



WEST VIRGINIA  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
 DIVISION OF AIR QUALITY  
 601 57th Street, SE  
 Charleston, WV 25304  
 Phone: (304) 926-0475 · www.dep.wv.gov/daq

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

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

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

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

**SECTION I. GENERAL INFORMATION**

1. Name of Applicant (as registered with the WV Secretary of State's Office): <b>Noble Energy, Inc</b>		2. Federal Employer ID No. (FEIN): <b>73-0785597</b>	
3. Applicant's mailing address: <b>Clayton Murrall 1000 Noble Energy Drive Canonsburg, PA 15317</b>		4. Applicant's Physical Address <b>1000 Noble Energy Drive Canonsburg, PA 15317</b>	
5. If applicant is a subsidiary corporation, please provide the name of parent corporation:			
6. WV BUSINESS REGISTRATION. Is the applicant a resident of the State of West Virginia? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO - IF YES, provide a copy of the Certificate of Incorporation/ Organization / Limited Partnership (one page) including any name change amendments or other Business Registration Certificate as Attachment A. - IF NO, provide a copy of the Certificate of Authority / Authority of LLC / Registration (one page) including any name change amendments or other Business Certificate as Attachment A.			

**SECTION II. FACILITY INFORMATION**

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.): <b>Oil and Gas Production Facility</b>		8a. Standard Industrial Classification (SIC) code: <b>1311</b>	8b. North American Industry Classification System (NAICS) code: <b>211111</b>
9. DAQ Plant ID No. (for existing facilities only):  <b>085-00052</b>		10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only):  <b>G70-A155A</b>	

**A: PRIMARY OPERATING SITE INFORMATION**

11A. Facility name of primary operating site: <b>Pennsboro 2 Production Facility</b>			12A. Address of primary operating site: Mailing: _____ Physical: <u>See Section 14A</u>		
13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - IF YES, please explain: <u>Lease</u> _____ - IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.					
14A. - For Modifications or Administrative Updates at an existing facility, please provide directions to the present location of the facility from the nearest state road; - For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a MAP as Attachment F.  From WV 2 south make a left onto WV 180 south of New Martinsville, follow WV 180 and travel approximately 7.4 miles to the intersection of WV 180 and WV 18, make a left onto WV 18 and travel approximately 17.6 miles to the intersection of WV 18 and WV 74, make a right onto WV 74 and follow it into Ritchie County for approximately 7.8 miles to CR 6 (Bonds Creek Road), make a right onto Bonds Creek Road and travel 3.5 miles to CR 6/3 (Stone Road), make a right onto Stone Road and travel 0.4 miles to lease road on the left.					
15A. Nearest city or town: <b>Pennsboro</b>		16A. County <b>Ritchie County</b>		17A. UTM Coordinates Northing (KM): <b>4354.14</b> Easting (KM): <b>498.94</b> Zone: <b>17</b>	
18A. Briefly describe the proposed new operation or change (s) to the facility:  Installation of one (1) additional enclosed combustion device to control tank vapors. Removal of one (1) Line Heater				19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):  Latitude: <b>39.33664</b> Longitude: <b>-81.01235</b>	

**B: 1st ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)**

11B. Name of 1st alternate operating site:		12B. Address of 1st alternate operating site: Mailing: _____ Physical: _____			
13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input type="checkbox"/> YES <input type="checkbox"/> NO - IF YES, please explain: _____ _____ - IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.					

<p>14B. - For <b>Modifications or Administrative Updates</b> at an existing facility, please provide directions to the present location of the facility from the nearest state road;          - For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a <b>MAP as Attachment F</b>.</p>		
15B. Nearest city or town:	16B. County	17B. UTM Coordinates Northing (KM): Easting (KM): Zone:
18B. Briefly describe the proposed new operation or change (s) to the facility:		19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):  Latitude: Longitude:

**C: 2nd ALTERNATE OPERATING SITE INFORMATION (only available for G20, G40, & G50 General Permits)**

11C. Name of 1st alternate operating site:	12C. Address of 1st alternate operating site:  Mailing: _____ Physical: _____ _____	
<p>13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>- IF YES, please explain: _____          _____</p> <p>- IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.</p>		
<p>14C. - For <b>Modifications or Administrative Updates</b> at an existing facility, please provide directions to the present location of the facility from the nearest state road;          - For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a <b>MAP as Attachment F</b>.</p>		
15C. Nearest city or town:	16C. County	17C. UTM Coordinates Northing (KM): Easting (KM): Zone:
18C. Briefly describe the proposed new operation or change (s) to the facility:		19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):  Latitude: Longitude:

<p>20. Provide the date of anticipated installation or change:</p> <p style="text-align: center;"><b>1/7/2016</b></p> <p>If this is an after the fact permit application, provide the date upon which the proposed change did happen:</p> <p style="text-align: center;">/ /</p>	<p>21. Date of anticipated Start-up if registration is granted:</p> <p style="text-align: center;"><b>1/7/2016</b></p>
<p>22. Provide maximum projected Operating Schedule of activity/activities outlined in this application if other than 8760 hours/year. (Note: anything other than 24/7/52 may result in a restriction to the facility's operation).</p> <p>Hours per day                    <b>24</b>                    Days per week                    <b>7</b>                    Weeks per year                    <b>52</b>                    Percentage of Operation                    <b>100</b></p>	

**SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS**

<p>23. Include a check payable to WVDEP – Division of Air Quality with the appropriate application fee (per 45CSR22 and 45CSR13).</p>
<p>24. Include a Table of Contents as the first page of your application package.</p>
<p>All of the required forms and additional information can be found under the Permitting Section (General Permits) of DAQ's website, or requested by phone.</p>
<p>25. Please check all attachments included with this permit application. Please refer to the appropriate reference document for an explanation of the attachments listed below.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> ATTACHMENT A : CURRENT BUSINESS CERTIFICATE</li> <li><input type="checkbox"/> ATTACHMENT B: PROCESS DESCRIPTION</li> <li><input type="checkbox"/> ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS</li> <li><input type="checkbox"/> ATTACHMENT D: PROCESS FLOW DIAGRAM</li> <li><input type="checkbox"/> ATTACHMENT E: PLOT PLAN</li> <li><input type="checkbox"/> ATTACHMENT F: AREA MAP</li> <li><input type="checkbox"/> ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM</li> <li><input type="checkbox"/> ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS</li> <li><input checked="" type="checkbox"/> ATTACHMENT I: EMISSIONS CALCULATIONS</li> <li><input type="checkbox"/> ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT</li> <li><input type="checkbox"/> ATTACHMENT K: ELECTRONIC SUBMITTAL</li> <li><input type="checkbox"/> ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE</li> <li><input type="checkbox"/> ATTACHMENT M: SITING CRITERIA WAIVER</li> <li><input type="checkbox"/> ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS)</li> <li><input type="checkbox"/> ATTACHMENT O: EMISSIONS SUMMARY SHEETS</li> <li><input type="checkbox"/> OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.)</li> </ul> <p>Please mail an original and two copies of the complete General Permit Registration Application with the signature(s) to the DAQ Permitting Section, at the address shown on the front page of this application. Please DO NOT fax permit applications. For questions regarding applications or West Virginia Air Pollution Rules and Regulations, please refer to the website shown on the front page of the application or call the phone number also provided on the front page of the application.</p>

SECTION IV. CERTIFICATION OF INFORMATION

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

FOR A CORPORATION (domestic or foreign)

