fuel Use (mmscf/yr)	1.752
Pilot Fuel Consumption (mmscf/hr):	1.00E-04
Purge Fuel Consumption (mmscf/hr):	1.00E-04
Fuel HHV (Btu/scf)	1,215

Pollutant	AP-42 Emission Factor	
	Factor	Corrected Factor
	(lb/mmscf)^a	
NO _x	100	119.1
CO	84	100.0
SO ₂	0.6	0.7
PM Total	7.6	9.1
PM Condensable	5.7	6.8
PM ₁₀ (Filterable)	1.9	2.3
PM _{2.5} (Filterable)	1.9	2.3

^a Emission factors from AP-42 Section 1.4 "Natural Gas Combustion" Tables 1.4-1 corrected for site-specific gas heat content.

^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).

Combustion of Hydrocarbons

Source Designation:	
Hourly Gas Flow (scf/hr)	19,188
Annual Gas Flow (mmscf/yr)	168.09
Heating value (btu/scf)	1,237.15
Maximum Heat Release of Flare (mmbtu/hr)	23.7
Maximum Heat Release of Flare (mmbtu/yr)	207,951
NO _x Emission Rate (lb/mmbtu)	0.068
CO Emission Rate (lb/mmbtu)	0.37

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

Total Emissions

Pollutant	lb/hr	tpy
NO _x	1.6381	7.1747
CO	8.8033	38.5587
SO ₂	0.0001	0.0006
PM Total	0.0018	0.0079
PM Condensable	0.0014	0.0059
PM ₁₀ (Filterable)	0.0005	0.0020
PM _{2.5} (Filterable)	0.0005	0.0020

Process Area	Component Type	No. of Components	Service ³	AP42 Leak Factor (lb/hr/component)	Reduction ²	Post-Control Emission Factor (lb/hr/component)	VOC Wt %	HAP Wt %	CO ₂ Wt %	CH ₄ Wt %	Emissions							
											Total HC (lb/hr)	Total VOC (lb/hr)	Total HAP (lb/hr)	Total HAP (tpy)	Total CO ₂ (lb/hr)	Total CO ₂ (tpy)		
Booster Station	Compressor ¹	2	Vapor	0.019400	85%	0.00291	14.87%	0.29%	0.44%	64.47%	0.01	0.00	0.00	0.00	0.00	0.00		
	Connector	1742	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.47%	0.54	0.08	0.33	0.00	0.01	7.25		
	Connector	946	Light Liquid	0.000463	30%	0.00032	95.67%	8.60%	0.03%	1.53%	0.31	0.29	1.29	0.03	0.13	0.10		
	PRV	18	Vapor	0.019400	97%	0.00058	14.87%	0.29%	0.44%	64.47%	0.01	0.00	0.01	0.00	0.00	0.14		
	Valve	347	Vapor	0.009920	97%	0.00030	14.87%	0.29%	0.44%	64.47%	0.04	0.02	0.07	0.00	0.00	1.40		
	Valve	264	Light Liquid	0.005500	97%	0.00017	95.67%	8.60%	0.03%	1.53%	0.10	0.04	0.18	0.00	0.02	0.01		
	Flange	153	Light Liquid	0.000243	30%	0.00017	95.67%	8.60%	0.03%	1.53%	0.03	0.02	0.11	0.00	0.01	0.01		
	Total												1.03	0.46	2.01	0.04	0.15	39.45
	DeEthnizer	Compressor	1	Vapor	0.019400	85%	0.00291	14.87%	0.29%	0.44%	64.47%	0.00	0.00	0.00	0.00	0.00	0.00	
		Connector	957	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.47%	0.29	0.04	0.19	0.00	0.00	3.98	
		Connector	584	Light Liquid	0.000463	30%	0.00032	95.67%	8.60%	0.03%	1.53%	0.00	0.00	0.00	0.00	0.00	0.00	
		Connector	584	Vapor	0.000440	30%	0.00031	100.00%	0.00%	0.00%	0.00%	0.18	0.18	0.79	0.00	0.00	0.00	
		Connector	12	Light Liquid	0.000463	30%	0.00032	100.00%	0.00%	0.00%	0.00%	0.00	0.00	0.02	0.00	0.00	0.00	
		Connector	616	Vapor	0.000440	30%	0.00031	10.00%	0.18%	0.29%	43.29%	0.19	0.02	0.08	0.00	0.00	1.73	
		Connector	86	Light Liquid	0.000463	30%	0.00032	10.00%	0.29%	0.44%	64.47%	0.03	0.00	0.01	0.00	0.00	0.00	
PRV		17	Vapor	0.019400	97%	0.00058	14.87%	0.29%	0.44%	64.47%	0.01	0.01	0.03	0.00	0.00	0.13		
PRV		10	Vapor	0.019400	97%	0.00058	100.00%	0.00%	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00		
PRV		5	Vapor	0.019400	97%	0.00058	100.00%	0.00%	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00		
Pump		2	Vapor	0.005290	85%	0.00079	14.87%	0.29%	0.44%	64.47%	0.00	0.00	0.01	0.00	0.00	0.02		
Pump		4	Vapor	0.005290	85%	0.00079	100.00%	0.00%	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00		
Pump		4	Vapor	0.005290	85%	0.00079	100.00%	0.00%	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00		
Valve		361	Vapor	0.005290	85%	0.00079	10.00%	0.18%	0.29%	43.29%	0.12	0.02	0.08	0.00	0.00	1.58		
Valve		2	Light Liquid	0.005290	85%	0.00030	95.67%	8.60%	0.03%	1.53%	0.00	0.00	0.00	0.00	0.00	0.00		
Valve		168	Vapor	0.005290	85%	0.00030	100.00%	0.00%	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00		
Valve		11	Light Liquid	0.005290	85%	0.00030	10.00%	0.29%	0.44%	64.47%	0.06	0.01	0.03	0.00	0.00	0.53		
Valve		11	Vapor	0.005290	85%	0.00030	10.00%	0.29%	0.44%	64.47%	0.03	0.00	0.01	0.00	0.00	0.00		
Valve		195	Vapor	0.005500	87%	0.00017	10.00%	0.18%	0.29%	43.29%	0.00	0.00	0.00	0.00	0.00	0.00		
Valve		48	Light Liquid	0.005500	87%	0.00017	14.87%	0.29%	0.44%	64.47%	0.00	0.00	0.00	0.00	0.00	0.00		
Flange		384	Vapor	0.000860	30%	0.00060	95.67%	8.60%	0.03%	1.53%	0.00	0.00	0.00	0.00	0.00	0.00		
Flange		2	Light Liquid	0.000243	30%	0.00017	95.67%	8.60%	0.03%	1.53%	0.00	0.00	0.00	0.00	0.00	0.00		
Flange		194	Vapor	0.000860	30%	0.00060	100.00%	0.00%	0.00%	0.00%	0.12	0.12	0.51	0.00	0.00	0.00		
Flange	156	Vapor	0.000860	30%	0.00060	10.00%	0.18%	0.29%	43.29%	0.09	0.01	0.06	0.00	0.00	0.86			
Flange	58	Light Liquid	0.000243	30%	0.00017	10.00%	0.29%	0.44%	64.47%	0.01	0.00	0.00	0.00	0.00	0.00			
Total												1.41	0.50	2.09	0.00	0.00	0.00	
Fire	Connector	70	Vapor	0.000440	30%	0.00031	10.00%	0.18%	0.29%	43.29%	0.02	0.00	0.13	0.00	0.01	12.06		
	Connector	1	Light Liquid	0.000463	30%	0.00032	10.00%	0.29%	0.44%	64.47%	0.00	0.00	0.00	0.00	0.00	0.00		
	Pump	1	Vapor	0.005290	85%	0.00079	10.00%	0.18%	0.29%	43.29%	0.00	0.00	0.00	0.00	0.00	0.00		
	Valve	32	Vapor	0.005920	97%	0.00030	10.00%	0.18%	0.29%	43.29%	0.01	0.00	0.00	0.00	0.00	0.01		
	Flange	67	Vapor	0.000860	30%	0.00060	10.00%	0.18%	0.29%	43.29%	0.04	0.00	0.02	0.00	0.00	0.37		
	Flange	15	Light Liquid	0.000243	30%	0.00017	10.00%	0.29%	0.44%	64.47%	0.00	0.00	0.00	0.00	0.00	0.00		
Total												0.08	0.01	0.03	0.00	0.00	0.00	

Process Area	Component Type	No. of Components	Service ¹	AP-42 Leak Factor (lb/hr/component)	Reduction ²	Past-Control Emission Factor (lb/hr/component)	VOC Wt %	HAP Wt %	CH ₄ Wt %	Emissions				Total CO ₂ e (lb/hr)	Total CO ₂ e (tpy)			
										Total HAP (lb/hr)	Total VOC (lb/hr)	Total HC (lb/hr)	Total HAP (tpy)					
Sherwood 1	Compressor	7	Vapor	0.019400	85%	0.00291	14.87%	0.29%	0.44%	64.47%	0.01	0.00	0.00	0.00	0.08	0.35		
	Connector	1142	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.47%	0.25	0.05	0.23	0.00	0.00	4.76	20.86	
	Connector	845	Light Liquid	0.000463	30%	0.00032	14.87%	0.29%	0.44%	64.47%	0.27	0.06	0.24	0.00	0.00	0.11	0.09	
	Connector	940	Vapor	0.000440	30%	0.00031	10.00%	0.19%	0.29%	43.35%	0.29	0.03	0.13	0.00	0.00	0.00	2.64	11.55
	Connector	984	Light Liquid	0.000463	30%	0.00032	10.00%	0.19%	0.29%	43.35%	0.32	0.03	0.14	0.00	0.00	0.01	0.01	
	Connector	37	Vapor	0.000440	30%	0.00031	88.97%	4.49%	0.21%	13.85%	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.05
	Connector	4	Light Liquid	0.000463	30%	0.00032	99.79%	10.04%	0.00%	0.00%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	PRV	32	Vapor	0.019400	97%	0.00058	14.87%	0.29%	0.44%	64.47%	0.02	0.00	0.01	0.00	0.00	0.00	0.25	1.10
	PRV	10	Vapor	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.23
	PRV	2	Light Liquid	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pump	2	Light Liquid	0.019400	97%	0.00058	88.97%	4.49%	0.21%	13.85%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	Pump	2	Light Liquid	0.019400	97%	0.00058	88.97%	4.49%	0.21%	13.85%	0.01	0.01	0.04	0.00	0.00	0.00	0.00	0.01
	Pump	5	Vapor	0.005500	85%	0.00039	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pump	5	Light Liquid	0.005500	85%	0.00039	10.00%	0.19%	0.29%	43.35%	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00
	Valve	512	Light Liquid	0.005500	85%	0.00039	14.87%	0.29%	0.44%	64.47%	0.15	0.04	0.18	0.00	0.00	0.00	2.66	9.04
	Valve	255	Light Liquid	0.005500	85%	0.00039	88.97%	4.49%	0.21%	13.85%	0.08	0.01	0.04	0.00	0.00	0.00	0.00	0.01
	Valve	271	Vapor	0.009200	97%	0.00063	10.00%	0.19%	0.29%	43.35%	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.01
	Valve	266	Light Liquid	0.009200	97%	0.00063	10.00%	0.19%	0.29%	43.35%	0.23	0.05	0.21	0.00	0.00	0.00	0.00	0.00
	Valve	13	Vapor	0.005500	97%	0.00039	68.97%	4.46%	0.21%	13.85%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Valve	4	Light Liquid	0.005500	97%	0.00039	68.97%	4.46%	0.21%	13.85%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Flange	537	Vapor	0.000660	30%	0.00047	14.87%	0.29%	0.44%	64.47%	0.10	0.01	0.05	0.00	0.00	0.00	0.00	0.00
	Flange	174	Light Liquid	0.000660	30%	0.00047	88.97%	4.49%	0.21%	13.85%	0.03	0.03	0.13	0.00	0.00	0.00	0.00	0.00
	Flange	174	Vapor	0.000660	30%	0.00047	10.00%	0.19%	0.29%	43.35%	0.03	0.03	0.13	0.00	0.00	0.00	0.00	0.00
	Flange	164	Light Liquid	0.000660	30%	0.00047	10.00%	0.19%	0.29%	43.35%	0.03	0.03	0.13	0.00	0.00	0.00	0.00	0.00
	Flange	16	Vapor	0.000660	30%	0.00047	68.97%	4.48%	0.21%	13.85%	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.00
Flange	9	Light Liquid	0.000660	30%	0.00047	68.97%	4.48%	0.21%	13.85%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Total																		
Sherwood 2	Compressor	2	Vapor	0.019400	85%	0.00291	14.87%	0.29%	0.44%	64.47%	0.01	0.00	0.00	0.00	0.00	0.08	0.35	
	Compressor	1	Vapor	0.019400	85%	0.00291	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Connector	1100	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.47%	0.34	0.05	0.22	0.00	0.00	4.59	20.10	
	Connector	56	Light Liquid	0.000463	30%	0.00032	95.67%	8.80%	0.03%	1.53%	0.02	0.02	0.08	0.00	0.00	0.01	0.01	
	Connector	415	Vapor	0.000440	30%	0.00031	10.00%	0.19%	0.29%	43.35%	0.13	0.01	0.06	0.00	0.00	0.00	1.16	5.10
	Connector	740	Light Liquid	0.000463	30%	0.00032	10.00%	0.19%	0.29%	43.35%	0.24	0.02	0.11	0.00	0.00	0.01	0.01	
	PRV	15	Vapor	0.019400	97%	0.00058	14.87%	0.29%	0.44%	64.47%	0.01	0.00	0.01	0.00	0.00	0.00	0.12	0.52
	PRV	5	Vapor	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	PRV	8	Light Liquid	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Pump	5	Light Liquid	0.028600	85%	0.00450	10.00%	0.19%	0.29%	43.35%	0.16	0.02	0.09	0.00	0.00	0.00	0.00	
	Valve	450	Vapor	0.005500	97%	0.00039	14.87%	0.29%	0.44%	64.47%	0.13	0.02	0.09	0.00	0.00	0.00	1.81	7.94
	Valve	44	Light Liquid	0.005500	97%	0.00039	88.97%	4.49%	0.21%	13.85%	0.01	0.01	0.03	0.00	0.00	0.00	0.00	
	Valve	165	Vapor	0.005500	97%	0.00039	10.00%	0.19%	0.29%	43.35%	0.05	0.00	0.02	0.00	0.00	0.00	0.45	1.96
	Valve	238	Light Liquid	0.005500	97%	0.00039	10.00%	0.19%	0.29%	43.35%	0.04	0.00	0.02	0.00	0.00	0.00	0.00	
	Flange	348	Vapor	0.000660	30%	0.00047	14.87%	0.29%	0.44%	64.47%	0.21	0.03	0.14	0.00	0.00	0.00	2.84	12.43
	Flange	105	Light Liquid	0.000660	30%	0.00047	88.97%	4.49%	0.21%	13.85%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Flange	105	Vapor	0.000660	30%	0.00047	10.00%	0.19%	0.29%	43.35%	0.06	0.01	0.03	0.00	0.00	0.00	0.00	
	Flange	251	Light Liquid	0.000660	30%	0.00047	10.00%	0.19%	0.29%	43.35%	0.04	0.00	0.02	0.00	0.00	0.00	0.00	
	Total																	
	Sherwood 3	Compressor	3	Vapor	0.019400	85%	0.00291	14.87%	0.29%	0.44%	64.47%	0.01	0.00	0.00	0.00	0.00	0.04	0.17
		Compressor	1	Vapor	0.019400	85%	0.00291	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Connector	1915	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.47%	0.39	0.09	0.38	0.00	0.00	0.01	7.99
		Connector	1562	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.47%	0.48	0.05	0.21	0.00	0.00	0.00	4.38
		PRV	28	Vapor	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.02	0.00	0.01	0.00	0.00	0.00	0.22
		PRV	15	Vapor	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.01	0.00	0.00	0.00	0.00	0.00	0.08
Pump		5	Vapor	0.005500	85%	0.00039	14.87%	0.29%	0.44%	64.47%	0.16	0.02	0.10	0.00	0.00	0.00	0.00	
Valve		535	Vapor	0.005500	85%	0.00039	10.00%	0.19%	0.29%	43.35%	0.12	0.02	0.07	0.00	0.00	0.00	0.00	
Valve		512	Vapor	0.005500	85%	0.00039	10.00%	0.19%	0.29%	43.35%	0.15	0.02	0.07	0.00	0.00	0.00	0.00	
Flange		652	Vapor	0.000660	30%	0.00047	14.87%	0.29%	0.44%	64.47%	0.40	0.06	0.26	0.00	0.00	0.01	5.40	
Flange		623	Vapor	0.000660	30%	0.00047	10.00%	0.19%	0.29%	43.35%	0.38	0.04	0.16	0.00	0.00	0.00	3.42	
Total																		

