Reviewer NTH
cc:
Modeler
D.E.
File A0001198
IMP FID F002205

TESORO LOGISTICS
Tesoro Logistics GP, LLC
1050 17th Street, Suite 1700
Denver, CO 80265

June 9, 2015

RECEIVED
JUN 10 2015
AIR QUALITY DIVISION

Wyoming Department of Environmental Quality
Division of Air Quality
Herschler Building, 2E
122 West 25th Street
Cheyenne, Wyoming 82002

Subject: QEPM Gathering I, LLC
Pinedale Complex, Permit MD-11378A
Operating Permit 3-1-218
Application for Permit Modification
Sublette County, Wyoming

Ladies/Gentlemen:

Tesoro Logistics-Rockies (TLLP), on behalf of QEPM Gathering I, LLC (QEPM), is submitting an application for the existing Pinedale Complex located in Section 2, Township 31N, and Range 109W in Sublette County pursuant to Chapter 6, Section 2 of Wyoming Department of Environmental Quality, Air Quality Division, Standards and Regulations, Permitting Requirements. TLLP requests Wyoming Department of Environmental Quality (WDEQ) make the following permit changes:

Reduce Caterpillar 3608 & Caterpillar 3616 reciprocating compressor engines NOx and VOC emission limits - TLLP requests lower nitrogen oxides (NOx) and volatile organic compounds (VOC) emission rates for the two (2) Caterpillar 3608 reciprocating compressor engines and the four (4) Caterpillar 3616 reciprocating compressor engines. TLLP has determined these emission rates are achievable based on emission test results over the last 3 years (2013 – 2015).

Increase operating hours for Caterpillar 3616 engines - Concurrently, TLLP requests that the combined annual hour limitation of 23,312 hours for the four (4) Caterpillar 3616 engines be increased to **33,500** hours. As a result of the proposed lower emission limits, there will be no increase in the annual permitted emissions of NOx or VOC associated with the hour limitation increase. There will be a small increase in the annual permitted emissions for carbon monoxide (CO) as identified in Table 3 below.

Corrections - In the course of preparing this permit application, TLLP has determined that the site-rated horsepower values for the Caterpillar 3608 and 3616 engines are higher than the values listed in construction permit MD-11378A (11/8/12) and Operating Permit 3-1-218 (4/15/14) for the Pinedale Complex. The corrected horsepower values were determined based on engineering review of manufacturer data and equipment configuration.

The revised site-rated horsepower value for the Caterpillar 3608 engines is 2,157 hp. This value was calculated using an iso-rated horsepower of 2,370 and applying a derate factor of 0.91 based on altitude and an average inlet air temperature of 50^0 F.

The revised site-rated horsepower for the Caterpillar 3616 engines is 3,797 hp. This value was calculated based on the maximum load that the compressor associated with each Caterpillar 3616 engine can consume plus the parasitic load (assumed to be 150 hp) from associated engine processes.

Table 1 below shows the original and updated site-rated horsepower values for the Caterpillar engines. For the purposes of this permit application, the revised horsepower values as shown are used in the emission calculations.

Table 1

Engine	Current listed horsepower[a] (hp)	Updated horsepower (hp)
E1 – Caterpillar G3608SITA	1,860	2,157
E2 – Caterpillar G3608SITA	1,860	2,157
E3 – Caterpillar G3616SITA	3,720	3,797
E4 – Caterpillar G3616SITA	3,720	3,797
E5 – Caterpillar G3616SITA	3,720	3,797
E6 – Caterpillar G3616SITA	3,720	3,797

[a] Operating Permit 3-1-218 (4/15/14), Permit MD-11378A (11/8/12)

TLLP notes that while the lb/hour emission limits were derived based on the engine horsepower rating, Permit MD-11378A does not include an operational limit restricting the horsepower of these engines. TLLP has reviewed five years of emission test results, and confirmed that no permitted emission limits were exceeded as a result of the horsepower discrepancy.

TLLP is requesting lower NOx and VOC emission rate limits for Engines E1 – E6 as shown in the following table:

Table 2

Engine	Current NOx g/hp-hr Limit[b]	Requested NOx g/hp-hr Limit	Current VOC g/hp-hr Limit[b]	Requested VOC g/hp-hr Limit
E1 – Caterpillar G3608SITA	0.7	0.5	0.8	0.6
E2 – Caterpillar G3608SITA	0.7	0.5	0.8	0.6
E3 – Caterpillar G3616SITA	0.7	0.5	0.7	0.5
E4 – Caterpillar G3616SITA	0.7	0.5	0.7	0.5
E5 – Caterpillar G3616SITA	0.7	0.5	0.7	0.5
E6 – Caterpillar G3616SITA	0.7	0.5	0.7	0.5

[b] Permit MD-11378A (11/8/12)

Replace Emergency Flare - TLLP plans to replace the existing Emergency Flare (Flare F2, Stabilizer Plant) with a new emergency flare that is equipped with two (2) pilot lights. This new emergency flare will have a purge gas flow rate of 15 standard cubic feet per hour. There will be no increase in the potential annual emissions of NOx or VOC associated with the installation of this replacement emergency flare.

Table 3 below shows the current and proposed annual potential to emit (PTE) emissions for Pinedale Complex.

Table 3

	NOx (ton/yr)	VOC (ton/yr)	CO (ton/yr)
Current PTE[c]	139.5	137.0	53.0
Proposed PTE	138.6	136.0	65.4

[c] Current emissions from air permit MD-11378A (11/8/12)

The required WDEQ IMPACT forms are provided in Attachment A of this submittal. Attachment B includes all supporting emission calculations for the proposed equipment. The current offset tracking spreadsheet for QEPM's Sublette County permitted emissions is provided in Attachment C. Attachment D includes Caterpillar 3608 engine information and the compressor load information for the Caterpillar 3616 engines.

If you should have any questions or need additional information in support of this submittal please contact me at (303) 640-4238.

Sincerely,

Daniel Pring
Senior Environmental Air Engineer

Enclosures

Process Description

The Pinedale Complex consists of two adjacent facilities, the Gobblers Knob Compressor Station (Gobblers Knob CS, aka the Pinedale Compressor Station) and the Pinedale Liquids Facility.

The Gobblers Knob CS receives gas via field gathering lines and the adjacent Pinedale Liquids Facility's electric recompressor. The gas is routed through a slug catcher which captures free liquids and then to an inlet scrubber. From there, the gas is directed to the compressors, which are driven by six gas-fired Caterpillar compressor engines and a Solar Titan turbine. The compressors boost the gas to pipeline pressure before it exits through the discharge header and is delivered to the pipeline sales line. Liquids from the slug catcher and the inlet scrubber are routed to two low pressure separation tanks. Streams exiting the low pressure separator tanks include gas, condensate, and water. These streams are routed as follows:

- Gas is compressed by an electric recompressor and routed to the compressor station gas inlet. This is a closed process with no point source emissions.
- Condensate is routed to the sales line. This is a closed process with no point source emissions.
- Water is routed to two 400-barrel storage tanks (ST-1 and ST-2). A small amount of condensate collected in the fuel gas scrubbers is also routed to storage tanks ST-1 and ST-2.

The Pinedale Liquids Facility receives condensate and liquids via the inlet pipelines. The condensate passes through a low pressure separator where water is separated and piped to the water disposal system. The condensate passes through a condensate stabilizer system, where the condensate is heated and light ends are volatilized. The condensate is then routed through a 6,000 bbl condensate tank (ST-3) before entering a liquid sales pipeline. Hydrocarbon light ends driven off by the stabilizer vessel overhead are recompressed by a 200 hp electric motor-driven compressor and routed to the Gobblers Knob CS suction header. An 8.5 MMBtu/hr boiler is used to heat ethylene glycol, which serves as the heat transfer medium for the stabilizer system. Condensate may be atmospherically stabilized in ST-3 while the stabilizer system is not operating or stored until it is pumped into the sales pipeline. Emissions from the condensate tank (ST-3) and the water tanks (ST-4 and ST-5) are routed to the low pressure flare. The water that enters the liquids facility via pipeline and the water collected by the water disposal system is pumped to a third party disposal facility via a water pipeline. Atmospherically stabilized condensate and liquids from upstream well sites and gathering facilities are also transported and loaded to tanks ST-3, ST-4, and ST-5 via truck.

Attachment A – WDEQ IMPACT FORMS

Revised 5/12/2015

WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY

Air Quality Division

New Source Review Permit Application Form Cover Sheet

Is this a revision to an existing application?

Yes X **No** _____

Previous Application #: Not Assigned

Date of Application: 6/8/2015

COMPANY INFORMATION:

Company Name: QEPM Gathering I, LLC
Address: 1050 17th Street, Suite 1700
City: Denver State: Colorado Zip Code: 80265
Country: USA Phone Number: (303) 640-4238

FACILITY INFORMATION:

Facility Name: Pinedale Complex
New Facility or Existing Facility: Existing

Facility Description: Pinedale Complex consists of the Gobblers Knob Compressor Station and the Pinedale Liquids Facility.
Facility Class: Title V Operating Status: Operating
Facility Type: Compressor Station

For Oil & Gas Production Sites ONLY:
First Date of Production (FDOP)/Date of Modification: N/A
Single well or multiple well facility? N/A
Does production at this facility contain H2S?* No
If yes, contact the Division.
API Number(s):

NAICS Code: 211111 Crude Petroleum and Natural Gas Extraction

FACILITY LOCATION:

***Enter the facility location in either the latitude/longitude area or section/township/range area. Both are not required.**

Physical Address:
City: Zip Code:
State: WY County:

OR

Latitude: 42.68655 Longitude: -109.7999 County: Sublette
Quarter Quarter: Quarter: NW
Section: 2 Township: 31N Range: 109W

For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)

CONTACT INFORMATION:

***Note that an Environmental AND NSR Permitting Contact is required for your application to be deemed complete by the agency.**

Title: Mr. First Name: Daniel
Last Name: Pring
Company Name: Tesoro Logisitics - Rockies
Job Title: Senior Environmental Air Engineer
Address: 1050 17th Street, Suite 1700
City: Denver State: Colorado
Zip Code: 80265
Primary Phone No.: (303) 640 - 4238 E-mail: Daniel.D.Pring@tsocorp.com
Mobile Phone No.: 720-376-9207 Fax No.: (303) 294 - 9632
Contact Type: Compliance contact Start Date: 7/9/2012

***Name of the contact to whom the permit will be issued:** Daniel Pring

Revised 5/12/2015

Additional Contact Type (if needed):
Title: First Name:
Last Name:
Company Name:
Job Title:
Address:
City: State:
Zip Code:
Primary Phone No.: E-mail:
Mobile Phone No.: Fax No.:
Contact Type: Start Date:

FACILITY APPLICATION INFORMATION:

General Info:

Has the facility changed location or is it a new/ greenfield facility?	No
Has a Land Use Planning document been included in this application?	No
Is the facility located in a sage grouse core area?*	No
If the facility is in a sage grouse core area, what is the WER number?	

** For questions about sage grouse core area, contact WY Game & Fish Department.*

Federal Rules Applicability - Facility Level:

Prevention of Significant Deterioration (PSD):	No
Non-Attainment New Source Review:	Yes

Modeling Section:

Has the Air Quality Division been contacted to determine if modeling is required?	No
Is a modeling analysis part of this application?	No
Is the proposed project subject to Prevention of Significant Deterioration (PSD) requirements?	No
Has the Air Quality Division been notified to schedule a pre-application meeting?	No
Has a modeling protocol been submitted to and approved by the Air Quality Division?	No
Has the Air Quality Division received a Q/D analysis to submit to the respective FLMs to determine the need for an AQRV analysis?	No

Required Attachments:

- Facility Map ☐
- Process Flow Diagram ☐
- Modeling Analysis (if applicable) ☐
- Land Use Planning Document ☐
- Detailed Project Description ☑
- Emissions Calculations ☑

I, Michael P. Gebhardt (Responsible Official (Printed Name)) Vice President, Tesoro Logistics - Rockies (Title)

an Official Representative of the Company, state that I have knowledge of the facts herein set forth and that the same are true and correct to the best of my knowledge and belief. I further certify that the operational information provided and emission rates listed on this application reflect the anticipated emissions due to the operation of this facility. The facility will operate in compliance with all applicable Wyoming Air Quality Standards and Regulations.

Signature: Michael P Gebhardt (ink) Date: 6/9/2015

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E1
Company Equipment Description: Caterpillar G3608SITA Compressor Engine

Operating Status: Operating
Initial Construction Commencement Date: 8/1/2002
Initial Operation Commencement Date: 8/1/2002
Most Recent Construction/ Modification Commencement Date: N/A

Most Recent Operation Commencement Date: N/A

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:
QEPM is proposing to lower the permitted NOx and VOC emission factors on all reciprocating engines at the complex in order to increase the allowable operating hours of E3-E6 while resulting in no emission change to total NOx and VOC. The proposed NOx emission limit on this engine would be lowered from 0.70 g/hp-hr to 0.50 g/hp-hr and the VOC emission limit from 0.80 g/hp-hr to 0.60 g/hp-hr.

Name Plate Rating: 2,370 Units: hp
Site Rating: 2,157 Units: hp
Primary Fuel Type: Pipeline Grade Natural Gas
Secondary Fuel Type: N/A
Model Name and Number: Caterpillar G3608SITA
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: 4WF00216 Order Date: Unknown
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: 8/1/2002
Operation Commencement/ Start-up Date: 8/1/2002
Manufacture Date: 6/1/2001
Btu Content: 1,081 Units: BTU/scf
Fuel Sulfur Content: < 2,000 Units: gr/MMscf
Type of Service: Compression
Is diesel engine EPA Tier Certified? N/A * If yes, list EPA Tier Rating N/A

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2-02-002-54

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: CO, Formaldehyde, VOC

Proposed BACT: Oxidation Catalyst

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant:

Proposed LAER:

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: ZZZZ

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Affected, but not modified

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:

Oxidation Catalyst

Manufacturer: EmeraChem

Date Installed: 3/19/2014

Model Name and Number: EC-OX-PX-OC-2100-RJM-2556-01

Company Control Equipment ID: N/A

Company Control Equipment Description: Engine 1 Oxidation Catalyst

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☑ Other: Formaldehyde						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): CO: 88, CH2O: 77, VOC: 25

Capture Efficiency (%): 100

Operating Control Efficiency (%): CO: 88, CH2O: 77, VOC: 25

Catalyst Type:* Oxidation Catalyst

Air Fuel Ratio Controller:* No

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* None

List all release point IDs associated with this control equipment:* Engine 1 Stack

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/yr)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)	0.731			0.167	0.731	AP-42
2.)	PM #10 microns in diameter (PE/PM10)	0.731			0.167	0.731	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)	0.731			0.167	0.731	AP-42
4.)	Sulfur dioxide (SO2)	0.04			0.01	0.04	AP-42
5.)	Nitrogen Oxides (NOx)	10.41			2.38	10.41	Other
6.)	Carbon monoxide (CO)	52.07			1.43	6.25	Other
7.)	Volatile organic compounds (VOC)	16.66			2.85	12.5	Other
8.)	Lead (Pb)	-			-	-	
9.)	Total Hazardous Air Pollutants (HAPs)	6.73			0.357	1.56	Other
10.)	Fluoride (F)	-			-		
11.)	Hydrogen Sulfide (H2S)	-			-		
12.)	Mercury (Hg)	-			-		
13.)	Total Reduced Sulfur (TRS)	-			-		
14.)	Sulfuric Acid Mist (SAM)	-			-		

Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	1,3 -Butadiene	0.0196			0.001	0.005	Other
2.)	2,2,4-Trimethylpentane	0.0183			0.001	0.004	Other
3.)	Acetaldehyde	0.612			0.034	0.147	Other
4.)	Acrolein	0.376			0.021	0.090	Other
5.)	Benzene	0.0322			0.002	0.008	Other
6.)	Biphenyl	0.0155			0.001	0.004	Other
7.)	Ethylbenzene	0.00291			0.000	0.001	Other
8.)	Formaldehyde	5.42			0.285	1.250	Other
9.)	Methanol	0.183			0.010	0.044	Other
10.)	n-Hexane	0.00813			0.000	0.002	Other
11.)	Toluene	0.0299			0.002	0.007	Other
12.)	Xylene	0.0135			0.001	0.003	Other

Greenhouse Gases (GHGs)

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Carbon Dioxide	8560.17			1954.38	8560.17	Other
2.)	Methane	0.16			0.04	0.16	Other
3.)	Nitrous Oxide	0.02			0.00	0.02	Other
4.)	Carbon Dioxide Equivalent	8569.21			1956.44	8569.21	Other
5.)							
6.)							
7.)							
8.)							

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E2
Company Equipment Description: Caterpillar G3608SITA Compressor Engine

Operating Status: Operating
Initial Construction Commencement Date: 8/17/2002
Initial Operation Commencement Date: 8/17/2002
Most Recent Construction/ Modification Commencement Date: N/A

Most Recent Operation Commencement Date: N/A

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:
QEPM is proposing to lower the permitted NOx and VOC emission factors on all reciprocating engines at the complex in order to increase the allowable operating hours of E3-E6 while resulting in no emission change to total NOx and VOC. The proposed NOx emission limit on this engine would be lowered from 0.70 g/hp-hr to 0.50 g/hp-hr and the VOC emission limit from 0.80 g/hp-hr to 0.60 g/hp-hr.

