

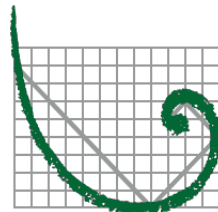


# Noble Energy, Inc.

## G70-D Permit Application Moundsville 9 (MND 9) Natural Gas Production Site

Marshall County, West Virginia

Prepared By:



**ERM**

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.  
Hurricane, West Virginia

April 2017

1000 Noble Energy Drive  
Canonsburg, PA 15317  
Tel: 724-820-3000  
Fax: 724-820-3098  
www.nobleenergyinc.com



April 27, 2017

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

RE: Noble Energy, Inc.  
Moundsville 9 (MND 9) Natural Gas Production Site  
G70-D General Permit Application  
Marshall County, West Virginia

Dear Director Durham:

Noble Energy, Inc respectfully submits the enclosed copies of a G70-D General Permit Application to conduct a modification to the Moundsville 9 (MND 9) natural gas production site that will trigger a substantive emission control rule, which requires permitting under WV45CSR13. We look forward to working towards a timely review and issuance of the permit.

The intention of this submittal is to permit the addition of a two hundred eleven (211) horsepower CAT G3306TAA engine that is subject to 40CFR60 JJJJ regulations.

Please note that the newspaper notification will be published and the original affidavit remitted to the Department. Enclosed are one (1) original hard copy and two (2) complete PDFs included on CD-ROM of the G70-D General Permit Application for the MND 9 natural gas production site.

Should you have any questions or require further information the application package, please do not hesitate to contact me at [Phil.Schlagel@nblenergy.com](mailto:Phil.Schlagel@nblenergy.com) or 724-820-3000.

We thank you in advance for your efforts in reviewing this submittal.

Sincerely,

Phil Schlagel  
Noble Energy, Inc

Enclosures:

## 1.0 INTRODUCTION NARRATIVE

Noble Energy Inc. (Noble) submits this G-70D General Permit Application to the West Virginia Department of Environmental Protection Division of Air Quality (WVDAQ) for the Moundsville 9 (MND 9) natural gas production site located in Marshal County, West Virginia. This application addresses the operational activities associated with the production of natural gas, condensate, and produced water at the MND 9 pad.

On December 19, 2016 WVDAQ issued a Permit Applicability Determination to Noble for the operations of the MND 9 pad. The evaluation concluded that a permit would not be required for the operation of the following equipment:

- Six (6) Natural Gas Wells;
- Six (6) Gas Production Units/Heaters each rated at 1.00 MMBtu/hr heat input;
- Four (4) 400 barrel (bbl) Produced Water Tanks; and
- Produced Water Truck Loadout;

With the submittal of this permit application, Noble seeks the authority to modify the site to include the addition of an engine which requires agency approval to construct due to NSPS JJJJ regulations. Noble now seeks the authority to operate the following equipment at the MND 9 pad:

- Six (6) Natural Gas Wells;
- Six (6) Gas Production Units/Heaters each rated at 1.00 MMBtu/hr heat input;
- Four (4) 400 bbl Produced Water Tanks;
- Produced Water Truck Loadout; and
- One (1) CAT G3306TAA engine rated at two hundred eleven (211) horsepower (hp) to pull gas off the sales gas pipeline to reinject natural gas into a single well to aide in unloading of fluids from the production well. The engine will also aide in routing gas to the sales pipeline.

### Statement of aggregation

The MND 9 pad is located in Marshal County, WV and operated by Noble. Stationary sources of air pollutants may require aggregation of total emission levels if these sources share the same industrial grouping, are operating under common control, and are classified as contiguous or adjacent properties. Noble operates the MND 9 site with the same industrial grouping as nearby facilities, and some of these facilities are under common control. However, the MND 9 site is not subject to the aggregation of stationary emission sources because these sites do not meet the definition of contiguous or adjacent facilities.

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Moundsville 9 (MND 9) Natural Gas Production Site  
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The MND 9 site operates under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding wells operated by Noble that share the same two-digit major SIC code of 13 for Crude Petroleum and Natural Gas Extraction. Therefore, the MND 9 site does share the same SIC codes as the surrounding wells.

