



625 Liberty Ave, Suite 1700
Pittsburgh PA 15222
www.eqt.com

TEL: (412) 395-3699
FAX: (412) 395-2156

Alex Bosiljevac
Environmental Coordinator

April 15, 2015

CERTIFIED MAIL # 7014 2120 0002 1164 5259

Mr. William F. Durham, Director
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, West Virginia, 25304

**RE: G30-D Air Permit Application
EQT Gathering, LLC
Robson, West Virginia
Pocahontas Compressor Station**

Dear Mr. Durham,

Enclosed is a G30-D General Air Permit Application for an after-the-fact permit at the Pocahontas Compressor Station. A legal advertisement will be published in the next few days and proof of publication will be forwarded as soon as it is received. Please contact me for payment of the application fee by credit card.

If you have any questions concerning this permit application, please contact me at (412) 395-3699 or by email at abosiljevac@eqt.com.

Sincerely,

A handwritten signature in blue ink, appearing to read 'RAB', with a long, sweeping flourish extending to the right.

Alex Bosiljevac
EQT Corporation

Enclosures



EQT Gathering, LLC

G30-D General Air Permit Application Pocahontas Compressor Station

Robson, West Virginia

Prepared By:

**ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia**

April 2015

Introduction

EQT is submitting this after-the-fact Class II G30-D General Permit Application for the Pocahontas Compressor Station located in Robson, Fayette County to comply with the permitting requirements of the state of West Virginia. Operations at the Pocahontas Compressor Station originally began in September 2004.

Any natural gas compressor station granted a Class II General Permit registration cannot have a potential to emit (PTE) of 10 tons per year of any hazardous/toxic pollutant (HAP) or 25 tons per year of any combination of HAP. Sources of emissions at eligible natural gas compressor stations under this permit include reciprocating internal combustion engine (RICE) driven compressors, emergency stand-by generators, engine driven air compressors, boilers, line heaters and tanks. An estimate of criteria and hazardous/toxic pollutant emissions is included with in this G30-D Permit Registration Application in Attachment I for the RICE and tanks located at Pocahontas Compressor Station. No other equipment subject to permitting is located at this facility. This facility is not subject to the requirements of a sitting criteria waiver, since there are no dwellings within 300 feet.

Facility Description

Natural gas produced from surrounding gas wells is routed to the Pocahontas Compressor Station. The pipeline gas suction line feeds into a natural gas fueled, internal combustion engine. Three tanks consisting of a Lube Oil Tank, a Used Oil Tank, and a Methanol Tank are also on site and are used to store fluids.

The following equipment is located at Pocahontas Compressor Station:

- One (1) natural gas fueled internal combustion engine (CAT 3306TA) with a design capacity of 203 brake horsepower,
- One (1) 1,000 gallon lube oil tank,
- One (1) 550 gallon methanol tank,
- One (1) 550 gallon used oil tank, and
- One (1) 30 gallon methanol tank.

A process flow diagram is included in this application in Attachment D.

Regulatory Applicability

This section outlines the State's air quality regulations that could be reasonably expected to apply to the Pocahontas Compressor Station based on activities conducted at the site and the emissions of regulated air pollutants. The West Virginia State Regulations address federal air quality regulations where West Virginia has delegated authority of enforcement, including PSD permitting, Title V permitting, certain New Source Performance Standards (NSPS), and certain National Emission Standards for Hazardous Air Pollutants (NESHAPs).

45 CSR 02 – To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect Heat Exchangers

There are no indirect heat exchangers at this facility.

45 CSR 04 – To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

Operations conducted at the compressor station are subject to this requirement. Based on the nature of the process at the compressor station, the presence of objectionable odors is unlikely.

45 CSR 10 – To Prevent and Control Air Pollution From the Emission of Sulfur Oxides

The compressor engine at the Pocahontas Compressor Station combusts natural gas and is subject to this requirement. The purpose of this rule is to prevent and control air pollution from the emission of sulfur oxides. All fuel burning units will be subject to the weight emission standard for sulfur dioxide.

45 CSR 13 – Permits For Construction, Modification, Relocation And Operation of Stationary Sources of Air Pollutants

This G30-D permit application is being submitted for the operational activities associated with EQT's compression of natural gas.

45 CSR 14 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

Operation of equipment at this compressor station will not exceed the PSD emission triggers.

45CSR16 – Standards of Performance for New Stationary Sources

The following NSPS were reviewed for applicability and do not apply to the operations at the Pocahontas Compressor Station:

- *40 CFR 60 Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines):* Subpart IIII sets forth emission

limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject emergency generator.

- *40 CFR 60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)* Subpart JJJJ sets forth emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of installation of the subject internal combustion engine.
- *40 CFR 60, Subpart OOOO (Standards of Performance for Crude oil and Natural Gas Production, Transmission and Distribution)* applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. There are no sources of emissions that meet the definition of any of the affected facilities regulated by Subpart OOOO located at Pocahontas.

45 CSR 19 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution Which Cause or Contributed to Nonattainment

Operation of equipment at the Pocahontas Compressor Station will not exceed the major NSR emission thresholds.

45 CSR 25 – Control of Air Pollution from Hazardous Waste Treatment, Storage, and Disposal Facilities

No hazardous waste will be burned at this well site; therefore, it is not subject to this hazardous waste rule.

45 CSR 30 – Requirements for Operating Permits

The production site does not currently operate under a Title V permit and emission rates will not trigger the need for a Title V permit.

45 CSR 34 – Emission Standards for Hazardous Air Pollutants

The following NESHAP were reviewed for applicability and apply to the operations at the Pocahontas Compressor Station:

- *40 CFR 63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)*. The CAT3306 RICE is subject to these requirements. 45CSR34 applies to any registrant that is subject to the area source requirements of 40 CFR 63, Subpart ZZZZ. The EPA has delegated authority of these area source requirements to the WVDAQ. The engine at Pocahontas Compressor Station was originally manufactured in 1993 and although the engine was overhauled in 2013, the cost of the maintenance was less than 50% of the

fixed capital costs, which does not meet the definition of reconstruction. As such, the engine is subject to the existing area source requirements of a four stroke, rich burn engine which have been incorporated into the G30-D permit by WVDAQ.

The following NESHAP were reviewed for applicability and do not apply to the operations At Pocahontas Compressor:

- *40 CFR 63 Subpart HH (National Emission Standards for Hazardous Air Pollutants From Oil and Natural Gas Production Facilities).*

Permit Application Contents

The remaining portion of this G30-D permit application is organized as follows:

Application For General Permit Registration

Attachment A: Business Certificate

Attachment B: Process Description

Attachment C: Not Applicable for G30-D Registrations

Attachment D: Process Flow Diagram

Attachment E: Plot Plan

Attachment F: Area Map

Attachment G: Affected Source Data Sheets

Attachment H: Not Applicable for G30-D Registrations

Attachment I: Emissions Calculations

Attachment J: Class I Legal Advertisement

Attachment K: Electronic submittal

Attachment L: General Permit Registration Fee

Attachment M: Siting Criteria Waiver

Attachment N: Material Safety Data Sheets

Attachment O: Emissions Summary Sheets

Attachment P: Other Supporting Documentation

Attachment Q: Business Confidentiality Claims



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

APPLICATION FOR GENERAL PERMIT REGISTRATION
 CONSTRUCT, MODIFY, RELOCATE OR ADMINISTRATIVELY UPDATE
 A STATIONARY SOURCE OF AIR POLLUTANTS

- CONSTRUCTION MODIFICATION RELOCATION CLASS I ADMINISTRATIVE UPDATE
 CLASS II ADMINISTRATIVE UPDATE

CHECK WHICH TYPE OF GENERAL PERMIT REGISTRATION YOU ARE APPLYING FOR:

- | | |
|---|--|
| <input type="checkbox"/> G10-D – Coal Preparation and Handling | <input type="checkbox"/> G40-C – Nonmetallic Minerals Processing |
| <input type="checkbox"/> G20-B – Hot Mix Asphalt | <input type="checkbox"/> G50-B – Concrete Batch |
| <input checked="" type="checkbox"/> G30-D – Natural Gas Compressor Stations | <input type="checkbox"/> G60-C - Class II Emergency Generator |
| <input type="checkbox"/> G33-A – Spark Ignition Internal Combustion Engines | <input type="checkbox"/> G65-C – Class I Emergency Generator |
| <input type="checkbox"/> G35-A – Natural Gas Compressor Stations (Flare/Glycol Dehydration Unit) | <input type="checkbox"/> G70-A – Class II Oil and Natural Gas Production Facility |

SECTION I. GENERAL INFORMATION

1. Name of applicant (as registered with the WV Secretary of State's Office): EQT Gathering, LLC		2. Federal Employer ID No. (FEIN): 25-2752042	
3. Applicant's mailing address: 625 Liberty Avenue Pittsburgh, PA 15222-3110		4. Applicant's physical address: County Road 61/2 Robson, West Virginia 25173	
5. If applicant is a subsidiary corporation, please provide the name of parent corporation:			
6. WV BUSINESS REGISTRATION. Is the applicant a resident of the State of West Virginia? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - IF YES , provide a copy of the Certificate of Incorporation/ Organization / Limited Partnership (one page) including any name change amendments or other Business Registration Certificate as Attachment A . - IF NO , provide a copy of the Certificate of Authority / Authority of LLC / Registration (one page) including any name change amendments or other Business Certificate as Attachment A .			