Name Plate Rating: 2,370 Units: hp
Site Rating: 2,157 Units: hp
Primary Fuel Type: Pipeline Grade Natural Gas
Secondary Fuel Type: N/A
Model Name and Number: Caterpillar G3608SITA
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: 4WF00216 Order Date: Unknown
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: 8/17/2002
Operation Commencement/ Start-up Date: 8/17/2002
Manufacture Date: 6/1/2001
Btu Content: 1,081 Units: BTU/scf
Fuel Sulfur Content: < 2,000 Units: gr/MMscf
Type of Service: Compression
Is diesel engine EPA Tier Certified? N/A * If yes, list EPA Tier Rating N/A

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2-02-002-54

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: 24

Hours/year: 8760

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: CO, Formaldehyde, VOC

Proposed BACT: Oxidation Catalyst

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant:

Proposed LAER:

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: ZZZZ

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Affected, but not modified

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:

Oxidation Catalyst

Manufacturer: EmeraChem

Date Installed: 3/19/2014

Model Name and Number: EC-OX-PX-OC-2100-RJM-2556-01

Company Control Equipment ID: N/A

Company Control Equipment Description: Engine 2 Oxidation Catalyst

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☑ Other: Formaldehyde						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): CO: 88, CH2O: 77, VOC: 25

Capture Efficiency (%): 100

Operating Control Efficiency (%): CO: 88, CH2O: 77, VOC: 25

Catalyst Type:* Oxidation Catalyst

Air Fuel Ratio Controller:* No

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* None

List all release point IDs associated with this control equipment:* Engine 2 Stack

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/yr)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)	0.731			0.167	0.731	AP-42
2.)	PM #10 microns in diameter (PE/PM10)	0.731			0.167	0.731	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)	0.731			0.167	0.731	AP-42
4.)	Sulfur dioxide (SO2)	0.04			0.01	0.04	AP-42
5.)	Nitrogen Oxides (NOx)	10.41			2.38	10.41	Other
6.)	Carbon monoxide (CO)	52.07			1.43	6.25	Other
7.)	Volatile organic compounds (VOC)	16.66			2.85	12.5	Other
8.)	Lead (Pb)	-			-	-	
9.)	Total Hazardous Air Pollutants (HAPs)	6.73			0.357	1.56	Other
10.)	Fluoride (F)	-			-		
11.)	Hydrogen Sulfide (H2S)	-			-		
12.)	Mercury (Hg)	-			-		
13.)	Total Reduced Sulfur (TRS)	-			-		
14.)	Sulfuric Acid Mist (SAM)	-			-		

Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

	Pollutants:	Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	1,3 -Butadiene	0.0196			0.001	0.005	Other
2.)	2,2,4-Trimethylpentane	0.0183			0.001	0.004	Other
3.)	Acetaldehyde	0.612			0.034	0.147	Other
4.)	Acrolein	0.376			0.021	0.090	Other
5.)	Benzene	0.0322			0.002	0.008	Other
6.)	Biphenyl	0.0155			0.001	0.004	Other
7.)	Ethylbenzene	0.00291			0.000	0.001	Other
8.)	Formaldehyde	5.42			0.285	1.250	Other
9.)	Methanol	0.183			0.010	0.044	Other
10.)	n-Hexane	0.00813			0.000	0.002	Other
11.)	Toluene	0.0299			0.002	0.007	Other
12.)	Xylene	0.0135			0.001	0.003	Other

Greenhouse Gases (GHGs)

	Pollutants:	Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Carbon Dioxide	8560.17			1954.38	8560.17	Other
2.)	Methane	0.16			0.04	0.16	Other
3.)	Nitrous Oxide	0.02			0.00	0.02	Other
4.)	Carbon Dioxide Equivalent	8569.21			1956.44	8569.21	Other
5.)							
6.)							
7.)							
8.)							

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E3
Company Equipment Description: Caterpillar G3616SITA Compressor Engine

Operating Status: Operating
Initial Construction Commencement Date: 10/10/2003
Initial Operation Commencement Date: 10/10/2003
Most Recent Construction/ Modification Commencement Date: N/A

Most Recent Operation Commencement Date: N/A

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:
QEPM is proposing to lower the permitted NOx and VOC emission factors on all reciprocating engines at the complex in order to increase the allowable operating hours of E3-E6 while resulting in no emission change to total NOx and VOC. The proposed NOx and VOC emission limits on this engine would be lowered from 0.70 g/hp-hr to 0.50 g/hp-hr.

Name Plate Rating: 4,735 Units: hp
Site Rating: 3,797 Units: hp
Primary Fuel Type: Pipeline Grade Natural Gas
Secondary Fuel Type: N/A
Model Name and Number: Caterpillar G3616SITA
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: BLB00207 Order Date: 5/1/2003
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: 10/10/2003
Operation Commencement/ Start-up Date: 10/10/2003
Manufacture Date: 7/1/2003
Btu Content: 1,081 Units: BTU/scf
Fuel Sulfur Content: < 2,000 Units: gr/MMscf
Type of Service: Compression
Is diesel engine EPA Tier Certified? N/A * If yes, list EPA Tier Rating N/A

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2-02-002-54

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: Varies

Hours/year: Proposed cumulative operating hour limit of 33,500 hr/yr for engines E3, E4, E5, and E6.

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: CO, Formaldehyde, VOC

Proposed BACT: Oxidation Catalyst

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant:

Proposed LAER:

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: ZZZZ

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Affected, but not modified

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:

Oxidation Catalyst

Manufacturer: EmeraChem

Date Installed: 4/7/2014

Model Name and Number: EC-OX-PX-OC-2100-RJM-2556-01

Company Control Equipment ID: N/A

Company Control Equipment Description: Engine 3 Oxidation Catalyst

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☑ Other: Formaldehyde						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): CO: 90, CH2O: 83, VOC: 37.5

Capture Efficiency (%): 100

Operating Control Efficiency (%): CO: 90, CH2O: 83, VOC: 37.5

Catalyst Type:* Oxidation Catalyst

Air Fuel Ratio Controller:* No

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* None

List all release point IDs associated with this control equipment:* Engine 3 Stack, Left Bank, Right Bank

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)	1.231			0.294	1.231	AP-42
2.)	PM #10 microns in diameter (PE/PM10)	1.231			0.294	1.231	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)	1.231			0.294	1.231	AP-42
4.)	Sulfur dioxide (SO2)	0.070			0.020	0.070	AP-42
5.)	Nitrogen Oxides (NOx)	17.530			4.190	17.530	Other
6.)	Carbon monoxide (CO)	87.630			2.090	8.760	Other
7.)	Volatile organic compounds (VOC)	28.040			4.190	17.530	Other
8.)	Lead (Pb)	-			-	-	
9.)	Total Hazardous Air Pollutants (HAPs)	11.300			0.503	2.110	Other
10.)	Fluoride (F)	-			-		
11.)	Hydrogen Sulfide (H2S)	-			-		
12.)	Mercury (Hg)	-			-		
13.)	Total Reduced Sulfur (TRS)	-			-		
14.)	Sulfuric Acid Mist (SAM)	-			-		

Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

	Pollutants:	Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	1,3 -Butadiene	0.033			0.002	0.008	Other
2.)	2,2,4-Trimethylpentane	0.031			0.002	0.007	Other
3.)	Acetaldehyde	1.030			0.059	0.247	Other
4.)	Acrolein	0.633			0.036	0.152	Other
5.)	Benzene	0.054			0.003	0.013	Other
6.)	Biphenyl	0.026			0.002	0.006	Other
7.)	Ethylbenzene	0.005			0.000	0.001	Other
8.)	Formaldehyde	9.110			0.377	1.580	Other
9.)	Methanol	0.309			0.018	0.074	Other
10.)	n-Hexane	0.014			0.001	0.003	Other
11.)	Toluene	0.050			0.003	0.012	Other
12.)	Xylene	0.023			0.001	0.005	Other

Greenhouse Gases (GHGs)

	Pollutants:	Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Carbon Dioxide	14406.33			3440.32	14406.33	Other
2.)	Methane	0.27			0.07	0.27	Other
3.)	Nitrous Oxide	0.03			0.01	0.03	Other
4.)	Carbon Dioxide Equivalent	14421.55			3443.95	14421.55	Other
5.)							
6.)							
7.)							
8.)							

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E4
Company Equipment Description: Caterpillar G3616SITA Compressor Engine

Operating Status: Operating
Initial Construction Commencement Date: 7/1/2004
Initial Operation Commencement Date: 7/1/2004
Most Recent Construction/ Modification Commencement Date: N/A

Most Recent Operation Commencement Date: N/A

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:
QEPM is proposing to lower the permitted NOx and VOC emission factors on all reciprocating engines at the complex in order to increase the allowable operating hours of E3-E6 while resulting in no emission change to total NOx and VOC. The proposed NOx and VOC emission limits on this engine would be lowered from 0.70 g/hp-hr to 0.50 g/hp-hr.

Name Plate Rating: 4,735 Units: hp
Site Rating: 3,797 Units: hp
Primary Fuel Type: Pipeline Grade Natural Gas
Secondary Fuel Type: N/A
Model Name and Number: Caterpillar G3616SITA
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: 4CG00166 Order Date: 2/1/2004
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: 7/1/2004
Operation Commencement/ Start-up Date: 7/1/2004
Manufacture Date: 11/1/1999
Btu Content: 1,081 Units: BTU/scf
Fuel Sulfur Content: < 2,000 Units: gr/MMscf
Type of Service: Compression
Is diesel engine EPA Tier Certified? N/A * If yes, list EPA Tier Rating N/A

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2-02-002-54

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: Varies

Hours/year: Proposed cumulative operating hour limit of 33,500 hr/yr for engines E3, E4, E5, and E6.

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: CO, Formaldehyde, VOC

Proposed BACT: Oxidation Catalyst

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant:

Proposed LAER:

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: ZZZZ

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Affected, but not modified

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:

Oxidation Catalyst

Manufacturer: Catalytic Combustion

Date Installed: 8/9/2011

Model Name and Number: 1010333

Company Control Equipment ID: N/A

Company Control Equipment Description: Engine 4 Oxidation Catalyst

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☑ Other: Formaldehyde						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): CO: 90, CH2O: 83, VOC: 37.5

Capture Efficiency (%): 100

Operating Control Efficiency (%): CO: 90, CH2O: 83, VOC: 37.5

Catalyst Type:* Oxidation Catalyst

Air Fuel Ratio Controller:* No

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* None

List all release point IDs associated with this control equipment:* Engine 4 Stack

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/yr)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)	1.231			0.294	1.231	AP-42
2.)	PM #10 microns in diameter (PE/PM10)	1.231			0.294	1.231	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)	1.231			0.294	1.231	AP-42
4.)	Sulfur dioxide (SO2)	0.070			0.020	0.070	AP-42
5.)	Nitrogen Oxides (NOx)	17.530			4.190	17.530	Other
6.)	Carbon monoxide (CO)	87.630			2.090	8.760	Other
7.)	Volatile organic compounds (VOC)	28.040			4.190	17.530	Other
8.)	Lead (Pb)	-			-	-	
9.)	Total Hazardous Air Pollutants (HAPs)	11.300			0.503	2.110	Other
10.)	Fluoride (F)	-			-		
11.)	Hydrogen Sulfide (H2S)	-			-		
12.)	Mercury (Hg)	-			-		
13.)	Total Reduced Sulfur (TRS)	-			-		
14.)	Sulfuric Acid Mist (SAM)	-			-		

Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	1,3 -Butadiene	0.033			0.002	0.008	Other
2.)	2,2,4-Trimethylpentane	0.031			0.002	0.007	Other
3.)	Acetaldehyde	1.030			0.059	0.247	Other
4.)	Acrolein	0.633			0.036	0.152	Other
5.)	Benzene	0.054			0.003	0.013	Other
6.)	Biphenyl	0.026			0.002	0.006	Other
7.)	Ethylbenzene	0.005			0.000	0.001	Other
8.)	Formaldehyde	9.110			0.377	1.580	Other
9.)	Methanol	0.309			0.018	0.074	Other
10.)	n-Hexane	0.014			0.001	0.003	Other
11.)	Toluene	0.050			0.003	0.012	Other
12.)	Xylene	0.023			0.001	0.005	Other

Greenhouse Gases (GHGs)

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Carbon Dioxide	14406.33			3440.32	14406.33	Other
2.)	Methane	0.27			0.07	0.27	Other
3.)	Nitrous Oxide	0.03			0.01	0.03	Other
4.)	Carbon Dioxide Equivalent	14421.55			3443.95	14421.55	Other
5.)							
6.)							
7.)							
8.)							

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E5
Company Equipment Description: Caterpillar G3616SITA Compressor Engine

Operating Status: Operating
Initial Construction Commencement Date: 10/17/2006
Initial Operation Commencement Date: 10/17/2006
Most Recent Construction/ Modification Commencement Date: N/A

Most Recent Operation Commencement Date: N/A

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:
QEPM is proposing to lower the permitted NOx and VOC emission factors on all reciprocating engines at the complex in order to increase the allowable operating hours of E3-E6 while resulting in no emission change to total NOx and VOC. The proposed NOx and VOC emission limits on this engine would be lowered from 0.70 g/hp-hr to 0.50 g/hp-hr.

Name Plate Rating: 4,735 Units: hp
Site Rating: 3,797 Units: hp
Primary Fuel Type: Pipeline Grade Natural Gas
Secondary Fuel Type: N/A
Model Name and Number: Caterpillar G3616SITA
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: BLB00309 Order Date: 10/1/2005
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: 10/17/2006
Operation Commencement/ Start-up Date: 10/17/2006
Manufacture Date: 6/8/2006
Btu Content: 1,081 Units: BTU/scf
Fuel Sulfur Content: < 2,000 Units: gr/MMscf
Type of Service: Compression
Is diesel engine EPA Tier Certified? N/A * If yes, list EPA Tier Rating N/A

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2-02-002-54

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: Varies

Hours/year: Proposed cumulative operating hour limit of 33,500 hr/yr for engines E3, E4, E5, and E6.

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: CO, Formaldehyde, VOC

Proposed BACT: Oxidation Catalyst

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant:

Proposed LAER:

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Subject to subpart

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart: *JJJJ*

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: ZZZZ

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Affected, but not modified

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:

Oxidation Catalyst

Manufacturer: Catalytic Combustion

Date Installed: 5/25/2011

Model Name and Number: 1010333

Company Control Equipment ID: N/A

Company Control Equipment Description: Engine 5 Oxidation Catalyst

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☑ Other: Formaldehyde						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): CO: 90, CH2O: 83, VOC: 37.5

Capture Efficiency (%): 100

Operating Control Efficiency (%): CO: 90, CH2O: 83, VOC: 37.5

Catalyst Type:* Oxidation Catalyst

Air Fuel Ratio Controller:* No

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* None

List all release point IDs associated with this control equipment:* Engine 5 Stack

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/yr)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)	1.231			0.294	1.231	AP-42
2.)	PM #10 microns in diameter (PE/PM10)	1.231			0.294	1.231	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)	1.231			0.294	1.231	AP-42
4.)	Sulfur dioxide (SO2)	0.070			0.020	0.070	AP-42
5.)	Nitrogen Oxides (NOx)	17.530			4.190	17.530	Other
6.)	Carbon monoxide (CO)	87.630			2.090	8.760	Other
7.)	Volatile organic compounds (VOC)	28.040			4.190	17.530	Other
8.)	Lead (Pb)	-			-	-	
9.)	Total Hazardous Air Pollutants (HAPs)	11.300			0.503	2.110	Other
10.)	Fluoride (F)	-			-		
11.)	Hydrogen Sulfide (H2S)	-			-		
12.)	Mercury (Hg)	-			-		
13.)	Total Reduced Sulfur (TRS)	-			-		
14.)	Sulfuric Acid Mist (SAM)	-			-		

Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	1,3 -Butadiene	0.033			0.002	0.008	Other
2.)	2,2,4-Trimethylpentane	0.031			0.002	0.007	Other
3.)	Acetaldehyde	1.030			0.059	0.247	Other
4.)	Acrolein	0.633			0.036	0.152	Other
5.)	Benzene	0.054			0.003	0.013	Other
6.)	Biphenyl	0.026			0.002	0.006	Other
7.)	Ethylbenzene	0.005			0.000	0.001	Other
8.)	Formaldehyde	9.110			0.377	1.580	Other
9.)	Methanol	0.309			0.018	0.074	Other
10.)	n-Hexane	0.014			0.001	0.003	Other
11.)	Toluene	0.050			0.003	0.012	Other
12.)	Xylene	0.023			0.001	0.005	Other

Greenhouse Gases (GHGs)

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Carbon Dioxide	14406.33			3440.32	14406.33	Other
2.)	Methane	0.27			0.07	0.27	Other
3.)	Nitrous Oxide	0.03			0.01	0.03	Other
4.)	Carbon Dioxide Equivalent	14421.55			3443.95	14421.55	Other
5.)							
6.)							
7.)							
8.)							

Specific Emission Unit Attributes:

Engine

Company Equipment ID: E6
Company Equipment Description: Caterpillar G3616SITA Compressor Engine

Operating Status: Operating
Initial Construction Commencement Date: 10/17/2006
Initial Operation Commencement Date: 10/17/2006
Most Recent Construction/ Modification Commencement Date: N/A

Most Recent Operation Commencement Date: N/A

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:
QEPM is proposing to lower the permitted NOx and VOC emission factors on all reciprocating engines at the complex in order to increase the allowable operating hours of E3-E6 while resulting in no emission change to total NOx and VOC. The proposed NOx and VOC emission limits on this engine would be lowered from 0.70 g/hp-hr to 0.50 g/hp-hr.