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

FOR A PARTNERSHIP

I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

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

FOR A JOINT VENTURE

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

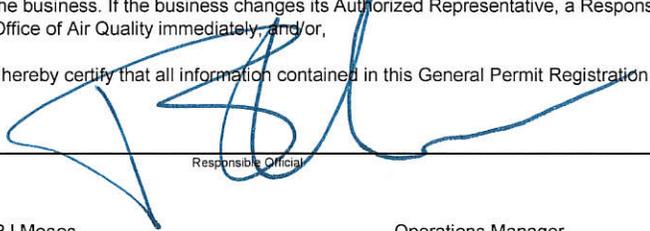
FOR A SOLE PROPRIETORSHIP

I certify that I am the Owner and Proprietor

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

I hereby certify that all information contained in this General Permit Registration Application and any supporting documents

Signature  
(Please use blue ink)

  
\_\_\_\_\_  
Responsible Official

12/22/15  
\_\_\_\_\_  
Date

Name & Title  
(Please print or type)

RJ Moses Operations Manager Marcellus Business Unit  
\_\_\_\_\_

Signature  
(Please use blue ink)

\_\_\_\_\_  
Authorized Representative (if applicable) Date

Applicant's Name Noble Energy, Inc

Phone & Fax

(724) 820-3001  
Phone Fax

Email

ri.moses@nblenergy.com CC: clayton.murral@nblenergy.com

Noble Energy, Inc.; Pennsboro 2 Production Facility  
 Emission Summary Sheet  
 TWO (2) COMBUSTION DEVICES

Emission Unit ID Number	Source Description	Potential Emissions (tpy)														
		NOX	CO	VOC	SOX	PM	PM10	Formaldehyde	Total HAPS	CH <sub>4</sub>	CO <sub>2</sub>	CO <sub>2</sub> e				
1S-TK1-10	10-400 bbl Condensate Tanks	---	---	VRU	---	---	---	VRU	---	---	---	---	---	---	---	---
2S-TK11-30	20-400 bbl Produced Water Tanks	---	---	VRU	---	---	---	VRU	---	---	---	---	---	---	---	---
3S-ENG1	276 hp CAT 3406TA	3.14	6.28	2.20	0.01	0.10	0.10	0.22	0.24	2.43	1,162	1,222	---	---	---	---
3S-ENG2	46 hp Gas Jack	0.89	1.78	0.44	0.00	0.00	0.00	0.00	0.09	0.00	229	229	---	---	---	---
4S-GPU1	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU2	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU3	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU4	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU5	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU6	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU7	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU8	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU9	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU10	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU11	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
4S-GPU12	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
5S-LP	Low Pressure Separator Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	431	431	---	---	---	---
6S-TL1	Condensate Truck Loadout	---	---	10.79	---	---	---	---	2.72	---	---	---	---	---	---	---
7S-TL2	Produced Water Truck Loadout	---	---	1.10	---	---	---	---	0.03	---	---	---	---	---	---	---
8S-COMB1-2	Two (2) Vapor Combustors	3.13	17.02	0.55	---	---	---	---	0.13	0.11	5411	5428	---	---	---	---
9S-PILOT1-2	Two (2) Combustor Pilot Emissions	0.01	0.01	0.00	0.00	0.00	0.00	0.00	---	---	---	13.14	---	---	---	---
10S-TE Gen	Thermo Electric Generator	0.02	0.01	0.00	0.00	0.00	0.00	0.00	---	---	16.88	16.89	---	---	---	---
12S-FLARE	Flare	0.59	3.19	3.00	---	---	---	---	0.05	0.00	1015	1018	---	---	---	---
13S-PILOT	Combustor Pilot Emissions	0.54	0.45	0.03	0.01	0.04	0.04	0.04	---	---	---	643.86	---	---	---	---
14S-VRU	Vapor Recovery (VRU)	---	---	48.64	---	---	---	---	0.16	---	---	---	---	---	---	---
FUG	Equipmt Component Fugitives Estimate	---	---	19.34	---	---	---	---	2.20	---	---	---	---	---	---	---
<b>Total Facility Emissions (tpy)</b>		<b>12.97</b>	<b>32.65</b>	<b>86.36</b>	<b>0.04</b>	<b>0.50</b>	<b>0.50</b>	<b>0.22</b>	<b>5.70</b>	<b>2.65</b>	<b>13433.72</b>	<b>14176.65</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
<b>Total Facility Emissions (lb/hr)</b>		<b>2.96</b>	<b>7.45</b>	<b>19.72</b>	<b>0.01</b>	<b>0.11</b>	<b>0.11</b>	<b>0.05</b>	<b>1.30</b>	<b>0.61</b>	<b>3067.06</b>	<b>3236.68</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
<b>Total Facility Emissions for Major Source Threshold* (tpy)</b>		<b>12.97</b>	<b>32.65</b>	<b>67.02</b>	<b>0.04</b>	<b>0.50</b>	<b>0.50</b>	<b>0.22</b>	<b>3.51</b>	<b>2.65</b>	<b>13433.72</b>	<b>14173.65</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>

\*Excludes fugitive emissions per 45 CSR 14-2.43.e.

Noble Energy, Inc.; Pennsboro 2 Production Facility  
 Emission Summary Sheet  
 ONE (1) COMBUSTION DEVICE

Emission Unit ID Number	Source Description	Potential Emissions (tpy)														
		NOX	CO	VOC	SOX	PM	PM10	Formaldehyde	Total HAPS	CH <sub>4</sub>	CO <sub>2</sub>	CO <sub>2</sub> e				
1S-TK1-10	10-400 bbl Condensate Tanks	---	---	VRU	---	---	---	VRU	---	---	---	---	---	---	---	---
2S-TK11-30	20-400 bbl Produced Water Tanks	---	---	VRU	---	---	---	VRU	---	---	---	---	---	---	---	---
3S-ENG1	276 hp CAT 3406TA	3.14	6.28	2.20	0.01	0.10	0.10	0.22	0.24	2.43	1,162	1,222	---	---	---	---
3S-ENG2	46 hp Gas Jack	0.89	1.78	0.44	0.00	0.00	0.00	0.00	0.09	0.00	0.00	229	---	---	---	---
4S-GPU1	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU2	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU3	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU4	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU5	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU6	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU7	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU8	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU9	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU10	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU11	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
4S-GPU12	1.0 MMBtu/hr Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
5S-LP	Low Pressure Separator Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
6S-TL1	Condensate Truck Loadout	---	---	10.79	---	---	---	---	2.72	---	---	---	---	---	---	---
7S-TL2	Produced Water Truck Loadout	---	---	1.10	---	---	---	---	0.03	---	---	---	---	---	---	---
8S-COMB1	Vapor Combustor	3.13	17.02	0.55	---	---	---	---	0.13	0.11	5411	5425	---	---	---	---
9S-PILOT1	Combustor Pilot Emissions	0.01	0.00	0.00	0.00	0.00	0.00	0.00	---	---	---	6.57	---	---	---	---
10S-TE Gen	Thermo Electric Generator	0.02	0.01	0.00	0.00	0.00	0.00	0.00	---	---	---	16.88	---	---	---	---
11S-LH	Line Heater	0.36	0.30	0.02	0.00	0.03	0.03	0.00	0.01	0.01	0.01	431	---	---	---	---
12S-FLARE	Flare	0.59	3.19	3.00	---	---	---	---	0.05	0.00	1015	1018	---	---	---	---
13S-PILOT	Combustor Pilot Emissions	0.54	0.45	0.03	0.01	0.04	0.04	0.00	0.16	---	---	643.86	---	---	---	---
14S-VRU	Vapor Recovery (VRU)	---	---	48.64	---	---	---	---	0.16	---	---	---	---	---	---	---
FUG	Equipmt Component Fugitives Estimate	---	---	19.34	---	---	---	---	2.20	---	---	---	---	---	---	---
<b>Total Facility Emissions (tpy)</b>		<b>13.33</b>	<b>32.95</b>	<b>86.38</b>	<b>0.04</b>	<b>0.52</b>	<b>0.52</b>	<b>0.22</b>	<b>5.71</b>	<b>2.66</b>	<b>13,865</b>	<b>14,598</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
<b>Total Facility Emissions (lb/hr)</b>		<b>3.04</b>	<b>7.52</b>	<b>19.72</b>	<b>0.01</b>	<b>0.12</b>	<b>0.12</b>	<b>0.05</b>	<b>1.30</b>	<b>0.61</b>	<b>3165.42</b>	<b>3332.94</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>
<b>Total Facility Emissions for Major Source Threshold* (tpy)</b>		<b>13.33</b>	<b>32.95</b>	<b>67.03</b>	<b>0.04</b>	<b>0.52</b>	<b>0.52</b>	<b>0.22</b>	<b>3.51</b>	<b>2.66</b>	<b>13864.54</b>	<b>14595.25</b>	<b>---</b>	<b>---</b>	<b>---</b>	<b>---</b>

\*Excludes fugitive emissions per 45 CSR 14-2.43.e.