Noble is the sole operator of the MND 9 site. Noble is also the sole operator of other production sites and compressor stations in the area. Therefore, Noble does qualify as having nearby operations under common control.

On August 18, 2016 the EPA Administrator signed the *Source Determination for Certain Emission Units in the Oil and Natural Gas Sector*. This notice clarified EPA's position regarding how properties in the oil and natural gas sector are determined to be adjacent in order to assist permitting authorities and permit applicants in making consistent source determinations. The following proposed regulatory text defines "adjacent" for the oil and gas sector in terms of proximity.

*Pollutant emitting activities shall be considered adjacent if they are located on the same surface site, or on surface sites that are located within ¼ mile of one another.*

There are no Noble owned or operated sites within a ¼ mile radius of the MND 9 pad. Nearby sites do not meet the definition of contiguous or adjacent properties since they are not in contact and do not share a common boundary. The operations conducted at the MND 9 site do not rely on or interact with other sites. Furthermore, operations separated by this distance do not meet the common sense notion of a "plant."

Based on the above reasoning, Noble is not subject to the aggregation of stationary emission sources since the stationary sources are not considered contiguous or adjacent facilities.

## **2.0 REGULATORY DISCUSSION**

This section outlines the State air quality regulations that could be reasonably expected to apply to the MND 9 site and makes an applicability determination for each regulation based on activities conducted at the site and the emissions of regulated air pollutants.

### **West Virginia State Air Regulations**

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

The line heaters associated with gas production units are indirect heat exchangers that combust natural gas, but are exempt from this regulation since the heat input capacities are less than 10 MMBtu/hr.

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

Operations conducted at the MND 9 site are subject to this requirement. Based on the nature of the process at the site, the presence of objectionable odors is unlikely.

*45 CSR 06 – Control of Air Pollution from the Combustion of Refuse*

This rule establishes emission standards for particulate matter and requirements for activities involving incineration of refuse. There will be no flaring or incineration activities at the MND 9 site; therefore, the site is not subject to this requirement.

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

The GPU heaters are indirect heat exchangers that combust natural gas, but are exempt from this regulation since the heat input capacities are less than 10 MMBtu/hr.

*45 CSR 13 – Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants*

This G-70D General Permit application is being submitted for the operational activities associated with Noble's production of natural gas.

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

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD). Operation of equipment at the MND 9 site will not exceed emission thresholds established by this permitting program. Noble will monitor future construction and modification activities at the site closely and will compare any future increase in emissions with the PSD thresholds to ensure these activities will not trigger this program.

*45 CSR 16 - Standards of Performance for New Stationary Sources (NSPS)*

45 CSR 16 applies to all registrants that are subject to any of the NSPS requirements, which are described in more detail in the Federal Regulations section. Applicable requirements of NSPS, Subparts JJJJ and OOOO/OOOOa are included in the G70-D General Permit.

*45 CSR 19 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contributed to Non-attainment*

Federal construction permitting programs regulate new and modified sources of non-attainment pollutants under Non-Attainment New Source Review (NNSR). Marshall County, WV is in full attainment for all nonattainment for the 2010 Sulfur Dioxide standard with a National Ambient Air Quality Standard (NAAQS). The sulfur dioxide

Noble Energy, Inc.  
Moundsville 9 (MND 9) Natural Gas Production Site  
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potential to emit for the MND 9 site is 0.02 tpy. Noble will monitor future construction and modification activities at the site that would cause an increase in emissions.

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

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

*45 CSR 30 – Requirements for Operating Permits*

45 CSR 30 applies to the requirements of the federal Title V operating permit program (40 CFR 70). The major source thresholds for the Title V operating permit program regulations are 10 tons per year (tpy) of a single hazardous air pollutant (HAP), 25 tpy of any combination of HAPs, or 100 tpy of all other regulated pollutants.

The potential emissions of all regulated pollutants at the proposed facility are below the corresponding major source threshold(s). Therefore, the MND 9 site will not be a major source under the Title V program.