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.): Class II Natural Gas Compressor Station	8a. Standard Industrial Classification Classification (SIC) code: 1311	AND	8b. North American Industry System (NAICS) code: 211111
9. DAQ Plant ID No. (for existing facilities only): N/A	10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only): N/A		

A: PRIMARY OPERATING SITE INFORMATION

<p>11A. Facility name of primary operating site:</p> <p>Pocahontas Compressor Station</p>	<p>12A. Address of primary operating site:</p> <p>Mailing: 625 Liberty Avenue Pittsburgh, PA 15222-3110</p> <p>Physical: County Road 61/2 Robson, West Virginia 25173</p> <p>Latitude: 38.10262 Longitude: - 81.22279</p>	
<p>13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>- IF YES, please explain: The applicant leases the proposed site.</p> <p>- IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.</p>		
<p>14A. <input type="checkbox"/> For Modifications or Administrative Updates at an existing facility, please provide directions to the present location of the facility from the nearest state road;</p> <p>- For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a MAP as Attachment F.</p>		
<p>15A. Nearest city or town:</p> <p>Robson</p>	<p>16A. County:</p> <p>Fayette</p>	<p>17A. UTM Coordinates:</p> <p>Northing (KM): 4,217.22 Easting (KM): 480.47 Zone: 17</p>
<p>18A. Briefly describe the proposed new operation or change (s) to the facility:</p> <p>The Pocahontas Creek Compressor Station was start-up in its current location in 2004.</p>		<p>19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):</p> <p>Latitude: 38.10262 Longitude: - 81.22279</p>

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

23. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

24. Include a **Table of Contents** as the first page of your application package.

All of the required forms and additional information can be found under the Permitting Section (General Permits) of DAQ's website, or requested by phone.

25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.

- ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ATTACHMENT B: PROCESS DESCRIPTION
- ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ATTACHMENT D: PROCESS FLOW DIAGRAM
- ATTACHMENT E: PLOT PLAN
- ATTACHMENT F: AREA MAP
- ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ATTACHMENT I: EMISSIONS CALCULATIONS
- ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ATTACHMENT K: ELECTRONIC SUBMITTAL
- ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE
- ATTACHMENT M: SITING CRITERIA WAIVER
- ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS)
- ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.)

Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.

SECTION IV. CERTIFICATION OF INFORMATION

This General Permit Registration Application shall be signed below by a Responsible Official. A Responsible Official is a President, Vice President, Secretary, Treasurer, General Partner, General Manager, a member of a Board of Directors, or Owner, depending on business structure. A business may certify an Authorized Representative who shall have authority to bind the Corporation, Partnership, Limited Liability Company, Association, Joint Venture or Sole Proprietorship. Required records of daily throughput, hours of operation and maintenance, general correspondence, Emission Inventory, Certified Emission Statement, compliance certifications and all required notifications must be signed by a Responsible Official or an Authorized Representative. If a business wishes to certify an Authorized Representative, the official agreement below shall be checked off and the appropriate names and signatures entered. Any administratively incomplete or improperly signed or unsigned Registration Application will be returned to the applicant.

FOR A CORPORATION (domestic or foreign)

[X] I certify that I am a President, Vice President, Secretary, Treasurer or in charge of a principal business function of the corporation

FOR A PARTNERSHIP

[] I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

[] I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

[] I certify that I am the President or a member of the Board of Directors

FOR A JOINT VENTURE

[] I certify that I am the President, General Partner or General Manager

FOR A SOLE PROPRIETORSHIP

[] I certify that I am the Owner and Proprietor

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

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

Signature Diana M. Charletta 4/15/15
(please use blue ink) Responsible Official Date

Name & Title Diana Charletta, Sr. VP Midstream Operations

Signature
(please use blue ink) Authorized Representative (if applicable) Date

Applicant's Name EQT Gathering, LLC

Phone & Fax (412) 395 - 3699
Phone Fax

Email abosiljevac@eqt.com

Attachment A

**WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION
CERTIFICATE**

ISSUED TO:
**EQT GATHERING, LLC
225 N SHORE DR
PITTSBURGH, PA 15212-5860**

BUSINESS REGISTRATION ACCOUNT NUMBER: 1010-2674

This certificate is issued on: **06/28/2011**

*This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code*

*The person or organization identified on this certificate is registered
to conduct business in the State of West Virginia at the location above.*

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them.
CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

Attachment B

Attachment B

Process Description

EQT Gathering, LLC is submitting this after-the-fact G-30D Class II General Permit for the Pocahontas Compressor Station to comply with the permitting requirements of the state of West Virginia. Natural gas is produced from surrounding gas wells and routed to this central compressor station. The pipeline gas suction line feeds into a natural gas fueled, internal combustion engine (CAT-001) that is present at the compressor station. The combustion engine is a CAT 3306TA natural gas fueled internal combustion engine with a design capacity of 203 brake horsepower. Three tanks, a Lube Oil Tank (LOT-002), Used Oil Tank (UOT-003), and a Methanol Tank (MT-004) are also on site and are used to store fluids.