Noble Energy, Inc; Pennsboro 2 Production Facility  
Enclosed Flare Detail Sheet

Source ID Number					
Equipment ID	8S-COMB1-2		<b>Truck Loading VOC Emissions &amp; Flash VRU downtime</b>		
SCC			Condensate Loading	25.18 tpy	6.34 tpy HAPs
Equipment Usage	Vapor Combustors		Produced Water Loading	2.56 tpy	0.08 tpy HAPs
Equipment Make	Leed		Total VOC Emissions	27.74 tpy	6.41 tpy HAPs
Equipment Model	LDF1350 Dual Stage Combustor		Control Efficiency	98%	98%
Serial Number	Unknown		Controlled VOC Emissions	0.55 tpy	0.13 tpy HAPs
Installation Date	TBD		<b>Combustion</b>		
Emission Controls	None		Molecular Weight of Vapors	lb/lb-mol	
<b>Pilot</b>			Fuel Heating Value	1800 Btu/scf	
Fuel Heating Value	1220	Btu/scf	Potential Heat Output	10.500 MMBtu/hr	
Design Heat Rate	0.02	MMBtu/hr	VOC Vapors sent to flare	55482.2 lbs/yr	
Site Heat Rate	0.02	MMBtu/hr	Potential Operation	365 days/yr	
Potential Operation	365	days/yr	Ave. Gas Flared	140.000 Mscf/day	
Potential Fuel Usage	0.30	Mscf/day			

9S-PILOT1  
Combustor Pilot Emissions

Pollutant	Emission Factor lb/MMSCF	Annual gas Usage MMSCF/yr	Enclosed Combustion Device Count	Hrs of Operation (hrs/yr)	Estimated Emissions		Source of Emission Factor
					(lb/hr)	Pilot tpy	
NOx	100.000	0.11	2	8760	0.00	0.01	AP-42 <sup>2</sup>
CO	84.000	0.11	2	8760	0.00	0.01	AP-42 <sup>2</sup>
PM10	7.600	0.11	2	8760	0.00	0.00	AP-42 <sup>2</sup>
VOC	5.500	0.11	2	8760	0.00	0.00	AP-42 <sup>2</sup>
N <sub>2</sub> O	1.000	0.11	2	8760	0.00	0.00	API
CO <sub>2</sub>	120000.000	0.11	2	8760	3.00	13.14	AP-42 <sup>2</sup>

Potential Combustion Emissions

Pollutant	Emission Factor lb/MMBtu	Annual gas Usage MMBtu/yr	Estimated Emissions tpy	Emission Factor Source
NOx	0.068	91980.00	3.13	AP-42 <sup>1</sup>
CO	0.370	91980.00	17.02	AP-42 <sup>1</sup>
N <sub>2</sub> O	0.001	91980.00	0.05	API
CO <sub>2</sub>	117.650	91980.00	5410.72	AP-42 <sup>1</sup>

Total Potential Vapor Combustor Emissions

Pollutant	tpy	lb/hr
NOx	3.13	0.71
CO	17.02	3.89
PM10	0.00	0.00
VOC	0.55	0.13
HAPs	0.13	0.03
N <sub>2</sub> O	0.05	0.01
CH <sub>4</sub>	0.11	0.03
CO <sub>2</sub>	5410.72	1235.33
CO <sub>2</sub> e	5427.60	1239.18

<sup>1</sup> EPA AP-42, Volume I, Fifth Edition - September 1991, Table 13.5-1, Emission Factors for Flare Operations.

<sup>2</sup> EPA AP-42, Volume I, Fifth Edition - September 1991, Table 1.4, Emission Factors for Natural Gas Combustion

One (1) Enclosed Combustion Device

Potential Emissions

Pollutant	Estimated Emissions	
	(lb/hr)	(tpy)
NOx	3.04	13.33
CO	7.52	32.95
VOC	19.72	86.38
SOx	0.01	0.04
PM	0.12	0.52
PM10	0.12	0.52
Formaldehyde	0.05	0.22
Total HAPS	1.30	5.71
CH <sub>4</sub>	0.61	2.66
CO <sub>2</sub>	3165.42	13864.54
CO <sub>2</sub> e	3332.94	14598.26

Two (2) Enclosed Combustion Devices

Potential Emissions

Pollutant	Estimated Emissions	
	(lb/hr)	(tpy)
NOx	2.96	12.97
CO	7.45	32.65
VOC	19.72	86.36
SOx	0.01	0.04
PM	0.11	0.50
PM10	0.11	0.50
Formaldehyde	0.05	0.22
Total HAPS	1.30	5.70
CH <sub>4</sub>	0.61	2.65
CO <sub>2</sub>	3067.06	13433.72
CO <sub>2</sub> e	3236.68	14176.65

Change in Emissions

Pollutant	Change in Emissions	
	(lb/hr)	(tpy)
NOx	-0.081	-0.354
CO	-0.068	-0.297
VOC	-0.004	-0.019
SOx	0.000	-0.002
PM	-0.006	-0.027
PM10	-0.006	-0.027
Formaldehyde	0.000	0.000
Total HAPS	-0.002	-0.007
CH <sub>4</sub>	-0.002	-0.008
CO <sub>2</sub>	-98.361	-430.820
CO <sub>2</sub> e	-96.257	-421.607

**AIR POLLUTION CONTROL DEVICE  
Vapor Combustion Control Device Sheet**

*Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.*

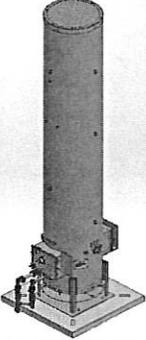
<b>IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.</b>			
<b>General Information</b>			
1. Control Device ID#:	8S-COMB2	2. Installation Date:	1/15/2016
3. Maximum Rated Total Flow Capacity:	140000 scfd 5833.3 scfh	4. Maximum Design Heat Input:	10.5 MMBtu/hr
		5. Design Heat Content:	1800 Btu/scf
<b>Control Device Information</b>			
6. Select the type of vapor combustion control device being used:			
<input type="checkbox"/> Elevated Flare <input checked="" type="checkbox"/> Ground Flare <input type="checkbox"/> Thermal Oxidizer <input type="checkbox"/> Completion Combustion Device <input checked="" type="checkbox"/> Enclosed Combustion Device			
7. Manufacturer:	Leed	8. Hours of operation per year:	
Model No.:	LDF1350 Dual Stage Combustor		8760
9. List the emission units whose emissions are controlled by this vapor combustion control device:			
(Emission Point ID#: 8E-Comb)			
10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
6S-TL1	Condensate Truck Loadout		
7S-TL2	Produced water truck loadout		
<i>If this vapor combustor controls emissions from more than six emission units, please attach additional pages.</i>			
11. Assist Type		12. Flare Height	13. Tip Diameter
<input checked="" type="checkbox"/> Steam <input type="checkbox"/> Air <input type="checkbox"/> Pressure <input checked="" type="checkbox"/> None		25	ft
14. Was the design per §60.18?			
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
<b>Waste Gas Information</b>			
15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
42	1800	TBD	TBD
19. Provide an attachment with the characteristics of the waste gas stream to be burned.			