Process Area	Component Type	No. of Components	Service ²	AP-42 Leak Factor (lb/hr/component)	Reduction ¹	Past-Control Emission Factor (lb/hr/component)	VOC Wt %	HAP Wt %	CO ₂ Wt %	CH ₄ Wt %	Emissions				
											Total HC (lb/hr)	Total VOC (lb/hr)	Total HAP (lb/hr)	Total CO ₂ (lb/hr)	Total CO _{2e} (ton)
Sherwood 4	Connector	12	Vapor	0.000440	30%	0.000312	14.87%	0.29%	0.44%	64.47%	0.00	0.00	0.00	0.00	0.00
	Connector	1183	Light Liquid	0.000463	30%	0.000331	95.67%	8.80%	0.61%	0.38	0.37	0.03	0.15	0.12	0.54
	Connector	338	Vapor	0.000463	30%	0.000331	10.00%	0.18%	0.29%	43.35%	0.10	0.05	0.00	0.00	0.95
	Connector	1008	Light Liquid	0.000463	30%	0.000331	10.00%	0.02%	0.00%	0.16%	0.14	0.00	0.01	0.01	0.05
	PRV	1	Vapor	0.019400	97%	0.000558	14.87%	0.25%	0.44%	64.47%	0.00	0.00	0.00	0.00	0.01
	PRV	38	Light Liquid	0.016500	97%	0.000558	95.67%	8.80%	0.03%	1.53%	0.02	0.02	0.08	0.00	0.01
	PRV	7	Vapor	0.019400	97%	0.000558	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.04
	PRV	34	Light Liquid	0.016500	97%	0.000558	10.00%	0.02%	0.00%	0.16%	0.01	0.04	0.00	0.00	0.00
	Pump	2	Light Liquid	0.028650	65%	0.004330	95.67%	8.80%	0.02%	0.00%	0.16%	0.01	0.04	0.00	0.00
	Pump	7	Light Liquid	0.028650	65%	0.004330	10.00%	0.02%	0.00%	0.16%	0.01	0.04	0.00	0.00	0.00
	Valve	22	Vapor	0.009220	97%	0.000317	14.87%	0.29%	0.44%	64.47%	0.00	0.00	0.00	0.00	0.00
	Valve	443	Light Liquid	0.009220	97%	0.000317	95.67%	8.80%	0.03%	1.53%	0.07	0.07	0.31	0.01	0.03
	Valve	202	Vapor	0.009220	97%	0.000317	10.00%	0.19%	0.29%	43.35%	0.00	0.01	0.00	0.00	0.28
	Valve	442	Light Liquid	0.009220	97%	0.000317	10.00%	0.02%	0.00%	0.16%	0.05	0.00	0.00	0.00	0.01
	Flange	27	Vapor	0.000650	30%	0.000463	14.87%	0.44%	0.44%	64.47%	0.02	0.01	0.00	0.00	0.22
	Flange	26	Light Liquid	0.000650	30%	0.000463	95.67%	8.80%	0.03%	1.53%	0.04	0.04	0.19	0.00	0.02
	Flange	67	Vapor	0.000650	30%	0.000463	10.00%	0.19%	0.29%	43.35%	0.05	0.01	0.02	0.00	0.47
	Flange	337	Light Liquid	0.000650	30%	0.000463	10.00%	0.02%	0.00%	0.16%	0.06	0.01	0.03	0.00	0.00
	Compressor	2	Light Liquid	0.016500	65%	0.00248	95.67%	8.80%	0.03%	1.53%	1.24	0.58	2.53	0.05	2.28
	Compressor	1	Vapor	0.016500	65%	0.00248	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.02	0.00	0.00
	Compressor	770	Light Liquid	0.016500	65%	0.00248	10.00%	0.03%	0.00%	0.16%	0.00	0.00	0.00	0.00	0.00
	Connector	752	Light Liquid	0.000463	30%	0.000317	14.87%	0.29%	0.44%	64.47%	0.24	0.04	0.15	0.00	0.03
	Connector	109	Heavy Liquid	0.000463	30%	0.000317	95.67%	8.80%	0.03%	1.53%	0.24	0.23	1.02	0.02	0.09
	Connector	129	Vapor	0.000463	30%	0.000317	10.00%	0.19%	0.29%	43.35%	0.04	0.00	0.01	0.00	0.00
	Connector	165	Light Liquid	0.000463	30%	0.000317	10.00%	0.02%	0.00%	0.16%	0.00	0.00	0.01	0.00	0.00
	Connector	10	Heavy Liquid	0.000463	30%	0.000317	10.00%	0.02%	0.00%	0.16%	0.00	0.00	0.00	0.00	0.00
	Connector	8	Vapor	0.000463	30%	0.000317	95.67%	8.80%	0.03%	1.53%	0.00	0.00	0.00	0.00	0.00
	Connector	26	Heavy Liquid	0.000463	30%	0.000317	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00
	PRV	22	Vapor	0.019400	97%	0.000558	14.87%	0.29%	0.44%	64.47%	0.01	0.00	0.00	0.00	0.00
	PRV	9	Light Liquid	0.016500	65%	0.000558	95.67%	8.80%	0.03%	1.53%	0.00	0.00	0.02	0.00	0.00
	PRV	2	Vapor	0.019400	97%	0.000558	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00
	Pump	281	Vapor	0.009220	65%	0.00079	10.00%	0.02%	0.00%	0.16%	0.02	0.00	0.01	0.00	0.00
	Pump	4	Light Liquid	0.028650	65%	0.00079	10.00%	0.02%	0.00%	0.16%	0.00	0.00	0.00	0.00	0.00
Valve	412	Vapor	0.009220	97%	0.000317	14.87%	0.29%	0.44%	64.47%	0.08	0.01	0.05	0.00	0.00	
Valve	53	Heavy Liquid	0.000919	97%	0.000317	95.67%	8.80%	0.03%	1.53%	0.07	0.07	0.28	0.01	0.03	
Valve	34	Vapor	0.009220	97%	0.000317	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	
Valve	82	Light Liquid	0.009220	97%	0.000317	10.00%	0.02%	0.00%	0.16%	0.01	0.00	0.00	0.00	0.00	
Valve	4	Heavy Liquid	0.000919	97%	0.000317	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	
Valve	1	Vapor	0.009220	97%	0.000317	10.00%	0.02%	0.00%	0.16%	0.00	0.00	0.00	0.00	0.00	
Valve	23	Heavy Liquid	0.000919	97%	0.000317	95.67%	8.80%	0.03%	1.53%	0.00	0.00	0.00	0.00	0.00	
Flange	207	Vapor	0.000650	30%	0.000463	14.87%	0.29%	0.44%	64.47%	0.12	0.02	0.08	0.00	0.00	
Flange	350	Light Liquid	0.000650	30%	0.000463	95.67%	8.80%	0.03%	1.53%	0.04	0.04	0.19	0.00	0.02	
Flange	43	Heavy Liquid	0.000650	30%	0.000463	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	
Flange	53	Vapor	0.000650	30%	0.000463	10.00%	0.02%	0.00%	0.16%	0.01	0.00	0.00	0.00	0.00	
Flange	58	Light Liquid	0.000650	30%	0.000463	10.00%	0.02%	0.00%	0.16%	0.01	0.00	0.00	0.00	0.00	
Flange	4	Heavy Liquid	0.000650	30%	0.000463	95.67%	8.80%	0.03%	1.53%	0.00	0.00	0.00	0.00	0.00	
Flange	1	Vapor	0.000650	30%	0.000463	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	
Flange	20	Heavy Liquid	0.000650	30%	0.000463	95.67%	8.80%	0.03%	1.53%	0.00	0.00	0.00	0.00	0.00	
Total											0.44	1.92	0.03	0.15	6.99