Attachment C

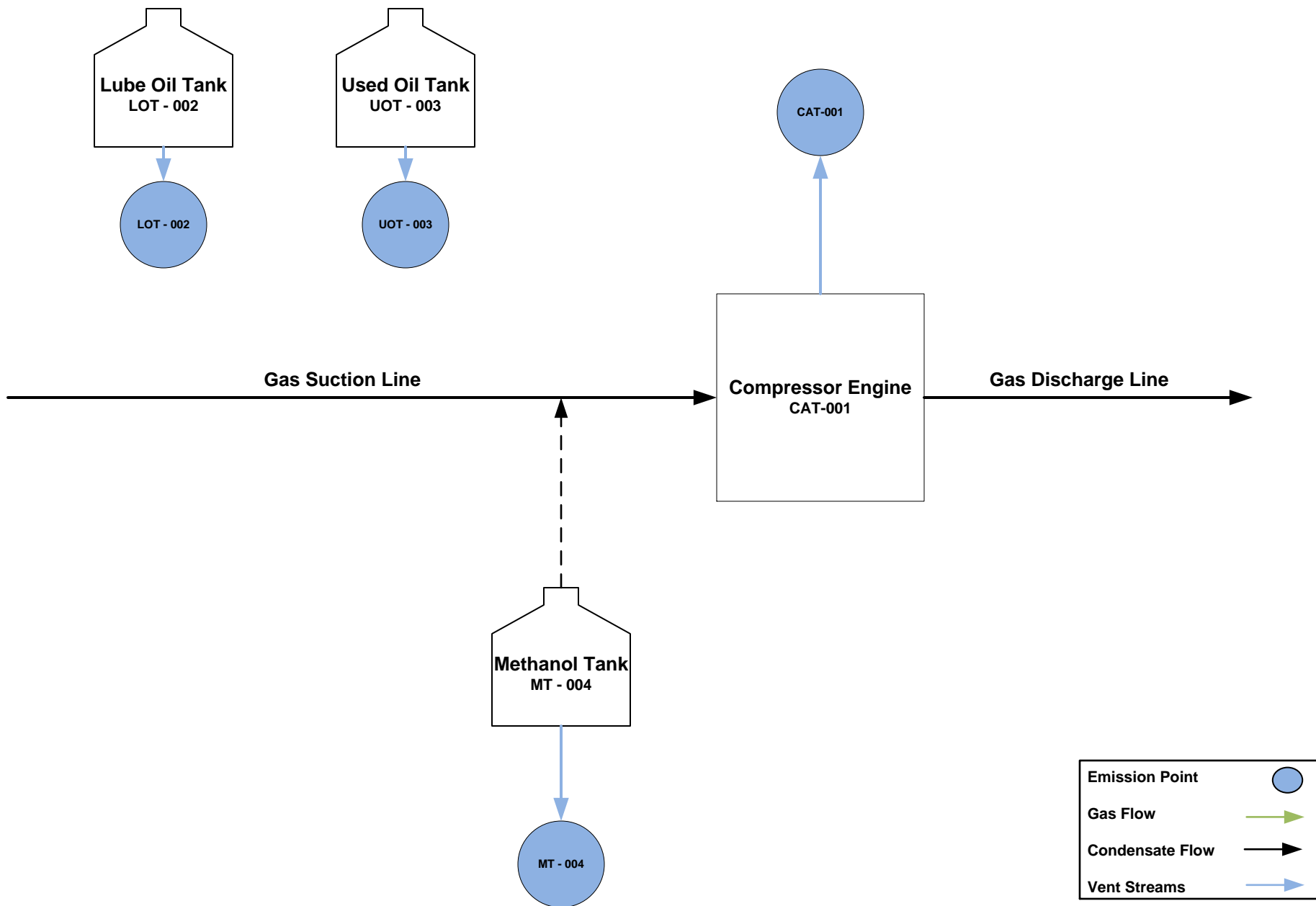
Attachment C

G30-D General Permit Description of Fugitive Emissions

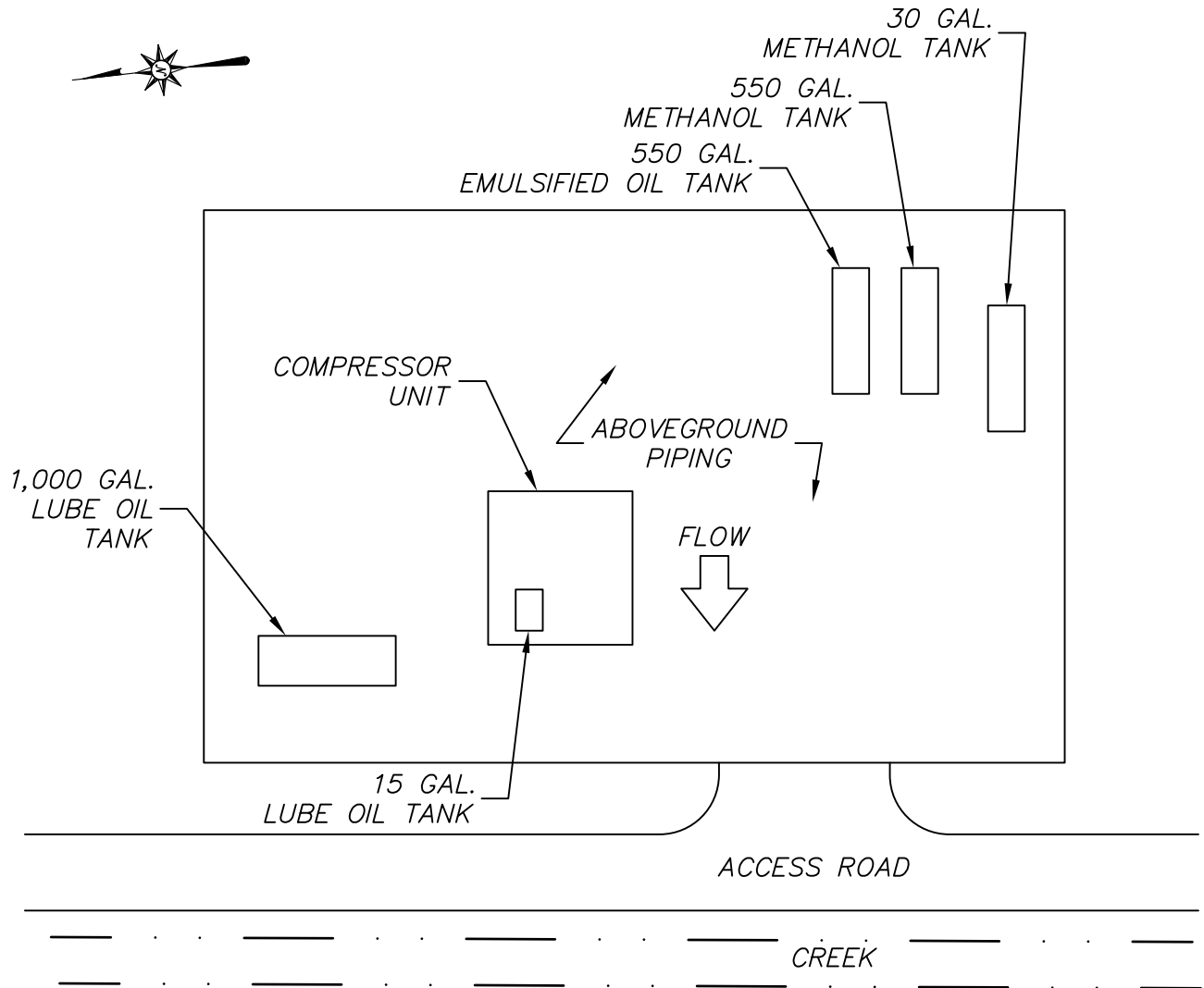
This permit application is being filed for EQT Gathering, LLC and addresses operational activities associated with the Pocahontas Compressor Station. Fugitive emissions on the site are generated from a number of sources, including an unpaved haul road and equipment leaks. These fugitive emission sources cannot be controlled by air pollution control devices. Emission levels for fugitive emissions were calculated using AP-42 emission factors, results of a gas analysis, and 40 CFR Part 98, Subpart W emission factors and component counts. A summary of the fugitive emissions for the Pocahontas Compressor Station can be found in Attachment O – Emissions Summary Sheet.

Attachment D

Attachment D - Process Flow Diagram
EQT Gathering, LLC – Pocahontas Compressor Station



Attachment E

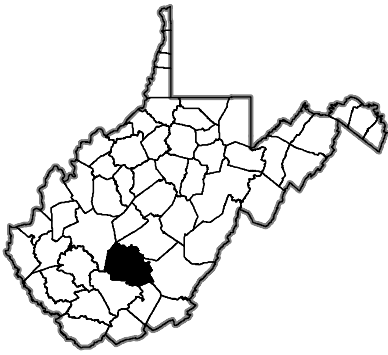


CADD FILE: MADISON FIGURES.dwg	
DRAWN BY: CLC	CHECKED BY: SC
DATE: 5/31/2012	SCALE: N.T.S.

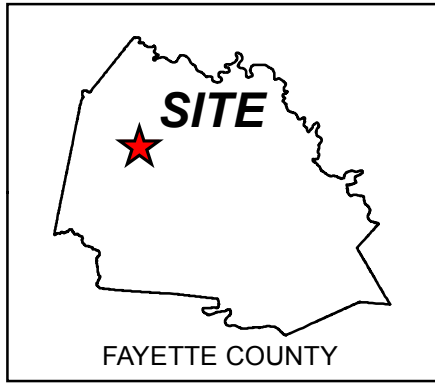
EQT GATHERING, LLC POCA LAND COMPRESSOR STATION SITE LAYOUT MADISON DISTRICT	
JOB NO: 04-11-0131	FIGURE No. 2


TRIAD ENGINEERING, INC.
www.triadeng.com
 4980 TEAYS VALLEY ROAD
 SCOTT DEPOT, WV 25560