Name Plate Rating: 4,735 Units: hp
Site Rating: 3,797 Units: hp
Primary Fuel Type: Pipeline Grade Natural Gas
Secondary Fuel Type: N/A
Model Name and Number: Caterpillar G3616SITA
Engine Type: 4 Stroke Lean Burn
Serial Number Tracking Table:
Serial Number: BLB00308 Order Date: 10/1/2005
Manufacturer Name: Caterpillar
Construction/Installation Commencement Date: 10/17/2006
Operation Commencement/ Start-up Date: 10/17/2006
Manufacture Date: 6/5/2006
Btu Content: 1,081 Units: BTU/scf
Fuel Sulfur Content: < 2,000 Units: gr/MMscf
Type of Service: Compression
Is diesel engine EPA Tier Certified? N/A * If yes, list EPA Tier Rating N/A

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

2-02-002-54

Potential Operating Schedule: Provide the operating schedule for this emission unit.

Hours/day: Varies

Hours/year: Proposed cumulative operating hour limit of 33,500 hr/yr for engines E3, E4, E5, and E6.

Control Equipment: Yes

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: CO, Formaldehyde, VOC

Proposed BACT: Oxidation Catalyst

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant:

Proposed LAER:

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Subject to subpart

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart: *JJJJ*

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart:

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Subject to subpart

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: ZZZZ

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Affected, but not modified

These rules are found under WAQSR Chapter 6, Section 13.

Control Equipment:

Oxidation Catalyst

Manufacturer:	Catalytic Combustion	Date Installed:	4/11/2011
Model Name and Number:	1010333	Company Control Equipment ID:	N/A
Company Control Equipment Description:	Engine 6 Oxidation Catalyst		

Pollutant(s) Controlled:

☑ CO	☐ NOx	☐ Pb	☐ SO2	☑ VOC	☐ PM	
☐ PM (FIL)	☐ PM Condensible	☐ PM 10 (FIL)	☐ PM 2.5 (FIL)	☐ PM 10	☐ PM 2.5	
☑ Other: Formaldehyde						

NOTE: The following fields require numeric values unless otherwise denoted with an asterisk*

Design Control Efficiency (%): CO: 90, CH2O: 83, VOC: 37.5

Capture Efficiency (%): 100

Operating Control Efficiency (%): CO: 90, CH2O: 83, VOC: 37.5

Catalyst Type:* Oxidation Catalyst

Air Fuel Ratio Controller:* No

☑ This is the only control equipment on this air contaminant source

If not, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List all other emission units that are also vented to this control equipment:* None

List all release point IDs associated with this control equipment:* Engine 6 Stack

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/yr)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)	1.231			0.294	1.231	AP-42
2.)	PM #10 microns in diameter (PE/PM10)	1.231			0.294	1.231	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)	1.231			0.294	1.231	AP-42
4.)	Sulfur dioxide (SO2)	0.070			0.020	0.070	AP-42
5.)	Nitrogen Oxides (NOx)	17.530			4.190	17.530	Other
6.)	Carbon monoxide (CO)	87.630			2.090	8.760	Other
7.)	Volatile organic compounds (VOC)	28.040			4.190	17.530	Other
8.)	Lead (Pb)	-			-	-	
9.)	Total Hazardous Air Pollutants (HAPs)	11.300			0.503	2.110	Other
10.)	Fluoride (F)	-			-		
11.)	Hydrogen Sulfide (H2S)	-			-		
12.)	Mercury (Hg)	-			-		
13.)	Total Reduced Sulfur (TRS)	-			-		
14.)	Sulfuric Acid Mist (SAM)	-			-		

Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	1,3 -Butadiene	0.033			0.002	0.008	Other
2.)	2,2,4-Trimethylpentane	0.031			0.002	0.007	Other
3.)	Acetaldehyde	1.030			0.059	0.247	Other
4.)	Acrolein	0.633			0.036	0.152	Other
5.)	Benzene	0.054			0.003	0.013	Other
6.)	Biphenyl	0.026			0.002	0.006	Other
7.)	Ethylbenzene	0.005			0.000	0.001	Other
8.)	Formaldehyde	9.110			0.377	1.580	Other
9.)	Methanol	0.309			0.018	0.074	Other
10.)	n-Hexane	0.014			0.001	0.003	Other
11.)	Toluene	0.050			0.003	0.012	Other
12.)	Xylene	0.023			0.001	0.005	Other

Greenhouse Gases (GHGs)

Pollutants:		Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Carbon Dioxide	14406.33			3440.32	14406.33	Other
2.)	Methane	0.27			0.07	0.27	Other
3.)	Nitrous Oxide	0.03			0.01	0.03	Other
4.)	Carbon Dioxide Equivalent	14421.55			3443.95	14421.55	Other
5.)							
6.)							
7.)							
8.)							

Specific Emission Unit Attributes:

Flare

Company Equipment ID: FLARE-2
Company Equipment Description: High Pressure Emergency Flare

Operating Status: Operating
Initial Construction Commencement Date: TBD
Initial Operation Commencement Date: TBD
Most Recent Construction/ Modification Commencement Date: TBD

Most Recent Operation Commencement Date: TBD

Select reason(s) for this emissions unit being included in this application (must be completed regardless of date of installation or modification):

Reason: Other

If reason is ***Reconstruction*** or ***Temporary Permit*** or ***Other,*** please explain below:
The existing Flare 2 will be replaced with a new high pressure emergency flare (also to be called Flare 2) better equipped to handle the amount of vapors being sent through it.

Maximum Design Capacity (MMSCF/hr): 0.05
Minimum Design Capacity (MMSCF/hr): 0.05
Pilot Gas Volume (scf/min): 2.17
Emergency Flare Only: Yes
Ignition Device Type: Pilot
Btu Content (Btu/scf): 1081
Smokeless Design: Yes
Assist Gas Utilized? Yes
Continuously Monitored?* Yes
*If yes, describle continuous monitoring:
Duration and volumes of events during which the flare receives gas from process is elctronically recorded and data records maintained for reporting purposes
Waste Gas Volume: 15 (purge gas)
Units: scf/hr
Installation Date: TBD

SCC Codes: List all Source Classification Code(s) (SCC) that describe the process(es) performed by the emission source (e.g., 1-02-002-04).

3-10-002-05

Potential Operating Schedule: Provide the operating schedule for this emission unit.
Hours/day: 24
Hours/year: 8760

Control Equipment: No

If yes, please fill out and attach the appropriate Control Device and Release Point Information worksheets.

Best Available Control Technology (BACT): Was a BACT Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed BACT: _____

*If yes, attach BACT Analysis with this application.

Lowest Achievable Emission Rate (LAER): Was a LAER Analysis completed for this emission unit?

☐ Yes ☑ No

Pollutant: _____

Proposed LAER: _____

*If yes, attach LAER Analysis with this application.

Federal and State Rule Applicability:

New Source Performance Standards (NSPS): Not Affected

New Source Performance Standard are listed under 40 CFR 60-Standards of Performance for New Stationary Sources.

NSPS Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 61): Not Affected

National Emissions Standards for Hazardous Air Pollutants (NESHAP Part 61) are listed under 40 CFR 61. (These include asbestos, benzene, beryllium, mercury, and vinyl chloride).

Part 61 NESHAP Subpart: _____

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63): Not Affected

National Emission Standards for Hazardous Air Pollutants (NESHAP Part 63) standards are listed under 40 CFR 63

Part 63 NESHAP Subpart: _____

Prevention of Significant Deterioration (PSD): Not Affected

These rules are found under WAQSR Chapter 6, Section 4.

Non-Attainment New Source Review: Affected, but not modified

These rules are found under WAQSR Chapter 6, Section 13.

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Emissions Information- The following tables request information needed to determine the applicable requirements and the compliance status of this emission unit with those requirements.

			Efficiency Standards				
		Pre-Controlled Potential Emissions (tons/yr)	Potential to Emit (PTE)	Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
Criteria Pollutants:							
1.)	Particulate emissions (PE/PM) (formerly particulate matter, PM)	0.005			0.001	0.005	AP-42
2.)	PM #10 microns in diameter (PE/PM10)	0.005			0.001	0.005	AP-42
3.)	PM #2.5 microns in diameter (PE/PM2.5)	0.005			0.001	0.005	AP-42
4.)	Sulfur dioxide (SO2)	0.000			0.000	0.000	AP-42
5.)	Nitrogen Oxides (NOx)	0.070			0.016	0.070	Other
6.)	Carbon monoxide (CO)	0.050			0.012	0.050	Other
7.)	Volatile organic compounds (VOC)	0.003			0.001	0.003	Other
8.)	Lead (Pb)				-	-	
9.)	Total Hazardous Air Pollutants (HAPs)	0.001			0.000	0.001	Other
10.)	Fluoride (F)	-			-	-	
11.)	Hydrogen Sulfide (H2S)	-			-	-	
12.)	Mercury (Hg)	-			-	-	
13.)	Total Reduced Sulfur (TRS)	-			-	-	
14.)	Sulfuric Acid Mist (SAM)	-			-	-	

Provide your calculations as an attachment and explain how all process variables and emissions factors were selected.

Revised 5/12/2015

Pollutant Emissions Form
(submit one for each emission unit)

Hazardous Air Pollutants (HAPs) and Toxic Air Contaminents

	Pollutants:	Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Benzene	0.000			0.000	0.000	Other
2.)	Dichlorobenzene	0.000			0.000	0.000	Other
3.)	Formaldehyde	0.000			0.000	0.000	Other
4.)	n-Hexane	0.001			0.000	0.001	Other
5.)	Toluene	0.000			0.000	0.000	Other
6.)							
7.)							
8.)							
9.)							
10.)							
11.)							
12.)							

Greenhouse Gases (GHGs)

	Pollutants:	Pre-Controlled Potential Emissions (tons/yr)	Efficiency Standards: Potential to Emit (PTE)	Efficiency Standards: Units	Potential to Emit (lbs/hr)	Potential to Emit (tons/yr)	Basis for Determination
1.)	Carbon Dioxide	80.17			18.30	80.17	Other
2.)	Methane	1.22			0.28	1.22	Other
3.)	Nitrous Oxide	0.00			0.00	0.00	Other
4.)	Carbon Dioxide Equivalent	110.79			25.29	110.79	Other
5.)							
6.)							
7.)							
8.)							

Revised 5/12/2015 Release Point Form

Release Point Information:

Complete the table below for ***each*** release point. Please include release point information for each emission unit. Multiple attachments may be necessary. A release point is a point at which emissions from an emission unit are released into the ambient (outside)air. List each individual release point on a separate pair of lines (release point ID and description). ***For longitude and latitude, use NAD 83/WGS84 datum and 5 digits after the decimal (i.e. 41.12345, -107.56789)***

Stack Release Point Information		
Company Release Point ID:	Release Point Type:	Vertical
E1	Release Point Latitude:	42.68987
	Release Point Longitude:	-109.80807
Company Release Point Description:	Base Elevation (ft):	7009.88
Exhaust stack from Engine 1 - Caterpillar G3608SITA	Stack Height (ft):	50
	Stack Diameter (ft):	1.5
	Exit Gas Velocity (ft/s):	153.38
	Exit Gas Temp (F):	878
	Exit Gas Flow Rate (acfm):	16263
Company Release Point ID:	Release Point Type:	Vertical
E2	Release Point Latitude:	42.68978
	Release Point Longitude:	-109.80801
Company Release Point Description:	Base Elevation (ft):	7008.83
Exhaust stack from Engine 2 - Caterpillar G3608SITA	Stack Height (ft):	50
	Stack Diameter (ft):	1.5
	Exit Gas Velocity (ft/s):	153.38
	Exit Gas Temp (F):	878
	Exit Gas Flow Rate (acfm):	16263
Company Release Point ID:	Release Point Type:	Vertical
E3	Release Point Latitude:	42.68956
	Release Point Longitude:	-109.80785
Company Release Point Description:	Base Elevation (ft):	7007.12
Exhaust stack from Engine 3 - Caterpillar G3616SITA	Stack Height (ft):	50
	Stack Diameter (ft):	1.5
	Exit Gas Velocity (ft/s):	304.97
	Exit Gas Temp (F):	876
	Exit Gas Flow Rate (acfm):	32336
Company Release Point ID:	Release Point Type:	Vertical
E4	Release Point Latitude:	42.68947
	Release Point Longitude:	-109.80778
Company Release Point Description:	Base Elevation (ft):	7007.12
Exhaust stack from Engine 4 - Caterpillar G3616SITA	Stack Height (ft):	50
	Stack Diameter (ft):	1.5
	Exit Gas Velocity (ft/s):	304.97
	Exit Gas Temp (F):	876
	Exit Gas Flow Rate (acfm):	32336
Company Release Point ID:	Release Point Type:	Vertical
E5	Release Point Latitude:	42.69062
	Release Point Longitude:	-109.80932
Company Release Point Description:	Base Elevation (ft):	7023.52

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Release Point Form

Exhaust stack from Engine 5 - Caterpillar G3616SITA	Stack Height (ft):	50
	Stack Diameter (ft):	1.5
	Exit Gas Velocity (ft/s):	305.26
	Exit Gas Temp (F):	876
	Exit Gas Flow Rate (acfm):	32366
Company Release Point ID:	Release Point Type:	Vertical
E6	Release Point Latitude:	42.69067
	Release Point Longitude:	-109.80617
Company Release Point Description:	Base Elevation (ft):	7022.77
Exhaust stack from Engine 6 - Caterpillar G3616SITA	Stack Height (ft):	50
	Stack Diameter (ft):	1.5
	Exit Gas Velocity (ft/s):	305.26
	Exit Gas Temp (F):	876
	Exit Gas Flow Rate (acfm):	32366
Company Release Point ID:	Release Point Type:	Vertical
F-2	Release Point Latitude:	42.69213
	Release Point Longitude:	-109.80862
Company Release Point Description:	Base Elevation (ft):	7030
High Pressure Emergency Flare	Stack Height (ft):	TBD
	Stack Diameter (ft):	TBD
	Exit Gas Velocity (ft/s):	TBD
	Exit Gas Temp (F):	TBD
	Exit Gas Flow Rate (acfm):	TBD

Attachment B – EMISSION CALCULATIONS

Pinedale Complex
Controlled Emissions Summary Sheet

Source ID No.	Source Usage	Source Description	Potential Emissions (tpy) NO_x	CO	VOC	SO_2	PM, PM_{10}, $PM_{2.5}$
Gobblers Knob Compressor Station							
E-1	**Compressor**	**2157 hp Caterpillar G3608SITA**	**10.41**	**6.25**	**12.50**	**0.04**	**0.73**
E-2	**Compressor**	**2157 hp Caterpillar G3608SITA**	**10.41**	**6.25**	**12.50**	**0.04**	**0.73**
E-3	**Compressor**	**3797 hp Caterpillar G3616SITA**	**17.53**	**8.76**	**17.53**	**0.07**	**1.23**
E-4	**Compressor**	**3797 hp Caterpillar G3616SITA**	**17.53**	**8.76**	**17.53**	**0.07**	**1.23**
E-5	**Compressor**	**3797 hp Caterpillar G3616SITA**	**17.53**	**8.76**	**17.53**	**0.07**	**1.23**
E-6	**Compressor**	**3797 hp Caterpillar G3616SITA**	**17.53**	**8.76**	**17.53**	**0.07**	**1.23**
EGEN-2	Backup Generator	950 hp Caterpillar C27 ACERT	2.80	1.36	0.01	0.00	0.01
TURBINE-1	Solar	15949 hp Titan 130	30.79	1.56	4.29	0.05	3.75
TURBINE SEALS	Vented Emissions	Turbine Seal Emissions			8.15		
ST-1 and ST-2	400 bbl Water Tanks	16,800 gal Condensate			3.13		
F-3	Flare 3	0.184 MMBtu/hr Emergency Flare	0.08	0.07	0.00	0.00	0.01
H-1	Scrubber Tank Heater	0.25 MMBtu/hr Unknown	0.11	0.09	0.01	0.00	0.01
H-2	Scrubber Tank Heater	0.25 MMBtu/hr Unknown	0.11	0.09	0.01	0.00	0.01
EL-1	Fugitive Emissions	Compressor Station Equipment Leaks			0.56		
ES	Vented Emissions	Engine Startups			0.86		
EB	Vented Emissions	Compressor Blowdowns			0.86		
ESD	Vented Emissions	Emergency Shutdowns			0.03		
PB	Vented Emissions	Pigging Blowdowns			0.37		
LO	Vented Emissions	Truck Loadouts			0.49		
Total Emissions			124.82	50.72	113.87	0.43	10.17
Pinedale Liquids Facility							
EGEN-1	Backup Generator	2200 hp Cummins KTA50-G9	8.37	10.31	1.21	0.01	0.49
H-3	Ethylene Glycol Heater	8.50 MMBtu/hr	3.65	3.07	0.20	0.02	0.28
ST-3, ST-4, ST-5	Three Storage Tanks	2-1,000 bbl Water & 1-6,000 bbl Condensate			1.57		
F-1	Flare 1	0.184 MMBtu/hr Low Pressure Flare	0.43	0.15	0.00	0.00	0.01
F-2	**Flare 2 - Proposed**	**0.141 MMBtu/hr Emergency Flare**	**0.07**	**0.05**	**0.00**	**0.00**	**0.00**
H-4	Condensate Bypass Heater	2.00 MMBtu/hr Unknown	0.86	0.72	0.05	0.01	0.07
H-5	Produced Water Tank Heater	0.50 MMBtu/hr Unknown	0.21	0.18	0.01	0.00	0.02
H-6	Produced Water Tank Heater	0.50 MMBtu/hr Unknown	0.21	0.18	0.01	0.00	0.02
EL-2	Fugitive Emissions	Liquids Facility Equipment Leaks			19.10		
Total Emissions			**13.80**	**14.66**	**22.16**	**0.04**	**0.87**
Total Pinedale Complex							
Total Emissions			**138.6**	**65.4**	**136.0**	**0.5**	**11.0**

Pinedale Complex
Controlled Emissions Summary Sheet (continued)