Total											0.44	1.92	0.03	0.15	6.99
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Process Area	Component Type	No. of Components	Service ¹	AP-42 Leak Factor (lb/hr/component)	Reduction ²	Past-Control Emission Factor (lb/hr/component)	VOC Wt. %	MAP Wt. %	CO ₂ Wt. %	CH ₄ Wt. %	Emissions				Total CO ₂ e (t/yr)			
											Total HC (lb/yr)	Total VOC (t/yr)	Total HAP (t/yr)	Total HAP (lb/yr)				
Sherwood 6	Compressor	3	Vapor	0.019400	85%	0.00291	14.87%	0.29%	0.44%	64.7%	0.01	0.00	0.03	0.00	0.00	0.12		
	Compressor	2	Vapor	0.019400	85%	0.00291	10.00%	0.19%	0.29%	43.35%	0.01	0.00	0.00	0.00	0.00	0.06		
	Compressor	1	Vapor	0.019400	85%	0.00291	68.97%	4.49%	0.21%	13.89%	0.20	0.01	0.00	0.00	0.00	0.01		
	Connector	651	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.7%	0.20	0.03	0.13	0.00	0.00	2.72		
	Connector	457	Light Liquid	0.000463	30%	0.00032	95.67%	8.80%	0.03%	0.03%	0.15	0.14	0.62	0.01	0.06	0.05		
	Connector	1362	Vapor	0.000440	30%	0.00031	10.00%	0.19%	0.29%	43.35%	0.42	0.04	0.18	0.00	0.00	3.82		
	Connector	37	Light Liquid	0.000463	30%	0.00032	10.00%	0.92%	0.00%	0.00%	0.01	0.00	0.11	0.00	0.00	0.00		
	Connector	114	Vapor	0.000440	30%	0.00031	88.97%	4.49%	0.21%	13.89%	0.04	0.02	0.11	0.00	0.01	0.10		
	Connector	37	Light Liquid	0.000463	30%	0.00032	95.78%	10.04%	0.09%	0.09%	0.01	0.01	0.05	0.00	0.01	0.00		
	PRV	2	Vapor	0.019400	97%	0.00058	14.87%	0.44%	0.29%	64.7%	0.00	0.00	0.00	0.00	0.00	0.02		
	PRV	5	Vapor	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.03		
	PRV	2	Vapor	0.019400	97%	0.00058	88.97%	4.49%	0.21%	13.89%	0.00	0.00	0.00	0.00	0.00	0.00		
	Pump	1	Light Liquid	0.028650	85%	0.00430	14.87%	0.29%	0.44%	64.7%	0.00	0.00	0.00	0.00	0.00	0.00		
	Pump	5	Vapor	0.005250	85%	0.00035	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00		
	Valve	324	Vapor	0.005250	97%	0.00037	14.87%	0.29%	0.44%	64.7%	0.00	0.01	0.08	0.00	0.00	0.00		
	Valve	324	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.02	0.02	0.02	0.00	0.00	1.02		
	Valve	276	Vapor	0.005250	97%	0.00037	10.00%	0.19%	0.29%	43.35%	0.11	0.01	0.05	0.00	0.00	0.00		
	Valve	276	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.00	0.00	0.00	0.00	0.00	0.00		
	Valve	6	Vapor	0.005250	97%	0.00037	10.00%	0.19%	0.29%	43.35%	0.13	0.02	0.09	0.00	0.00	0.00		
	Valve	24	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.00	0.00	0.00	0.00	0.00	0.00		
	Valve	223	Vapor	0.000660	30%	0.00050	14.87%	0.29%	0.44%	64.7%	0.00	0.00	0.00	0.00	0.00	0.00		
	Flange	101	Light Liquid	0.000243	30%	0.00017	95.67%	8.80%	0.03%	0.03%	0.13	0.02	0.07	0.00	0.00	0.82		
	Flange	311	Vapor	0.000660	30%	0.00050	10.00%	0.19%	0.29%	43.35%	0.13	0.02	0.07	0.00	0.00	0.00		
	Flange	51	Vapor	0.000660	30%	0.00050	88.97%	4.49%	0.21%	13.89%	0.13	0.02	0.09	0.00	0.01	0.09		
	Flange	31	Light Liquid	0.000243	30%	0.00017	95.78%	10.04%	0.09%	0.09%	0.01	0.01	0.02	0.00	0.00	0.00		
	Total											1.48	0.40	1.75	0.03	0.11	13.97	56.79
	Sherwood 7	Compressor	3	Vapor	0.019400	85%	0.00291	14.87%	0.29%	0.44%	64.7%	0.01	0.00	0.01	0.00	0.00	0.12	
		Compressor	2	Vapor	0.019400	85%	0.00291	10.00%	0.19%	0.29%	43.35%	0.01	0.00	0.00	0.00	0.00	0.05	
		Compressor	1	Vapor	0.019400	85%	0.00291	68.97%	4.49%	0.21%	13.89%	0.20	0.01	0.00	0.00	0.00	0.01	
		Connector	651	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.7%	0.20	0.03	0.13	0.00	0.00	2.72	
		Connector	457	Light Liquid	0.000463	30%	0.00032	95.67%	8.80%	0.03%	0.03%	0.15	0.14	0.62	0.01	0.06	0.05	
Connector		1362	Vapor	0.000440	30%	0.00031	10.00%	0.19%	0.29%	43.35%	0.42	0.04	0.18	0.00	0.00	3.82		
Connector		37	Light Liquid	0.000463	30%	0.00032	10.00%	0.92%	0.00%	0.00%	0.01	0.00	0.11	0.00	0.00	0.00		
Connector		114	Vapor	0.000440	30%	0.00031	88.97%	4.49%	0.21%	13.89%	0.04	0.02	0.11	0.00	0.01	0.10		
Connector		37	Light Liquid	0.000463	30%	0.00032	95.78%	10.04%	0.09%	0.09%	0.00	0.00	0.00	0.00	0.00	0.02		
PRV		2	Vapor	0.019400	97%	0.00058	14.87%	0.44%	0.29%	64.7%	0.00	0.00	0.00	0.00	0.00	0.00		
PRV		5	Vapor	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00		
PRV		2	Vapor	0.019400	97%	0.00058	88.97%	4.49%	0.21%	13.89%	0.00	0.00	0.00	0.00	0.00	0.00		
Pump		1	Light Liquid	0.028650	85%	0.00430	14.87%	0.29%	0.44%	64.7%	0.00	0.00	0.00	0.00	0.00	0.00		
Pump		5	Vapor	0.005250	85%	0.00035	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00		
Valve		324	Vapor	0.005250	97%	0.00037	14.87%	0.29%	0.44%	64.7%	0.00	0.01	0.08	0.00	0.00	0.00		
Valve		324	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.02	0.02	0.02	0.00	0.00	1.02		
Valve		276	Vapor	0.005250	97%	0.00037	10.00%	0.19%	0.29%	43.35%	0.11	0.01	0.05	0.00	0.00	0.00		
Valve		276	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.00	0.00	0.00	0.00	0.00	0.00		
Valve		6	Vapor	0.005250	97%	0.00037	10.00%	0.19%	0.29%	43.35%	0.13	0.02	0.09	0.00	0.00	0.00		
Valve		24	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.00	0.00	0.00	0.00	0.00	0.00		
Flange		101	Light Liquid	0.000243	30%	0.00017	95.67%	8.80%	0.03%	0.03%	0.13	0.02	0.07	0.00	0.00	0.82		
Flange		311	Vapor	0.000660	30%	0.00050	10.00%	0.19%	0.29%	43.35%	0.13	0.02	0.07	0.00	0.00	0.00		
Flange		51	Vapor	0.000660	30%	0.00050	88.97%	4.49%	0.21%	13.89%	0.13	0.02	0.09	0.00	0.01	0.09		
Flange		31	Light Liquid	0.000243	30%	0.00017	95.78%	10.04%	0.09%	0.09%	0.01	0.01	0.02	0.00	0.00	0.00		
Total											1.48	0.40	1.75	0.03	0.11	13.97	56.79	
Sherwood 8		Compressor	3	Vapor	0.019400	85%	0.00291	14.87%	0.29%	0.44%	64.7%	0.01	0.00	0.01	0.00	0.00	0.12	
		Compressor	2	Vapor	0.019400	85%	0.00291	10.00%	0.19%	0.29%	43.35%	0.01	0.00	0.00	0.00	0.00	0.05	
		Compressor	1	Vapor	0.019400	85%	0.00291	68.97%	4.49%	0.21%	13.89%	0.20	0.01	0.00	0.00	0.00	0.01	
		Connector	651	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.7%	0.20	0.03	0.13	0.00	0.00	2.72	
		Connector	457	Light Liquid	0.000463	30%	0.00032	95.67%	8.80%	0.03%	0.03%	0.15	0.14	0.62	0.01	0.06	0.05	
		Connector	1362	Vapor	0.000440	30%	0.00031	10.00%	0.19%	0.29%	43.35%	0.42	0.04	0.18	0.00	0.00	3.82	
	Connector	37	Light Liquid	0.000463	30%	0.00032	10.00%	0.92%	0.00%	0.00%	0.01	0.00	0.11	0.00	0.00	0.00		
	Connector	114	Vapor	0.000440	30%	0.00031	88.97%	4.49%	0.21%	13.89%	0.04	0.02	0.11	0.00	0.01	0.10		
	Connector	37	Light Liquid	0.000463	30%	0.00032	95.78%	10.04%	0.09%	0.09%	0.00	0.00	0.00	0.00	0.00	0.02		
	PRV	2	Vapor	0.019400	97%	0.00058	14.87%	0.44%	0.29%	64.7%	0.00	0.00	0.00	0.00	0.00	0.00		
	PRV	5	Vapor	0.019400	97%	0.00058	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00		
	PRV	2	Vapor	0.019400	97%	0.00058	88.97%	4.49%	0.21%	13.89%	0.00	0.00	0.00	0.00	0.00	0.00		
	Pump	1	Light Liquid	0.028650	85%	0.00430	14.87%	0.29%	0.44%	64.7%	0.00	0.00	0.00	0.00	0.00	0.00		
	Pump	5	Vapor	0.005250	85%	0.00035	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00		
	Valve	324	Vapor	0.005250	97%	0.00037	14.87%	0.29%	0.44%	64.7%	0.00	0.01	0.08	0.00	0.00	0.00		
	Valve	324	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.02	0.02	0.02	0.00	0.00	1.02		
	Valve	276	Vapor	0.005250	97%	0.00037	10.00%	0.19%	0.29%	43.35%	0.11	0.01	0.05	0.00	0.00	0.00		
	Valve	276	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.00	0.00	0.00	0.00	0.00	0.00		
	Valve	6	Vapor	0.005250	97%	0.00037	10.00%	0.19%	0.29%	43.35%	0.13	0.02	0.09	0.00	0.00	0.00		
	Valve	24	Light Liquid	0.005250	97%	0.00037	88.97%	0.29%	0.03%	13.8%	0.00	0.00	0.00	0.00	0.00	0.00		
	Flange	101	Light Liquid	0.000243	30%	0.00017	95.67%	8.80%	0.03%	0.03%	0.13	0.02	0.07	0.00	0.00	0.82		
	Flange	311	Vapor	0.000660	30%	0.00050	10.00%	0.19%	0.29%	43.35%	0.13	0.02	0.07	0.00	0.00	0.00		
	Flange	5																