Pilot Information				
20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Natural Gas	1	12.5	20,000	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
25. If automatic re-ignition will be used, describe the method: Piezoelectric Inspiring Ignitor				
26. Describe the method of controlling flame:				
27. Is pilot flame equipped with a monitor to detect the presence of the flame?		28. If yes, what type?		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		<input checked="" type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-red <input type="checkbox"/> Ultra Violet Camera with monitoring control room Other, describe:		

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
VOC	98	98
32. Has the control device been tested by the manufacturer and certified? Yes. The control device has been guaranteed by the manufacturer. Please see attached report.		
33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty: TBD		
34. Additional Information Attached? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
<i>Please attach a copy of manufacturer's data sheet.</i> <i>Please attach a copy of manufacturer's drawing.</i> <i>Please attach a copy of the manufacturer's performance testing.</i>		

**If any of the requested information is not available, please contact the manufacturer.**

 <b>Environmental Control Equipment Data Sheet</b>		Item/Tag No.:		Page	1	of	2
		Project No.:		Revision:	B		
		Project:		Date:	27 February 2014		
		P.O. No.:	-	By:	JS		
		RFQ No.:	-	Checked:	SG		
		Ref. P&ID:	-	Approved:	MS		
Client:		Remarks:		Supplier:	LEED FABRICATION		
Site:				Model No.:	L30-0011-00		
Unit/Lease:							
<b>GENERAL</b>							
1 Design Code:				NDE:	LEED Fabrication Standards		
2 Service:				Customer Specs:	<input type="checkbox"/> Yes		
3 Description:	Standard Dual Stage 48 High Efficiency Combustor				<input checked="" type="checkbox"/> No		
<b>PROCESS DATA</b>							
Gas Composition:		mol %	Process Conditions:				
4 Methane			Variable	Value	Units		
5 Ethane			Flow Rate	Up to 140	Mscfd		
6 Propane			Pressure	Up to 12	oz/in <sup>2</sup>		
7 I-Butane			Temperature		°F		
8 n-Butane			Molecular Weight				
9 I-Pentane			Process/Waste Stream	<input checked="" type="checkbox"/> Gas	<input type="checkbox"/> Liquid		
10 n-Pentane			Detailed Process Description / Process Notes:				
11 n-Hexane			1. Turndown 10:1. Based on an expected normal operating rate indicated above.				
12 CO <sub>2</sub>			2. DRE: 98 % operating at design conditions				
13 N <sub>2</sub>			3. Burner Pressure Drop: Min. 0.10 oz/in <sup>2</sup>				
14 Helium							
15 H <sub>2</sub> O							
16 C <sub>7</sub>							
17 C <sub>8</sub>							
18 C <sub>9</sub>							
19 C <sub>10</sub>							
20 C <sub>11+</sub>							
21 TOTAL							
Other Components:		PPMV	Available Utilities:				
22 H <sub>2</sub> S			Fuel / Pilot Gas	Min. 30psig Natural Gas / Propane 40-50 SCFH			
23 Benzene			Instrument Air	NA			
24 Toluene			Power	120 V / 60 Hz or Solar Power			
25 E-Benzene			Steam	NA			
26 Xylene			Purge Gas				
<b>DESIGN DATA</b>							
Ambient Temperatures:			Noise Performance Requirements:		Under 85 dBA		
28 Low, °F		-20	Structural Design Code:				
29 High, °F		120	Wind Design Code:		ASCE		
Design Conditions:		Pressure/Temperature					
31 Max. Relative Humidity, %		90	Pressure/Speed		100 mph		
32 Elevation (ASL), ft			Category				
33 Area Classification:		Class 1 Div 2	Seismic Design Code:				
34 Electrical Design Code:		NEC	Location				
<b>EQUIPMENT SPECIFICATION</b>							
Type:		<input type="checkbox"/> Elevated <input checked="" type="checkbox"/> Enclosed	Equipment Design:				
36		<input type="checkbox"/> Above Ground	Component		Material / Size / Rating / Other		
37		<input checked="" type="checkbox"/> Stack <input type="checkbox"/> Multiple Stack	Burner				
38		<input type="checkbox"/> Portable / Trailer	Burner Tip / Assist Gas Burner		304 SS		
39			Burner Body		Carbon Steel		
40 Smokeless By:		<input type="checkbox"/> Steam <input type="checkbox"/> Assist Air	Pilot				
41		<input type="checkbox"/> Gas Assist <input checked="" type="checkbox"/> Staging	Pilot Tip		304 SS		
42			Pilot Line(s)		Carbon Steel		
43 Stack:		<input checked="" type="checkbox"/> Self Supporting	Firebox / Stack				
44 Flare Burner:		<input type="checkbox"/> Non-Smokeless <input checked="" type="checkbox"/> Smokeless <input type="checkbox"/> Gas Assist	Shell		Carbon Steel		
45 Pilot:		<input checked="" type="checkbox"/> Intermittent <input type="checkbox"/> Continuous	Piping		Carbon Steel		
46 Pilot Air Inspirator:		<input checked="" type="checkbox"/> Local <input type="checkbox"/> Remote	Nozzles		Carbon Steel		
47 Pilot Flame Control:		<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes (Thermocouple)	Flanges		Carbon Steel		
48			Insulation		Blanket		
49 Pilot Ignition:		<input type="checkbox"/> Flamefront Generator <input checked="" type="checkbox"/> Inspiring Ignitor	Insulation Pins		304 SS		
50		<input type="checkbox"/> Electronic <input checked="" type="checkbox"/> Automatic <input type="checkbox"/> Manual	Refractory		NA		
51		<input type="checkbox"/> With Pilot Flame Control	Refractory Anchors		NA		
52		<input type="checkbox"/> With Auto Pilot Re-Ignition	Ladders and Platforms		NA		
53			Stack Sample Connections		Per EPA requirements		
54 Pilot Ignition Backup:		<input type="checkbox"/> Manual Specify: i.e. Piezo-Electric	Sight Glass		2		
55		<input type="checkbox"/> Battery Pack	Other				