			Potential GHG Emissions (tpy)				HAPs Emissions (tpy)														
Source ID No.	Source Usage	Source Description	CO_2	CH_4	N_2O	CO_2e	1,3-Butadiene	2,2,4-Trimethylpentane	Acetaldehyde	Acrolein	Benzene	Biphenyl	Dichlorobenzene	Ethylbenzene	Formaldehyde	Hexane	Methanol	PAH	Toluene	Xylene	TOTALS
Gobblers Knob Compressor Station																					
E-1	**Compressor**	**2157 hp Caterpillar G3608SITA**	**8560.2**	**0.16**	**0.02**	**8569.2**	**4.7E-03**	**4.4E-03**	**1.5E-01**	**9.0E-02**	**7.7E-03**	**3.7E-03**		**7.0E-04**	**1.2E+00**	**2.0E-03**	**4.4E-02**		**7.2E-03**	**3.2E-03**	**1.6E+00**
E-2	**Compressor**	**2157 hp Caterpillar G3608SITA**	**8560.2**	**0.16**	**0.02**	**8569.2**	**4.7E-03**	**4.4E-03**	**1.5E-01**	**9.0E-02**	**7.7E-03**	**3.7E-03**		**7.0E-04**	**1.2E+00**	**2.0E-03**	**4.4E-02**		**7.2E-03**	**3.2E-03**	**1.6E+00**
E-3	**Compressor**	**3797 hp Caterpillar G3616SITA**	**14406.3**	**0.27**	**0.03**	**14421.5**	**7.9E-03**	**7.4E-03**	**2.5E-01**	**1.5E-01**	**1.3E-02**	**6.3E-03**		**1.2E-03**	**1.6E+00**	**3.3E-03**	**7.4E-02**		**1.2E-02**	**5.4E-03**	**2.1E+00**
E-4	**Compressor**	**3797 hp Caterpillar G3616SITA**	**14406.3**	**0.27**	**0.03**	**14421.5**	**7.9E-03**	**7.4E-03**	**2.5E-01**	**1.5E-01**	**1.3E-02**	**6.3E-03**		**1.2E-03**	**1.6E+00**	**3.3E-03**	**7.4E-02**		**1.2E-02**	**5.4E-03**	**2.1E+00**
E-5	**Compressor**	**3797 hp Caterpillar G3616SITA**	**14406.3**	**0.27**	**0.03**	**14421.5**	**7.9E-03**	**7.4E-03**	**2.5E-01**	**1.5E-01**	**1.3E-02**	**6.3E-03**		**1.2E-03**	**1.6E+00**	**3.3E-03**	**7.4E-02**		**1.2E-02**	**5.4E-03**	**2.1E+00**
E-6	**Compressor**	**3797 hp Caterpillar G3616SITA**	**14406.3**	**0.27**	**0.03**	**14421.5**	**7.9E-03**	**7.4E-03**	**2.5E-01**	**1.5E-01**	**1.3E-02**	**6.3E-03**		**1.2E-03**	**1.6E+00**	**3.3E-03**	**7.4E-02**		**1.2E-02**	**5.4E-03**	**2.1E+00**
EGEN-2	Backup Generator	950 hp Caterpillar C27 ACERT	263.0	0.01	0.00	263.9			4.1E-05	1.3E-05	1.3E-03				2.5E-02			3.4E-04	4.5E-04	3.1E-04	2.7E-02
TURBINE-1	Solar	15949 hp Titan 130	66382.5	1.25	0.13	66447.7			5.5E-03		1.6E-03			4.4E-03	9.7E-02				1.8E-02	8.7E-03	1.3E-01
TURBINE SEALS	Vented Emissions	Turbine Seal Emissions	2.4	103.06		2166.6		1.9E-02			6.4E-02			3.7E-03		1.6E-01			1.1E-01	4.3E-02	4.1E-01
ST-1 and ST-2	400 bbl Water Tanks	16,800 gal Condensate	0.3	3.92		82.5		7.0E-03			2.4E-02			1.7E-03		5.1E-02			3.0E-02	8.7E-03	1.2E-01
F-3	Flare 3	0.184 MMBtu/hr Emergency Flare	94.1	0.00	0.00	94.2					1.7E-06		9.5E-07		5.9E-05	1.4E-03			2.7E-06		1.5E-03
H-1	Scrubber Tank Heater	0.25 MMBtu/hr Unknown	128.0	0.00	0.00	128.1					2.3E-06		1.3E-06		8.1E-05	1.9E-03			3.7E-06		2.0E-03
H-2	Scrubber Tank Heater	0.25 MMBtu/hr Unknown	128.0	0.00	0.00	128.1					2.3E-06		1.3E-06		8.1E-05	1.9E-03			3.7E-06		2.0E-03
EL-1	Fugitive Emissions	Compressor Station Equipment Leaks	0.2	7.03		147.9					3.7E-03			3.0E-04					6.2E-03	1.6E-03	1.2E-02
ES	Vented Emissions	Engine Startups	0.3	10.92		229.5															0.0E+00
EB	Vented Emissions	Compressor Blowdowns	0.3	10.92		229.5															0.0E+00
ESD	Vented Emissions	Emergency Shutdowns	0.0	0.41		8.6															0.0E+00
PB	Vented Emissions	Pigging Blowdowns	0.1	4.65		97.7															0.0E+00
LO	Vented Emissions	Truck Loadouts																			0.0E+00
Total Emissions			141744.81	143.58	0.27	144848.94	4.1E-02	6.5E-02	1.3E+00	7.9E-01	1.6E-01	3.3E-02	3.5E-06	1.6E-02	8.9E+00	2.4E-01	3.8E-01	3.4E-04	2.3E-01	9.1E-02	1.2E+01
Pinedale Liquids Facility																					
EGEN-1	Backup Generator	2200 hp Cummins KTA50-G9	627.8	0.0	0.0	629.9			9.7E-05	3.0E-05	3.0E-03				2.5E-02			8.2E-04	1.1E-03	7.4E-04	3.1E-02
H-3	Ethylene Glycol Heater	8.50 MMBtu/hr	4351.8	0.1	0.0	4356.0					7.7E-05		4.4E-05		2.7E-03	6.6E-02			1.2E-04		6.9E-02
ST-3, ST-4, ST-5	Three Storage Tanks	2-1,000 bbl Water & 1-6,000 bbl Condensate	1.3	0.3		8.2		0.0E+00			1.5E-02			1.0E-03		3.4E-02			1.0E-02	6.0E-03	6.6E-02
F-1	Flare 1	0.184 MMBtu/hr Low Pressure Flare	415.2	8.0	0.0	584.0					1.7E-06		9.5E-07		5.9E-05	1.4E-03			2.7E-06		1.5E-03
F-2	**Flare 2 - Proposed**	**0.141 MMBtu/hr Emergency Flare**	**80.2**	**1.2**	**0.0**	**110.8**					**1.3E-06**		**7.2E-07**		**4.5E-05**	**1.1E-03**			**2.1E-06**		**1.1E-03**
H-4	Condensate Bypass Heater	2.00 MMBtu/hr Unknown	1023.9	0.0	0.0	1025.0					1.8E-05		1.0E-05		6.4E-04	1.5E-02			2.9E-05		1.6E-02
H-5	Produced Water Tank Heater	0.50 MMBtu/hr Unknown	256.0	0.0	0.0	256.2					4.5E-06		2.6E-06		1.6E-04	3.9E-03			7.3E-06		4.0E-03
H-6	Produced Water Tank Heater	0.50 MMBtu/hr Unknown	256.0	0.0	0.0	256.2					4.5E-06		2.6E-06		1.6E-04	3.9E-03			7.3E-06		4.0E-03
EL-2	Fugitive Emissions	Liquids Facility Equipment Leaks	5.7	241.5		5077.5					1.8E-02			1.1E-02					0.0E+00	2.4E-02	5.2E-02
Total Emissions			**7017.8**	**251.2**	**0.0**	**12303.9**	**0.0E+00**	**0.0E+00**	**9.7E-05**	**3.0E-05**	**3.6E-02**	**0.0E+00**	**6.1E-05**	**1.2E-02**	**2.9E-02**	**1.3E-01**	**0.0E+00**	**8.2E-04**	**1.1E-02**	**3.0E-02**	**2.4E-01**
Total Pinedale Complex																					
Total Emissions			**148762.6**	**394.8**	**0.3**	**157153**	**0.04**	**0.06**	**1.29**	**0.79**	**0.20**	**0.03**	**0.00**	**0.03**	**8.96**	**0.36**	**0.38**	**0.00**	**0.24**	**0.12**	**12.51**

Pinedale Complex
Uncontrolled Emissions Summary Sheet

Source ID No.	Source Usage	Source Description	Potential Emissions (tpy)					Potential GHG Emissions (tpy)				HAPs Emissions (tpy)															
			NO_x	CO	VOC	SO_2	PM_{10}, $PM_{2.5}$	CO_2	CH_4	N_2O	CO_2e	1,3-Butadiene	2,2,4-Trimethylpentane	Acetaldehyde	Acrolein	Benzene	Biphenyl	Dichlorobenzene	Ethylbenzene	Formaldehyde	Hexane	Methanol	PAH	Toluene	Xylene	TOTALS
Gobblers Knob Compressor Station																											
E-1	Compressor	2157 hp Caterpillar G3608SITA	10.41	52.07	16.66	0.04	0.73	8560.17	0.161	0.016	8569.21	2.0E-02	1.8E-02	6.1E-01	3.8E-01	3.2E-02	1.8E-02		2.9E-03	5.4E+00	8.1E-03	1.8E-01		3.0E-02	1.3E-02	6.7E+00
E-2	Compressor	2157 hp Caterpillar G3608SITA	10.41	52.07	16.66	0.04	0.73	8560.17	0.161	0.016	8569.21	2.0E-02	1.8E-02	6.1E-01	3.8E-01	3.2E-02	1.8E-02		2.9E-03	5.4E+00	8.1E-03	1.8E-01		3.0E-02	1.3E-02	6.7E+00
E-3	Compressor	3797 hp Caterpillar G3616SITA	17.53	87.63	28.04	0.07	1.23	14406.33	0.27	0.03	14421.55	3.3E-02	3.1E-02	1.0E+00	6.3E-01	5.4E-02	2.6E-02		4.9E-03	9.1E+00	1.4E-02	3.1E-01		5.0E-02	2.3E-02	1.1E+01
E-4	Compressor	3797 hp Caterpillar G3616SITA	17.53	87.63	28.04	0.07	1.23	14406.33	0.27	0.03	14421.55	3.3E-02	3.1E-02	1.0E+00	6.3E-01	5.4E-02	2.6E-02		4.9E-03	9.1E+00	1.4E-02	3.1E-01		5.0E-02	2.3E-02	1.1E+01
E-5	Compressor	3797 hp Caterpillar G3616SITA	17.53	87.63	28.04	0.07	1.23	14406.33	0.27	0.03	14421.55	3.3E-02	3.1E-02	1.0E+00	6.3E-01	5.4E-02	2.6E-02		4.9E-03	9.1E+00	1.4E-02	3.1E-01		5.0E-02	2.3E-02	1.1E+01
E-6	Compressor	3797 hp Caterpillar G3616SITA	17.53	87.63	28.04	0.07	1.23	14406.33	0.27	0.03	14421.55	3.3E-02	3.1E-02	1.0E+00	6.3E-01	5.4E-02	2.6E-02		4.9E-03	9.1E+00	1.4E-02	3.1E-01		5.0E-02	2.3E-02	1.1E+01
EGEN-2	Backup Generator	950 hp Caterpillar C27 ACERT	2.80	1.36	0.01	0.00	0.01	263.03	0.01	0.00	263.92			4.1E-05	1.3E-05	1.3E-03				2.9E-02			3.4E-04	4.5E-04	3.1E-04	2.7E-02
TURBINE-1	Solar	15949 hp Titan 130	30.79	31.23	17.87	0.05	3.75	66382.55	1.26	0.13	66447.85			2.3E-02		8.8E-03			1.8E-02	4.0E-01				7.4E-02	3.6E-02	5.6E-01
TURBINE SEALS	Vented Emissions	Turbine Seal Emissions			8.15			2.41	103.06		2166.62		1.9E-02			6.4E-02			3.7E-03		1.6E-01			1.1E-01	4.3E-02	4.1E-01
ST-1 and ST-2	400 bbl Water Tanks	16,800 gal Condensate			3.13			0.28	3.92		82.50		7.0E-03			2.4E-02			1.7E-03		5.1E-02			3.0E-02	8.7E-03	1.2E-01
F-3	Flare 3	0.184 MMBtu/hr Emergency Flare	0.08	0.07	0.00	0.00	0.01	94.09	0.00	0.00	94.18					1.7E-06		9.5E-07		5.9E-05	1.4E-03			2.7E-06		1.5E-03
H-1	Scrubber Tank Heater	0.25 MMBtu/hr Unknown	0.11	0.09	0.01	0.00	0.01	127.99	0.00	0.00	128.12					2.3E-06		1.3E-06		8.1E-05	1.9E-03			3.7E-06		2.0E-03
H-2	Scrubber Tank Heater	0.25 MMBtu/hr Unknown	0.11	0.09	0.01	0.00	0.01	127.99	0.00	0.00	128.12					2.3E-06		1.3E-06		8.1E-05	1.9E-03			3.7E-06		2.0E-03
EL-1	Fugitive Emissions	Compressor Station Equipment Leaks			0.56			0.16	7.03		147.86					3.7E-03			3.0E-04					6.2E-03	1.6E-03	1.2E-02
																											0.0E+00
E5	Vented Emissions	Engine Startups			0.86			0.26	10.92		229.52																0.0E+00
EB	Vented Emissions	Compressor Blowdowns			0.86			0.26	10.92		229.52																0.0E+00
ESD	Vented Emissions	Emergency Shutdowns			0.03			0.01	0.41		8.57																0.0E+00
PB	Vented Emissions	Pigging Blowdowns			0.37			0.11	4.65		97.75																0.0E+00
LO	Vented Emissions	Truck Loadouts			0.49																						0.0E+00
Total Emissions			124.82	487.51	177.85	0.43	10.17	141744.81	143.58	0.27	144848.94	1.7E-01	1.9E-01	6.4E+00	3.3E+00	3.8E-01	1.4E-01	3.5E-06	4.9E-02	4.8E+01	2.0E-01	1.6E+00	3.4E-04	4.8E-01	2.1E-01	0.0E+01
Pinedale Liquids Facility																											
EGEN-1	Backup Generator	2200 hp Cummins KTA50-G9	8.37	10.31	1.21	0.01	0.49	627.76	0.03	0.01	629.87			9.7E-05	3.0E-05	3.0E-03				2.5E-02			8.2E-04	1.1E-03	7.4E-04	3.1E-02
H-3	Ethylene Glycol Heater	8.50 MMBtu/hr	3.65	3.07	0.20	0.02	0.28	4351.78	0.08	0.01	4356.05					7.7E-05		4.4E-06		2.7E-03	6.6E-02			1.2E-04		0.9E-02
ST-3, ST-4, ST-5	Three Storage Tanks	2-1,000 bbl Water & 1-6,000 bbl Condensate			78.52			1.30	16.65		348.78		0.0E+00			7.4E-01			4.7E-02		1.7E+00			5.1E-01	3.1E-01	3.3E+00
F-1	Flare 1	0.184 MMBtu/hr Low Pressure Flare	0.43	0.15	0.00	0.00	0.01	415.21	8.04	0.00	594.04					1.7E-06		9.5E-07		5.9E-05	1.4E-03			2.7E-06		1.5E-03
F-2	Flare 2 - Proposed	8.141 MMBtu/hr Emergency Flare	0.07	0.06	0.00	0.00	0.00	80.17	1.22	0.00	116.79					1.3E-06		7.2E-07		4.5E-05	1.1E-03			2.1E-06		1.1E-03
H-4	Condensate Bypass Heater	2.00 MMBtu/hr Unknown	0.86	0.72	0.05	0.01	0.07	1023.95	0.02	0.00	1024.95					1.8E-05		1.0E-05		6.4E-04	1.5E-02			2.9E-05		1.6E-02
H-5	Produced Water Tank Heater	0.50 MMBtu/hr Unknown	0.21	0.18	0.01	0.00	0.02	255.99	0.00	0.00	256.24					4.5E-06		2.6E-06		1.6E-04	3.9E-03			7.3E-06		4.0E-03
H-6	Produced Water Tank Heater	0.50 MMBtu/hr Unknown	0.21	0.18	0.01	0.00	0.02	255.99	0.00	0.00	256.24					4.5E-06		2.6E-06		1.6E-04	3.9E-03			7.3E-06		4.0E-03
EL-2	Fugitive Emissions	Liquids Facility Equipment Leaks			19.10			5.65	241.91		5077.46					1.8E-02			1.1E-02					0.0E+00	2.4E-02	5.2E-02
Total Emissions			13.80	14.66	99.11	0.04	0.87	7017.79	267.46	0.02	12644.42	0.0E+00	0.0E+00	9.7E-05	3.0E-05	7.6E-01	0.0E+00	6.1E-05	5.5E-02	2.9E-02	1.8E+00	0.0E+00	8.2E-04	5.1E-01	3.4E-01	3.5E+00
Total Pinedale Complex																											
Total Emissions			138.62	502.17	276.96	0.47	11.04	148762.6	411.0	0.3	157493.4	0.17	0.19	5.37	3.29	1.14	0.14	0.00	0.11	47.74	2.08	1.60	0.00	0.99	0.54	63.35