Process Area	Component Type	No. of Components	Service ³	AP-42 Leak Factor (lb/hr/component)	Reduction ²	Post-Control Emission Factor (lb/hr/component)	VOC Wt. %	HAP Wt. %	CO ₂ Wt. %	CH ₄ Wt. %	Emissions																
											Total HC (lb/hr)	Total VOC (lb/hr)	Total HAP (lb/hr)	Total HAP (ppm)	Total CO ₂ (lb/hr)	Total CO ₂ (ppm)											
Sherwood 9	Compressor	3	Vapor	0.015400	85%	0.00291	14.87%	0.29%	0.44%	64.47%	0.01	0.00	0.00	0.00	0.00	0.00	0.00										
	Compressor	7	Vapor	0.015400	85%	0.00291	10.00%	0.19%	0.28%	43.35%	0.01	0.00	0.00	0.00	0.00	0.00	0.00										
	Compressor	1	Vapor	0.015400	85%	0.00291	66.97%	4.49%	0.21%	13.89%	0.20	0.00	0.00	0.00	0.00	0.00	0.00										
	Connector	651	Vapor	0.000440	30%	0.00031	14.87%	0.29%	0.44%	64.47%	0.20	0.03	0.13	0.00	0.00	0.00	2.72	11.89									
	Connector	1362	Light Liquid	0.000463	30%	0.00031	85.67%	8.80%	0.03%	1.53%	0.15	0.14	0.62	0.01	0.06	0.05	0.21	15.73									
	Connector	37	Vapor	0.000440	30%	0.00031	10.00%	0.19%	0.29%	43.35%	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00									
	Connector	114	Light Liquid	0.000440	30%	0.00031	10.00%	0.19%	0.29%	43.35%	0.01	0.01	0.05	0.00	0.00	0.01	0.10	0.44									
	Connector	37	Light Liquid	0.000463	30%	0.00031	99.79%	10.04%	0.00%	0.03%	0.01	0.01	0.05	0.00	0.00	0.00	0.02	0.07									
	Exhibitor	2	Light Liquid	0.000463	30%	0.00031	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
	PRV	2	Vapor	0.015400	97%	0.00058	14.87%	0.46%	0.21%	13.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01									
	PRV	5	Vapor	0.015400	97%	0.00058	66.97%	4.49%	0.21%	13.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01									
	PRV	2	Vapor	0.015400	97%	0.00058	95.67%	8.80%	0.03%	1.53%	0.00	0.00	0.02	0.00	0.00	0.00	0.04	0.16									
	Pump	1	Light Liquid	0.028660	85%	0.00019	10.00%	0.19%	0.29%	43.35%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04									
	Pump	1	Vapor	0.028660	85%	0.00019	14.87%	0.29%	0.44%	64.47%	0.10	0.01	0.06	0.00	0.00	0.00	1.35	5.90									
	Valve	134	Vapor	0.005250	97%	0.00017	95.67%	8.80%	0.03%	1.53%	0.02	0.02	0.09	0.00	0.00	0.01	0.01	0.03									
	Valve	376	Light Liquid	0.005250	97%	0.00017	10.00%	0.19%	0.29%	43.35%	0.11	0.01	0.05	0.00	0.00	0.00	1.02	4.46									
	Valve	376	Light Liquid	0.005250	97%	0.00017	10.00%	0.19%	0.29%	43.35%	0.11	0.01	0.05	0.00	0.00	0.00	1.02	4.46									
	Valve	6	Light Liquid	0.005250	97%	0.00017	10.00%	0.19%	0.29%	43.35%	0.11	0.01	0.05	0.00	0.00	0.00	1.02	4.46									
	Valve	34	Vapor	0.009920	97%	0.00030	95.67%	8.80%	0.03%	1.53%	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.00									
	Valve	24	Light Liquid	0.005500	97%	0.00017	99.79%	10.04%	0.00%	0.03%	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.00									
	Valve	223	Vapor	0.006860	30%	0.00017	14.87%	0.29%	0.44%	64.47%	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00									
	Flange	101	Light Liquid	0.000243	30%	0.00017	95.67%	8.80%	0.03%	1.53%	0.02	0.02	0.09	0.00	0.00	0.00	1.82	7.96									
	Flange	311	Vapor	0.000860	30%	0.00060	10.00%	0.19%	0.29%	43.35%	0.12	0.02	0.07	0.00	0.00	0.01	0.01	0.02									
	Flange	51	Vapor	0.000860	30%	0.00060	66.97%	4.49%	0.21%	13.89%	0.12	0.02	0.07	0.00	0.00	0.01	0.01	0.02									
	Flange	31	Light Liquid	0.000243	30%	0.00017	95.67%	8.80%	0.03%	1.53%	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.00									
	Total												1.46	0.40	1.75	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Tank Farm	Connector	82	Vapor	0.000440	30%	0.00031	66.97%	4.49%	0.21%	13.89%	0.02	0.02	0.07	0.00	0.00	0.00	0.00	0.00								
		Connector	89	Light Liquid	0.000463	30%	0.00032	10.04%	0.00%	0.03%	0.03	0.03	0.13	0.00	0.00	0.00	0.00	0.00	0.00								
		PRV	8	Vapor	0.015400	97%	0.00058	66.97%	4.49%	0.21%	13.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
		Pump	2	Light Liquid	0.016500	97%	0.00050	95.67%	10.04%	0.00%	0.03%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00								
		Pump	2	Light Liquid	0.028660	85%	0.00040	99.79%	10.04%	0.00%	0.03%	0.01	0.01	0.04	0.00	0.00	0.00	0.00	0.00								
Valve		38	Vapor	0.009920	97%	0.00030	66.97%	4.49%	0.21%	13.89%	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.00									
Valve		75	Light Liquid	0.005500	97%	0.00017	99.79%	10.04%	0.00%	0.03%	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.00									
Valve		56	Vapor	0.000860	30%	0.00060	66.97%	4.49%	0.21%	13.89%	0.03	0.02	0.10	0.00	0.00	0.01	0.10	0.42									
Flange		93	Light Liquid	0.000243	30%	0.00017	95.67%	8.80%	0.03%	1.53%	0.02	0.02	0.07	0.00	0.00	0.00	0.00	0.00									
Total												0.14	0.12	0.52	0.01	0.04	0.22	0.95									
Truck Loading	Connector	76	Vapor	0.000440	30%	0.00031	66.97%	4.49%	0.21%	13.89%	0.02	0.02	0.07	0.00	0.00	0.00	0.00	0.00									
	Connector	183	Light Liquid	0.000463	30%	0.00032	95.67%	10.04%	0.00%	0.03%	0.05	0.05	0.26	0.01	0.03	0.00	0.00										
	Connector	1	Heavy Liquid	0.000017	30%	0.00001	99.79%	10.04%	0.00%	0.03%	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
	PRV	2	Vapor	0.015400	97%	0.00058	66.97%	4.49%	0.21%	13.89%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00									
	PRV	8	Light Liquid	0.016500	97%	0.00050	99.79%	10.04%	0.00%	0.03%	0.00	0.00	0.00	0.00	0.00	0.00	0.00										
	Valve	27	Vapor	0.009920	97%	0.00030	66.97%	4.49%	0.21%	13.89%	0.01	0.01	0.04	0.00	0.00	0.00	0.00										
	Valve	55	Light Liquid	0.005500	97%	0.00017	99.79%	10.04%	0.00%	0.03%	0.01	0.01	0.04	0.00	0.00	0.00	0.00										
	Flange	45	Vapor	0.000860	30%	0.00060	66.97%	4.49%	0.21%	13.89%	0.03	0.02	0.08	0.00	0.00	0.01	0.08										
	Flange	65	Light Liquid	0.000243	30%	0.00017	95.67%	8.80%	0.03%	1.53%	0.01	0.01	0.05	0.00	0.00	0.00	0.00										
Total												0.14	0.12	0.54	0.01	0.05	0.17	0.75									
Steward Total												16.60	4.87	21.31	1.32	136.17	596.41										

All other components in Vapor Service are considered inlet gas.

²Based on Texas Commission on Environmental Quality (TCEQ) 28VWP Control Program and guidance titled "Air Permit Technical Guidance for Chemical Sources: Equipment Leak Pathways". Connectors are

MarkWest Liberty Midstream and Resources, L.L.C.
 Sherwood Gas Plant

Condensate Truck Loadout Emissions

Station	Volume Loaded (gallyr)	Saturation Factor ¹	Vapor Pressure ² (psia)	Vapor Molecular Weight ² (lb/lb-mol)	Liquid Temp ³ (°F)	Liquid Temp (°R)	Loading Loss ⁴ (lb VOC/1000 gal)	VOC Loading Loss (lb/yr)
Sherwood Gas Plant	364,000	0.6	7.07	60	50.33	510	6.2	2262.83
								1.13

¹ From AP-42 Table 5.2-1, for tank trucks in submerged loading: dedicated normal service

² From AP42 Table 7.1-2, Gasoline (RVP 15), 60 deg

³ Daily average liquid surface temperature (TANKS 4.09d)

⁴ Loading Loss (lb VOC/1000 gal) = (12.46*S^{0.7}*M)/T [AP42 Section 5.2 (1/95)]

Capture Efficiency 95%
 Destruction Efficiency 98%

Pollutant	Weight Percent	Uncontrolled (tpy)	Capture Efficiency	Emissions Routed to Tanks (tpy)	Emissions Routed to Atmosphere (tpy)	Destruction Efficiency	Post Control Emissions from Tanks (tpy)	Total Post Control Emissions (tpy)
VOC	65.60%	1.131	95%	1.075	0.057	98%	0.02	0.078
Benzene	0.12%	0.002		0.002	0.000		0.00	0.000
Toluene	0.07%	0.001		0.001	0.000		0.00	0.000
Ethylbenzene	0.00%	0.000		0.000	0.000		0.00	0.000
n-Hexane	3.70%	0.064		0.061	0.003		0.00	0.004
Xylenes	0.06%	0.001		0.001	0.000		0.00	0.000
Methane	16.03%	0.276		0.263	0.014		0.01	0.019
CO ₂	0.23%	0.004	0.004	0.000	0.00	0.000		

**MarkWest Liberty Midstream & Resources L.L.C.
 Sherwood Gas Plant
 Rod Packing Emissions**

Emission Factor^a 0.02 (scf CH₄/min)
 Mole fraction Methane 0.64
 Total Emission Factor 0.03 (scf/min)
 MW 20.05 (lb/lbmole)
 Number of Compressors 3
 Total Emissions 0.27 (lb/hr)

^aBased on 40 CFR Part 98 Subpart W Section 233 Emissions Factors

Pollutant	Mass %	Emissions	
		lb/hr	tpy
VOC	14.87%	0.04	0.17
Total HAPs	0.29%	0.00	0.00
Benzene	0.01%	0.00	0.00
Toluene	0.00%	0.00	0.00
Ethylbenzene	0.00%	0.00	0.00
Xylenes	0.01%	0.00	0.00
n-Hexane	0.27%	0.00	0.00

MarkWest Liberty Midstream & Resources L.L.C.
Sherwood Gas Plant
Crankcase Emissions

Crankcase Blowby Percentage¹ 3%

Pollutant	Total Engine Emissions		Blowby Percentage	Blowby Emissions	
	lb/hr	tpy		lb/hr	tpy
VOC	18.90	82.78	3%	0.57	2.48
Benzene	0.01	0.04		0.00	0.00
Toluene	0.01	0.03		0.00	0.00
Ethylbenzene	0.00	0.00		0.00	0.00
Xylenes	0.01	0.03		0.00	0.00
n-Hexane	0.34	1.51		0.01	0.05
Total HAPs	0.37	1.60		0.01	0.05

¹Based on manufacturer data

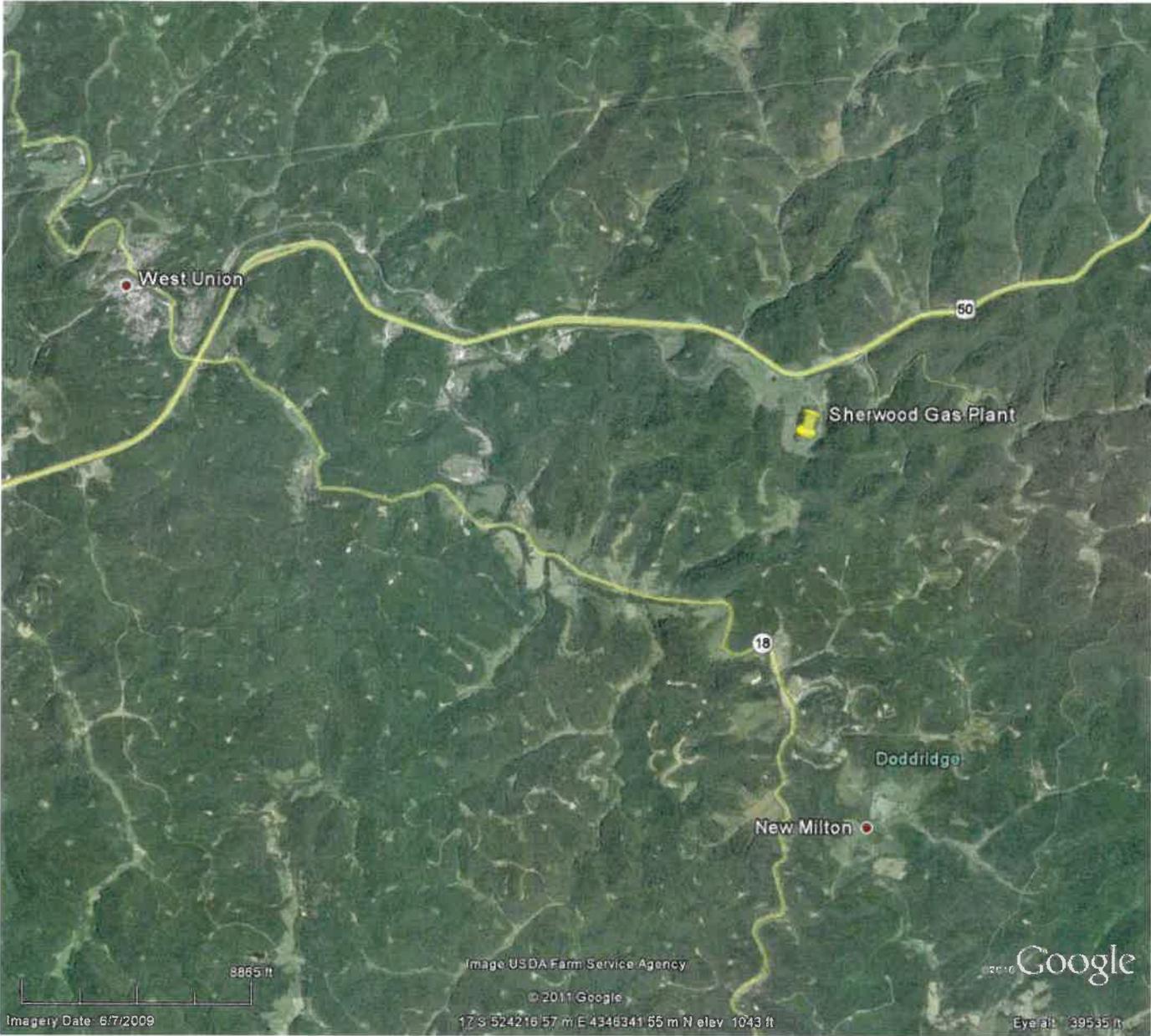
MarkWest Liberty Midstream & Resources L.L.C.
 Sherwood Compressor Station at Sherwood Gas Plant