*45 CSR 34 – National Emission Standards for Hazardous Air Pollutants (NESHAP)*

45 CSR 34 applies to all registrants that are subject to any of the NESHAP requirements. Additional discussion is provided in the federal discussion of this permit application.

## **Federal Regulations**

### **New Source Performance Standards**

*40 CFR 60, Subpart OOOO (Standards of Performance for Crude oil and Natural Gas Production, Transmission and Distribution)*

Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>) emissions from affected facilities that commence construction, modification or reconstruction between August 23, 2011 and September 18, 2015. The site commenced construction on 9/21/2014 and, therefore, will be subject to Subpart OOOO.

Noble will operate the following affected facilities under Subpart OOOO:

- Each gas well affected facility, which is a single natural gas well; and

The MND 9 site does not operate equipment that would qualify as an affected facility for the following:

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Moundsville 9 (MND 9) Natural Gas Production Site  
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- Storage vessels: Emissions from each storage vessel are expected to be below 6 tons per year (tpy) of VOC. Therefore, the produced water tanks are not affected storage vessels; and
- Pneumatic Controllers: All pneumatic controllers installed at the MND 9 site are low-continuous bleed or intermittent bleed and do not qualify as affected sources.

*Subpart OOOOa (Standards Of Performance For Crude Oil And Natural Gas Facilities For Which Construction, Modification, Or Reconstruction Commenced After September 18, 2015)*

The MND 9 commenced construction before September 18, 2015 and the addition of a compressor does not trigger collection of fugitive components affected facility status for a well pad. Therefore, the MND 9 site does not qualify as an affected facility under OOOOa. Furthermore, the addition of this compressor engine does not trigger compressor affected facility status because the compressor engine is located at a well pad.

*40 CFR 60 Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)*

Subpart JJJJ sets forth nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and volatile organic compound (VOC) emission limits, fuel requirements, installation requirements, and monitoring requirements based on the year of manufacture of the subject internal combustion engine.

The MND 9 site operates a CAT G3306TAA engine rated at 211 hp. Based upon the engine rating and an engine manufacture date of September 8, 2008, this engine is subject to requirements under 40 CFR 60 JJJJ.

Noble must keep a maintenance plan and records of conducted maintenance as well as conduct an initial performance test to demonstrate compliance with NO<sub>x</sub>, CO, and VOC emission standards of 2.0, 4.0, and 1.0 g/hp-hr, respectively.

No additional NSPS are expected to be applicable to this facility.

### **National Emissions Standards for Hazardous Air Pollutants**

*40CFR63 Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)*

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAPs) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This Subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

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The CAT G3306TAA engine meets the requirements of 40 CFR 60 Subpart JJJJ. Per 40CFR63.6590(c)(1), no further requirements apply for a new or reconstructed stationary RICE located at an area source subject to regulation under 40 CFR 60 Subpart JJJJ.

The following NESHAP are not applicable to the MND 9 site:

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

No additional NESHAP are expected to be applicable to this facility.

General Permit G70-D will establish an emission cap on the following regulated and hazardous air pollutants:

Pollutant	Maximum Annual Emission Limit (tons/year)	MND 9 Potential to Emit (PTE) (tons/year)
Nitrogen Oxides	50	3.17
Carbon Monoxide	80	2.83
Volatile Organic Compounds	80	3.84
Particulate Matter – 10/2.5	20	0.16
Sulfur Dioxide	20	0.02
Any Single Hazardous Air Pollutant	8	0.42 (as Formaldehyde)
Total Hazardous Air Pollutants	20	0.53

The fugitive emissions of a stationary source shall not be considered in determining whether it is a major stationary source for the purposes of 45CSR30-2.26.b or for eligibility of this General Permit.





west virginia department of environmental protection

Division of Air Quality  
601 57<sup>th</sup> Street SE  
Charleston, WV 25 4  
Phone (304) 926-0475  
Fax (304) 926-0479  
www.dep.wv.gov

### G70-D GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

- CONSTRUCTION
- MODIFICATION
- RELOCATION

- CLASS I ADMINISTRATIVE UPDATE
- CLASS II ADMINISTRATIVE UPDATE

#### SECTION I. GENERAL INFORMATION

Name of Applicant (as registered with the WV Secretary of State's Office): **Noble Energy, Inc.**

Federal Employer ID No. (FEIN): **73-0785597**

Applicant's Mailing Address: **1000 Noble Energy Drive**

City: **Cannonsburg**

State: **PA**

ZIP Code: **15317**

Facility Name: **Moundsville 9 (MND 9)**

Operating Site Physical Address: **2795 Taylors Ridge Road**  
If none available, list road, city or town and zip of facility.