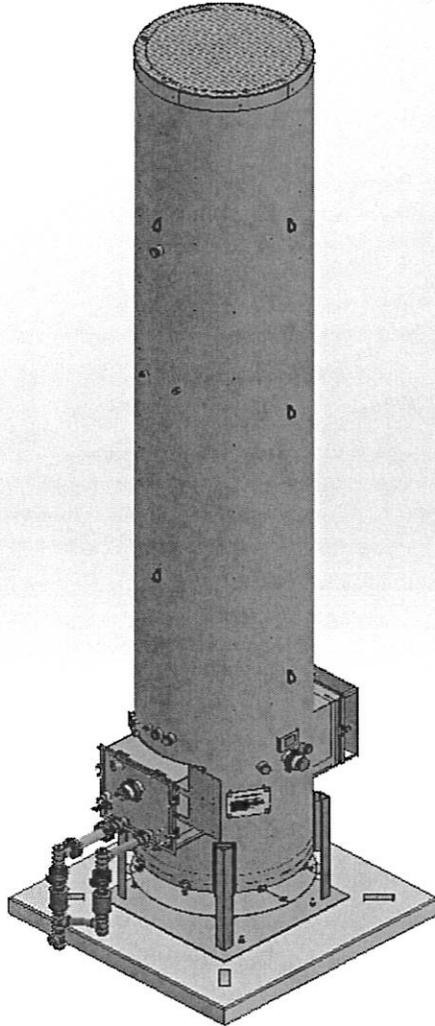
 <b>Environmental Control Equipment</b> <b>Data Sheet</b>		Item/Tag No.:		Page	2	of	3			
		Project No.:		Revision:	B					
Client:		Project:		Date:	27 February 2014					
Site:		P.O. No.:	-	By:	JS					
Unit/Lease:		RFQ No.:	-	Checked:	5G					
		Ref. P&ID:	-	Approved:	MS					
		Remarks:		Supplier:	LEED FABRICATION					
				Model No.:	L30-0011-00					
<b>EQUIPMENT SPECIFICATION</b>										
56	Flame Detection:	<input type="checkbox"/> Thermocouple	<input checked="" type="checkbox"/> Ionization Rod	<b>Auxiliary Equipment</b>						
57		<input type="checkbox"/> UV Scanner		Valves	NA					
58	<b>General Configuration:</b> 			Blowers	NA					
59				Dampers	NA					
60				Inlet KO / Liquid Seal	NA					
61				Flame / Detonation Arrestor	Yes					
62				<b>Instrumentation &amp; Controls</b>			Solenoids / Shut-Off Valves	Check with Sales for available config.		
63							Flow Meters	NA		
64							Calorimeter	NA		
65							Pressure Switches/Transmitters	NA		
66							Thermocouples	Check with Sales for available config.		
67							Temperature Switches/Transmitters	NA		
68				BMS	Check with Sales for available config.					
69				CEMS	NA					
70				Other	NA					
71										
72										
73										
74										
75										
<b>FABRICATION AND INSPECTION</b>										
76	Special requirements	<input type="checkbox"/> Skid Mounted	<input checked="" type="checkbox"/> Concrete Pad	<b>Equipment Info</b>						
77		<input type="checkbox"/> Other		<b>Component</b>	<b>Weight / Dimensions</b>					
78				Burner						
79	Inspection	<input checked="" type="checkbox"/> Vendor Standard		Burner Assembly						
80		<input type="checkbox"/> Other, Specify:		Stack						
81	Material Certification	<input checked="" type="checkbox"/> Vendor Standard		Stack Assembly	48" OD x 25' H					
82		<input type="checkbox"/> MTR		Pilot Tip						
83		<input type="checkbox"/> Certificate of Compliance		Pilot Line(s)						
84		<input type="checkbox"/> Other (Specify):		Stack Assembly						
85	NDE	<input checked="" type="checkbox"/> Vendor Standard		<b>Auxiliary Equipment</b>						
86		<input type="checkbox"/> Radiography, Specify:		Blowers						
87		<input type="checkbox"/> Ultrasonic, Specify:		Inlet KO / Liquid Seal						
88		<input type="checkbox"/> Liquid Penetrant		Flame / Detonation Arrestor						
89		<input type="checkbox"/> Magnetic Particles		Skid						
90		<input type="checkbox"/> PMI, Specify:		<b>Instrumentation &amp; Controls</b>						
91		<input type="checkbox"/> Other, Specify:		BMS						
92	Surface Preparation	<input checked="" type="checkbox"/> Vendor Standard		Control Panel						
93		<input type="checkbox"/> Other, Specify:								
94	Paint System	<input checked="" type="checkbox"/> Vendor Standard								
95		<input type="checkbox"/> Other, Specify:								
96	Finished Color	<input checked="" type="checkbox"/> Vendor Standard								
97		<input type="checkbox"/> Other, Specify:								
98										
99	<b>Additional Notes:</b>									



Environmental Control Equipment  
Data Sheet

Item/Tag No.:		Page	3	of	3
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Project:		Date:	27 February 2014		
P.O. No.:		By:	JS		
RFQ No.:		Checked:	SG		
		Approved:	MS		
Client:		Ref. P&ID:	-		
Site:		Supplier:	LEED FABRICATION		
Unit/Lease:		Remarks:			
		Model No.:	L30-0011-00		

GENERAL ARRANGEMENT





**Source Emissions Test Report  
Leed Fabrication**

**Combustor**

**Milliken, Colorado**

Test Dates:  
October 27- 28, 2011

Report prepared for:  
Leed Fabrication  
12535 Weld County Rd. #2  
Brighton, Colorado 80601

Report prepared by:  
Air Pollution Testing, Inc.  
5530 Marshall St.  
Arvada, CO 80002

APT Project: LDF1350

DENVER OFFICE  
5530 Marshall Street  
Arvada, CO 80002  
(303) 420-5949  
FAX (303) 420-5920  
(800) 268-6213





## Certification

### Team Leader Certification:

I certify that all of the sampling and analytical procedures and data presented in this report are authentic and accurate.

A handwritten signature in cursive script that reads "Dane C. Murray".

Dane Murray  
Field Team Leader

### Reviewer Certification:

I certify that all of the testing details and conclusions are accurate and valid.

A handwritten signature in cursive script that reads "M. Willinger".

Marty Willinger  
Technical Writer



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Field Data.....	Appendix 2
Laboratory Data.....	Appendix 3
Calibration Information.....	Appendix 4
Schematics.....	Appendix 5

## 1. Introduction

Air Pollution Testing, Inc. (APT) was contracted by Leed Fabrication (LDF) to conduct source emissions testing services at a facility near Milliken, CO.

The purpose of the testing program was to determine the concentrations and mass emission rates of non-methane/non-ethane organic compounds (NMEOC) from the exhaust stack of one (1) enclosed flare in service at the facility. Data collected was used to determine the unit's NMEOC destruction removal efficiency (DRE). Concurrent gas velocity and concentration measurements of moisture (H<sub>2</sub>O), oxygen (O<sub>2</sub>), carbon monoxide (CO) and carbon dioxide (CO<sub>2</sub>) were conducted at the exhaust sampling location for the determination of mass emission rates.

The emissions testing program contact personnel are shown in Table 1.1 below.

<b>Leed Fabrication : Incinerator DRE Testing Emissions Testing Program Contact Personnel</b>		
<i>Name, Title</i>	<i>Company, Affiliation Address</i>	<i>Phone, FAX</i>
Mr. Jim Chick, Senior Engineer	Leed Fabrication Services, Inc. 12535 Weld County Road #2 Brighton, Colorado 80601	303-659-6801 ext. 152, 303-558-8909
Mr. Dave Maiers, Operations Director	Air Pollution Testing, Inc. 5530 Marshall Street Arvada, Colorado 80002	303-420-5949 ext. 33, 303-420-5920

**Table 1.1: Emissions Testing Program Contact Personnel**

## 2. Methods

APT tested in accordance with the following United States Environmental Protection Agency (EPA) source emissions test methods (referenced in 40 CFR Part 60, Appendix A).

- *Method 1 – Sample and Velocity Traverses for Stationary Sources*
- *Method 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate*
- *Method 3A – Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)*
- *Method 4 – Determination of Moisture Content of Stack Gases*
- *Method 10 – Determination of Carbon Monoxide Emissions from Stationary Sources*

- *Method 18 – Measurement of Gaseous Organic Compound Emissions by Gas Chromatography*
- *Method 25A – Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer*

**3. Test Program Summary**

APT provided all necessary equipment and labor for the determination of all emission parameters detailed in Table 3.1. All gaseous emission parameters were determined using on-site gas analyzers housed in a mobile, analytical trailer to provide a temperature controlled environment for stable accurate analyzer response.

Triplicate, 60-minute test runs were conducted at the unit exhaust stack for the determination of O<sub>2</sub>, CO<sub>2</sub>, NO<sub>x</sub>, CO and NMOC (non-methane organic compounds) concentrations, as well as volumetric flow. Concurrent with emissions sampling, integrated samples of outlet gas were collected in clean, leak-free Tedlar bags which were analyzed for speciated hydro-carbon content. NMEOC DRE was determined using a carbon balance on exhaust pollutant mass emission rates.