Condensate Tanks - Controlled by VRU

Season	Days	Condensate Throughput (bbl/day)
Spring/Fall	183	34.2
Winter	91	73.8
Summer	91	24.0
Annual Total	365	15158.4

Component	HYSYS Output - Mass Flow (lb/hr)			Total Uncontrolled Emissions		Total Controlled Emissions ¹	
	Spring/Fall	Winter	Summer	max lb/hr	tpy	max lb/hr	tpy
Methane	145.2198	153.5715	141.8713	153.57	641.53	3.07	12.83
Ethane	63.7172	82.7564	56.8724	82.76	292.40	1.66	5.85
Propane	38.3124	67.4620	27.4359	67.46	187.76	1.35	3.76
i-Butane	7.4677	15.8107	3.5455	15.81	37.54	0.32	0.75
n-Butane	17.4756	36.3413	7.1284	36.34	85.85	0.73	1.72
i-Pentane	8.0622	13.4093	2.1422	13.41	34.69	0.27	0.69
n-Pentane	7.3656	10.9583	1.7927	10.96	30.10	0.22	0.60
3-Mpentane	5.6192	5.7926	1.2709	5.79	20.05	0.12	0.40
n-Hexane	13.2133	12.5530	3.1236	13.21	46.14	0.26	0.92
n-Heptane	3.6414	2.2964	1.5296	3.64	12.17	0.07	0.24
n-Octane	3.4703	1.3068	3.7856	3.79	13.18	0.08	0.26
n-Nonane	1.2655	0.2724	3.9497	3.95	7.39	0.08	0.15
n-Decane	0.3419	0.0479	3.1316	3.13	4.22	0.06	0.08
H2O	3.1951	1.1934	11.6766	11.68	21.07	0.23	0.42
Nitrogen	2.3464	2.3719	2.3361	2.37	10.29	0.05	0.21
CO2	1.6405	1.7680	1.6028	1.77	7.28	0.04	0.15
Oxygen	0.2106	0.2184	0.2087	0.22	0.93	0.00	0.02
Total VOC	106.2351	166.2507	58.8357	177.50	479.09	3.55	9.58
Total HAP	13.2133	12.5530	3.1236	13.21	46.14	0.26	0.92

Attachment A – Area Map



West Union

50

Sherwood Gas Plant

18

Doddridge

New Milton

8865 ft

Image USDA Farm Service Agency

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Google

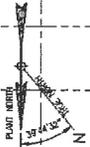
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17°S 524216'57" E 4346341'55" N elev 1043 ft

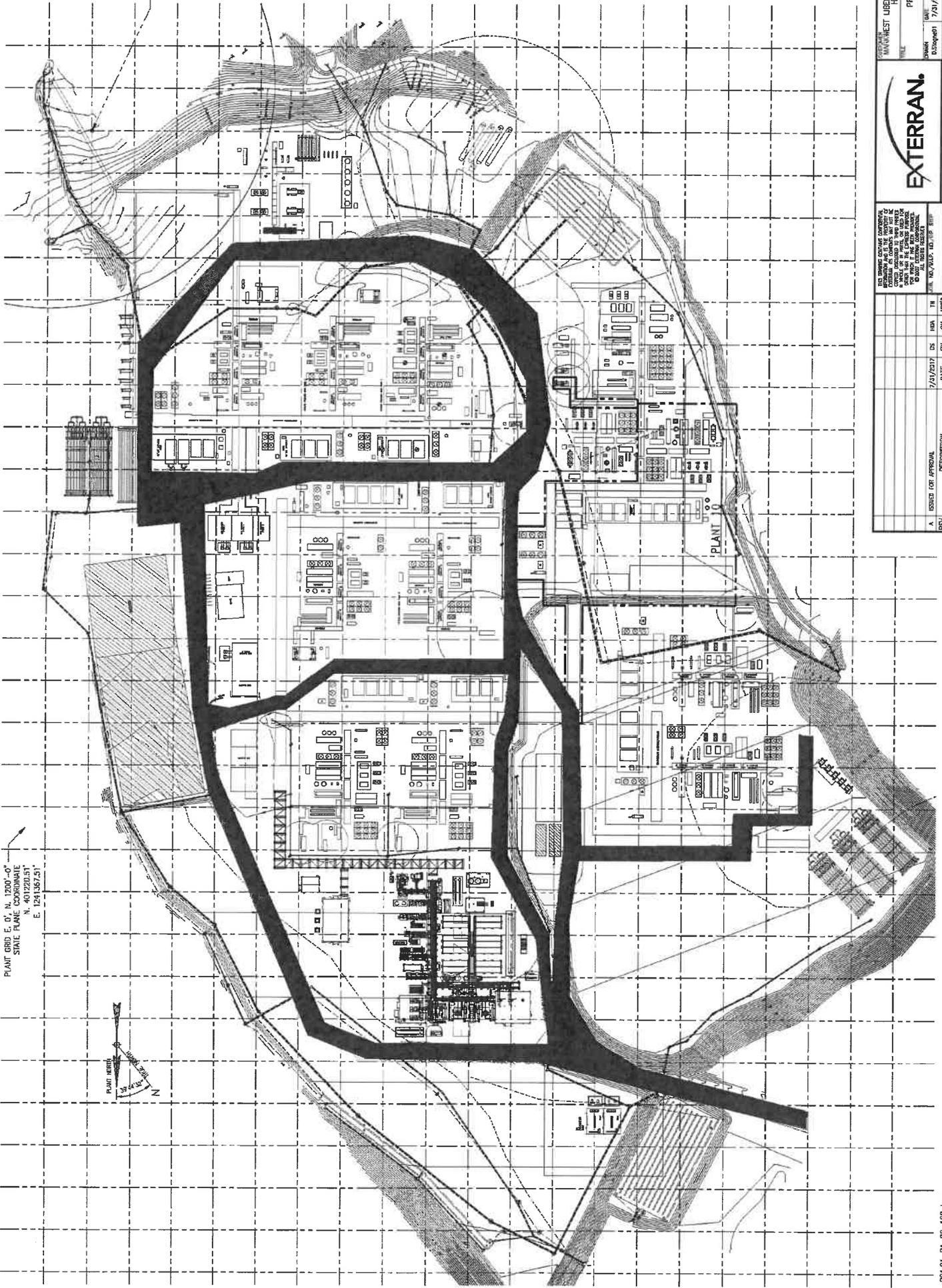
Eye alt: 39535 ft

Attachment B – Plot Plan

PLANT GRID E, 0', N, 1200'-0"
 STATE PLANE COORDINATE
 N, 401220.51'
 E, 1241357.51'



PLANT GRID E, 1
 STATE PLANE COORDINATE
 N, 401220.51'
 E, 1242785.11'



US OWNER'S OFFICE: LIBERTY WASTEWATER TREATMENT PLANT
 PROJECT NO: 107418-201.01-BA-05-100

DATE: 7/31/2017
 DRAWN BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

ISSUED FOR APPROVAL: 7/31/2017
 DATE: [Date]
 BY: [Name]
 CHECKED BY: [Name]
 APPROVED BY: [Name]

REVISIONS

NO.	DATE	DESCRIPTION

EXTERRAN

3060 E. 8th Street
 Boulder, CO 80501
 (303) 440-4571

Attachment C – Process Flow Diagram

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
CM-1001	Oxid. Cat.	CM-1001	4,735 hp Caterpillar G3616LE	4,735 hp	2012
CM-1002	Oxid. Cat.	CM-1002	4,735 hp Caterpillar G3616LE	4,735 hp	2012
CM-2001	Oxid. Cat.	CM-2001	2,370 hp Caterpillar G3608LE	2,370 hp	2012
G-1	N/A	G-1	Generac Generator	102 hp	2012
G-2	N/A	G-2	Generac Generator	152 hp	2012
G-3	N/A	G-3	Generac Generator	152 hp	2017
H-711	None	H-711	Mole Sieve Regeneration Heater	7.85 mmBtu/hr	2012
H-2711	None	H-2711	Mole Sieve Regeneration Heater	7.85 mmBtu/hr	2013
H-3711	None	H-3711	Mole Sieve Regeneration Heater	15.58 mmBtu/hr	2013
H-4711	None	H-4711	Mole Sieve Regeneration Heater	18.00 mmBtu/hr	2014
H-5711	None	H-5711	Mole Sieve Regeneration Heater	18.00 mmBtu/hr	2014
H-6711	None	H-6711	Mole Sieve Regeneration Heater	18.00 mmBtu/hr	2015
H-7711	None	H-7711	Mole Sieve Regeneration Heater	18.00 mmBtu/hr	2015
H-8711	None	H-8711	Mole Sieve Regeneration Heater	18.00 mmBtu/hr	2017
H-9711	None	H-9711	Mole Sieve Regeneration Heater	18.00 mmBtu/hr	2017
H-771	None	H-771	Hot Oil Heater	30.04 mmBtu/hr	2012
H-751	None	H-751	Stabilization Heater I	6.35 mmBtu/hr	2012
H-4712	None	H-4712	Hot Oil Heater	6.60 mmBtu/hr	2014
H-6712	None	H-6712	Hot Oil Heater	6.60 mmBtu/hr	2015
H-8712	None	H-8712	Hot Oil Heater	7.19 mmBtu/hr	2017
D1-H-782	None	D1-H-782	DeEthanizer HMO Heater	119.20 mmBtu/hr	2015
D1-H-741	None	D1-H-741	DeEthanizer Regen Heater	12.23mmBtu/hr	2015
DH-001	Flare	DH-001	TEG Dehydration Unit	120 MMSscfd	2012
RB-001	None	RB-001	Dehydration Unit Reboiler	2.00 mmBtu/hr	2012
TNK-001	VRU	TNK-001	Storage Tank Flashing Emissions	N/A	2012
FS-762	N/A	FS-762	Main Process/Emergency Flare	68,600 scf/min	2012
FL-HD	N/A	FL-HD	Dehydrator Flare	0.69 scf/min	2012
BD	Flare	BD	Engine Blowdowns	N/A	2012

Title V Equipment Table (equipment_table.doc)

Page 1 of 1

Revised 4/11/05

FUG-001	LDAR	FUG-001	Fugitive Leaks	N/A	2012 - 2017
Loadout	Flare	Loadout	Facility Loadout	364,000 gal/yr	2012
CC	N/A	CC	Crankcase Emissions	N/A	2012
RP	N/A	RP	Rod Packing Emissions	N/A	2012
MT-1	N/A	MT-1	Methanol Tank	500 gallons	2012
MT-2	N/A	MT-2	Methanol tank	500 gallons	2012
MT-3	N/A	MT-3	Methanol Tank	500 gallons	2012
MT-4	N/A	MT-4	Methanol Tank	500 gallons	2012
MT-5	N/A	MT-5	Methanol Tank	500 gallons	2012
MT-6	N/A	MT-6	Methanol Tank	500 gallons	2012
MT-7	N/A	MT-7	Methanol Tank	500 gallons	2012
MT-8	N/A	MT-8	Methanol Tank	500 gallons	2012
GT-1	N/A	GT-1	Gasoline Tank	500 gallons	2012
DT-1	N/A	DT-1	Diesel Tank	500 gallons	2012
DT-2	N/A	DT-2	Diesel Tank	1,000 gallons	2012

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: CM-1001	Emission unit name: Caterpillar G3616LE 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.): 4,735 hp natural gas fired 4-stroke lean-burn compressor engine			
Manufacturer: Caterpillar	Model number: G3616LE	Serial number:	
Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s): NA	
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 4,735 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: 35.44 mmbtu/hr 4,735 hp		Type and Btu/hr rating of burners: N/A	
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 31,527 scf/hr 276.18 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

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.46	6.40
Nitrogen Oxides (NO _x)	5.22	22.86
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.35	1.55
Particulate Matter (PM ₁₀)	0.35	1.55
Total Particulate Matter (TSP)	0.35	1.55
Sulfur Dioxide (SO ₂)	0.02	0.09
Volatile Organic Compounds (VOC)	1.67	7.32
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Acetaldehyde	0.30	1.30
Acrolein	0.18	0.80
Formaldehyde	0.42	1.83
Methanol	0.09	0.39
Total HAPs	1.10	4.84
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	4,146.50	18,161.67
<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: Manufacturer specified emission factors (g/hp-hr) for engine and catalyst -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>		