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet

Source ID Number	E-1		SCC		
Equipment ID	C-1200		Source Location - Zone:	12	
			Horizontal:	597639.64	
Engine Usage	Compressor		Vertical:	4727064.81	
Engine Make	Caterpillar				
Engine Model	G3608SITA				
Serial Number	4WF00217		Potential Operation	8760	hr/yr
Installation Date	8/1/2002		Actual Operation	N/A	hr/yr
Engine Configuration	4 Stroke Lean-Burn				
Emission Controls	Oxidizing Catalyst		Potential Fuel Usage	135.51	MMscf/yr
			Actual Fuel Usage	N/A	MMscf/yr
Design Rating	2370	BHP			
Site Rating	2157	BHP			
Fuel Heating Value (LHV)	976	Btu/scf			
Fuel Heating Value (HHV)	1081	Btu/scf	Stack ID	E-1	
Heat Rate (LHV)	15.10	MMBtu/hr	Stack Height	50	ft
Engine Heat Rate (LHV)	7000	Btu/hp-hr	Stack Diameter	18	in
Engine Heat Rate (HHV)	7751	Btu/hp-hr	Exit Velocity	153.38	ft/s
Potential Operation	8760	hr/yr	Exit Temperature	878	deg F
Potential Fuel Usage	135.51	MMscf/yr	Volume Flow Rate	16263	ft^3/min

Potential Controlled Emissions

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu) (HHV)	(g/hp-hr)	(hp)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	0.14	0.50	2157	8760	2.38	10.41	Permit Limit[1]
CO	0.09	0.30	2157	8760	1.43	6.25	Permit Limit[1]
VOC	0.17	0.60	2157	8760	2.85	12.50	Permit Limit[1]
SO_2	5.88E-04	2.07E-03	2157	8760	0.01	0.04	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	2157	8760	0.167	0.731	AP-42[2]
1,3-Butadiene	6.41E-05	2.25E-04	2157	8760	1.07E-03	4.69E-03	76% Control[3]
2,2,4-Trimethylpentane	6.00E-05	2.11E-04	2157	8760	1.00E-03	4.39E-03	76% Control[3]
Acetaldehyde	2.01E-03	7.05E-03	2157	8760	3.35E-02	1.47E-01	76% Control[3]
Acrolein	1.23E-03	4.34E-03	2157	8760	2.06E-02	9.03E-02	76% Control[3]
Benzene	1.06E-04	3.71E-04	2157	8760	1.77E-03	7.73E-03	76% Control[3]
Biphenyl	5.09E-05	1.79E-04	2157	8760	8.51E-04	3.73E-03	76% Control[3]
Ethylbenzene	9.53E-06	3.35E-05	2157	8760	1.59E-04	6.98E-04	76% Control[3]
Formaldehyde	1.71E-02	0.06	2157	8760	2.85E-01	1.25E+00	Permit Limit[1]
Methanol	6.00E-04	2.11E-03	2157	8760	1.00E-02	4.39E-02	76% Control[3]
n-Hexane	2.66E-05	9.37E-05	2157	8760	4.45E-04	1.95E-03	76% Control[3]
Toluene	9.79E-05	3.44E-04	2157	8760	1.64E-03	7.17E-03	76% Control[3]
Xylene	4.42E-05	1.55E-04	2157	8760	0.001	0.003	76% Control[3]
CO_2	116.89	4.11E+02	2157	8760	1954.38	8560.17	Subpart C[4]
CH_4	0.0022	7.75E-03	2157	8760	0.037	0.161	Subpart C[4]
N_2O	0.0002	7.75E-04	2157	8760	0.004	0.016	Subpart C[4]
CO_2e	--	--	2157	8760	1956.44	8569.21	Subpart A[5]

[1] Requested permit limits

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] A control efficiency of 76% was assumed for organic HAPs.

[4] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[5] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet E-1 Cont.

Potential Uncontrolled Emissions

Pollutant	Emission Factor		Nominal	Hrs of	Estimated Emissions		Source of
	(lb/MMBtu) (HHV)	(g/hp-hr)	Rating (hp)	Operation (hrs/yr)	(lb/hr)	(tpy)	Emission Factor
NOx	0.14	0.50	2157	8760	2.38	10.41	Manufacturer[1]
CO	0.71	2.50	2157	8760	11.89	52.07	Manufacturer[1]
VOC	0.23	0.80	2157	8760	3.80	16.66	Manufacturer[1]
SO_2	5.88E-04	2.07E-03	2157	8760	0.01	0.04	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	2157	8760	0.167	0.731	AP-42[2]
1,3-Butadiene	2.67E-04	9.39E-04	2157	8760	4.46E-03	1.96E-02	AP-42[2]
2,2,4-Trimethylpentane	2.50E-04	8.79E-04	2157	8760	4.18E-03	1.83E-02	AP-42[2]
Acetaldehyde	8.36E-03	2.94E-02	2157	8760	1.40E-01	6.12E-01	AP-42[2]
Acrolein	5.14E-03	1.81E-02	2157	8760	8.59E-02	3.76E-01	AP-42[2]
Benzene	4.40E-04	1.55E-03	2157	8760	7.36E-03	3.22E-02	AP-42[2]
Biphenyl	2.12E-04	7.45E-04	2157	8760	3.54E-03	1.55E-02	AP-42[2]
Ethylbenzene	3.97E-05	1.40E-04	2157	8760	6.64E-04	2.91E-03	AP-42[2]
Formaldehyde	0.07	0.26	2157	8760	1.24E+00	5.42E+00	Manufacturer[1]
Methanol	2.50E-03	8.79E-03	2157	8760	4.18E-02	1.83E-01	AP-42[2]
n-Hexane	1.11E-04	3.90E-04	2157	8760	1.86E-03	8.13E-03	AP-42[2]
Toluene	4.08E-04	1.43E-03	2157	8760	6.82E-03	2.99E-02	AP-42[2]
Xylene	1.84E-04	6.47E-04	2157	8760	3.08E-03	1.35E-02	AP-42[2]
CO_2	116.89	4.11E+02	2157	8760	1954.38	8560.17	Subpart C[3]
CH_4	0.0022	7.75E-03	2157	8760	0.037	0.161	Subpart C[3]
N_2O	0.0002	7.75E-04	2157	8760	0.004	0.016	Subpart C[3]
CO_2e	--	--	2157	8760	1956.44	8569.21	Subpart A[4]

[1] Caterpillar G3608 engine specification, TMI reference number DM5561-00, 2003 and TMI reference number DM5561-04-001, 2012.

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[4] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet

Source ID Number	E-2		SCC		
Equipment ID	C-1201		Source Location - Zone:	12	
			Horizontal:	597645.10	
Engine Usage	Compressor		Vertical:	4727054.97	
Engine Make	Caterpillar				
Engine Model	G3608SITA				
Serial Number	4WF00216		Potential Operation	8760	hr/yr
Installation Date	8/17/2002		Actual Operation	N/A	hr/yr
Engine Configuration	4 Stroke Lean-Burn				
Emission Controls	Oxidizing Catalyst		Potential Fuel Usage	135.51	MMscf/yr
			Actual Fuel Usage	N/A	MMscf/yr
Design Rating	2370	BHP			
Site Rating	2157	BHP			
Fuel Heating Value (LHV)	976	Btu/scf			
Fuel Heating Value (HHV)	1081	Btu/scf	Stack ID	E-2	
Heat Rate (LHV)	15.10	MMBtu/hr	Stack Height	50	ft
Engine Heat Rate (LHV)	7000	Btu/hp-hr	Stack Diameter	18	in
Engine Heat Rate (HHV)	7751	Btu/hp-hr	Exit Velocity	153.38	ft/s
Potential Operation	8760	hr/yr	Exit Temperature	878	deg F
Potential Fuel Usage	135.51	MMscf/yr	Volume Flow Rate	16263	ft^3/min

Potential Controlled Emissions

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu) (HHV)	(g/hp-hr)	(hp)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	0.14	0.50	2157	8760	2.38	10.41	Permit Limit[1]
CO	0.09	0.30	2157	8760	1.43	6.25	Permit Limit[1]
VOC	0.17	0.60	2157	8760	2.85	12.50	Permit Limit[1]
SO_2	5.88E-04	2.07E-03	2157	8760	0.01	0.04	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	2157	8760	0.167	0.731	AP-42[2]
1,3-Butadiene	6.41E-05	2.25E-04	2157	8760	1.07E-03	4.69E-03	76% Control[3]
2,2,4-Trimethylpentane	6.00E-05	2.11E-04	2157	8760	1.00E-03	4.39E-03	76% Control[3]
Acetaldehyde	2.01E-03	7.05E-03	2157	8760	3.35E-02	1.47E-01	76% Control[3]
Acrolein	1.23E-03	4.34E-03	2157	8760	2.06E-02	9.03E-02	76% Control[3]
Benzene	1.06E-04	3.71E-04	2157	8760	1.77E-03	7.73E-03	76% Control[3]
Biphenyl	5.09E-05	1.79E-04	2157	8760	8.51E-04	3.73E-03	76% Control[3]
Ethylbenzene	9.53E-06	3.35E-05	2157	8760	1.59E-04	6.98E-04	76% Control[3]
Formaldehyde	1.71E-02	0.06	2157	8760	2.85E-01	1.25E+00	Permit Limit[1]
Methanol	6.00E-04	2.11E-03	2157	8760	1.00E-02	4.39E-02	76% Control[3]
n-Hexane	2.66E-05	9.37E-05	2157	8760	4.45E-04	1.95E-03	76% Control[3]
Toluene	9.79E-05	3.44E-04	2157	8760	1.64E-03	7.17E-03	76% Control[3]
Xylene	4.42E-05	1.55E-04	2157	8760	7.38E-04	3.23E-03	76% Control[3]
CO_2	116.89	4.11E+02	2157	8760	1954.38	8560.17	Subpart C[4]
CH_4	0.0022	7.75E-03	2157	8760	0.037	0.161	Subpart C[4]
N_2O	0.0002	7.75E-04	2157	8760	0.004	0.016	Subpart C[4]
CO_2e	--	--	2157	8760	1956.44	8569.21	Subpart A[5]

[1] Requested permit limits

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] A control efficiency of 76% was assumed for organic HAPs.

[4] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[5] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet E-2 Cont.

Potential Uncontrolled Emissions

Pollutant	Emission Factor		Nominal	Hrs of	Estimated Emissions		Source of
	(lb/MMBtu) (HHV)	(g/hp-hr)	Rating (hp)	Operation (hrs/yr)	(lb/hr)	(tpy)	Emission Factor
NOx	0.14	0.50	2157	8760	2.38	10.41	Manufacturer[1]
CO	0.71	2.50	2157	8760	11.89	52.07	Manufacturer[1]
VOC	0.23	0.80	2157	8760	3.80	16.66	Manufacturer[1]
SO_2	5.88E-04	2.07E-03	2157	8760	0.01	0.04	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	2157	8760	0.167	0.731	AP-42[2]
1,3-Butadiene	2.67E-04	9.39E-04	2157	8760	4.46E-03	1.96E-02	AP-42[2]
2,2,4-Trimethylpentane	2.50E-04	8.79E-04	2157	8760	4.18E-03	1.83E-02	AP-42[2]
Acetaldehyde	8.36E-03	2.94E-02	2157	8760	1.40E-01	6.12E-01	AP-42[2]
Acrolein	5.14E-03	1.81E-02	2157	8760	8.59E-02	3.76E-01	AP-42[2]
Benzene	4.40E-04	1.55E-03	2157	8760	7.36E-03	3.22E-02	AP-42[2]
Biphenyl	2.12E-04	7.45E-04	2157	8760	3.54E-03	1.55E-02	AP-42[2]
Ethylbenzene	3.97E-05	1.40E-04	2157	8760	6.64E-04	2.91E-03	AP-42[2]
Formaldehyde	0.07	0.26	2157	8760	1.24E+00	5.42E+00	Manufacturer[1]
Methanol	2.50E-03	8.79E-03	2157	8760	4.18E-02	1.83E-01	AP-42[2]
n-Hexane	1.11E-04	3.90E-04	2157	8760	1.86E-03	8.13E-03	AP-42[2]
Toluene	4.08E-04	1.43E-03	2157	8760	6.82E-03	2.99E-02	AP-42[2]
Xylene	1.84E-04	6.47E-04	2157	8760	3.08E-03	1.35E-02	AP-42[2]
CO_2	116.89	4.11E+02	2157	8760	1954.38	8560.17	Subpart C[3]
CH_4	0.0022	7.75E-03	2157	8760	0.037	0.161	Subpart C[3]
N_2O	0.0002	7.75E-04	2157	8760	0.004	0.016	Subpart C[3]
CO_2e	--	--	2157	8760	1956.44	8569.21	Subpart A[4]

[1] Caterpillar G3608 engine specification, TMI reference number DM5561-00, 2003 and TMI reference number DM5561-04-001, 2012.

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[4] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet

Source ID Number	E-3		SCC		
Equipment ID	C-1202		Source Location - Zone:	12	
			Horizontal:	597658.74	
Engine Usage	Compressor		Vertical:	4727030.35	
Engine Make	Caterpillar				
Engine Model	G3616SITA				
Serial Number	BLB00207		Potential Operation	8760	hr/yr
Installation Date	10/10/2003		Actual Operation	N/A	hr/yr
Engine Configuration	4 Stroke Lean-Burn				
Emission Controls	Oxidizing Catalyst		Potential Fuel Usage	228.05	MMscf/yr
			Actual Fuel Usage	N/A	MMscf/yr
Design Rating	4735	BHP			
Site Rating	3797	BHP			
Fuel Heating Value (LHV)	976	Btu/scf			
Fuel Heating Value (HHV)	1081	Btu/scf	Stack ID	E-3	
Heat Rate (LHV)	26.58	MMBtu/hr	Stack Height	50	ft
Engine Heat Rate (LHV)	7000	Btu/hp-hr	Stack Diameter	18	in
Engine Heat Rate (HHV)	7751	Btu/hp-hr	Exit Velocity	304.97	ft/s
Potential Operation [4]	8375	hr/yr	Exit Temperature	876	deg F
Potential Fuel Usage	228.05	MMscf/yr	Volume Flow Rate	32336	ft^3/min

Potential Controlled Emissions

Pollutant	Emission Factor (lb/MMBtu) (HHV)	Emission Factor (g/hp-hr)	Nominal Rating (hp)	Hrs of Operation (hrs/yr)[4]	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)	Source of Emission Factor
NOx	0.14	0.50	3797	8375	4.19	17.53	Permit Limit[1]
CO	0.07	0.25	3797	8375	2.09	8.76	Permit Limit[1]
VOC	0.14	0.50	3797	8375	4.19	17.53	Permit Limit[1]
SO_2	5.88E-04	2.07E-03	3797	8375	0.02	0.07	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	3797	8375	0.294	1.231	AP-42[2]
1,3-Butadiene	6.41E-05	2.25E-04	3797	8375	1.89E-03	7.90E-03	76% Control[3]
2,2,4-Trimethylpentane	6.00E-05	2.11E-04	3797	8375	1.77E-03	7.39E-03	76% Control[3]
Acetaldehyde	2.01E-03	7.05E-03	3797	8375	5.91E-02	2.47E-01	76% Control[3]
Acrolein	1.23E-03	4.34E-03	3797	8375	3.63E-02	1.52E-01	76% Control[3]
Benzene	1.06E-04	3.71E-04	3797	8375	3.11E-03	1.30E-02	76% Control[3]
Biphenyl	5.09E-05	1.79E-04	3797	8375	1.50E-03	6.27E-03	76% Control[3]
Ethylbenzene	9.53E-06	3.35E-05	3797	8375	2.80E-04	1.17E-03	76% Control[3]
Formaldehyde	1.28E-02	0.045	3797	8375	3.77E-01	1.58E+00	Permit Limit[1]
Methanol	6.00E-04	2.11E-03	3797	8375	1.77E-02	7.39E-02	76% Control[3]
n-Hexane	2.66E-05	9.37E-05	3797	8375	7.84E-04	3.28E-03	76% Control[3]
Toluene	9.79E-05	3.44E-04	3797	8375	2.88E-03	1.21E-02	76% Control[3]
Xylene	4.42E-05	1.55E-04	3797	8375	1.30E-03	5.44E-03	76% Control[3]
CO_2	116.89	4.11E+02	3797	8375	3440.32	14406.33	Subpart C[5]
CH_4	0.0022	7.75E-03	3797	8375	0.065	0.272	Subpart C[5]
N_2O	0.0002	7.75E-04	3797	8375	0.006	0.027	Subpart C[5]
CO_2e	--	--	3797	8375	3443.95	14421.55	Subpart A[6]

[1] Requested permit limits

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] Control efficiency of 76% was assumed for organic HAPs.

[4] Requesting a combined annual operational hour limit of 33,500 hours for the four (4) Cat 3616 engines (E3 - E6). For these calculations, the hours are divided evenly; each engine is assumed to operate 8,375 operating hours per year.

[5] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[6] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet E-3 Cont.