<b>Lead Fabrication : Incinerator DRE Testing Sampling and Analytical Methods</b>			
<i>Gas Parameter</i>	<i>Sampling Method</i>	<i>Analytical Method</i>	<i>Laboratory</i>
gas flow	Methods 1, 2	draft gauge, thermocouple, pitot tube	APT, on-site
O <sub>2</sub> , CO <sub>2</sub>	Method 3A	paramagnetic and non-dispersive infrared analyzers	
H <sub>2</sub> O	Method 4	gravimetric	
CO	Method 10	gas filter correlation, infrared analyzer	
NMOC	Method 25A	flame ionization detector	
C <sub>2</sub> H <sub>6</sub>	Method 18	gas chromatography	APT, off-site

**Table 3.1 Emissions Sampling Methods**

**4. Test Results Summary**

The results of the testing are summarized in Tables 4.1 and 4.2. Any emission parameters not found in the tables may be found in *Appendix 1 – Testing Parameters / Sample Calculations*. The following terms are used in the tables:

- %vd – diluent concentration, dry volume percent
- %vw – moisture content, wet volume percent

- dscfm – stack gas flow rate, dry standard (one atmosphere, 68°F) cubic feet per minute
- lb/hr – pollutant mass emission rate, pounds per hour
- ppmvd – parts per million, dry basis
- NMOC – non-methane organic compounds
- NMEOC – non-methane / non-ethane organic compounds
- % DRE – destruction removal efficiency
- C<sub>3</sub>H<sub>8</sub> – propane

<b>Lead Fabrication : Combustor DRE Testing</b>				
<b>Test Results Summary – 10/27/2010</b>				
	<u>Run #1</u>	<u>Run #2</u>	<u>Run #3</u>	<u>Average</u>
Start Time	11:35	13:43	14:58	
Stop Time	12:35	14:43	15:58	
Stack Temp (°F)	82	89	84	<b>85</b>
Stack Exhaust Flow (dscfm)	1,880	1,779	1,063	<b>1,574</b>
O <sub>2</sub> (%vd)	19.9	20.2	19.5	<b>19.9</b>
CO <sub>2</sub> (%vd)	0.8	0.5	1.0	<b>0.8</b>
H <sub>2</sub> O (%vw)	1.4	1.5	1.4	<b>1.4</b>
CO (ppmvd)	14.5	8.2	14.2	<b>12.3</b>
NMOC (ppmvd as C <sub>3</sub> H <sub>8</sub> )	22.1	24.3	19.2	<b>21.9</b>
NMEOC (ppmvd as C <sub>3</sub> H <sub>8</sub> )	12.7	21.3	17.3	<b>17.1</b>
<b><u>Exhaust Emission Data</u></b>				
CO (lb/hr)	0.1	0.1	0.1	<b>0.1</b>
NMOC (lb/hr as C <sub>3</sub> H <sub>8</sub> )	0.3	0.3	0.1	<b>0.2</b>
NMEOC (lb/hr as C <sub>3</sub> H <sub>8</sub> )	0.2	0.3	0.1	<b>0.2</b>
% DRE (NMOC carbon balance)	99.1	98.7	99.4	<b>99.1</b>
% DRE (NMEOC carbon balance)	99.5	98.8	99.5	<b>99.3</b>

**Table 4.1: Test Results Summary**

<b>Lead Fabrication : Combustor DRE Testing</b>		
<b>Test Results Summary – 10/28/2010</b>		
	<u>Run #1</u>	<u>Run #2</u>
Start Time	10:20	12:29
Stop Time	11:20	12:47
Stack Temp (°F)	72	71
Stack Exhaust Flow (dscfm)	1,591	3,459
O <sub>2</sub> (%vd)	18.5	15.9
CO <sub>2</sub> (%vd)	1.4	3.2
H <sub>2</sub> O (%vw)	1.6	N/A
CO (ppmvd)	19.7	10.5
NMOC (ppmvd as C <sub>3</sub> H <sub>8</sub> )	19.2	2.2
<b><u>Exhaust Emission Data</u></b>		
CO (lb/hr)	0.1	0.2
NMOC (lb/hr as C <sub>3</sub> H <sub>8</sub> )	0.2	0.1
% DRE (NMOC carbon balance)	99.6	100.0
<b><u>Inlet Data</u></b>		
Inlet fuel (oz.)	3.0	13.1

**Table 4.2: Test Results Summary**

**5. Test Method Details**

**5.1. Stack Gas Velocity, Volumetric Flow Rate and Moisture**

Stack gas velocity, volumetric flow rate and moisture (H<sub>2</sub>O) content were measured in accordance with EPA Methods 1, 2 and 4.

Each sampling period consisted of conducting a temperature and differential pressure traverse of the stack using a K-type thermocouple and an S-type pitot tube. Concurrent with the traverse, a sample of gas for moisture determination was extracted from the stack at a constant flow rate of no more than 0.75 cubic feet per minute (cfm). The gas sample passed through a stainless steel probe, through a series of four (4) chilled glass impingers, and through a calibrated dry gas meter. See *Appendix 5 – Schematics* for a diagram of the EPA Methods 1, 2 and 4 sampling train.

Prior to sampling, the first two impingers were each seeded with 100 milliliters of water. The third impinger was empty. The fourth impinger was seeded with 250 grams of dried silica gel. Following sampling, the moisture gain in the impingers was measured

gravimetrically to determine the moisture content of the gas.

All of the above data were combined with concurrently collected diluent data to calculate the stack gas velocity and volumetric flow rate in units of feet per second (ft/sec), actual cubic feet per minute (acfm), dry standard (1 atmosphere and 68°F) cubic feet per minute (dscfm), and pounds per hour (lb/hr).

### 5.2. Diluent (O<sub>2</sub> and CO<sub>2</sub>), and Carbon Monoxide

O<sub>2</sub>, CO<sub>2</sub>, and CO emission concentrations were measured in accordance with EPA Methods 3A (O<sub>2</sub> and CO<sub>2</sub>) and 10 (CO). Each sampling period consisted of extracting a gas sample from the stack at a constant flow rate of approximately three liters per minute (lpm). The sample passed through a refrigeration-type gas conditioner to remove moisture and into the sampling port of a TECO Model 48H gas filter correlation infrared CO analyzer, and a Servomex Series 1400 paramagnetic O<sub>2</sub> / non-dispersive infrared CO<sub>2</sub> analyzer. The gas concentrations were displayed on the analyzer front panels in units of either parts per million, dry volume basis (ppmvd – CO) or percent, dry volume basis (%vvd – O<sub>2</sub> and CO<sub>2</sub>) and logged to a computerized data acquisition system (CDAS). Please see *Appendix 5 – Schematics* for a diagram of the EPA Methods 3A and 10 sampling train.

Before and after each sampling period, the analyzers were challenged with calibration gases to calibrate the instruments, to verify linearity of response, and to quantify zero and span drift for the previous sampling period. The calibration gases were prepared and certified in accordance with EPA Protocol 1. To ensure no system bias, the analyzer calibrations were conducted by introducing all gases to the analyzers at the sampling probe tip at stack pressure. Following sampling, the CDAS data was averaged in one-minute increments, corrected for instrumental drift, and reported as average O<sub>2</sub>, CO<sub>2</sub>, and CO emission concentrations for each sampling period in units of %vvd or ppmvd. The concentration data was combined with concurrently collected stack gas flow data to calculate the CO mass emission rates in units of lb/hr and tpy.

### 5.3. NMOC Emissions

NMOC concentrations were measured in accordance with EPA Methods 25A. A flame ionization detector (FID) was used to determine NMOC levels. The FID was housed in a mobile analytical trailer to provide a temperature-controlled environment for stable, accurate response.