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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- 4.1.1 [40 CFR §60.4333(e), 40 CFR §60.4243(g), & 40 CFR §60.5385(a)(1)]
- 4.1.3 [40 CFR §60.4243(e)]
- 4.1.4
- 4.1.5 [45 CSR §13-5.11]
- 4.2.1 [40 CFR §60.4243(b)(2)(ii)]
- 4.2.2 [40 CFR §60.4245(b)]
- 4.3.1 [40 CFR §60.4243(b)]
- 4.4.1
- 4.4.2
- 4.4.3
- 4.4.4 [40 CFR §60.5385(c)(3)]
- 4.4.5
- 4.5.1 [40 CFR §60.5420(b) and (b)(4)(ii)]

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
4.1.1	Engine operational time will be monitored.	Engine tests will be performed to verify emission limits are met.	Records of operational hours and testing will be maintained.		
4.1.3			Records of emergency propane use will be maintained.		
4.1.4	Air/fuel ratio will be checked and adjusted every 1,500 service hours.		Records of adjustments will be maintained for a period of at least 5 years.		
4.1.5					
4.2.1			Maintain a maintenance plan of conducted maintenance.		
4.2.2	Monitor and record the hours of operation of the engine the a non-resettable hour meter on a monthly basis.		Maintain records of engine operation including time where propane was used as fuel.		Condition 3.4.1
4.3.1		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
4.4.1			Records of required monitoring will be maintained and kept.		
4.4.2			Records of all		

			pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
4.4.3			Required records of control equipment malfunction will be maintained.		
4.4.4			Required records of rod-packing replacement and compressor operation will be maintained.		
4.4.5			Records of required monitoring will be maintained as required.		Condition 3.4.1
4.5.1				Annual compliance reports will be submitted to the Director and Administrator as required.	40 CFR §60.5420(b) and (b)(4)(ii)

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: CM-1002	Emission unit name: Caterpillar G3616LE 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.):
4,735 hp natural gas fired 4-stroke lean-burn compressor engine

Manufacturer: Caterpillar	Model number: G3616LE	Serial number:
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Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 4,735 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: 35.44 mmbtu/hr 4,735 hp	Type and Btu/hr rating of burners: N/A
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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
31,527 scf/hr
276.18 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

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.46	6.40
Nitrogen Oxides (NO _x)	5.22	22.86
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.35	1.55
Particulate Matter (PM ₁₀)	0.35	1.55
Total Particulate Matter (TSP)	0.35	1.55
Sulfur Dioxide (SO ₂)	0.02	0.09
Volatile Organic Compounds (VOC)	1.67	7.32
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Acetaldehyde	0.30	1.30
Acrolein	0.18	0.80
Formaldehyde	0.42	1.83
Methanol	0.09	0.39
Total HAPs	1.10	4.84
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	4,146.50	18,161.67
<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: Manufacturer specified emission factors (g/hp-hr) for engine and catalyst -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>		

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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4.1.1 [40 CFR §60.4333(e), 40 CFR §60.4243(g), & 40 CFR §60.5385(a)(a)]

4.1.3 [40 CFR §60.4243(e)]

4.1.4

4.1.5 [45 CSR §13-5.11]

4.2.1 [40 CFR §60.4243(b)(2)(ii)]

4.2.2 [40 CFR §60.4245(b)]

4.3.1 [40 CFR §60.4234(b)]

4.4.1

4.4.2

4.4.3

4.4.4 [40 CFR §60.5385(c)(3)]

4.4.5

4.5.1 [40 CFR §60.5420(b) and (b)(4)(ii)]

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
4.1.1	Engine operational time will be monitored.	Engine tests will be performed to verify emission limits are met.	Records of operational hours and testing will be maintained.		
4.1.3			Records of emergency propane use will be maintained.		
4.1.4	Air/fuel ratio will be checked and adjusted every 1,500 service hours.		Records of adjustments will be maintained for a period of at least 5 years.		
4.1.5					
4.2.1			Maintain a maintenance plan of conducted maintenance.		
4.2.2	Monitor and record the hours of operation of the engine the a non-resettable hour meter on a monthly basis.		Maintain records of engine operation including time where propane was used as fuel.		Condition 3.4.1
4.3.1		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
4.4.1			Records of required monitoring will be maintained and kept.		
4.4.2			Records of all		

			pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
4.4.3			Required records of control equipment malfunction will be maintained.		
4.4.4			Required records of rod-packing replacement and compressor operation will be maintained.		
4.4.5			Records of required monitoring will be maintained as required.		Condition 3.4.1
4.5.1				Annual compliance reports will be submitted to the Director and Administrator as required.	40 CFR §60.5420(b) and (b)(4)(ii)

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: CM-2001	Emission unit name: Caterpillar G3608LE 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: G3608LE	Serial number:
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Construction date: 10/12/2012	Installation date: 10/12/2012	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
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Maximum design heat input and/or maximum horsepower rating: 15.71 mmbtu/hr 2,370 hp	Type and Btu/hr rating of burners: N/A
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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
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

Emissions Data		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.73	3.20
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)	1.46	6.41
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Acetaldehyde	0.13	0.58
Acrolein	0.08	0.35
Formaldehyde	0.16	0.69
Methanol	0.04	0.17
Total HAPs	0.46	2.02
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,080.99	9,114.72
<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: Manufacturer specified emission factors (g/hp-hr) for engine and catalyst -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>		

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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4.1.2 [40 CFR §60.4333(e), 40 CFR §60.4243(g), & 40 CFR §60.5385(a)(a)]

4.1.3 [40 CFR §60.4243(e)]

4.1.4

4.1.5 [45 CSR §13-5.11]

4.2.1 [40 CFR §60.4243(b)(2)(ii)]

4.2.2 [40 CFR §60.4245(b)]

4.3.1 [40 CFR §60.4234(b)]

4.4.1

4.4.2

4.4.3

4.4.4 [40 CFR §60.5385(c)(3)]

4.4.5

4.5.1 [40 CFR §60.5420(b) and (b)(4)(ii)]

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
4.1.2	Engine operational time will be monitored.	Engine tests will be performed to verify emission limits are met.	Records of operational hours and testing will be maintained.		
4.1.3			Records of emergency propane use will be maintained.		
4.1.4	Air/fuel ratio will be checked and adjusted every 1,500 service hours.		Records of adjustments will be maintained for a period of at least 5 years.		
4.1.5					
4.2.1			Maintain a maintenance plan of conducted maintenance.		
4.2.2	Monitor and record the hours of operation of the engine the a non-resettable hour meter on a monthly basis.		Maintain records of engine operation including time where propane was used as fuel.		Condition 3.4.1
4.3.1		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
4.4.1			Records of required monitoring will be maintained and kept.		
4.4.2			Records of all		

			pollution control equipment inspection and/or preventative maintenance procedures will be maintained.		
4.4.3			Required records of control equipment malfunction will be maintained.		
4.4.4			Required records of rod-packing replacement and compressor operation will be maintained.		
4.4.5			Records of required monitoring will be maintained as required.		Condition 3.4.1
4.5.1				Annual compliance reports will be submitted to the Director and Administrator as required.	40 CFR §60.5420(b) and (b)(4)(ii)

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-711	Emission unit name: Mole Sieve 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.):
7.85 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Devco	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.85 mmbtu/hr

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: 7.85 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 7.85 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
6,984.63 scf/hr
61.19 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.47	2.06
Nitrogen Oxides (NO _x)	0.24	1.03
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.06	0.26
Particulate Matter (PM ₁₀)	0.06	0.26
Total Particulate Matter (TSP)	0.06	0.26
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.19
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)	918.62	4,023.57
<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: Manufacturer specified emission factors (lb/mmbtu) -All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion -GHG: 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 and High Heat Values for Various Types of Fuel</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
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-2711	Emission unit name: Mole Sieve 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.):
7.85 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Devco	Model number:	Serial number:
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Construction date: 05/16/2013	Installation date: 05/16/2013	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.85 mmbtu/hr

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: 7.85 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 7.85 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
6,984.63 scf/hr
61.19 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.47	2.06
Nitrogen Oxides (NO _x)	0.24	1.03
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.06	0.26
Particulate Matter (PM ₁₀)	0.06	0.26
Total Particulate Matter (TSP)	0.06	0.26
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.19
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)	918.62	4,023.57

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-3711	Emission unit name: Mole Sieve 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.):
15.58 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Devco	Model number:	Serial number:
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Construction date: 11/20/2013	Installation date: 11/20/2013	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 15.58 mmbtu/hr

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: 15.58 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 15.58 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
13,859.53 scf/hr
121.41 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.93	4.09
Nitrogen Oxides (NO _x)	0.47	2.05
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.12	0.51
Particulate Matter (PM ₁₀)	0.12	0.51
Total Particulate Matter (TSP)	0.12	0.51
Sulfur Dioxide (SO ₂)	0.01	0.04
Volatile Organic Compounds (VOC)	0.08	0.37
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.02	0.11
Total HAPs	0.03	0.11
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	1,822.82	7,983.93

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
 -All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
 -GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-4711	Emission unit name: Mole Sieve 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.):
18.00 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Tulsa Heater Inc.	Model number:	Serial number:
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Construction date: 8/14/2014	Installation date: 8/14/2014	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 18.00 mmbtu/hr

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: 18.00 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 18.00 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
16,014.23 scf/hr
140.28 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.72	3.15
Nitrogen Oxides (NO _x)	0.72	3.15
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.13	0.59
Particulate Matter (PM ₁₀)	0.13	0.59
Total Particulate Matter (TSP)	0.13	0.59
Sulfur Dioxide (SO ₂)	0.01	0.05
Volatile Organic Compounds (VOC)	0.10	0.43
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.13
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,106.20	9,225.17

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
 -All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
 -GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-5711	Emission unit name: Mole Sieve Regeneration 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.): 18.00 mmbtu/hr natural gas-fired molecular sieve regeneration heater			
Manufacturer: Tulsa Heater Inc.	Model number:	Serial number:	
Construction date: 11/2/2014	Installation date: 11/2/2014	Modification date(s): NA	
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 18.00 mmbtu/hr			
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: 18.00 mmbtu/hr		Type and Btu/hr rating of burners: Helical coil 18.00 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 16,014.23 scf/hr 140.28 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
Emissions Data			

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.72	3.15
Nitrogen Oxides (NO _x)	0.72	3.15
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.13	0.59
Particulate Matter (PM ₁₀)	0.13	0.59
Total Particulate Matter (TSP)	0.13	0.59
Sulfur Dioxide (SO ₂)	0.01	0.05
Volatile Organic Compounds (VOC)	0.10	0.43
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.13
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,106.20	9,225.17

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-6711	Emission unit name: Mole Sieve 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.):
18.00 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Tulsa Heater Inc.	Model number:	Serial number:
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Construction date: 07/19/2015	Installation date: 07/19/2015	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 18.00 mmbtu/hr

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: 18.00 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 18.00 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
16,014.23 scf/hr
140.28 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.72	3.15
Nitrogen Oxides (NO _x)	0.72	3.15
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.13	0.59
Particulate Matter (PM ₁₀)	0.13	0.59
Total Particulate Matter (TSP)	0.13	0.59
Sulfur Dioxide (SO ₂)	0.01	0.05
Volatile Organic Compounds (VOC)	0.10	0.43
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.13
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,106.20	9,225.17

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-7711	Emission unit name: Mole Sieve 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.):
18.00 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Tulsa Heater Inc.	Model number:	Serial number:
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Construction date: 03/08/2017	Installation date: 03/08/2017	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 18.00 mmbtu/hr

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: 18.00 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 18.00 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
16,014.23 scf/hr
140.28 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.72	3.15
Nitrogen Oxides (NO _x)	0.72	3.15
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.13	0.59
Particulate Matter (PM ₁₀)	0.13	0.59
Total Particulate Matter (TSP)	0.13	0.59
Sulfur Dioxide (SO ₂)	0.01	0.05
Volatile Organic Compounds (VOC)	0.10	0.43
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.13
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,106.20	9,225.17

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-8711	Emission unit name: Mole Sieve 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.):
18.00 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Tulsa Heater Inc.	Model number:	Serial number:
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Construction date: TBD	Installation date: TBD	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 18.00 mmbtu/hr

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: 18.00 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 18.00 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
16,014.23 scf/hr
140.28 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.72	3.15
Nitrogen Oxides (NO _x)	0.72	3.15
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.13	0.59
Particulate Matter (PM ₁₀)	0.13	0.59
Total Particulate Matter (TSP)	0.13	0.59
Sulfur Dioxide (SO ₂)	0.01	0.05
Volatile Organic Compounds (VOC)	0.10	0.43
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.13
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,106.20	9,225.17

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
 -All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
 -GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-9711	Emission unit name: Mole Sieve 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.):
18.00 mmbtu/hr natural gas-fired molecular sieve regeneration heater

Manufacturer: Tulsa Heater Inc.	Model number:	Serial number:
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Construction date: TBD	Installation date: TBD	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 18.00 mmbtu/hr