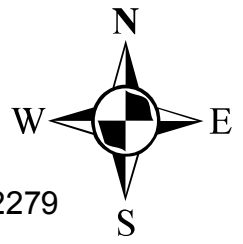
Attachment F



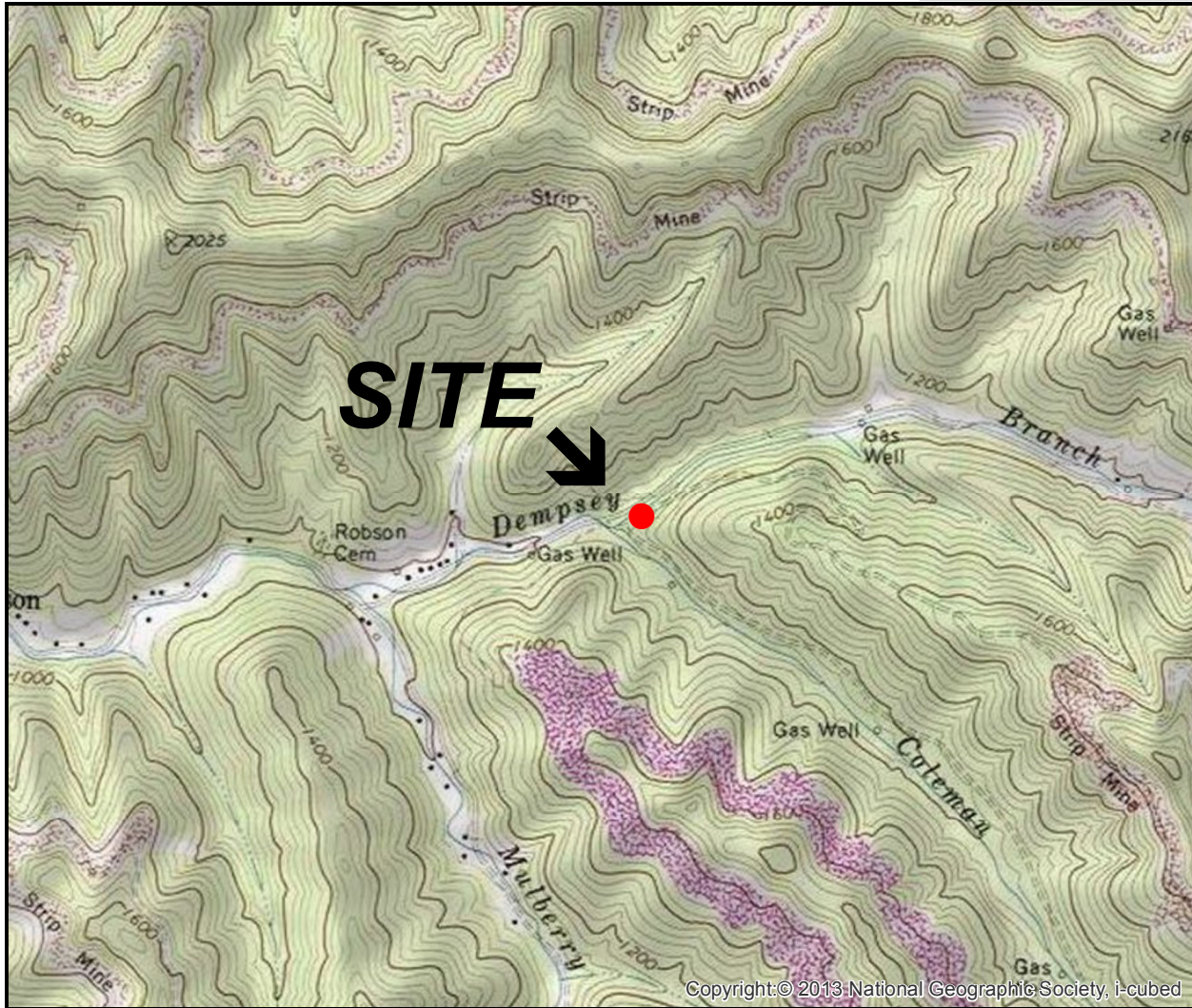
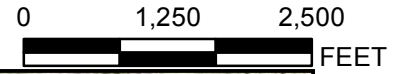
WEST VIRGINIA



FAYETTE COUNTY



LAT. 38.10262 LONG. -81.22279
CITY OF ROBSON
FAYETTE COUNTY
WEST VIRGINIA



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SITE LOCATION MAP

USGS 24K QUAD GRID
BECKWITH



EQT GATHERINGS LLC

POCAHONTAS COMPRESSOR STATION

ROBSON, WEST VIRGINIA

Review GM

CHK'D GM

0250449

Drawn By
FB 3/9/15

Environmental Resources Management

ATTACHMENT F

Attachment G

Attachment G

Affected Sources Data

NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

Source Identification Number ¹		CAT-001	
Engine Manufacturer and Model		CATERPILLAR 3306TA	
Manufacturer's Rated bhp/rpm		203 BHP @ 1800 RPM	
Source Status ²		Existing Source (ES)	
Date Installed/Modified/Removed ³		September 2004	
Engine Manufactured/Reconstruction Date ⁴		2004 No Reconstruction	
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No) ⁵		No	
Engine, Fuel and Combustion Data	Engine Type ⁶	RB4S	
	APCD Type ⁷	NSCR	
	Fuel Type ⁸	RG	
	H ₂ S (gr/100 scf)	0.25	
	Operating bhp/rpm	203 BHP @ 1800 RPM	
	BSFC (Btu/bhp-hr)	7,604	
	Fuel throughput (ft ³ /hr)	1,706	
	Fuel throughput (MMft ³ /yr)	14.94	
	Operation (hrs/yr)	8,760	
Reference ⁹	Potential Emissions ¹⁰	lbs/hr	tons/yr
Vendor Guarantee	NO _x	10.19	44.62
Vendor Guarantee	CO	0.57	2.51
Vendor Guarantee	VOC	0.05	0.22
AP-42 Chapter 3.2	SO ₂	0.001	0.004
AP-42 Chapter 3.2	PM ₁₀	0.01	0.06
Vendor Guarantee	Formaldehyde	0.23	1.01

1. Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-

Attachment G

Affected Sources Data

2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. If more than three (3) engines exist, please use additional sheets.

2. Enter the Source Status using the following codes:

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

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

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

5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.

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

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

LB2S	Lean Burn Two Stroke	RB4S	Rich Burn Four Stroke
LB4S	Lean Burn Four Stroke		

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

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

8. Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas
----	------------------------------	----	-----------------

9. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this *Compressor/Generator Data Sheet(s)*.

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

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

Attachment G

Affected Sources Data

STORAGE TANK DATA SHEET

Source ID # ¹	Status ²	Content ³	Volume (gallons) ⁴	Dia (ft) ⁵	Throughput (gallons/year) ⁶	Orientation ⁷	Liquid Height (ft) ⁸
MT-004	EXIST	Methanol	550	4	550	HORZ	2
LOT-002	EXIST	Lube Oil	1,000	4	1,000	HORZ	2
UOT-003	EXIST	Used Oil	550	4	550	HORZ	2
MT-005	EXIST	Methanol	30	4	30	HORZ	2

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:
EXIST Existing Equipment
REM Equipment Removed
NEW Installation of New Equipment
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, etc.
4. Enter storage tank volume in gallons.
5. Enter storage tank diameter in feet.
6. Enter storage tank throughput in gallons per year.
7. Enter storage tank orientation using the following:
VERT Vertical Tank
HORZ Horizontal Tank
8. Enter storage tank average liquid height in feet.

Attachment H

Attachment H
Air Pollution Control Device Data Sheets

This information is not required for the General Permit G30-D.

Attachment I

Compressor Engine - CAT 001

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas ³ (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
NOx	22.76	g/bhp-hr	Vendor Guarantee	203	7,604	905	8,760	10.19	44.62
CO	1.28	g/bhp-hr	Vendor Guarantee	203	7,604	905	8,760	0.57	2.51
VOC's	0.11	g/bhp-hr	Vendor Guarantee	203	7,604	905	8,760	0.05	0.22
PM ₁₀	9.50E-03	lb/mmBtu	AP-42 Chapter 3.2	203	7,604	905	8,760	0.01	0.06
SO ₂	5.88E-04	lb/mmBtu	AP-42 Chapter 3.2	203	7,604	905	8,760	0.001	0.004
Benzene	1.58E-03	lb/mmBtu	AP-42 Chapter 3.2	203	7,604	905	8,760	0.002	0.01
Ethylbenze	2.48E-05	lb/mmBtu	AP-42 Chapter 3.2	203	7,604	905	8,760	0.000	0.000
Formaldehyde	1.50E-01	g/(bhp-hr)	Vendor Guarantee	203	7,604	905	8,760	0.07	0.29
Xylene	1.95E-04	lb/mmBtu	AP-42 Chapter 3.2	203	7,604	905	8,760	0.000	0.001
Toluene	5.58E-04	lb/mmBtu	AP-42 Chapter 3.2	203	7,604	905	8,760	0.001	0.004
CO ₂	4.96E+02	g/bhp-hr	Vendor Guarantee	203	7,604	905	8,760	222.02	972.43
CH ₄	1.00E-04	kg/mmBtu	40 CFR 98 Subpart C	203	7,604	905	8,760	0.000	0.00
N ₂ O ⁴	1.00E-03	kg/mmBtu	40 CFR 98 Subpart C	203	7,604	905	8,760	0.003	0.015
Total CO ₂ e								223.04	976.91

Notes:

- ¹- AP-42, Chapter 3.2 references for 4 stroke rich burn engines are from the August 2000 revision.
- ²-Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- ³- Heat Value of Natural Gas used based upon manufacturer emissions guarantee usage conditions
- ⁴-Nitrous Oxide emissions solved for using equation in 98.233(z)(2)(vi) from 40CFR98, Subpart W. Calculation methodology is included below.
- CO2 equivalency solved for using Global Warming Potentials found in 40CFR98 Table A-1 (Updated January 2014). GWP CO2=1, GWP CH4=25, GWP N2O=298

Example Equations:

Vendor Guaranteed Max. Hourly Emission Rate (lb/hr) = Emission Factor (g/bhp-hr) x Engine Rating (bhp) x 0.002205 (lb/gram)
 Subpart C Max. Hourly Emission Rate (lb/hr) = Fuel Consumption Rate (Btu/bhp-hr) x Engine Rating (bhp) x (1000 g/kg) x Emission Factor (kg N₂O/mmBtu) x (1 lb / 453.592 g) * (1 mmBtu / 10⁶ Btu)

Equation Methodology used to solve for Nitrous Oxide Emissions:

(z)(2)(vi) Calculate N₂O mass emissions using Equation W-40 of this section.

$$CH_4 \text{ or } N_2O = 1 \times 10^{-3} * HHV * EF * Fuel \quad (\text{Eq. C-9a})$$

Where:

- CH₄ or N₂O = Annual emissions from the combustion of a particular type of fuel (metric tons CO₂e).
- Fuel = Mass or volume of the fuel combusted (mass or volume per year, choose appropriately to be consistent with the units of HHV).
- HHV = High heat value of the fuel, averaged for all valid measurements for reportinh year (mmBtu per mass or volume).
- EF = Use 1.0 x 10⁻³ kg N₂O/mmBtu or 1.0⁻⁴ kg CH₄
- 1 x 10⁻³ = Conversion factor from kilograms to metric tons.