Potential Uncontrolled Emissions

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu) (HHV)	(g/hp-hr)	(hp)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	0.14	0.50	3797	8375	4.19	17.53	Manufacturer[1]
CO	0.71	2.50	3797	8375	20.93	87.63	Manufacturer[1]
VOC	0.23	0.80	3797	8375	6.70	28.04	Manufacturer[1]
SO_2	5.88E-04	2.07E-03	3797	8375	0.02	0.07	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	3797	8375	0.294	1.231	AP-42[2]
1,3-Butadiene	2.67E-04	9.39E-04	3797	8375	7.86E-03	3.29E-02	AP-42[2]
2,2,4-Trimethylpentane	2.50E-04	8.79E-04	3797	8375	7.36E-03	3.08E-02	AP-42[2]
Acetaldehyde	8.36E-03	2.94E-02	3797	8375	2.46E-01	1.03E+00	AP-42[2]
Acrolein	5.14E-03	1.81E-02	3797	8375	1.51E-01	6.33E-01	AP-42[2]
Benzene	4.40E-04	1.55E-03	3797	8375	1.30E-02	5.42E-02	AP-42[2]
Biphenyl	2.12E-04	7.45E-04	3797	8375	6.24E-03	2.61E-02	AP-42[2]
Ethylbenzene	3.97E-05	1.40E-04	3797	8375	1.17E-03	4.89E-03	AP-42[2]
Formaldehyde	0.07	0.26	3797	8375	2.18E+00	9.11E+00	Manufacturer[1]
Methanol	2.50E-03	8.79E-03	3797	8375	7.36E-02	3.08E-01	AP-42[2]
n-Hexane	1.11E-04	3.90E-04	3797	8375	3.27E-03	1.37E-02	AP-42[2]
Toluene	4.08E-04	1.43E-03	3797	8375	1.20E-02	5.03E-02	AP-42[2]
Xylene	1.84E-04	6.47E-04	3797	8375	5.42E-03	2.27E-02	AP-42[2]
CO_2	116.89	4.11E+02	3797	8375	3440.32	14406.33	Subpart C[3]
CH_4	0.0022	7.75E-03	3797	8375	0.065	0.272	Subpart C[3]
N_2O	0.0002	7.75E-04	3797	8375	0.006	0.027	Subpart C[3]
CO_2e	--	--	3797	8375	3443.95	14421.55	Subpart A[4]

[1] Caterpillar G3616 engine specification, TMI reference number DM5563-00, 2003 and TMI reference number DM5563-04-001, 2012.

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[4] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet

Source ID Number	E-4		SCC			
Equipment ID	C-1203		Source Location - Zone:	12		
			Horizontal:	597664.20		
Engine Usage	Compressor		Vertical:	4727020.51		
Engine Make	Caterpillar					
Engine Model	G3616SITA					
Serial Number	4CG00166		Potential Operation	8760	hr/yr	
Installation Date	7/1/2004		Actual Operation	N/A	hr/yr	
Engine Configuration	4 Stroke Lean-Burn					
Emission Controls	Oxidizing Catalyst		Potential Fuel Usage	228.05	MMscf/yr	
			Actual Fuel Usage	N/A	MMscf/yr	
Design Rating	4735	BHP				
Site Rating	3797	BHP				
Fuel Heating Value (LHV)	976	Btu/scf				
Fuel Heating Value (HHV)	1081	Btu/scf	Stack ID	E-4		
Heat Rate (LHV)	26.58	MMBtu/hr	Stack Height	50	ft	
Engine Heat Rate (LHV)	7000	Btu/hp-hr	Stack Diameter	18	in	
Engine Heat Rate (HHV)	7751	Btu/hp-hr	Exit Velocity	304.97	ft/s	
Potential Operation [4]	8375	hr/yr	Exit Temperature	876	deg F	
Potential Fuel Usage	228.05	MMscf/yr	Volume Flow Rate	32336	ft^3/min	

Potential Controlled Emissions

Pollutant	Emission Factor (lb/MMBtu) (HHV)	Emission Factor (g/hp-hr)	Nominal Rating (hp)	Hrs of Operation (hrs/yr)[4]	Estimated Emissions (lb/hr)	Estimated Emissions (tpy)	Source of Emission Factor
NOx	0.14	0.50	3797	8375	4.19	17.53	Permit Limit[1]
CO	0.07	0.25	3797	8375	2.09	8.76	Permit Limit[1]
VOC	0.14	0.50	3797	8375	4.19	17.53	Permit Limit[1]
SO_2	5.88E-04	2.07E-03	3797	8375	0.02	0.07	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	3797	8375	0.294	1.231	AP-42[2]
1,3-Butadiene	6.41E-05	2.25E-04	3797	8375	1.89E-03	7.90E-03	76% Control[3]
2,2,4-Trimethylpentane	6.00E-05	2.11E-04	3797	8375	1.77E-03	7.39E-03	76% Control[3]
Acetaldehyde	2.01E-03	7.05E-03	3797	8375	5.91E-02	2.47E-01	76% Control[3]
Acrolein	1.23E-03	4.34E-03	3797	8375	3.63E-02	1.52E-01	76% Control[3]
Benzene	1.06E-04	3.71E-04	3797	8375	3.11E-03	1.30E-02	76% Control[3]
Biphenyl	5.09E-05	1.79E-04	3797	8375	1.50E-03	6.27E-03	76% Control[3]
Ethylbenzene	9.53E-06	3.35E-05	3797	8375	2.80E-04	1.17E-03	76% Control[3]
Formaldehyde	1.28E-02	0.045	3797	8375	3.77E-01	1.58E+00	Permit Limit[1]
Methanol	6.00E-04	2.11E-03	3797	8375	1.77E-02	7.39E-02	76% Control[3]
n-Hexane	2.66E-05	9.37E-05	3797	8375	7.84E-04	3.28E-03	76% Control[3]
Toluene	9.79E-05	3.44E-04	3797	8375	2.88E-03	1.21E-02	76% Control[3]
Xylene	4.42E-05	1.55E-04	3797	8375	1.30E-03	5.44E-03	76% Control[3]
CO_2	116.89	4.11E+02	3797	8375	3440.32	14406.33	Subpart C[5]
CH_4	0.0022	7.75E-03	3797	8375	0.065	0.272	Subpart C[5]
N_2O	0.0002	7.75E-04	3797	8375	0.006	0.027	Subpart C[5]
CO_2e	--	--	3797	8375	3443.95	14421.55	Subpart A[6]

[1] Requested permit limits

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] Control efficiency of 76% was assumed for organic HAPs.

[4] Requesting a combined annual operational hour limit of 33,500 hours for the four (4) Cat 3616 engines (E3 - E6). For these calculations, the hours are divided evenly; each engine is assumed to operate 8,375 operating hours per year.

[5] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[6] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet E-4 Cont.

Potential Uncontrolled Emissions

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu) (HHV)	(g/hp-hr)	(hp)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	0.14	0.50	3797	8375	4.19	17.53	Manufacturer[1]
CO	0.71	2.50	3797	8375	20.93	87.63	Manufacturer[1]
VOC	0.23	0.80	3797	8375	6.70	28.04	Manufacturer[1]
SO_2	5.88E-04	2.07E-03	3797	8375	0.02	0.07	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	3797	8375	0.294	1.231	AP-42[2]
1,3-Butadiene	2.67E-04	9.39E-04	3797	8375	7.86E-03	3.29E-02	AP-42[2]
2,2,4-Trimethylpentane	2.50E-04	8.79E-04	3797	8375	7.36E-03	3.08E-02	AP-42[2]
Acetaldehyde	8.36E-03	2.94E-02	3797	8375	2.46E-01	1.03E+00	AP-42[2]
Acrolein	5.14E-03	1.81E-02	3797	8375	1.51E-01	6.33E-01	AP-42[2]
Benzene	4.40E-04	1.55E-03	3797	8375	1.30E-02	5.42E-02	AP-42[2]
Biphenyl	2.12E-04	7.45E-04	3797	8375	6.24E-03	2.61E-02	AP-42[2]
Ethylbenzene	3.97E-05	1.40E-04	3797	8375	1.17E-03	4.89E-03	AP-42[2]
Formaldehyde	0.07	0.26	3797	8375	2.18E+00	9.11E+00	Manufacturer[1]
Methanol	2.50E-03	8.79E-03	3797	8375	7.36E-02	3.08E-01	AP-42[2]
n-Hexane	1.11E-04	3.90E-04	3797	8375	3.27E-03	1.37E-02	AP-42[2]
Toluene	4.08E-04	1.43E-03	3797	8375	1.20E-02	5.03E-02	AP-42[2]
Xylene	1.84E-04	6.47E-04	3797	8375	5.42E-03	2.27E-02	AP-42[2]
CO_2	116.89	4.11E+02	3797	8375	3440.32	14406.33	Subpart C[3]
CH_4	0.0022	7.75E-03	3797	8375	0.065	0.272	Subpart C[3]
N_2O	0.0002	7.75E-04	3797	8375	0.006	0.027	Subpart C[3]
CO_2e	--	--	3797	8375	3443.95	14421.55	Subpart A[4]

[1] Caterpillar G3616 engine specification, TMI reference number DM5563-00, 2003 and TMI reference number DM5563-04-001, 2012.

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[4] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet

Source ID Number	E-5		SCC		
Equipment ID	C-1204		Source Location - Zone:	12	
			Horizontal:	597537.90	
Engine Usage	Compressor		Vertical:	4727146.78	
Engine Make	Caterpillar				
Engine Model	G3616SITA				
Serial Number	BLB00309		Potential Operation	8760	hr/yr
Installation Date	10/17/2006		Actual Operation	N/A	hr/yr
Engine Configuration	4 Stroke Lean-Burn				
Emission Controls	Oxidizing Catalyst		Potential Fuel Usage	228.05	MMscf/yr
			Actual Fuel Usage	N/A	MMscf/yr
Design Rating	4735	BHP			
Site Rating	3797	BHP			
Fuel Heating Value (LHV)	976	Btu/scf			
Fuel Heating Value (HHV)	1081	Btu/scf	Stack ID	E-5	
Heat Rate (LHV)	26.58	MMBtu/hr	Stack Height	50	ft
Engine Heat Rate (LHV)	7000	Btu/hp-hr	Stack Diameter	18	in
Engine Heat Rate (HHV)	7751	Btu/hp-hr	Exit Velocity	305.26	ft/s
Potential Operation[4]	8375	hr/yr	Exit Temperature	876	deg F
Potential Fuel Usage	228.05	MMscf/yr	Volume Flow Rate	32366	ft^3/min

Potential Controlled Emissions

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu) (HHV)	(g/hp-hr)	(hp)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	0.14	0.50	3797	8375	4.19	17.53	Permit Limit[1]
CO	0.07	0.25	3797	8375	2.09	8.76	Permit Limit[1]
VOC	0.14	0.50	3797	8375	4.19	17.53	Permit Limit[1]
SO_2	5.88E-04	2.07E-03	3797	8375	0.02	0.07	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	3797	8375	0.294	1.231	AP-42[2]
1,3-Butadiene	6.41E-05	2.25E-04	3797	8375	1.89E-03	7.90E-03	76% Control[3]
2,2,4-Trimethylpentane	6.00E-05	2.11E-04	3797	8375	1.77E-03	7.39E-03	76% Control[3]
Acetaldehyde	2.01E-03	7.05E-03	3797	8375	5.91E-02	2.47E-01	76% Control[3]
Acrolein	1.23E-03	4.34E-03	3797	8375	3.63E-02	1.52E-01	76% Control[3]
Benzene	1.06E-04	3.71E-04	3797	8375	3.11E-03	1.30E-02	76% Control[3]
Biphenyl	5.09E-05	1.79E-04	3797	8375	1.50E-03	6.27E-03	76% Control[3]
Ethylbenzene	9.53E-06	3.35E-05	3797	8375	2.80E-04	1.17E-03	76% Control[3]
Formaldehyde	1.28E-02	0.045	3797	8375	3.77E-01	1.58E+00	Permit Limit[1]
Methanol	6.00E-04	2.11E-03	3797	8375	1.77E-02	7.39E-02	76% Control[3]
n-Hexane	2.66E-05	9.37E-05	3797	8375	7.84E-04	3.28E-03	76% Control[3]
Toluene	9.79E-05	3.44E-04	3797	8375	2.88E-03	1.21E-02	76% Control[3]
Xylene	4.42E-05	1.55E-04	3797	8375	1.30E-03	5.44E-03	76% Control[3]
CO_2	116.89	4.11E+02	3797	8375	3440.32	14406.33	Subpart C[5]
CH_4	0.0022	7.75E-03	3797	8375	0.065	0.272	Subpart C[5]
N_2O	0.0002	7.75E-04	3797	8375	0.006	0.027	Subpart C[5]
CO_2e	--	--	3797	8375	3443.95	14421.55	Subpart A[6]

[1] Requested permit limits

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] Control efficiency of 76% was assumed for organic HAPs.

[4] Requesting a combined annual operational hour limit of 33,500 hours for the four (4) Cat 3616 engines (E3 - E6). For these calculations, the hours are divided evenly; each engine is assumed to operate 8,375 operating hours per year.

[5] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[6] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet E-5 Cont.

Potential Uncontrolled Emissions

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu) (HHV)	(g/hp-hr)	(hp)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	0.14	0.50	3797	8375	4.19	17.53	Manufacturer[1]
CO	0.71	2.50	3797	8375	20.93	87.63	Manufacturer[1]
VOC	0.23	0.80	3797	8375	6.70	28.04	Manufacturer[1]
SO_2	5.88E-04	2.07E-03	3797	8375	0.02	0.07	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	3797	8375	0.294	1.231	AP-42[2]
1,3-Butadiene	2.67E-04	9.39E-04	3797	8375	7.86E-03	3.29E-02	AP-42[2]
2,2,4-Trimethylpentane	2.50E-04	8.79E-04	3797	8375	7.36E-03	3.08E-02	AP-42[2]
Acetaldehyde	8.36E-03	2.94E-02	3797	8375	2.46E-01	1.03E+00	AP-42[2]
Acrolein	5.14E-03	1.81E-02	3797	8375	1.51E-01	6.33E-01	AP-42[2]
Benzene	4.40E-04	1.55E-03	3797	8375	1.30E-02	5.42E-02	AP-42[2]
Biphenyl	2.12E-04	7.45E-04	3797	8375	6.24E-03	2.61E-02	AP-42[2]
Ethylbenzene	3.97E-05	1.40E-04	3797	8375	1.17E-03	4.89E-03	AP-42[2]
Formaldehyde	0.07	0.26	3797	8375	2.18E+00	9.11E+00	Manufacturer[1]
Methanol	2.50E-03	8.79E-03	3797	8375	7.36E-02	3.08E-01	AP-42[2]
n-Hexane	1.11E-04	3.90E-04	3797	8375	3.27E-03	1.37E-02	AP-42[2]
Toluene	4.08E-04	1.43E-03	3797	8375	1.20E-02	5.03E-02	AP-42[2]
Xylene	1.84E-04	6.47E-04	3797	8375	5.42E-03	2.27E-02	AP-42[2]
CO_2	116.89	4.11E+02	3797	8375	3440.32	14406.33	Subpart C[3]
CH_4	0.0022	7.75E-03	3797	8375	0.065	0.272	Subpart C[3]
N_2O	0.0002	7.75E-04	3797	8375	0.006	0.027	Subpart C[3]
CO_2e	--	--	3797	8375	3443.95	14421.55	Subpart A[4]

[1] Caterpillar G3616 engine specification, TMI reference number DM5563-00, 2003 and TMI reference number DM5563-04-001, 2012.

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[4] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet

Source ID Number	E-6		SCC			
Equipment ID	C-1205		Source Location - Zone:	12		
			Horizontal:	597548.98		
Engine Usage	Compressor		Vertical:	4727152.92		
Engine Make	Caterpillar					
Engine Model	G3616SITA					
Serial Number	BLB00308		Potential Operation	8760	hr/yr	
Installation Date	10/17/2006		Actual Operation	N/A	hr/yr	
Engine Configuration	4 Stroke Lean-Burn					
Emission Controls	Oxidizing Catalyst		Potential Fuel Usage	223.42	MMscf/yr	
			Actual Fuel Usage	N/A	MMscf/yr	
Design Rating	4735	BHP				
Site Rating	3720	BHP				
Fuel Heating Value (LHV)	976	Btu/scf				
Fuel Heating Value (HHV)	1081	Btu/scf	Stack ID	E-6		
Heat Rate (LHV)	26.04	MMBtu/hr	Stack Height	50	ft	
Engine Heat Rate (LHV)	7000	Btu/hp-hr	Stack Diameter	18	in	
Engine Heat Rate (HHV)	7751	Btu/hp-hr	Exit Velocity	305.26	ft/s	
Potential Operation[4]	8375	hr/yr	Exit Temperature	876	deg F	
Potential Fuel Usage	223.42	MMscf/yr	Volume Flow Rate	32366	ft^3/min	

Potential Controlled Emissions

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu) (HHV)	(g/hp-hr)	(hp)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	0.14	0.50	3720	8375	4.10	17.17	Permit Limit[1]
CO	0.07	0.25	3720	8375	2.05	8.59	Permit Limit[1]
VOC	0.14	0.50	3720	8375	4.10	17.17	Permit Limit[1]
SO_2	5.88E-04	2.07E-03	3720	8375	0.02	0.07	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	3720	8375	0.288	1.206	AP-42[2]
1,3-Butadiene	6.41E-05	2.25E-04	3720	8375	1.85E-03	7.74E-03	76% Control[3]
2,2,4-Trimethylpentane	6.00E-05	2.11E-04	3720	8375	1.73E-03	7.24E-03	76% Control[3]
Acetaldehyde	2.01E-03	7.05E-03	3720	8375	5.79E-02	2.42E-01	76% Control[3]
Acrolein	1.23E-03	4.34E-03	3720	8375	3.56E-02	1.49E-01	76% Control[3]
Benzene	1.06E-04	3.71E-04	3720	8375	3.05E-03	1.28E-02	76% Control[3]
Biphenyl	5.09E-05	1.79E-04	3720	8375	1.47E-03	6.14E-03	76% Control[3]
Ethylbenzene	9.53E-06	3.35E-05	3720	8375	2.75E-04	1.15E-03	76% Control[3]
Formaldehyde	7.39E-03	0.045	3720	8375	3.69E-01	1.55E+00	Permit Limit[1]
Methanol	6.00E-04	2.11E-03	3720	8375	1.73E-02	7.24E-02	76% Control[3]
n-Hexane	2.66E-05	9.37E-05	3720	8375	7.68E-04	3.22E-03	76% Control[3]
Toluene	9.79E-05	3.44E-04	3720	8375	2.82E-03	1.18E-02	76% Control[3]
Xylene	4.42E-05	1.55E-04	3720	8375	1.27E-03	5.33E-03	76% Control[3]
CO_2	116.89	4.11E+02	3720	8375	3370.55	14114.18	Subpart C[5]
CH_4	0.0022	7.75E-03	3720	8375	0.064	0.266	Subpart C[5]
N_2O	0.0002	7.75E-04	3720	8375	0.006	0.027	Subpart C[5]
CO_2e	--	--	3720	8375	3374.11	14129.09	Subpart A[6]

[1] Requested permit limits

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] Control efficiency of 76% was assumed for organic HAPs.