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: 18.00 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 18.00 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
16,014.23 scf/hr
140.28 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.72	3.15
Nitrogen Oxides (NO _x)	0.72	3.15
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.13	0.59
Particulate Matter (PM ₁₀)	0.13	0.59
Total Particulate Matter (TSP)	0.13	0.59
Sulfur Dioxide (SO ₂)	0.01	0.05
Volatile Organic Compounds (VOC)	0.10	0.43
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.03	0.13
Total HAPs	0.03	0.13
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2,106.20	9,225.17

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-771	Emission unit name: Hot Oil 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.):
30.04 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Devco	Model number:	Serial number:
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Construction date: 03/08/2017	Installation date: 03/08/2017	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 30.04 mmbtu/hr

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: 30.04 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 30.04 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
26,729.07 scf/hr
234.15 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.80	7.90
Nitrogen Oxides (NO _x)	0.90	3.95
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.22	0.98
Particulate Matter (PM ₁₀)	0.22	0.98
Total Particulate Matter (TSP)	0.22	0.98
Sulfur Dioxide (SO ₂)	0.02	0.08
Volatile Organic Compounds (VOC)	0.16	0.71
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.01
n-Hexane	0.05	0.21
Total HAPs	0.05	0.22
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	3,515.43	15,397.57
<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: Manufacturer specified emission factors (lb/mmbtu) -All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion -GHG: 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 and High Heat Values for Various Types of Fuel</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 [45 CSR §2-3.1]
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.2	Visible emissions shall be monitored to ensure opacity limits are not exceeded.		Records of opacity monitoring will be kept.		6.1.2
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-751	Emission unit name: Stabilization Heater I	List any control devices associated with this emission unit: NA	
Provide a description of the emission unit (type, method of operation, design parameters, etc.): 6.35 mmbtu/hr natural gas-fired stabilization heater			
Manufacturer: Devco	Model number:	Serial number:	
Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s): NA	
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 6.35 mmbtu/hr			
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: 6.35 mmbtu/hr		Type and Btu/hr rating of burners: Helical coil 6.35 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 5,649.47 scf/hr 49.49 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%	1,124 btu/scf
Emissions Data			

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.25	1.11
Nitrogen Oxides (NO _x)	0.25	1.11
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.05	0.21
Particulate Matter (PM ₁₀)	0.05	0.21
Total Particulate Matter (TSP)	0.05	0.21
Sulfur Dioxide (SO ₂)	0.00	0.01
Volatile Organic Compounds (VOC)	0.03	0.15
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)	743.02	3,254.44

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.2 [45 CSR §2-3.1]
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.2	Visible emissions shall be monitored to ensure opacity limits are not exceeded.		Records of opacity monitoring will be kept.		6.1.2
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-4712	Emission unit name: Hot Oil 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.):
6.60 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Zeeco USA, L.L.C.	Model number:	Serial number:
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Construction date: 08/14/2014	Installation date: 08/14/2014	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 6.60 mmbtu/hr

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: 6.60 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 6.60 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
5,853.16 scf/hr
51.27 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.26	1.15
Nitrogen Oxides (NO _x)	0.26	1.15
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.05	0.22
Particulate Matter (PM ₁₀)	0.05	0.22
Total Particulate Matter (TSP)	0.05	0.22
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.16
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.05
Total HAPs	0.01	0.05
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	769.81	3,371.77

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.2 [45 CSR §2-3.1]
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.2	Visible emissions shall be monitored to ensure opacity limits are not exceeded.		Records of opacity monitoring will be kept.		6.1.2
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-6712	Emission unit name: Hot Oil 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.):
6.60 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Zeeco USA, L.L.C.	Model number:	Serial number:
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Construction date: 07/19/2015	Installation date: 07/19/2015	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 6.60 mmbtu/hr

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: 6.60 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 6.60 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
5,853.16 scf/hr
51.27 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.26	1.15
Nitrogen Oxides (NO _x)	0.26	1.15
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.05	0.22
Particulate Matter (PM ₁₀)	0.05	0.22
Total Particulate Matter (TSP)	0.05	0.22
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.16
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.05
Total HAPs	0.01	0.05
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	769.81	3,371.77

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.2 [45 CSR §2-3.1]
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.2	Visible emissions shall be monitored to ensure opacity limits are not exceeded.		Records of opacity monitoring will be kept.		6.1.2
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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-8712	Emission unit name: Hot Oil 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.):
7.19 mmbtu/hr natural gas-fired hot oil heater

Manufacturer: Zeeco USA, L.L.C.	Model number:	Serial number:
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Construction date: 07/17/2017	Installation date: 07/17/2017	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.19 mmbtu/hr

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: 7.19 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 7.19 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
6,394.57 scf/hr
56.02 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.29	1.26
Nitrogen Oxides (NO _x)	0.29	1.26
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.05	0.24
Particulate Matter (PM ₁₀)	0.05	0.24
Total Particulate Matter (TSP)	0.05	0.24
Sulfur Dioxide (SO ₂)	0.00	0.02
Volatile Organic Compounds (VOC)	0.04	0.17
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.00	0.00
n-Hexane	0.01	0.05
Total HAPs	0.01	0.05
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	841.02	3,683.66

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
- All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
- GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.2 [45 CSR §2-3.1]
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.2	Visible emissions shall be monitored to ensure opacity limits are not exceeded.		Records of opacity monitoring will be kept.		6.1.2
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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: D1-H-782	Emission unit name: DeEthanizer 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 DeEthanizer HMO heater

Manufacturer: Zeeco USA, L.L.C.	Model number:	Serial number:
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Construction date: 12/15/2017	Installation date: 12/15/2017	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 119.20 mmbtu/hr

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: 119.20 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 119.20 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
103,054.55 scf/hr
902.76 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	4.63	20.29
Nitrogen Oxides (NO _x)	3.47	15.22
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.86	3.78
Particulate Matter (PM ₁₀)	0.86	3.78
Total Particulate Matter (TSP)	0.86	3.78
Sulfur Dioxide (SO ₂)	0.07	0.30
Volatile Organic Compounds (VOC)	0.62	2.74
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	0.01	0.03
n-Hexane	0.19	0.81
Total HAPs	0.19	0.85
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	13,947.75	61,091.16

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 and CO: Manufacturer specified emission factors (lb/mmbtu)
 -All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion
 -GHG: 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 and High Heat Values 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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- 6.1.1
- 6.1.2 [45 CSR §2-3.1]
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.2	Visible emissions shall be monitored to ensure opacity limits are not exceeded.		Records of opacity monitoring will be kept.		6.1.2
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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: D1-H-741	Emission unit name: DeEthanizer Regenerator 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.):
12.23 mmbtu/hr natural gas-fired DeEthanizer Regenerator heater

Manufacturer: Tulsa Heater Inc.	Model number:	Serial number:
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Construction date: 12/07/2015	Installation date: 12/07/2015	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 12.23 mmbtu/hr

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: 12.23 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 12.23 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
11,118.18 scf/hr
97.40 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.51	2.24
Nitrogen Oxides (NO _x)	0.5	2.19
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.16	0.71
Particulate Matter (PM ₁₀)	0.16	0.71
Total Particulate Matter (TSP)	0.16	0.71
Sulfur Dioxide (SO ₂)	0.01	0.03
Volatile Organic Compounds (VOC)	0.07	0.30
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	<0.01	<0.01
n-Hexane	0.02	0.09
Total HAPs	0.02	0.09
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	1,431.53	6,270.09
<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: Manufacturer specified emission factors (lb/mmbtu) -All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion -GHG: 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 and High Heat Values for Various Types of Fuel</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
- 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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: RB-001	Emission unit name: Dehydration Unit Reboiler	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.):
2.00 mmbtu/hr natural gas-fired Dehydration Unit Reboiler

Manufacturer:	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 2.00 mmbtu/hr

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: 2.00 mmbtu/hr	Type and Btu/hr rating of burners: Helical coil 2.00 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
1,779.36 scf/hr
15.59 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)	0.17	0.72
Nitrogen Oxides (NO _x)	0.20	0.86
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	0.01	0.07
Particulate Matter (PM ₁₀)	0.01	0.07
Total Particulate Matter (TSP)	0.01	0.07
Sulfur Dioxide (SO ₂)	<0.01	<0.01
Volatile Organic Compounds (VOC)	0.01	0.05
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Formaldehyde	<0.01	<0.01
n-Hexane	<0.01	0.01
Total HAPs	<0.01	0.01
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	234.02	1,025.02
<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: Manufacturer specified emission factors (lb/mmbtu) -All other criteria pollutants and HAPs: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion and Table 1.4-3 Emissions Factors for Speciated Organic Compounds from Natural Gas Combustion -GHG: 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 and High Heat Values for Various Types of Fuel</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 [45 CSR §2-3.1] 6.1.3
- 6.1.4 [45 CSR §2A-3.1.a, 45CSR §10-10.3, & 45 CSR §10A-3.1.b]
- 6.1.5
- 6.1.6
- 6.2.1 (40 CFR §60.48c(g)(2) & 45 CSR §2A-7.1.a.1)
- 6.4.1

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			Records of heater rating will be maintained.		6.1.1
6.1.3			Records sufficient to demonstrate compliance with the emission limits will be maintained.		Conditions 6.1.4, 6.1.5, and 6.1.6
6.1.4			Records demonstrating residue gas is used as fuel will be maintained.		6.1.4
6.1.5	Required inspections will be conducted every three years to ensure proper operation of the heaters.		Records of required inspections and tune-ups will be maintained.		6.1.5
6.1.6			Records of heater rating will be maintained.		6.1.6
6.2.1	Hours of operation will be monitored on a monthly basis.		Records of operational hours and fuel usage will be maintained as required.		6.2.1
6.4.1			The records outlined in section 6.4.1 will be maintained as required.		Condition 3.4.1 and Condition 6.1.5

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: FS-762	Emission unit name: Plant Flare	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.):
Plant Flare

Manufacturer:	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput: 19,188 scf/hr	Maximum Annual Throughput: 169.84 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: 23.7 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 (Pilot + purge gas)
200 scf/hr
1.75 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)	8.80	38.56
Nitrogen Oxides (NO _x)	1.64	7.17
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	<0.01	0.01
Particulate Matter (PM ₁₀)	<0.01	0.01
Total Particulate Matter (TSP)	<0.01	0.01
Sulfur Dioxide (SO ₂)	< 0.01	< 0.01
Volatile Organic Compounds (VOC)	<0.01	<0.01
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO2(e)	2.37	10.39
<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: AP-42 Table 1.4-1 Emission Factors for NO_x and CO from Natural Gas Combustion -All other criteria pollutants: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion -GHG: 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 and High Heat Values for Various Types of Fuel</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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- 8.1.3.a 40CFR §60.18(c)(6) & §60.482-10a(d)
- 8.1.3.b 40 CFR §60.18(c)
- 8.1.3.c 40 CFR §60.18(c)(2)
- 8.1.3.d 40 CFR §§60.18(c)(3)(ii) & (c)(4)(ii)
- 8.1.3.e 40 CFR §60.18(c)(5)
- 8.1.3.f 40 CFR §60.18(c)(4)(ii)
- 8.1.3.g
- 8.1.3.h
- 8.1.4 45 CSR §13-5.11

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
8.1.3.a			Records of flare design will be kept		40CFR §60.18(c)(6) & §60.482-10a(d)
8.1.3.b	The flare will be operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours				40 CFR §60.18(c)
8.1.3.c	The flare will be operated with a flame present at all times whenever emissions may be vented to it.				40 CFR §60.18(c)(2)
8.1.3.d			Records of gas volume and heating value routed to the flare will be maintained.		40 CFR §§60.18(c)(3)(ii) & (c)(4)(ii)
8.1.3.e	Flared volume will be monitored.		Records of monitored flare volumes will be maintained.		40 CFR §60.18(c)(5)
8.1.3.f	Flared volume will be monitored.		Records of monitored flare volumes will be maintained.		40 CFR §60.18(c)(4)(ii)
8.1.3.g	Flared volume will be monitored.		Records of monitored flare volumes will be maintained.		
8.1.3.h	Flared volume will be monitored.		Records of monitored flare volumes will be maintained.		
8.1.4					45 CSR §13-5.11

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-DH	Emission unit name: Dehydrator Flare	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.):
Dehydrator Flare

Manufacturer: Aereon	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s): NA
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput: 241.74 scf/hr	Maximum Annual Throughput: 2.12 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: 7.00 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 (Pilot + purge gas)
200 scf/hr
1.75 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

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.04	0.19
Nitrogen Oxides (NO _x)	0.03	0.12
Lead (Pb)	0.00	0.00
Particulate Matter (PM _{2.5})	<0.01	0.01
Particulate Matter (PM ₁₀)	<0.01	0.01
Total Particulate Matter (TSP)	<0.01	0.01
Sulfur Dioxide (SO ₂)	< 0.01	< 0.01
Volatile Organic Compounds (VOC)	<0.01	<0.01
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	2.37	10.39

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 and CO: AP-42 Table 1.4-1 Emission Factors for NO_x and CO from Natural Gas Combustion
 -All other criteria pollutants: AP-42 Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion
 -GHG: 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 and High Heat Values 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.