Fugitive Leaks

Default Average Component Counts for Major Onshore Natural Gas Equipment ¹				
Facility Equipment Type	Valves	Connectors	Open-ended Lines	Pressure Relief Valves
Wellheads	8	38	0.5	0
Separators	1	6	0	0
Meters/Piping	12	45	0	0
Compressors	12	57	0	0
In-line Heaters	14	65	2	1
Dehydrators	24	90	2	2

Equipment Counts	
Facility Equipment Type	Count on Site
Wellheads	0
Separators	0
Meters/Piping	1
Compressors	1
In-line Heaters	0
Dehydrators	0

¹- Table W-1B to 40CFR98 Subpart W

Gas Composition														
	Propane	Butane	Pentanes	Heptanes	Octanes	Nonanes	Decanes	Hexane	Benzene	Toluene	Ethylbenzene	Xylene	CO ₂	CH ₄
Mole %	4.16	1.71	0.71	0.22	0.14	0.03	0.009	0.407	0.006	0.01	0.001	0.007	0.19	78.57
MW	44	58	72	100	114	128	412	86	78	92	106	106	44	16

Fugitive Emissions													
Facility Equipment Type	Total Count	Emission Rate (scf/hr/component) ²	Hours of Operation	VOCs (lbs/hr)	VOCs (tons/yr)	HAPs (lbs/hr)	HAPs (tons/yr)	CO ₂ (lbs/hr)	CO ₂ (tons/yr)	CH ₄ (lbs/hr)	CH ₄ (tons/yr)	Total CO ₂ e (lbs/hr)	Total CO ₂ e (tons/yr)
Valves	12	0.027	8760	0.00	0.02	3.2E-04	1.4E-03	7.0E-05	3.0E-04	0.01	0.05	0.26	1.16
Connectors	45	0.003	8760	0.00	0.01	1.3E-04	5.8E-04	2.9E-05	1.3E-04	0.00	0.02	0.11	0.48
Open-ended Lines	0	0.06	8760	0.00	0.00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.000	0.000	0.000	0.000
Pressure Relief Valves	0	0.04	8760	0.000	0.00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.000	0.000	0.000	0.000
Total Emissions:				0.005	0.02	<0.001	0.002	<0.001	<0.001	0.01	0.07	0.37	1.64

²- Table W-1A to 40CFR98 Subpart W

Notes:

-Gas Composition data for the Pocahontas Compressor Stations was unavailable. Gas composition was used to determine fugitive emissions based a nearby similar site operated by EQT.

Example Equations:

Fugitive Emissions (lb/hr) = Count x Emission Rate x Hours of Operation ÷ 385.5 scf/lbmol x mol % x MW

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	LOT-002
City:	
State:	
Company:	
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):	11.00
Diameter (ft):	4.00
Volume (gallons):	1,000.00
Turnovers:	12.00
Net Throughput(gal/yr):	12,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Red/Primer
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

LOT-002 - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Lube Oil	All	66.21	54.54	77.87	59.32	0.0001	0.0001	0.0001	200.0000			380.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

LOT-002 - Horizontal Tank

Annual Emission Calculations

Standing Losses (lb):	0.0096
Vapor Space Volume (cu ft):	88.0446
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0845
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	88.0446
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	7.4867
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	11.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg. R):	525.8765
Daily Average Ambient Temp. (deg. F.):	54.9833
Ideal Gas Constant R	
(psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	518.9933
Tank Paint Solar Absorptance (Shell):	0.8900
Daily Total Solar Insulation	
Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0845
Daily Vapor Temperature Range (deg. R):	46.6683
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Minimum Liquid	
Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Maximum Liquid	
Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg R):	525.8765
Daily Min. Liquid Surface Temp. (deg R):	514.2094
Daily Max. Liquid Surface Temp. (deg R):	537.5436
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid:	
Surface Temperature (psia):	0.0001
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	0.0057
Vapor Molecular Weight (lb/lb-mole):	200.0000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.0001
Annual Net Throughput (gall/yr.):	12,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.0153

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

LOT-002 - Horizontal Tank

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Lube Oil	0.01	0.01	0.02

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	UOT-003
City:	
State:	
Company:	
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):	6.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	12.00
Net Throughput(gal/yr):	6,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

UOT-003 - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Used Oil	All	63.43	53.60	73.25	58.06	0.0001	0.0001	0.0001	380.0000			200.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

UOT-003 - Horizontal Tank

Annual Emission Calculations

Standing Losses (lb):	0.0084
Vapor Space Volume (cu ft):	48.0243
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0709
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	48.0243
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.5293
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	380.0000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg. R):	523.0962
Daily Average Ambient Temp. (deg. F):	54.9833
Ideal Gas Constant R	
(psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	517.7333
Tank Paint Solar Absorptance (Shell):	0.6800
Daily Total Solar Insulation	
Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0709
Daily Vapor Temperature Range (deg. R):	39.3149
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Minimum Liquid	
Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Maximum Liquid	
Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg R):	523.0962
Daily Min. Liquid Surface Temp. (deg R):	513.2675
Daily Max. Liquid Surface Temp. (deg R):	532.9249
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid:	
Surface Temperature (psia):	0.0001
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	0.0054
Vapor Molecular Weight (lb/lb-mole):	380.0000
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.0001
Annual Net Throughput (gall/yr.):	6,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.0138

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

UOT-003 - Horizontal Tank

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Used Oil	0.01	0.01	0.01

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	MT-004
City:	
State:	
Company:	
Type of Tank:	Horizontal Tank
Description:	

Tank Dimensions

Shell Length (ft):	6.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	12.00
Net Throughput(gal/yr):	6,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

MT-004 - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Methyl alcohol	All	63.43	53.60	73.25	58.06	1.6051	1.1753	2.1628	32.0400			32.04	Option 2: A=7.897, B=1474.08, C=229.13

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

MT-004 - Horizontal Tank

Annual Emission Calculations

Standing Losses (lb):	20.3789
Vapor Space Volume (cu ft):	48.0243
Vapor Density (lb/cu ft):	0.0092
Vapor Space Expansion Factor:	0.1485
Vented Vapor Saturation Factor:	0.8546
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	48.0243
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.5293
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0092
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.6051
Daily Avg. Liquid Surface Temp. (deg. R):	523.0962
Daily Average Ambient Temp. (deg. F):	54.9833
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	517.7333
Tank Paint Solar Absorptance (Shell):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1485
Daily Vapor Temperature Range (deg. R):	39.3149
Daily Vapor Pressure Range (psia):	0.9875
Breather Vent Press. Setting Range(psia):	0.0500
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.6051
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	1.1753
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	2.1628
Daily Avg. Liquid Surface Temp. (deg R):	523.0962
Daily Min. Liquid Surface Temp. (deg R):	513.2675
Daily Max. Liquid Surface Temp. (deg R):	532.9249
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8546
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.6051
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	7.3468
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.6051
Annual Net Throughput (gall/yr.):	6,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	27.7257

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

MT-004 - Horizontal Tank

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	7.35	20.38	27.73

Attachment J

Attachment J

AIR QUALITY PERMIT NOTICE Notice of Application

Notice is given that EQT Gathering, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a General Permit for the Pocahontas Natural Gas Compressor Station located on Dempsey Branch Road in Robson, Fayette County, West Virginia. The latitude and longitude coordinates are: 38.10262 and -81.22279. Operations began at the facility in September 2004.

The applicant estimates the potential to discharge the following Regulated Air Pollutants associated with the permit application:

Particulate Matter (PM) = 0.06 tpy
Sulfur Dioxide (SO₂) = 0.004 tpy
Volatile Organic Compounds (VOC) = 0.25 tpy
Carbon Monoxide (CO) = 2.51 tpy
Nitrogen Oxides (NO_x) = 44.62 tpy
Hazardous Air Pollutants (HAPs) = 0.32 tpy
Carbon Dioxide Equivalents (CO_{2e}) = 978.55 tpy

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

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1227, during normal business hours.