Each sampling period consisted of extracting a gas sample from the stack at a constant flow rate of approximately three liters per minute using a heated Teflon line. The gas was directed into the sampling port of a TECO Model 55i flame ionization analyzer. NMOC concentrations were displayed on the analyzer front panel in units of parts per million, wet volume basis (ppmvw) and logged to a CDAS (see *Appendix 5 – Schematics*).

Before and after each sampling period, the analyzer was challenged with EPA Protocol 1

calibration gases to calibrate the instrument, to verify linearity of response, and to quantify zero and span drift for the previous sampling period. To ensure no system bias, the analyzer calibrations were conducted by introducing all gases to the analyzer at the sampling probe tip at stack pressure. Following sampling, the CDAS data was averaged in one-minute increments, corrected for instrumental drift, and reported as average emission concentrations for each sampling period.

Concurrent with each NMOC sampling run, APT personnel collected an integrated sample of inlet gas for subsequent speciated TVOC analysis by the APT lab in Arvada, CO. The above data was combined with concurrently collected volumetric flow data to calculate NMOC and NMEOC emissions in units of lb/hr, and the system DRE.

## **6. Conclusion**

The results of the testing demonstrate that the combustor in service at the facility operates at >99 % DRE NMEOC.

**AIR POLLUTION CONTROL DEVICE  
Vapor Combustion Control Device Sheet**

*Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.*

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.			
General Information			
1. Control Device ID#:	12S-FLARE	2. Installation Date:	5/31/2015
3. Maximum Rated Total Flow Capacity:	394000 scfd 16416.7 scfh	4. Maximum Design Heat Input:	19.7 MMBtu/hr
		5. Design Heat Content:	1200 Btu/scf
Control Device Information			
6. Select the type of vapor combustion control device being used: <input checked="" type="checkbox"/> New			
<input checked="" type="checkbox"/> Elevated Flare <input type="checkbox"/> Ground Flare <input type="checkbox"/> Thermal Oxidizer <input type="checkbox"/> Completion Combustion Device <input type="checkbox"/> Enclosed Combustion Device			
7. Manufacturer:	Leed	8. Hours of operation per year:	
Model No.:	LDF1350 Dual Stage Combustor	8760	
9. List the emission units whose emissions are controlled by this vapor combustion control device: (Emission Point ID#: 12E-FLARE)			
10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
12E-FLARE	LP Separator Condensate Stabilizer		
<i>If this vapor combustor controls emissions from more than six emission units, please attach additional pages.</i>			
11. Assist Type		12. Flare Height	13. Tip Diameter
<input type="checkbox"/> Steam <input type="checkbox"/> Air <input type="checkbox"/> Pressure <input checked="" type="checkbox"/> None		25	ft
14. Was the design per §60.18?			
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Waste Gas Information			
15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
274	1200	TBD	4.76
19. Provide an attachment with the characteristics of the waste gas stream to be burned.			

Pilot Information				
20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Natural Gas	1	12.5	20,000	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
25. If automatic re-ignition will be used, describe the method: Piezoelectric Inspiring Ignitor				
26. Describe the method of controlling flame:				
27. Is pilot flame equipped with a monitor to detect the presence of the flame?		28. If yes, what type? <input type="checkbox"/> Thermocouple <input type="checkbox"/> Infra-red <input type="checkbox"/> Ultra Violet		
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Camera with monitoring control room    Other, describe:		

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
VOC	100	98
32. Has the control device been tested by the manufacturer and certified? Yes. The control device has been guaranteed by the manufacturer. Please see attached report.		
33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty:  TBD		
34. Additional Information Attached? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no  <i>Please attach a copy of manufacturer's data sheet.</i> <i>Please attach a copy of manufacturer's drawing.</i> <i>Please attach a copy of the manufacturer's performance testing.</i>		

**If any of the requested information is not available, please contact the manufacturer.**

**AIR POLLUTION CONTROL DEVICE  
(OTHER COLLECTORS)**

Control Device ID No. (must match Emission Units Table):

3C-NSCR

Equipment Information	
1. Manufacturer: TBD	2. Control Device Name: 3C-NSCR
Type: NSCR Catalyst	
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: 100%	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: SCFM	10. Capacity:
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.	
N/A	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment. N/A	
13. Description of method of handling the collected material(s) for reuse or disposal. N/A	

Gas Stream Characteristics		
14. Are halogenated organics present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
Are particulates present?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No
Are metals present?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
15. Inlet Emission stream parameters:	<b>Maximum</b>	<b>Typical</b>
Pressure (mmHg):	Not Specified	
Heat Content (BTU/scf):	1400	1220
Oxygen Content (%):	Not Specified	
Moisture Content (%):	Not Specified	
Relative Humidity (%):	Not Specified	

16. Type of pollutant(s) controlled: SO <sub>x</sub> Odor Particulate (type): Other NO <sub>x</sub>						
17. Inlet gas velocity: TBD ft/sec			18. Pollutant specific gravity: N/A			
19. Gas flow into the collector: ACF @ °F and PSIA			20. Gas stream temperature: Inlet: °F Outlet: 960 °F			
21. Gas flow rate: Design Maximum: ACFM Average Expected: ACFM			22. Particulate Grain Loading in grains/scf: N/A Inlet: Outlet:			
23. Emission rate of each pollutant (specify) into and out of collector:						
Pollutant	IN Pollutant		Emission Capture Efficiency %	OUT Pollutant		Control Efficiency %
	lb/hr	grains/acf		lb/hr	grains/acf	
A NO <sub>x</sub>	0.20		100	0.02		88
B VOC	0.10		100	0.10		0
C CO	0.41		100	0.40		78.3
D						
E						
24. Dimensions of stack: Height ft. Diameter ft.						
25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.						

Particulate Distribution		
26. Complete the table: Particulate Size Range (microns)	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
	Weight % for Size Range	Weight % for Size Range
0 – 2	N/A	
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): N/A	
28. Describe the collection material disposal system: Catalyst elements can be cleaned and/or replaced; materials are not disposed of on site.	
29. Have you included <i>Other Collectors Control Device</i> in the Emissions Points Data Summary Sheet?	
30. <b>Proposed Monitoring, Recordkeeping, Reporting, and Testing</b>	
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING:	RECORDKEEPING: All maintenance records will be maintained.
REPORTING: All required emissions test reports will be submitted to appropriate agencies	TESTING: All testing requirements will be performed to ensure catalyst performance.
MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.	
RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.	
REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.	
TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.	
31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.	
32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.	
33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.	
See NGSG operations and maintenance plan submitted with the permit application.	



**COMPRESSCO PARTNERS, G.P.**  
*The Natural Choice in  
 Production Enhancement Services!*



## GJ230

## Natural Gas Engine Performance With Emission Control Package

Maximum Engine Speed (RPM)	2000	Fuel	Nat Gas
Compression Ratio	10:1	Ignition System	CD
Bore	4.360 in. (110.74mm)	Fuel System	NG IMPCO
Stroke	3.850 in. (97.79mm)	Jacket Water Outlet Temperature	180°F (82.2°C)
Displacement	230 c.i. (3.8L)	Minimum Fuel Pressure (psig)	2 oz.