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.)

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: DH-001	Emission unit name: Natural Gas Dehydrator	List any control devices associated with this emission unit: NA FL-DH
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Natural Gas Dehydrator

Manufacturer: N/A	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 2012	Modification date(s):
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput N/A	Maximum Annual Throughput:	Maximum Operating Schedule:
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? ___ Yes <input checked="" type="checkbox"/> No	If yes, is it? ___ Indirect Fired ___ Direct Fired
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Maximum design heat input and/or maximum horsepower rating:	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.

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)		
Nitrogen Oxides (NO _x)		
Lead (Pb)		
Particulate Matter (PM _{2.5})		
Particulate Matter (PM ₁₀)		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO ₂)		
Volatile Organic Compounds (VOC)	2.02	8.84
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.34	1.47
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	40.38	176.86
<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>Engineering estimation</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.

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.)

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: Storage Tanks	Emission unit name: Storage Tanks	List any control devices associated with this emission unit: NA VRU
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Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Storage Tanks

Manufacturer: N/A	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 2012	Modification date(s):
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 15,158.40 bbl/yr

Maximum Hourly Throughput N/A	Maximum Annual Throughput:	Maximum Operating Schedule:
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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
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Maximum design heat input and/or maximum horsepower rating:	Type and Btu/hr rating of burners: NA
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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.

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)		
Nitrogen Oxides (NO _x)		
Lead (Pb)		
Particulate Matter (PM _{2.5})		
Particulate Matter (PM ₁₀)		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO ₂)		
Volatile Organic Compounds (VOC)	3.55	9.58
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.26	0.92
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	64.50	269.44
<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>Engineering estimation</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.

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.*)

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: FUG-001	Emission unit name: Fugitive Equipment Leaks	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.):
Fugitive equipment leaks from valves, connectors, flanges, pump seals, and other equipment.

Manufacturer: N/A	Model number:	Serial number:
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Construction date: Various per plant.	Installation date: 2012	Modification date(s): 2017
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

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? ___Yes <input checked="" type="checkbox"/> No	If yes, is it? ___ Indirect Fired ___ Direct Fired
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Maximum design heat input and/or maximum horsepower rating:	Type and Btu/hr rating of burners: NA
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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.

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

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

<i>Emissions Data</i>		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)		
Nitrogen Oxides (NO _x)		
Lead (Pb)		
Particulate Matter (PM _{2.5})		
Particulate Matter (PM ₁₀)		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO ₂)		
Volatile Organic Compounds (VOC)	4.87	21.31
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.30	1.32
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)	136.17	596.41
<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>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</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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- 8.1.1.a 40 CFR §60.5390(b)(1) & (b)(2)
- 8.1.1.b 40 CFR §60.5401(b)(1) through (b)(4)
- 8.1.1.c 40 CFR §60.5400(a), §60.5400a(a), §60.482-2a, 7a, and 11a
- 8.1.1.c.i 40 CFR §60.482-2a(b)(1) and §60.18(g)(3)
- 8.1.1.c.ii 40 CFR §60.482-7a(b) and §60.18(g)(3)
- 8.1.1.c.iii 40 CFR §60.482-11a(b)(2) and §60.18(g)(3)
- 8.1.1.d 40 CFR §60.5402(c)
- 8.1.1.e 40 CFR §60.5400(a), §60.5400a(a), §60.482-6a
- 8.1.1.f
- 8.1.1.g 40 CFR §60.5400(a), §60.5400a(a), §60.482-9a(a)
- 8.1.1.h 40 CFR §60.5400(a), §60.5400a(a), §60.482-9a(b)
- 8.1.1.i 40 CFR §60.5400(a), §60.482-9a(b)
- 8.1.1.j
- 8.1.1.k
- 8.1.2.a 40 CFR §60.5400(a), §60.5400a(a), §60.482-11a(f)(1)
- 8.1.2.b 40 CFR §60.5400(a), §60.5400a(a), §60.482-11a(g)
- 8.1.2.c 40 CFR §60.5400(a), §60.5400a(a), §60.482-11a(g)(1) & (g)(2)
- 8.1.2.d 40 CFR §60.5400(a), §60.5400a(a), §60.482-11a(h)
- 8.1.2.e
- 8.1.2.f
- 8.1.2.g 40 CFR §60.482-10a, §60.5400(a)

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
8.1.1.a			Pneumatic controllers will be tagged and records showing they are air driven will be kept.		40 CFR §60.5390(b)(1) & (b)(2)
8.1.1.b	Each pressure relief device in gas/vapor service will be monitored quarterly and within 30 days after each pressure release unless specified in the condition.		Records showing compliance will e kept.		40 CFR §60.5401(b)(1) through (b)(4)
8.1.1.c	Pumps will be monitored per the requirements of the		Records of monitoring will be maintained.		40 CFR §60.5400(a), §60.5400a(a), §60.482-2a, 7a,

	condition.				and 11a
8.1.1.c.i	Pumps will be monitored per the requirements of the condition.		Records of monitoring will be maintained.		40 CFR §60.482-2a(b)(1) and §60.18(g)(3)
8.1.1.c.ii	Pumps will be monitored per the requirements of the condition.		Records of monitoring will be maintained.		40 CFR §60.482-7a(b) and §60.18(g)(3)
8.1.1.c.iii	Pumps will be monitored per the requirements of the condition.		Records of monitoring will be maintained.		40 CFR §60.482-11a(b)(2) and §60.18(g)(3)
8.1.1.d					40 CFR §60.5402(c)
8.1.1.e					40 CFR §60.5400(a), §60.5400a(a), §60.482-6a
8.1.1.f			Records of repair attempts will be maintained.		
8.1.1.g			DOR records will be maintained.		40 CFR §60.5400(a), §60.5400a(a), §60.482-9a(a)
8.1.1.h			DOR records will be maintained.		40 CFR §60.5400(a), §60.5400a(a), §60.482-9a(b)
8.1.1.i			DOR records will be maintained.		40 CFR §60.5400(a), §60.482-9a(b)
8.1.1.j			DOR records will be maintained.		
8.1.1.k			DOR records will be maintained.		
8.1.2.a			Records of closed vent system construction will be maintained.		40 CFR §60.5400(a), §60.5400a(a), §60.482-11a(f)(1)
8.1.2.b	The closed vent system will be monitored to ensure leak free operation.				40 CFR §60.5400(a), §60.5400a(a), §60.482-11a(g)
8.1.2.c			DOR records will be maintained		40 CFR §60.5400(a), §60.5400a(a),

					§60.482-11a(g)(1) & (g)(2)
8.1.2.d			DOR records will be maintained		40 CFR §60.5400(a), §60.5400a(a), §60.482-11a(h)
8.1.2.e					
8.1.2.f			Records for difficult to inspect components will e maintained.		
8.1.2.g					40 CFR §60.482-10a, §60.5400(a)
<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: 1B	Emission unit name: Blowdowns	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.):
Gas venting to atmosphere resulting from equipment blowdowns

Manufacturer: N/A	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 2012	Modification date(s):
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput N/A	Maximum Annual Throughput: 237,600 scf/yr (compressors) 168,089,152 scf/yr (plant venting)	Maximum Operating Schedule: 36 events/compressor/yr
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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: 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.

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)		
Nitrogen Oxides (NO _x)		
Lead (Pb)		
Particulate Matter (PM _{2.5})		
Particulate Matter (PM ₁₀)		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO ₂)		
Volatile Organic Compounds (VOC)		13.4
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs		0.26
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)		1,218.65
<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>Engineering estimation</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.

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.*)

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: Rod Packing	Emission unit name: Rod Packing Emissions	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.):
Gas venting to atmosphere resulting from rod packing.

Manufacturer: N/A	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s):
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):
0.03 scf/min/compressor

Maximum Hourly Throughput N/A	Maximum Annual Throughput: 44,114.30 scf/yr	Maximum Operating Schedule: 8,760 hr/yr
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Fuel Usage Data (fill out all applicable fields)

Does this emission unit combust fuel? ___ Yes <input checked="" type="checkbox"/> 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: 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.

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

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

<i>Emissions Data</i>		
Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)		
Nitrogen Oxides (NO _x)		
Lead (Pb)		
Particulate Matter (PM _{2.5})		
Particulate Matter (PM ₁₀)		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO ₂)		
Volatile Organic Compounds (VOC)	0.04	0.17
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.00	0.00
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)		36.87
<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>Engineering estimation</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.

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.)

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: Crankcase Emissions	Emission unit name: Crankcase Emissions	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.):
Gas venting to atmosphere resulting from engine crankcase vents.

Manufacturer: N/A	Model number:	Serial number:
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Construction date: 10/12/2012	Installation date: 10/12/2012	Modification date(s):
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Design Capacity (examples: furnaces - tons/hr, tanks - gallons):
3% Crankcase blowby

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

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

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)		
Nitrogen Oxides (NO _x)		
Lead (Pb)		
Particulate Matter (PM _{2.5})		
Particulate Matter (PM ₁₀)		
Total Particulate Matter (TSP)		
Sulfur Dioxide (SO ₂)		
Volatile Organic Compounds (VOC)	0.57	2.48
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAPs	0.01	0.05
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO ₂ (e)		
<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>Engineering estimation</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.

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.)

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: C-1001	List all emission units associated with this control device. CM-1001	
Manufacturer:	Model number:	Installation date: 10/12/2012

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>Selective Catalytic Reduction (SCR)</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		
CO		95%
VOC		75%
HCHO		90%

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

Catalyst inlet temperature: 850 °F

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 JJJ.

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

- Exhaust gas temperature and exhaust oxygen content
- Masking, poisoning or overrich air/fuel ratio situation which results in performance degradation or failure of the catalyst element
- Check air/fuel ratio every 1,500 service hours and adjust in accordance to the manufacturer's specifications
- Monitor the temperature to the catalyst inlet, and in accordance with manufacturer's specifications a high temperature alarm shall shut off the engine before thermal deactivation of the catalyst occurs.

Inspect for thermal deactivation before restarting the engine.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: C-1002	List all emission units associated with this control device. CM-1002	
Manufacturer:	Model number:	Installation date: 10/12/2012

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>Selective Catalytic Reduction (SCR)</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		
CO		95%
VOC		75%
HCHO		90%

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

Catalyst inlet temperature: 850 °F

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.

- Exhaust gas temperature and exhaust oxygen content
- Masking, poisoning or overrich air/fuel ratio situation which results in performance degradation or failure of the catalyst element
- Check air/fuel ratio every 1,500 service hours and adjust in accordance to the manufacturer's specifications
- Monitor the temperature to the catalyst inlet, and in accordance with manufacturer's specifications a high temperature alarm shall shut off the engine before thermal deactivation of the catalyst occurs.

Inspect for thermal deactivation before restarting the engine.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: C-2001	List all emission units associated with this control device. CM-2001	
Manufacturer:	Model number:	Installation date: 10/12/2012

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>Selective Catalytic Reduction (SCR)</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		
CO		95%
VOC		75%
HCHO		88%

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

Catalyst inlet temperature: 850 °F

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 JJJ.

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

- Exhaust gas temperature and exhaust oxygen content
- Masking, poisoning or overrich air/fuel ratio situation which results in performance degradation or failure of the catalyst element
- Check air/fuel ratio every 1,500 service hours and adjust in accordance to the manufacturer's specifications
- Monitor the temperature to the catalyst inlet, and in accordance with manufacturer's specifications a high temperature alarm shall shut off the engine before thermal deactivation of the catalyst occurs.

Inspect for thermal deactivation before restarting the engine.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: FS-762	List all emission units associated with this control device. Various plant vents	
Manufacturer:	Model number:	Installation date: 10/12/2012

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
VOC		98%
HAPs		98%

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

Air-assisted elevated flare.
Maximum volumetric flowrate: 19,188 scf/hr

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.** Flare is subject to the general requirements of NSPS Subpart A

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

Flare is operated with a continuous pilot light. Presence of a pilot light is monitored via thermocouple. Should the thermocouple sense a loss of flame, the flame front generator will initiate a re-light cycle and send a common trouble alarm to the plant control system.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: FL-DH		List all emission units associated with this control device. DH-001	
Manufacturer: Aereon		Model number:	Installation date: 10/12/2012
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	
VOC		98%	
HAPs		98%	
Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).			
Air-assisted elevated flare. Maximum volumetric flowrate: 41.74 scf/hr			
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. Flare is subject to the general requirements of NSPS Subpart A			
Describe the parameters monitored and/or methods used to indicate performance of this control device.			
Flare is operated with a continuous pilot light. Presence of a pilot light is monitored via thermocouple. Should the thermocouple sense a loss of flame, the flame front generator will initiate a re-light cycle and send a common trouble alarm to the plant control system.			