Dated this the XX day of April, 2015.

By: EQT Gathering, LLC
Diana Charletta
Senior Vice President Midstream Operations
625 Liberty Avenue
Pittsburgh, PA 15212-3110

Attachment K

**Attachment K
Electronic Submittal**

No Electronic Submittal is being provided for this registration.

Attachment L

Attachment L
General Permit Application Fee

Please contact Alex Bosiljevac at (412) 395-3699 for payment of the application fee by credit card.

Attachment M

Attachment M
G30-D General Permit Siting Criteria Waiver

There are no dwellings within 550 feet of the proposed natural gas compressor station.

Attachment N



Where energy meets innovation.

MATERIAL SAFETY DATA SHEET GAS PIPELINE CONDENSATE – HIGH ORGANICS

FILE NO.:
MSDS DATE: 05/17/2012

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Gas Pipeline Condensate – High Organics

SYNONYMS: NGL, Y-Grade, Raw Product

PRODUCT CODES: CAS Reg. No. 64741-48-6

MANUFACTURER: EQT
 DIVISION: Saturn Compressor Station
 ADDRESS: 34145 Sam Cavins Road
 West Union, WV 26456

EMERGENCY PHONE: (800) 926-1759 After hours: (800) 926-1759
 CHEMTREC PHONE: (800) 424-9300

CHEMICAL NAME: Natural Gas Liquids
 CHEMICAL FAMILY: Mixture
 CHEMICAL FORMULA: Mixture
 CAS Reg. No.: 64741-48-6

PRODUCT USE: Feed stock for Liquefied Petroleum Gas, Special Napthas, Jet Fuel, Kerosene, and Distillate Fuel Oil

PREPARED BY: MSES Consultants, Inc.
 609 West Main Street
 Clarksburg, WV 26301

SECTION 1 NOTES:

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

<u>INGREDIENT</u>	CAS No.	% Wt	OSHA PEL	ACGIH TLV
Methanol	74-98-6	40 - 80	200 ppm	200 ppm
Methyl-cyclohexane	108-87-2	1 – 10	500 ppm	400 ppm
Heptane	142-82-5	1 – 10	500 ppm	500 ppm
Octane	111-65-9	1 – 10	300 ppm	300 ppm
3-methyl hexane	589-34-4	1 – 10	500 ppm	500 ppm
3,4,4-trimethyl- 2-pentene	598-96-9	1 – 5	none	none
Toluene	108-88-3	1 – 5	200 ppm	50 ppm
Butane	106-97-8	1 – 5	None	1000 ppm (Alkanes)

**MATERIAL SAFETY DATA SHEET
NATURAL GAS LIQUIDS**

FILE NO.:
MSDS DATE: 02/13/2012

Isopentane	78-78-4	1 – 5	None	600 ppm
Water	7732-18-5	0 – 5	None	None

SECTION 2 NOTES:

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

ROUTES OF ENTRY: Absorption through skin and eyes. Ingestion. Inhalation

POTENTIAL HEALTH EFFECTS

EYES: Possible freeze burns and eye damage.

SKIN: Possible freeze burns.

INGESTION: Possible gastroenteritis. Vomiting and aspiration of ingested material may cause pneumonia.

INHALATION: Possible suffocation due to displacement of oxygen. Potential central nervous system depression as vapors enter the blood stream.

ACUTE HEALTH HAZARDS: Inhalation of high vapor concentrations may have results ranging from eye, nose, throat and lung irritation, to dizziness, drowsiness, headache, nausea and possibly unconsciousness, depending on concentrations and length of exposure. Limit and exposure of 10% LEL to prevent the above effects. Contact of the liquid with skin or eyes may cause freeze burns and possible eye damage.

CHRONIC HEALTH HAZARDS: Pain, tears, swelling, redness and blurred vision in the eyes, dizziness, headache, loss of appetite, weakness and loss of coordination.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Any condition causing impaired function of the respiratory, cardiovascular, or nervous systems.

CARCINOGENICITY

OSHA: Not Regulated NTP: Not Applicable IARC: Not Applicable

SECTION 3 NOTES:

SECTION 4: FIRST AID MEASURES

EYES: Immediately flush eyes with running water for at least fifteen (15) minutes. Immediately following flushing, seek medical attention

SKIN: Immediately flush skin with running water for at least fifteen (15) minutes. Immediately following flushing, seek medical attention

INGESTION: Seek immediate medical attention.

INHALATION: Immediately remove from exposure. If breathing becomes shallow, administer oxygen.

MATERIAL SAFETY DATA SHEET

NATURAL GAS LIQUIDS

FILE NO.:
MSDS DATE: 02/13/2012

If breathing ceases, administer artificial respiration followed by oxygen. Seek immediate medical attention

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS:

High aspiration risk. For large amounts, use careful gastric lavage. Eructation and gastroenteritis may be a complication. Aspiration may cause chemical pneumonitis or lipoid pneumonia.

SECTION 4 NOTES:

SECTION 5: FIRE-FIGHTING MEASURES

FLAMMABLE LIMITS IN AIR, UPPER: 15%
(% BY VOLUME) LOWER: 1.0%

FLASH POINT: -200° F to 10° F

AUTOIGNITION TEMPERATURE: 260 – 464° C

NFPA HAZARD CLASSIFICATION

HEALTH: 2 FLAMMABILITY: 4 REACTIVITY: 0
OTHER: Chronic hazard

EXTINGUISHING MEDIA: Dry chemical, foam, CO₂ using manufacturer's recommended technique

SPECIAL FIRE FIGHTING PROCEDURES: Stop flow of gas/liquid if possible. If not, allow fire to burn. Do NOT direct water into liquid spill. Remain upwind of the fire, if possible. Cool containers that are exposed to flame water from the side, until well after the fire is out. Firefighters should wear full bunker gear, including a positive self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Extremely flammable. Material may be ignited by heat, sparks, or flame. When burning, there is the danger of a violent explosion as liquid level in tank nears empty. Product gives off heavier-than-air vapors that may travel considerable distances to a source ignition, then flash back. Extinguishment of a fire before the source of vapor is shut off can create an explosive mixture in the air. Liquid or vapor runoff to sewers may create a fire or explosion hazard.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon dioxide, carbon monoxide, and toxic vapors as a result of incomplete combustion.

SECTION 5 NOTES:

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES: **Small Spill:** Evacuate area. Eliminate all sources of ignition such as flares, flames (including pilot lights), and electrical sparks. Ventilate area.

**MATERIAL SAFETY DATA SHEET
NATURAL GAS LIQUIDS**

FILE NO.:
MSDS DATE: 02/13/2012

Large Spill: Evacuate area. Eliminate all sources of ignition such as flares, flames (including pilot lights), and electrical sparks. Non-essential employees should be evacuated from the exposure area. Persons involved in the control and repair of the leak should be provided with all necessary protective equipment and be properly trained for emergency situations involving this material. Stop leaks only when safe to do so. Stay upwind, and out of low areas. Ventilate closed spaces before entering. Use water spray to reduce vapor if necessary.

SECTION 6 NOTES:

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE: Do not get in eyes, on skin, or on clothing. Do not breathe the vapors, mist or fumes. Wear protective equipment and/or garments if exposure conditions warrant. Wash thoroughly after handling. Launder contaminated clothing before reuse. May cause freeze burns upon direct contact. Protect from sources of ignition. Keep containers closed. Bond and ground during storage to prevent ignition from static discharges.

OTHER PRECAUTIONS: Bond and ground during transfer to prevent ignition caused by static discharges.

SECTION 7 NOTES:

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

VENTILATION : Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below the PEL and TLV.

RESPIRATORY PROTECTION: If workplace exposure limit of product or any component is exceeded, a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. Engineering or administrative controls should be implemented to reduce exposure.

EYE PROTECTION: Wear safety glasses in compliance with OSHA regulations.

SKIN PROTECTION: Avoid unnecessary skin contact with material. Wear resistant gloves. To prevent repeated or prolonged skin contact, wear impervious clothing and boots.

SECTION 8 NOTES:

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Gas and liquid. Clear to light brown color.

MATERIAL SAFETY DATA SHEET

NATURAL GAS LIQUIDS

FILE NO.:
MSDS DATE: 02/13/2012

ODOR: Alcohol to hydrocarbon odor

PHYSICAL STATE: Gas and liquid.