[4] Requesting a combined annual operational hour limit of 33,500 hours for the four (4) Cat 3616 engines (E3 - E6). For these calculations, the hours are divided evenly; each engine is assumed to operate 8,375 operating hours per year.

[5] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[6] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Gobblers Knob Compressor Station
Engine Detail Sheet E-6 Cont.

Potential Uncontrolled Emissions

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu) (HHV)	(g/hp-hr)	(hp)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	0.14	0.50	3720	8375	4.10	17.17	Manufacturer[1]
CO	0.71	2.50	3720	8375	20.50	85.86	Manufacturer[1]
VOC	0.23	0.80	3720	8375	6.56	27.47	Manufacturer[1]
SO_2	5.88E-04	2.07E-03	3720	8375	0.02	0.07	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	9.99E-03	3.51E-02	3720	8375	0.288	1.206	AP-42[2]
1,3-Butadiene	2.67E-04	9.39E-04	3720	8375	7.70E-03	3.22E-02	AP-42[2]
2,2,4-Trimethylpentane	2.50E-04	8.79E-04	3720	8375	7.21E-03	3.02E-02	AP-42[2]
Acetaldehyde	8.36E-03	2.94E-02	3720	8375	2.41E-01	1.01E+00	AP-42[2]
Acrolein	5.14E-03	1.81E-02	3720	8375	1.48E-01	6.21E-01	AP-42[2]
Benzene	4.40E-04	1.55E-03	3720	8375	1.27E-02	5.31E-02	AP-42[2]
Biphenyl	2.12E-04	7.45E-04	3720	8375	6.11E-03	2.56E-02	AP-42[2]
Ethylbenzene	3.97E-05	1.40E-04	3720	8375	1.14E-03	4.79E-03	AP-42[2]
Formaldehyde	0.07	0.26	3720	8375	2.13E+00	8.93E+00	Manufacturer[1]
Methanol	2.50E-03	8.79E-03	3720	8375	7.21E-02	3.02E-01	AP-42[2]
n-Hexane	1.11E-04	3.90E-04	3720	8375	3.20E-03	1.34E-02	AP-42[2]
Toluene	4.08E-04	1.43E-03	3720	8375	1.18E-02	4.93E-02	AP-42[2]
Xylene	1.84E-04	6.47E-04	3720	8375	5.31E-03	2.22E-02	AP-42[2]
CO_2	116.89	4.11E+02	3720	8375	3370.55	14114.18	Subpart C[3]
CH_4	0.0022	7.75E-03	3720	8375	0.064	0.266	Subpart C[3]
N_2O	0.0002	7.75E-04	3720	8375	0.006	0.027	Subpart C[3]
CO_2e	--	--	3720	8375	3374.11	14129.09	Subpart A[4]

[1] Caterpillar G3616 engine specification, TMI reference number DM5563-00, 2003 and TMI reference number DM5563-04-001, 2012.

[2] EPA AP-42, Volume I, Fifth Edition - August 2000, Table 3.2-2, Uncontrolled Emission Factors for 4-Stroke Lean-Burn Engines. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so PM = PM_{10} = $PM_{2.5}$.

[3] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[4] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Pinedale Liquid Facility
Flare Detail Sheet

Source ID Number	F-2		SCC		
Equipment ID	Flare 2 - Proposed		Source Location - Zone:	12	
			Horizontal:	597598.11	
Equipment Usage	Emergency Flare		Vertical:	4727325.72	
Equipment Make	Unknown				
Equipment Model	Unknown		Potential Operation	8760	hr/yr
Serial Number	Unknown		Actual Operation	N/A	hr/yr
Installation Date	TBD		Potential Fuel Usage	1.14	MMscf/yr
Flare Capacity	1.2	MMSCFD	Actual Fuel Usage	N/A	MMscf/yr
			Stack ID	F-2	
Fuel Heating Value	1081	Btu/scf	Stack Height	TBD	ft
Pilot Flow Rate	130	scf/hr	Stack Diameter	TBD	in
Pilot Flow Rate	1.1388	MMscf/yr	Exit Velocity	TBD	ft/s
Pilot Heat Input	0.14053	MMBtu/hr	Exit Temperature	TBD	deg F
Potential Operation Pilot	8760		Volume Flow Rate	TBD	ft^3/min
Purge Gas Heating Value	1081.00	Btu/scf			
Purge Gas Flow Rate	15.00	scf/hr			
Purge Gas Flow Rate	2.30	MMscf/yr			
Purge Gas Heat Input	0.02	MMBtu/hr			
Potential Operation Purge	8760	hr/yr			

Potential Emissions from Pilot and Igniter

Pollutant	Emission Factor		Nominal Rating	Hrs of Operation	Estimated Emissions		Source of Emission Factor
	(lb/MMscf)	(lb/MMBtu)	(MMBtu/hr)	(hrs/yr)	(lb/hr)	(tpy)	
NOx	100.00	0.10	0.14	8760	0.01	0.06	AP-42[1]
CO	84.00	0.08	0.14	8760	0.01	0.05	AP-42[1]
VOC	5.50	0.01	0.14	8760	0.00	0.00	AP-42[2]
SO_2	0.60	0.00	0.14	8760	0.00	0.00	AP-42[2]
PM, PM_{10}, $PM_{2.5}$	7.60	0.01	0.14	8760	0.00	0.00	AP-42[2]
Benzene	2.1E-03	0.000002	0.14	8760	2.89E-07	1.27E-06	AP-42[3]
Dichlorobenzene	1.2E-03	0.000001	0.14	8760	1.65E-07	7.24E-07	AP-42[3]
Formaldehyde	7.5E-02	0.000074	0.14	8760	1.03E-05	4.53E-05	AP-42[3]
Hexane	1.8E+00	0.001765	0.14	8760	2.48E-04	1.09E-03	AP-42[3]
Toluene	3.4E-03	0.000003	0.14	8760	4.68E-07	2.05E-06	AP-42[3]
CO_2	--	116.89	0.14	8760	1.64E+01	71.95	Subpart C[4]
CH_4	--	0.0022	0.14	8760	3.10E-04	0.001	Subpart C[4]
N_2O	--	0.0002	0.14	8760	3.10E-05	0.000	Subpart C[4]
CO_2e	--	--	--	--	16.44	72.02	Subpart A[5]

[1] EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-1, Emission Factors for Nitrogen Oxides (NOx) and Carbon Monoxide (CO) from Natural Gas Combustion

[2] EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-2, Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion. PM includes both condensible and filterable PM. All PM is assumed to be $PM_{2.5}$, so $PM = PM_{10} = PM_{2.5}$.

[3] EPA AP-42, Volume I, Fifth Edition - July 1998, Table 1.4-3, Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

[4] 40 CFR Part 98, Subpart C, Tables C-1 and C-2.

[5] 40 CFR Part 98, Subpart A, Table A-1, Global Warming Potentials (100-YearTime Horizon).

Pinedale Complex - Pinedale Liquid Facility
Flare Detail Sheet Flare 2 - Proposed Cont.

Potential Emissions from Combustion of Purge Gas

Pollutant	Emission Factor		Nominal Rating	Nominal Rating	Estimated Emissions		Source of Emission Factor
	(lb/MMscf)	(lb/MMBtu)	(MMBtu/hr)	(MMBtu/yr)	(lb/hr)	(tpy)	
NOx	151.3	0.14	0.02	142	0.0023	0.010	C6, S2[1]
CO	37.8	0.035	0.02	142	0.0006	0.00	C6, S2[1]

[1] Oil and Gas Production Facilities Chapter 6, Section 2 Permitting Guidance, September 2013, Emission Calculations, Flares

Potential CO_2 Emissions from Combustion of Purge Gas

Component	Moles Carbon/mole	Fraction of Gas Combusted[2]	Mole Percent of Purge Gas	Standard Vapor Volumetric Flow[3] (SCFD)	Combusted CO_2 Emissions (SCFD)	CO_2 Density[4] (kg/ft^3)	Combusted CO_2 Emissions (tpy)
CO_2	1	1	0.79%	360	2.842E+00	0.0526	6.015E-02
Methane	1	0.98	92.48%	360	3.263E+02	0.0526	6.905E+00
Ethane	2	0.98	4.43%	360	3.127E+01	0.0526	6.618E-01
Propane	3	0.98	1.26%	360	1.333E+01	0.0526	2.821E-01
Isobutane	4	0.98	0.28%	360	3.905E+00	0.0526	8.264E-02
n-butane	4	0.98	0.25%	360	3.525E+00	0.0526	7.460E-02
Pentanes +	5	0.98	0.41%	360	7.296E+00	0.0526	1.544E-01
Component	**Moles Carbon/mole**	**Fraction of Gas Uncombusted[5]**	**Mole Percent of Purge Gas**	**Standard Vapor Volumetric Flow[3] (SCFD)**	**CH_4 Emissions (SCFD)**	**CH_4 Density[6] (kg/ft^3)**	**CH_4 Emissions (tpy)**
Methane	1	0.02	92.48%	360	6.659E+00	0.019	1.222E+00
					Total CO_2		8.22
					Total Methane		1.22
					Total CO_2e		38.76

[2] Using default fraction of 0.98 from 40 CFR Part 98, Subpart W, Equation 21 for all components combusted into CO_2. Assuming all CO_2 in vent gas is released as CO_2.

[3] Standard vapor volumetric flow is based on purge gas flow rate.

[4] Using 0.0526 kg/ft^3 for CO_2 density as specified in 40 CFR Part 98, Subpart W, Equation 36.

[5] Assuming fraction of CH_4 not combusted is released as CH_4.

[6] Using 0.0192 kg/ft^3 for CH_4 density as specified in 40 CFR Part 98, Subpart W, Equation 36.

Total Controlled Potential Emissions from Flare

Pollutant	Estimated Emissions	
	(lb/hr)	(tpy)
NOx	0.0160	0.07
CO	0.0121	0.05
VOC	0.0008	0.0033
SO_2	0.0001	3.62E-04
PM, PM_{10}, $PM_{2.5}$	0.0010	4.59E-03
Benzene	2.89E-07	1.27E-06
Dichlorobenzene	1.65E-07	7.24E-07
Formaldehyde	1.03E-05	4.53E-05
Hexane	2.48E-04	1.09E-03
Toluene	4.68E-07	2.05E-06
CO_2	1.83E+01	8.02E+01
CH_4	2.79E-01	1.22E+00
N_2O	3.10E-05	1.36E-04
CO_2e	2.53E+01	1.11E+02

Attachment C – QEPM's SUBLETTE COUNTY PERMITTED EMISSIONS, April 1, 2008 – PRESENT

SUBLETTE COUNTY PERMITTED EMISSIONS April 1, 2008 - PRESENT

company	field	facility	date of permit application	date of receipt (permit)	permit/waiver / AP #	Equipment Design / Current Actual Emissions (TPY)		Baseline Emissions (TPY)		increase/decrease from baseline emissions (TPY)		VOC Offset Bank	NOx Offset Bank	Reason for Change
						VOC	NO_x	VOC	NO_x	VOC	NO_x			
QEPM	Dry Piney	Dry Piney Compressor Station	6/17/2013	10/7/2013	MD-15150	3.3	2.3	24.3	100.3	-21.0	-98.0	-21.0	-98.0	Replacement of uncontrolled IR 12-SVGA 660 hp engine with Waukesha H24GSI 483 hp engine with AFRC and NSCR
QEPM	Pinedale	Pinedale Complex	2/8/2008	7/31/2008	MD-7332	117.9	138.8	128.4	139.5	-10.5	-0.7	-10.5	-0.7	Installation of turbine
QEPM	Pinedale	Pinedale Complex	3/31/2010	7/16/2010	MD-8682	108.3	139.2	113.0	139.2	-4.7	0.0	-4.7	0.0	Routing condensate to sales line instead of truck loadout
QEPM	Pinedale	Pinedale Complex - Gobblers Knob	11/11/2010	3/2/2011	MD-11378	137.0	139.5	114.1	139.5	22.9	0.0	34.4	0.0	Increase VOC emission limit for four engines
QEPM	Pinedale	Pinedale Complex - Stab Plant	6/30/2010	10/22/2010	MD-10895	1.1	0.3	0.0	0.0	1.1	0.3	1.7	0.3	Route all condensate through ST-3.
QEPM	Pinedale	Mesa 6-16 Pad	12/1/2014			1.6	2.6	1.6	2.6	0	0.0	0.0	0.0	Establish QEPM baseline and current emissions resulting from QEPM and QEPE permit split
QEPM	Pinedale	Mesa 5-8 Pad	12/1/2014			1.5	2.4	1.5	2.4	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 9-8 Pad	12/1/2014			3.2	2.8	3.2	2.8	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 12-8 Pad	12/1/2014			0.5	0.7	0.5	0.7	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 12-16 Pad	12/1/2014			1.0	1.6	1.0	1.6	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 13-16 Pad	12/1/2014			0.5	0.9	0.5	0.9	0	0.0	0.0	0.0	
QEPM	Pinedale	Pinedale Unit 8 Well	12/1/2014			6.6	0.1	6.6	0.1	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 3-21 Pad	12/1/2014			0.4	0.6	0.4	0.6	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 15-9 Pad	12/1/2014			1.3	1.6	1.3	1.6	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 9-16 Pad	12/1/2014			1.8	2.7	1.8	2.7	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 8-17 Pad	12/1/2014			7.3	4.7	7.3	4.7	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 11-7 Pad	12/1/2014			1.7	2.5	1.7	2.5	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 15-16 Pad	12/1/2014			2.4	1.6	2.4	1.6	0	0.0	0.0	0.0	
QEPM	Pinedale	Stewart Point 5-20 Pad	12/1/2014			3.6	2.7	3.6	2.7	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 14-16 Pad	12/1/2014			1.8	0.4	1.8	0.4	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 15-6 Pad	12/1/2014			2.1	0.7	2.1	0.7	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 10-16 Pad	12/1/2014			2.3	1.7	2.3	1.7	0	0.0	0.0	0.0	
QEPM	Pinedale	Stewart Point 1-30 Pad	12/1/2014			1.7	0.5	1.7	0.5	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 6-7 Pad	12/1/2014			3.4	2.9	3.4	2.9	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa Unit 13-05V Well	12/1/2014			10.8	0.1	10.8	0.1	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 1 Pad	12/1/2014			2.0	0.5	2.0	0.5	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa Unit 4-8 Well	12/1/2014			9.1	0.1	9.1	0.1	0	0.0	0.0	0.0	
QEPM	Pinedale	Stewart Point 14-20 Pad	12/1/2014			4.1	2.0	4.1	2.0	0	0.0	0.0	0.0	
QEPM	Pinedale	Stewart Point 7-20 Pad	12/1/2014			5.7	2.8	5.7	2.8	0	0.0	0.0	0.0	
QEPM	Pinedale	Stewart Point 2-20 Pad	12/1/2014			6.4	2.7	6.4	2.7	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 11-16 Pad	12/1/2014			2.7	1.6	2.7	1.6	0	0.0	0.0	0.0	
QEPM	Pinedale	Mesa 7-7 Pad	4/14/2015			1.9	0.6	1.6	0.2	0.3	0.4	0.5	0.4	Establish QEPM baseline and current emissions resulting from QEPM and QEPE permit split
QEPM	Pinedale	Mesa 3-7 Pad	4/14/2015			1.3	2.2	1.6	2.6	-0.3	-0.4	-0.3	-0.4	Establish QEPM baseline and current emissions resulting from QEPM and QEPE permit split
QEPM	Pinedale	Pinedale Complex - Gobblers Knob	6/8/2015			136.0	138.6	137.0	139.5	-1	-0.9	-1.0	-0.9	Proposed lower VOC/NOx emission factors for the Cat 3608s and 3616s engines, increased combined annual hour limitation for the Cat 3616s, increased hp, and flare replacement project
		QEPM TOTAL				592.3	605.0	605.5	704.3	-13.2	-99.3	-1.0	-99.2	

Pinedale Complex - Pinedale Liquid Facility
Flare Detail Sheet Flare 2 - Proposed Cont.