Engine Rating Data	% Load	100%	50%	10%
Engine Power	bhp	46 (34.3kw)	26 (19.39kw)	10 (7.46 kw)

Engine Data				
Specific Fuel Consumption (BSFC)	Btu/bhp-hr	10.7775	10.3792	9.91443
Intake Manifold Pressure	"Hg	-0.8	-8.9	-12.3
Timing	"BTDC	38	38	38
Exhaust Stack Temperature	*F	960	N/A	N/A
Stack Flow Rate	SCF/hr	3965.27	N/A	N/A
Stack Height	94"			
Stack Diameter	2 1/2"			

Engine Emissions Data	% Load	g/bhp-hr	lb/hr	TPY
Nitrous Oxides (NOx)	100	< 2.0	< 0.20	< 0.88
Carbon Monoxide (CO)	100	< 4.0	< 0.37	< 1.78
Volatile Organic Compounds (VOC)	100	< 1.0	< 0.14	< 0.44
CO2	100	(avg %)		11.73%

Test Gas Data				
Methane	94.827 %	Btu	1014.8	

CGJ230 FI Low Pressure				
Displacement	230 c.i. (3.8L)	Maximum Discharge Pressure	125 psig (861.8kPaG)	
Bore	4.360 in. (110.74mm)	Maximum Suction Pressure	12 psig (82.7kPaG)	
Stroke	3.850 in. (97.79mm)	Maximum Compression Ratio	18:1	
Number of Throws	4	Valves	Concentric	
Compression on Head End Only				

CGJ170 MP Medium Pressure				
Displacement	170 c.i. (2.8L)	Maximum Discharge Pressure	450 psig (3447kPaG)	
Bore	3.750 in. (95.25mm)	Maximum Suction Pressure	60 psig (413.7kPaG)	
Stroke	3.850 in. (97.79mm)	Maximum Compression Ratio	18:1	
Number of Throws	4	Valves	Concentric	
Compression on Head End Only				

The GJ230 complies with 40 CFR 60 Subpart JJJJ for the current model year.

CPE-GJNE-004	Effective Date: May 23, 2013	Supersedes: January 15, 2012
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**AIR POLLUTION CONTROL DEVICE  
(OTHER COLLECTORS)**

Control Device ID No. (must match Emission Units Table):

3C-Oxy-cat

**Equipment Information**

1. Manufacturer: TBD		2. Control Device Name: 3C-Oxy-cat	
		Type: Oxidation Catalyst	
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.			
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.			
5. Provide a scale diagram of the control device showing internal construction.			
6. Submit a schematic and diagram with dimensions and flow rates.			
7. Guaranteed minimum collection efficiency for each pollutant collected: 100%			
8. Attached efficiency curve and/or other efficiency information.			
9. Design inlet volume: SCFM		10. Capacity:	
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.			
N/A			
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment. N/A			
13. Description of method of handling the collected material(s) for reuse or disposal. N/A			

**Gas Stream Characteristics**

14. Are halogenated organics present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
Are particulates present? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
Are metals present? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
15. Inlet Emission stream parameters:		
	<b>Maximum</b>	<b>Typical</b>
Pressure (mmHg):	Not Specified	
Heat Content (BTU/scf):	1400	1220
Oxygen Content (%):	Not Specified	
Moisture Content (%):	Not Specified	
Relative Humidity (%):	Not Specified	

16. Type of pollutant(s) controlled: SO <sub>x</sub> , Odor Particulate (type): Other NO <sub>x</sub>						
17. Inlet gas velocity: TBD ft/sec			18. Pollutant specific gravity: N/A			
19. Gas flow into the collector: ACF @ °F and PSIA			20. Gas stream temperature: Inlet: °F Outlet: 973 °F			
21. Gas flow rate: Design Maximum: ACFM Average Expected: ACFM			22. Particulate Grain Loading in grains/scf: N/A Inlet: Outlet:			
23. Emission rate of each pollutant (specify) into and out of collector:						
Pollutant	IN Pollutant		Emission Capture Efficiency %	OUT Pollutant		Control Efficiency %
	lb/hr	grains/acf		lb/hr	grains/acf	
A NO <sub>x</sub>	0.76		100	0.76		0%
B VOC	0.84		100	0.84		0%
C CO	3.92		100	3.04		22%
D						
E						
24. Dimensions of stack: Height ft. Diameter ft.						
25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.						

**Particulate Distribution**

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2	N/A	
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification); N/A	
28. Describe the collection material disposal system: Catalyst elements can be cleaned and/or replaced; materials are not disposed of on site.	
29. Have you included <i>Other Collectors Control Device</i> in the Emissions Points Data Summary Sheet?	
<b>30. Proposed Monitoring, Recordkeeping, Reporting, and Testing</b>	
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.	
MONITORING:	RECORDKEEPING: All maintenance records will be maintained.
REPORTING: All required emissions test reports will be submitted to appropriate agencies	TESTING: All testing requirements will be performed to ensure catalyst performance.
MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.	
RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.	
REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.	
TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.	
31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.	
32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.	
33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.	



# G3508B LE GAS PETROLEUM ENGINE

515 bkW (690 bhp)

## TECHNICAL DATA

### G3508B Gas Petroleum Engine — 1400 rpm

Fuel System		0.5 g NOx NTE Rating DM8826-00	1.0 g NOx NTE Rating DM8827-00
<b>Engine Power</b>			
@ 100% Load	bkW (bhp)	514.53 (690)	514.53 (690)
<b>Engine Speed</b>			
	rpm	1400	1400
Max Altitude @ Rated Torque and 38°C (100°F)	m (ft)	1524 (5000)	1828.8 (6000)
Speed Turndown @ Max Altitude, Rated Torque, and 38°C (100°F)	%	36	36
<b>Aftercooler Temperature</b>			
Stage 1 (JW)	°C (°F)	95.0 (203)	95.0 (203)
Stage 2 (SCAC)	°C (°F)	54.44 (130)	54.44 (130)
<b>Compression Ratio</b>			
		8.0:1	8.0:1
<b>Emissions*</b>			
NOx	g/bkW-hr (g/bhp-hr)	0.67 (0.50)	1.34 (1.00)
CO	g/bkW-hr (g/bhp-hr)	3.46 (2.58)	4.01 (2.99)
CO <sub>2</sub>	g/bkW-hr (g/bhp-hr)	639.67 (477)	610.17 (455)
VOC**	g/bkW-hr (g/bhp-hr)	0.74 (0.55)	0.58 (0.43)
<b>Fuel Consumption***</b>			
@ 100% Load	MJ/bkW-hr (Btu/bhp-hr)	10.26 (7254)	10.00 (7068)
@ 75% Load	MJ/bkW-hr (Btu/bhp-hr)	10.89 (7700)	10.68 (7549)
<b>Heat Balance</b>			
Heat Rejection to Jacket Water			
@ 100% Load			
JW	bkW (Btu/min)	190.24 (10,819)	1953.81 (111,111)
OC	bkW (Btu/min)	46.16 (2625)	46.16 (2625)
Heat Rejection to Aftercooler			
@ 100% Load			
1st Stage AC	bkW (Btu/min)	88.13 (5012)	74.28 (4224)
2nd Stage AC	bkW (Btu/min)	53.63 (3050)	48.62 (2765)
Heat Rejection to Exhaust			
@ 100% Load	bkW (Btu/min)	526.70 (29,953)	502.00 (28,548)
Heat Rejection to Atmosphere			
@ 100% Load	bkW (Btu/min)	61.51 (3498)	61.51 (3498)
<b>Exhaust System</b>			
Exhaust Gas Flow Rate			
@ 100% Load	m <sup>3</sup> /min (cfm)	126.15 (4455)	120.37 (4251)
Exhaust Stack Temperature			
@ 100% Load	°C (°F)	499.44 (931)	512.78 (955)
<b>Intake System</b>			
Air Inlet Flow Rate			
@ 100% Load	m <sup>3</sup> /min (scfm)	45.17 (1595)	42.28 (1493)
<b>Gas Pressure</b>			
	kPag (psig)	48-345 (7-50)	48-345 (7-50)

\*at 100% load and speed, all values are listed as not to exceed

\*\*Volatile organic compounds as defined in U.S. EPA 40 CFR 60, subpart JJJJ

\*\*\*ISO 3046/1