BOILING POINT: -126° F to 156° F

MELTING POINT: -144 ° F

FREEZING POINT: Not determined

VAPOR PRESSURE (mmHg): 698 mm Hg @ 100° F

VAPOR DENSITY (AIR = 1): 1.11 to 3.0

SPECIFIC GRAVITY (H2O = 1): 0.50 to 0.79

EVAPORATION RATE: Not Determined

SOLUBILITY IN WATER: Miscible (100%) to Slightly Soluble (30%)

PERCENT SOLIDS BY WEIGHT: N/A

PERCENT VOLATILE: 100% by weight and by volume

VOLATILE ORGANIC COMPOUNDS (VOC): The material is 95 - 100% VOC

MOLECULAR WEIGHT: Not determined

VISCOSITY: Not determined

SECTION 9 NOTES:

SECTION 10: STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID (STABILITY): Extremely flammable – avoid flames, spark, heat

INCOMPATIBILITY (MATERIAL TO AVOID): Oxygen and strong oxidizing materials.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: Carbon dioxide, carbon monoxide, and various hydrocarbons formed during combustion.

HAZARDOUS POLYMERIZATION: Polymerization will not occur.

SECTION 10 NOTES:

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION: Skin – rat; LD50: 4500 mg/kg (Slightly toxic)
Inhalation – rat; LC50: 6700 ppm (Very low toxicity)
Eye – rabbit; ALD: 4320 mg/kg (Moderately toxic)

SECTION 11 NOTES:

**MATERIAL SAFETY DATA SHEET
NATURAL GAS LIQUIDS**

FILE NO.:
MSDS DATE: 02/13/2012

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: **Not available**

SECTION 12 NOTES:

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: **Small Spill: Allow material to evaporate.
Large Spill: Ventilate area of spill with no ignition sources allowed.
Allow material to evaporate**

SECTION 13 NOTES:

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION
PROPER SHIPPING NAME: **Petroleum Gases, liquefied**
UN NUMBER: **UN1075**
Hazard CLASS: **2.1**
Labels Required: **2.1**

SECTION 14 NOTES:

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS
TSCA (TOXIC SUBSTANCE CONTROL ACT): **All components are on the USEPA TSCA Inventory List**

CERCLA Section 103 and SARA Title III: **The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply. The Hexane component is a Section 313, SARA Title III listed material. The CERCLA Reportable Quantity for Propane is 100 lb.**

SECTION 15 NOTES:

SECTION 16: OTHER INFORMATION

OTHER INFORMATION: **HMIS Ratings: Health 2, Flammability 4, Reactivity 0**

PREPARATION INFORMATION: **MSES Consultants, Inc.
609 West Main Street
Clarksburg, WV 26301**

DISCLAIMER: **This material safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in this data sheet which we received from sources outside our Company. We believe that information to be correct but cannot guarantee its accuracy or completeness. Health and safety precautions in this data sheet may not be adequate for all individuals and/or situations. It is the user's obligation to evaluate and use this product safely and to comply with all applicable laws and regulations. No statement made in this data sheet shall be construed as a**

MATERIAL SAFETY DATA SHEET
NATURAL GAS LIQUIDS

FILE NO.:
MSDS DATE: 02/13/2012

permission or recommendation for the use of any product in a manner that might infringe existing patents. No warranty is made, either express or implied.

Attachment O

Attachment P



Service Information System

Shutdown SIS

[Previous Screen](#)

Product: GAS ENGINE
 Model: G3306 GAS ENGINE 07Ynull
 Configuration: G3306 ENGINE 07Y04279-UP

Serial Number: 07Y04418
Sales Model: 3306
Built: 1993-04-29
Plant: 88
Test Date: 1993-05-06
Shipped: 1993-05-19
Tested: LB
Test Number: 01
Cell Number: 06

Engine Test Cell Results

Description	Reset	Test Results	Specification Values
Specification Number		0T-4020	0T-4020
Arrangement Number		102-9436	102-9436
Corr FL Power		195 HP	195 HP
Speed		1801 RPM	1800 RPM
COR FL F RAT		472.0 GAL/HR	459.3 GAL/HR
CSFC		0.172 LB/HP-HR	0.167 LB/HP-HR
Adj Boost		0.0 PSI	0.0 PSI
Fuel Pressure		0 PSI	0 PSI
Oil Pressure		54.2 PSI	57.7 PSI
TQ Cor F RAT		426.6 GAL/HR	0.0 GAL/HR
TQ CK CSFC		0.000 LB/HP-HR	0.000 LB/HP-HR
TQ CK Adj Bst		0.0 PSI	0.0 PSI
Torq CK Speed		1594 RPM	1600 RPM
TQ CK Tor TQ		597 LB/FT	597 LB/FT
LI Speed		902 RPM	900 RPM
LI Oil Press		32.1 PSI	33.6 PSI
Hi Speed		1907 RPM	1925 RPM
Response Time		0 SEC	0 SEC
FL ST F SET		0.000 IN	0.000 IN
FT ST F SET		0.000 IN	0.000 IN
Timing BTDC		0 DEG	0 DEG
FLS(Intercept)		0	0
FTS(Slope)		0	0

Private Network For SIS Licensees.

d470jh

ENGINE SPEED (rpm):	1800	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	10.5:1	APPLICATION:	GAS COMPRESSION
AFTERCOOLER TYPE:	SCAC	RATING LEVEL:	CONTINUOUS
AFTERCOOLER WATER INLET (°F):	130	FUEL:	NAT GAS
JACKET WATER OUTLET (°F):	210	FUEL SYSTEM:	HPG IMPCO
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig):	12.0-24.9
COOLING SYSTEM:	JW+OC, AC	FUEL METHANE NUMBER:	80
CONTROL SYSTEM:	MAG	FUEL LHV (Btu/scf):	905
EXHAUST MANIFOLD:	WC	ALTITUDE CAPABILITY AT 77°F INLET AIR TEMP. (ft):	1500
COMBUSTION:	STANDARD SETTING		
EXHAUST OXYGEN (% O2):	2.0		

RATING	NOTES	LOAD	100%	75%	50%
ENGINE POWER (WITHOUT FAN)	(1)	bhp	203	152	102
ENGINE EFFICIENCY (ISO 3046/1)	(2)	%	33.5	31.3	27.9
ENGINE EFFICIENCY (NOMINAL)	(2)	%	33.5	31.3	27.9

ENGINE DATA						
FUEL CONSUMPTION (ISO 3046/1)	(3)	Btu/bhp-hr	7604	8131	9116	
FUEL CONSUMPTION (NOMINAL)	(3)	Btu/bhp-hr	7604	8131	9116	
AIR FLOW (77°F, 14.7 psia) (WET)	(4) (5)	ft ³ /min	314	244	181	
AIR FLOW (WET)	(4) (5)	lb/hr	1393	1083	804	
FUEL FLOW (60°F, 14.7 psia)		scfm	28	23	17	
COMPRESSOR OUT PRESSURE		in Hg(abs)	44.1	40.1	34.2	
COMPRESSOR OUT TEMPERATURE		°F	218	177	140	
AFTERCOOLER AIR OUT TEMPERATURE		°F	133	130	128	
INLET MAN. PRESSURE	(6)	in Hg(abs)	39.1	31.2	24.0	
INLET MAN. TEMPERATURE (MEASURED IN PLENUM)	(7)	°F	133	130	128	
TIMING	(8)	°BTDC	23	23	23	
EXHAUST TEMPERATURE - ENGINE OUTLET	(9)	°F	996	985	935	
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia) (WET)	(10) (5)	ft ³ /min	947	733	525	
EXHAUST GAS MASS FLOW (WET)	(10) (5)	lb/hr	1471	1145	850	

EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)	(11)(12)	g/bhp-hr	22.76	20.33	20.66	
CO	(11)(13)	g/bhp-hr	1.28	1.31	1.28	
THC (mol. wt. of 15.84)	(11)(13)	g/bhp-hr	1.14	1.18	1.41	
NMHC (mol. wt. of 15.84)	(11)(13)	g/bhp-hr	0.17	0.18	0.21	
NMNEHC (VOCs) (mol. wt. of 15.84)	(11)(13)(14)	g/bhp-hr	0.11	0.12	0.14	
HCHO (Formaldehyde)	(11)(13)	g/bhp-hr	0.15	0.15	0.18	
CO2	(11)(13)	g/bhp-hr	496	530	594	
EXHAUST OXYGEN	(11)(15)	% DRY	2.0	1.6	1.6	
LAMBDA	(11)(15)		1.12	1.09	1.08	