Potential Emissions from Combustion of Purge Gas

Pollutant	Emission Factor		Nominal Rating	Nominal Rating	Estimated Emissions		Source of Emission Factor
	(lb/MMscf)	(lb/MMBtu)	(MMBtu/hr)	(MMBtu/yr)	(lb/hr)	(tpy)	
NOx	151.3	0.14	0.02	142	0.0023	0.010	C6, S2[1]
CO	37.8	0.035	0.02	142	0.0006	0.00	C6, S2[1]

[1] Oil and Gas Production Facilities Chapter 6, Section 2 Permitting Guidance, September 2013, Emission Calculations, Flares

Potential CO_2 Emissions from Combustion of Purge Gas

Component	Moles Carbon/mole	Fraction of Gas Combusted[2]	Mole Percent of Purge Gas	Standard Vapor Volumetric Flow[3] (SCFD)	Combusted CO_2 Emissions (SCFD)	CO_2 Density[4] (kg/ft^3)	Combusted CO_2 Emissions (tpy)
CO_2	1	1	0.79%	360	2.842E+00	0.0526	6.015E-02
Methane	1	0.98	92.48%	360	3.263E+02	0.0526	6.905E+00
Ethane	2	0.98	4.43%	360	3.127E+01	0.0526	6.618E-01
Propane	3	0.98	1.26%	360	1.333E+01	0.0526	2.821E-01
Isobutane	4	0.98	0.28%	360	3.905E+00	0.0526	8.264E-02
n-butane	4	0.98	0.25%	360	3.525E+00	0.0526	7.460E-02
Pentanes +	5	0.98	0.41%	360	7.296E+00	0.0526	1.544E-01
Component	**Moles Carbon/mole**	**Fraction of Gas Uncombusted[5]**	**Mole Percent of Purge Gas**	**Standard Vapor Volumetric Flow[3] (SCFD)**	**CH_4 Emissions (SCFD)**	**CH_4 Density[6] (kg/ft^3)**	**CH_4 Emissions (tpy)**
Methane	1	0.02	92.48%	360	6.659E+00	0.019	1.222E+00
					Total CO_2		8.22
					Total Methane		1.22
					Total CO_2e		38.76

[2] Using default fraction of 0.98 from 40 CFR Part 98, Subpart W, Equation 21 for all components combusted into CO_2. Assuming all CO_2 in vent gas is released as CO_2.

[3] Standard vapor volumetric flow is based on purge gas flow rate.

[4] Using 0.0526 kg/ft^3 for CO_2 density as specified in 40 CFR Part 98, Subpart W, Equation 36.

[5] Assuming fraction of CH_4 not combusted is released as CH_4.

[6] Using 0.0192 kg/ft^3 for CH_4 density as specified in 40 CFR Part 98, Subpart W, Equation 36.

Total Controlled Potential Emissions from Flare

Pollutant	Estimated Emissions	
	(lb/hr)	(tpy)
NOx	0.0160	0.07
CO	0.0121	0.05
VOC	0.0008	0.0033
SO_2	0.0001	3.62E-04
PM, PM_{10}, $PM_{2.5}$	0.0010	4.59E-03
Benzene	2.89E-07	1.27E-06
Dichlorobenzene	1.65E-07	7.24E-07
Formaldehyde	1.03E-05	4.53E-05
Hexane	2.48E-04	1.09E-03
Toluene	4.68E-07	2.05E-06
CO_2	1.83E+01	8.02E+01
CH_4	2.79E-01	1.22E+00
N_2O	3.10E-05	1.36E-04
CO_2e	2.53E+01	1.11E+02

ATTACHMENT D

CATERPILLAR 3608 ENGINE SPECIFICATIONS, CATERPILLAR 3616 COMPRESSOR (ARIEL JGD/6) PERFORMANCE SPECIFICATIONS

G3608

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

Industrial/Petroleum 03/02

ENGINE SPEED (rpm):	1000	FUEL TYPE:	Nat Gas
COMPRESSION RATIO:	9:1	MIN. FUEL PRESSURE (PSIG):	43
AFTERCOOLER WATER (°F)	129	MIN. RATED METHANE NUMBER:	66
JACKET WATER OUTLET (°F)	190	RATED ALTITUDE @ 77°F (ft):	3200
IGNITION SYSTEM:	CIS/A3	FUEL LHV (BTU/SCF):	905
EXHAUST MANIFOLD:	DRY		

RATING		NOTES	LOAD	100%	75%	50%
ENGINE POWER		(2)	bhp	2370	1777	1185
ENGINE EFFICIENCY	**(ISO 3046/1)**	**(1)**	**%**	**38.6**	**37.1**	**34.4**
ENGINE EFFICIENCY	(NOMINAL)	(1)	%	37.6	36.2	33.6

ENGINE DATA						
FUEL CONSUMPTION	**(ISO 3046/1)**	**(1)**	**BTU/bhp-hr**	**6601**	**6864**	**7401**
FUEL CONSUMPTION	(NOMINAL)	(1)	BTU/bhp-hr	6761	7031	7581
AIR FLOW (@ 77°F, 14.7 psia)			scfm	6,066	4,712	3,190
AIR MASS FLOW			lb/hr	26,894	20,893	14,143
COMPRESSOR OUTLET PRESSURE			psi (abs)	36.8	28.7	20.6
COMPRESSOR OUTLET TEMPERATURE			°F	301	244	163
INLET MANIFOLD PRESSURE			psi (abs)	35.3	27.6	19.6
INLET MANIFOLD TEMPERATURE			°F	143	140	136
LAMBDA				2.07	2.06	1.94
TIMING			°BTDC	20.5	19.9	18.4
EXHAUST STACK TEMPERATURE			°F	865	884	963
EXHAUST GAS FLOW (@ stack temp, 14.5 psia)			ft3/min	16,265	12,821	9,185
EXHAUST GAS MASS FLOW			lb/hr	27,715	21,530	14,575

EMISSIONS					
NOx (as NO)	(3)	g/bhp-hr	0.7	0.7	0.7
CO	(3)	g/bhp-hr	2.5	2.5	2.5
THC (molecular weight of 15.84)	(3)	g/bhp-hr	6.01	6.26	6.48
NMHC (molecular weight of 15.84)	(3)	g/bhp-hr	0.91	0.94	0.98
EXHAUST OXYGEN		%	12.5	11.8	10.8

ENERGY BALANCE DATA						
FUEL INPUT ENERGY (LHV)	(NOMINAL)	(1)	BTU/min	267,019	208,263	149,705
WORK ENERGY	(NOMINAL)	(2)	BTU/min	100,504	75,378	50,252
HEAT REJ. TO JACKET WATER	(NOMINAL)	(4)	BTU/min	23,946	20,926	16,815
HEAT REJ. TO ATMOSPHERE	(NOMINAL)	(5)	BTU/min	9,346	8,747	8,234
HEAT REJ. TO LUBE OIL	(NOMINAL)	(6)	BTU/min	12,016	11,454	11,228
HEAT REJ. TO EXH. (LHV to 77°F)	(NOMINAL)	(4)	BTU/min	103,649	82,483	61,335
HEAT REJ. TO EXH. (LHV to 350°F)	(NOMINAL)	(4)	BTU/min	63,074	50,915	39,813
HEAT REJ. TO AFTERCOOLER	(NOMINAL)	(7) (8)	BTU/min	17,558	9,275	1,841

CONDITIONS AND DEFINITIONS

ENGINE RATING OBTAINED AND PRESENTED IN ACCORDANCE WITH ISO 3046/1 (STD. REF. CONDITIONS OF 25°C, 100 KPA, 152 m). NO OVERLOAD PERMITTED AT RATING SHOWN. CONSULT ALTITUDE CURVES FOR APPLICATIONS ABOVE MAXIMUM RATED ALTITUDE AND/OR TEMPERATURE.

NOTES

1) FUEL CONSUMPTION TOLERANCE. ISO 3046/1 IS 0, + 5% OF FULL LOAD DATA. NOMINAL IS ± 2.5 % OF FULL LOAD DATA.
2) ENGINE POWER AND WORK ENERGY INCLUDE 2 ENGINE DRIVEN WATER PUMPS.
3) EMISSION DATA SHOWN ARE DRY AND NOT TO EXCEED VALUES.
4) HEAT REJECTION TO JACKET AND EXHAUST TOLERANCE IS ± 10% OF FULL LOAD DATA. (heat rate based on treated water)
5) HEAT REJECTION TO ATMOSPHERE TOLERANCE IS ± 50% OF FULL LOAD DATA. (heat rate based on treated water)
6) HEAT REJECTION TO LUBE OIL TOLERANCE IS ± 20% OF FULL LOAD DATA. (heat rate based on treated water)
7) HEAT REJECTION TO AFTERCOOLER TOLERANCE IS ± 5% OF FULL LOAD DATA. (heat rate based on treated water)
8) TOTAL AFTERCOOLER HEAT = AFTERCOOLER HEAT x ACHRF (heat rate based on treated water)

G3608

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

FUEL USAGE GUIDE

DERATE FACTOR vs CATERPILLAR METHANE NUMBER

Methane Number	30	35	40	45	50	55	60	65	70>=100
Rating Factor	0.00	0.00	0.00	0.76	0.82	0.87	0.93	0.98	1.00

Minimum Methane Number for Full Rating = 66.5

Fuel System Limit (minimum Wobbe Index) = 1130 BTU/SCF

TOTAL DERATION FACTORS - ALTITUDE & COOLING

AIR TO TURBO (°F)	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.00	0.99	0.95	0.92	0.88	0.85	0.82	0.78	0.75	0.72	0.70	0.67	0.63
120	1.00	1.00	0.97	0.93	0.90	0.86	0.83	0.80	0.77	0.74	0.71	0.68	0.65
110	1.00	1.00	0.99	0.95	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.69	0.66
100	1.00	1.00	1.00	0.97	0.93	0.89	0.86	0.83	0.79	0.76	0.73	0.70	0.67
90	1.00	1.00	1.00	0.98	0.95	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.69
80	1.00	1.00	1.00	1.00	0.96	0.93	0.89	0.86	0.82	0.79	0.76	0.73	0.70
70	1.00	1.00	1.00	1.00	0.98	0.94	0.91	0.87	0.84	0.81	0.77	0.74	0.71
60	1.00	1.00	1.00	1.00	1.00	0.96	0.93	0.89	0.86	0.82	0.79	0.76	0.73
50	1.00	1.00	1.00	1.00	1.00	0.98	0.94	0.91	0.87	0.84	0.80	0.77	0.74

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS

AIR TO TURBO (°F)	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.43	1.50	1.56	1.63	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65	1.65
120	1.34	1.41	1.48	1.54	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56	1.56
110	1.26	1.32	1.39	1.45	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47	1.47
100	1.17	1.23	1.30	1.36	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38	1.38
90	1.08	1.14	1.21	1.27	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29	1.29
80	1.00	1.06	1.12	1.18	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
70	1.00	1.00	1.03	1.09	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
60	1.00	1.00	1.00	1.00	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

ALTITUDE (FEET ABOVE SEA LEVEL)

MINIMUM SPEED CAPABILITY AT MAX SITE TORQUE (RPM)

AIR TO TURBO (°F)	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	890	950	950	950	950	950	950	950	950	950	950	950	950
120	860	940	950	950	950	950	950	950	950	950	950	950	950
110	820	900	950	950	950	950	950	950	950	950	950	950	950
100	780	860	950	950	950	950	950	950	950	950	950	950	950
90	750	820	900	950	950	950	950	950	950	950	950	950	950
80	750	780	860	950	950	950	950	950	950	950	950	950	950
70	750	750	820	900	950	950	950	950	950	950	950	950	950
60	750	750	780	860	950	950	950	950	950	950	950	950	950
50	750	750	750	820	900	950	950	950	950	950	950	950	950

ALTITUDE (FEET ABOVE SEA LEVEL)

ALLOWABLE INERTS IN THE FUEL:
The maximum amount of free inerts in the fuel is limited to 5%.

FUEL SYSTEM LIMIT:
Fuels with a Wobbe index lower than the limit, require a custom fuel system and engine control system mapping from the factory. The Wobbe index is determined using the Caterpillar Methane Number Calculation program.

FUEL USAGE GUIDE:
This table shows the derate factor required for a given fuel. Note that deration occurs 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.

TOTAL 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. The total deration factor includes deration due to altitude and ambient temperature, and air inlet manifold temperature deration.

ACTUAL ENGINE RATING:
It is important to note that the Altitude/Temperature deration and the Fuel Usage Guide deration are not cumulative. They are not to be added together. To determine the actual power available, take the lowest rating between the Altitude/Temperature Deration and the Fuel Usage Guide Deration.

EXHAUST STACK TEMPERATURE:
The exhaust stack temperature listed in the technical data is a nominal value with a tolerance = +35°C, -30°C (+63°F, -54°F)

AFTERCOOLER HEAT REJECTION FACTORS:
Aftercooler heat rejection is given for standard conditions of 77°F and 500 ft altitude. To maintain a constant air inlet manifold temperature, as the air to turbo 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 to adjust for ambient and altitude conditions. Multiply this factor by the standard aftercooler heat rejection. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

MINIMUM SPEED CAPABILITY AT MAX SITE TORQUE:
This table shows the minimum allowable engine operating speed for site-specific ratings as determined by the Total Deration Factor chart. The minimum allowable engine operating speed may be lowered by 50 rpm for each 45 bHp that the actual engine power falls below the site-specific rating allowed by the Total Deration Factor chart. The minimum allowable continuous engine operating speed cannot be lower than 750 rpm.

Ariel Performance

7.7.2.2	Company: Ariel Corporation	Customer:	
	Quote:	Inquiry:	
	Case 1:	Project:	

Compressor Data:

Elevation,ft:	7015.00	Barmtr,psia:	11.312	Ambient,°F:	100.00	**Driver Data:**	
Frame: **(ELP)**	JGD/6	Stroke, in:	5.50	Rod Dia, in:	2.500	Type:	Nat. Gas
Max RL Tot, lbf:	114000	Max RL Tens, lbf:	57000	Max RL Comp, lbf:	60000	Mfg:	Caterpillar
Rated RPM:	1200	Rated BHP:	6210.0	Rated PS FPM:	1100.0	Model:	G3616 LE
Calc RPM:	1000.0	BHP:	3647	Calc PS FPM:	916.7	BHP:	4190 (11.50%)
						Avail:	4040 (150)

Services	**Service 1**					
Gas Model	VMG					
Stage Data:	**1 (SG)**	---	---	---	---	---
Target Flow, MMSCFD	53.000	---	---	---	---	---
Flow Calc, MMSCFD	72.058	---	---	---	---	---
BHP per Stage	3599.1	---	---	---	---	---
Specific Gravity	0.6200	---	---	---	---	---
Ratio of Sp Ht (N)	1.2931	---	---	---	---	---
Comp Suct (Zs)	0.9002	---	---	---	---	---
Comp Disch (Zd)	0.9071	---	---	---	---	---
Pres Suct Line, psig	530.00	---	---	---	---	---
Pres Suct Flg, psig	530.00	---	---	---	---	---
Pres Disch Flg, psig	1360.00	---	---	---	---	---
Pres Disch Line, psig	1350.00	---	---	---	---	---
Pres Ratio F/F	2.533	---	---	---	---	---
Temp Suct, °F	70.00	---	---	---	---	---
Temp Clr Disch, °F	120.00	---	---	---	---	---
Cylinder Data:	**Throw 1**	**Throw 2**	**Throw 3**	**Throw 4**	**Throw 5**	**Throw 6**
Cyl Model	8-3/8D	8-3/8D	8-3/8D	8-3/8D	8-3/8D	8-3/8D
Cyl Bore, in	7.875	7.875	7.875	7.875	7.875	7.875
Cyl RDP (API), psig	1722.7	1722.7	1722.7	1722.7	1722.7	1722.7
Cyl MAWP, psig	1895.0	1895.0	1895.0	1895.0	1895.0	1895.0
Cyl Action	DBL	DBL	DBL	DBL	DBL	DBL
Cyl Disp, CFM	294.4	294.4	294.4	294.4	294.4	294.4
Pres Suct Intl, psig	505.18	505.18	505.18	505.18	505.18	505.18
Temp Suct Intl, °F	75	75	75	75	75	75
Pres Disch Intl, psig	1426.39	1426.39	1426.39	1426.39	1426.39	1426.39
Temp Disch Intl, °F	215	215	215	215	215	215
HE Suct Gas Vel, FPM	7042	7042	7042	7042	7042	7042
HE Disch Gas Vel, FPM	6800	6800	6800	6800	6800	6800
HE Spcrs Used/Max	0/4	0/4	0/4	0/4	0/4	0/4
HE Vol Pkt Avail, %	0.81+45.81	0.81+45.81	0.81+45.81	0.81+45.81	0.81+45.81	0.81+45.81
Vol Pkt Used, %	0.00 (V)	0.00 (V)	0.00 (V)	0.00 (V)	0.00 (V)	0.00 (V)
HE Min Clr, %	20.43	20.43	20.43	20.43	20.43	20.43
HE Total Clr, %	21.24	21.24	21.24	21.24	21.24	21.24
CE Suct Gas Vel, FPM	6332	6332	6332	6332	6332	6332
CE Disch Gas Vel, FPM	6115	6115	6115	6115	6115	6115
CE Spcrs Used/Max	0/4	0/4	0/4	0/4	0/4	0/4
CE Min Clr, %	23.78	23.78	23.78	23.78	23.78	23.78
CE Total Clr, %	23.78	23.78	23.78	23.78	23.78	23.78
Suct Vol Eff HE/CE, %	71.9/69.1	71.9/69.1	71.9/69.1	71.9/69.1	71.9/69.1	71.9/69.1
Disch Event HE/CE, ms	11.3/12.5	11.3/12.5	11.3/12.5	11.3/12.5	11.3/12.5	11.3/12.5
Suct Pseudo-Q HE/CE	5.5/4.4	5.5/4.4	5.5/4.4	5.5/4.4	5.5/4.4	5.5/4.4
Gas Rod Ld Comp, %	79.3 C	79.3 C	79.3 C	79.3 C	79.3 C	79.3 C
Gas Rod Ld Tens, %	66.1 T	66.1 T	66.1 T	66.1 T	66.1 T	66.1 T
Gas Rod Ld Total, %	74.8	74.8	74.8	74.8	74.8	74.8
Xhd Pin Deg/%Rvrsl lbf	179/68.3	179/68.3	179/68.3	179/68.3	179/68.3	179/68.3
Flow Calc, MMSCFD	12.010	12.010	12.010	12.010	12.010	12.010
Cyl BHP	599.8	599.8	599.8	599.8	599.8	599.8