ENERGY BALANCE DATA						
LHV INPUT	(16)	Btu/min	25728	20632	15422	
HEAT REJECTION TO JACKET WATER (JW)	(17)(23)	Btu/min	7935	7088	6050	
HEAT REJECTION TO ATMOSPHERE	(18)	Btu/min	1029	825	617	
HEAT REJECTION TO LUBE OIL (OC)	(19)(23)	Btu/min	1298	1159	990	
HEAT REJECTION TO EXHAUST (LHV TO 77°F)	(20)(21)	Btu/min	6320	4873	3419	
HEAT REJECTION TO EXHAUST (LHV TO 350°F)	(20)	Btu/min	4401	3377	2302	
HEAT REJECTION TO AFTERCOOLER (AC)	(22)(24)	Btu/min	538	230	42	

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3. Part load data may require engine adjustment.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	55	60	65	70	75	80	100
SET POINT TIMING	-	-	19	21	22	23	23
DERATION FACTOR	0	0	1	1	1	1	1

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °F	130	0.96	0.93	0.89	0.86	0.83	0.80	0.77	0.74	0.71	0.68	0.65	0.63	0.60
	120	0.98	0.94	0.91	0.87	0.84	0.81	0.78	0.75	0.72	0.69	0.66	0.64	0.61
	110	1	0.96	0.92	0.89	0.86	0.82	0.79	0.76	0.73	0.70	0.67	0.65	0.62
	100	1	0.98	0.94	0.91	0.87	0.84	0.81	0.77	0.74	0.72	0.69	0.66	0.63
	90	1	1	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.64
	80	1	1	0.98	0.94	0.90	0.87	0.84	0.80	0.77	0.74	0.71	0.68	0.66
	70	1	1	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.76	0.73	0.70	0.67
	60	1	1	1	0.98	0.94	0.90	0.87	0.83	0.80	0.77	0.74	0.71	0.68
	50	1	1	1	0.99	0.96	0.92	0.89	0.85	0.82	0.79	0.75	0.72	0.69
			0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS (ACHRF)

INLET AIR TEMP °F	130	1.71	1.88	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96	1.96
	120	1.56	1.73	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81	1.81
	110	1.42	1.58	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66	1.66
	100	1.27	1.43	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51	1.51
	90	1.12	1.27	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35	1.35
	80	1	1.12	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
	70	1	1	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	60	1	1	1	1	1	1	1	1	1	1	1	1	1
	50	1	1	1	1	1	1	1	1	1	1	1	1	1
			0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000

ALTITUDE (FEET ABOVE SEA LEVEL)

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM)

INLET AIR TEMP °F	130	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1440	1500
	120	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1420	1480
	110	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1450
	100	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1430
	90	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
	80	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
	70	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
	60	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
	50	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
			0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000

ALTITUDE (FEET ABOVE SEA LEVEL)

FUEL USAGE GUIDE:

This table shows the derate factor and full load set point timing required for a given fuel. Note that deration and set point timing reduction may be required as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar methane number calculation program.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site.

ACTUAL ENGINE RATING:

To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/Temperature deration factors and RPC (reference the Caterpillar Methane Program) establish air system limitations. RPC comes into play when the Altitude/Temperature deration is less than 1.0 (100%). Under this condition, add the two factors together. When the site conditions do not require an Altitude/Temperature derate (factor is 1.0), it is assumed the turbocharger has sufficient capability to overcome the low fuel relative power, and RPC is ignored. To determine the actual power available, take the lowest rating between 1) and 2).

- 1) Fuel Usage Guide Deration
- 2) $1 - ((1 - \text{Altitude/Temperature Deration}) + (1 - \text{RPC}))$

AFTERCOOLER HEAT REJECTION FACTORS(ACHRF):

To maintain a constant air inlet manifold temperature, as the inlet air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor (ACHRF) to adjust for inlet air temp and altitude conditions. See note 24 for application of this factor in calculating the heat exchanger sizing criteria. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

MINIMUM SPEED CAPABILITY AT THE RATED SPEED'S SITE TORQUE (RPM):

This table shows the minimum allowable engine turndown speed where the engine will maintain the Rated Speed's Torque for the given ambient conditions.

NOTES:

1. Engine rating is with two engine driven water pumps. Tolerance is $\pm 3\%$ of full load.
2. ISO 3046/1 engine efficiency tolerance is (+)0, (-)5% of full load % efficiency value. Nominal engine efficiency tolerance is $\pm 5.0\%$ of full load % efficiency value.
3. ISO 3046/1 fuel consumption tolerance is (+)5, (-)0% of full load data. Nominal fuel consumption tolerance is $\pm 5.0\%$ of full load data.
4. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of $\pm 5\%$.
5. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
6. Inlet manifold pressure is a nominal value with a tolerance of $\pm 5\%$.
7. Inlet manifold temperature is a nominal value with a tolerance of $\pm 9^\circ\text{F}$.
8. Timing indicated is for use with the minimum fuel methane number specified. Consult the appropriate fuel usage guide for timing at other methane numbers.
9. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
10. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of $\pm 6\%$.
11. Emissions data is at engine exhaust flange prior to any after treatment.
12. NOx values are "Not to Exceed".
13. CO, CO2, THC, NMHC, NMNEHC, and HCHO values are "Not to Exceed" levels. THC, NMHC, and NMNEHC do not include aldehydes.
14. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
15. Exhaust Oxygen tolerance is ± 0.5 .
16. LHV rate tolerance is $\pm 5.0\%$.
17. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is $\pm 10\%$ of full load data.
18. Heat rejection to atmosphere based on treated water. Tolerance is $\pm 50\%$ of full load data.
19. Lube oil heat rate based on treated water. Tolerance is $\pm 20\%$ of full load data.
20. Exhaust heat rate based on treated water. Tolerance is $\pm 10\%$ of full load data.
21. Heat rejection to exhaust (LHV to 77°F) value shown includes unburned fuel and is not intended to be used for sizing or recovery calculations.
22. Heat rejection to aftercooler based on treated water. Tolerance is $\pm 5\%$ of full load data.
23. Total Jacket Water Circuit heat rejection is calculated as: $(\text{JW} \times 1.1) + (\text{OC} \times 1.2)$. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
24. Total Aftercooler Circuit heat rejection is calculated as: $\text{AC} \times \text{ACHRF} \times 1.05$. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.

FREE FIELD MECHANICAL & EXHAUST NOISE

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	203	104.6	69.0	72.5	73.5	78.7	87.2	84.9	84.9	89.1	90.0	92.9
75	152	104.8	67.3	70.8	72.6	78.7	83.9	83.7	83.8	87.8	90.2	91.5
50	102	103.1	66.3	69.5	72.9	76.2	80.9	81.3	81.9	86.5	87.4	91.0

MECHANICAL: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	203	93.4	98.1	95.8	94.5	94.3	92.5	92.3	91.0	88.7	86.9	83.8
75	152	98.7	97.5	94.9	92.9	93.7	91.7	92.3	90.0	88.3	84.8	81.5
50	102	90.9	97.9	93.3	92.2	93.5	91.1	91.1	89.5	86.1	83.0	77.6

EXHAUST: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	Overall	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	203	114.2	98.9	88.1	93.3	100.4	100.1	99.2	101.4	105.0	104.0	104.6
75	152	114.3	97.2	91.3	99.8	106.4	101.3	101.8	102.1	103.7	103.4	104.0
50	102	112.5	95.8	90.1	98.2	105.0	101.5	100.1	102.1	101.6	101.4	101.7

EXHAUST: Sound Power (1/3 Octave Frequencies)

Percent Load	Engine Power	1 kHz	1.25 kHz	1.6 kHz	2 kHz	2.5 kHz	3.15 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz
%	bhp	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
100	203	104.0	103.7	103.1	103.1	102.4	100.1	97.5	91.1	81.1	69.3	59.4
75	152	103.8	102.8	102.0	102.2	100.2	97.4	94.2	87.8	77.8	66.7	60.0
50	102	102.3	100.7	99.0	98.8	96.0	92.7	89.0	82.2	71.9	64.9	47.8

SOUND PARAMETER DEFINITION:

Sound Power Level Data - DM8702-02

Sound power is defined as the total sound energy emanating from a source irrespective of direction or distance. Sound power level data is presented under two index headings:

Sound power level -- Mechanical

Sound power level -- Exhaust

Mechanical: Sound power level data is calculated in accordance with ISO 6798. The data is recorded with the exhaust sound source isolated.

Exhaust: Sound power level data is calculated in accordance with ISO 6798 Annex A. Exhaust data is post-catalyst on gas engine ratings labeled as "Integrated Catalyst".

Measurements made in accordance with ISO 6798 for engine and exhaust sound level only. No cooling system noise is included unless specifically indicated. Sound level data is indicative of noise levels recorded on one engine sample in a survey grade 3 environment.

How an engine is packaged, installed and the site acoustical environment will affect the site specific sound levels. For site specific sound level guarantees, sound data collection needs to be done on-site or under similar conditions.