City: **Moundsville**

Zip Code: **26041**

County: **Marshall**

Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits):

Latitude: **39.83150**

Longitude: **-80.78710**

SIC Code: **1311**

DAQ Facility ID No. (For existing facilities)

NAICS Code: **211111**

**051-00233**

#### CERTIFICATION OF INFORMATION

This G70-D 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 the 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, 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 G70-D Registration Application will be returned to the applicant. Furthermore, if the G70-D forms are not utilized, the application will be returned to the applicant. No substitution of forms is allowed.**

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 Division of Air Quality immediately.

I hereby certify that all information contained in this G70-D General Permit Registration Application and any supporting documents appended hereto is, to the best of my knowledge, true, accurate and complete, and that all reasonable efforts have been made to provide the most comprehensive information possible.

Responsible Official Signature: \_\_\_\_\_

Name and Title: **RJ Moses - Operations Manager**

Phone: **724-820-3000**

Fax: **724-820-3098**

Email: **rj.moses@nblenergy.com**

Date: **4/28/17**

If applicable:

Authorized Representative Signature: \_\_\_\_\_

Name and Title:

Phone:

Fax:

Email:

Date:



west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25 4
Phone (304) 926-0475
Fax (304) 926-0479
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G70-D GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION,
RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF
NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

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

If applicable:

Environmental Contact

Name and Title: Phil Schlagel - Air Quality Manager Phone: 281-872-3202 Fax:

Email: phil.schlagel@nbenergy.com Date:

OPERATING SITE INFORMATION

Briefly describe the proposed new operation and/or any change(s) to the facility: Installation of 211 hp engine
subject to 40CFR 60 Subpart JJJJ.

Directions to the facility: From WV Route 2 South at traffic signal, make a left turn onto WV Alternate
2 (Round Bottom Hill Road and travel 1.54 miles to CR 88/5 (Lindsey Lane), make a right onto
Lindsey Lane and travel 1.77 miles to CR 21 (Roberts Ridge Road), make a right onto Roberts Ridge
Road and travel 3.38 miles to CR 2/1 (Taylors Ridge/McFarland Run Road), make a right onto
Taylors Ridge/McFarland Run Road and travel 1.26 miles to intersection, make a right and follow
road until you reach a gate. Travel through the gate to the intersection, make a left and travel for
3000

ATTACHMENTS AND SUPPORTING DOCUMENTS

I have enclosed the following required documents:

Check payable to WVDEP - Division of Air Quality with the appropriate application fee (per 45CSR13 and 45CSR22).

- Check attached to front of application.
I wish to pay by electronic transfer. Contact for payment (incl. name and email address):
I wish to pay by credit card. Contact for payment (incl. name and email address): Phil Schlagel -
phil.schlagel@nbenergy.com

- \$500 (Construction, Modification, and Relocation) \$300 (Class II Administrative Update)
\$1,000 NSPS fee for 40 CFR60, Subpart IIII, JJJJ, OOOO and/or OOOOa 1
\$2,500 NESHAP fee for 40 CFR63, Subpart ZZZZ and/or HH 2

1 Only one NSPS fee will apply.

2 Only one NESHAP fee will apply. The Subpart ZZZZ NESHAP fee will be waived for new engines that satisfy
requirements by complying with NSPS, Subparts IIII and/or JJJJ.
NSPS and NESHAP fees apply to new construction or if the source is being modified.

Responsible Official or Authorized Representative Signature (if applicable)

Single Source Determination Form (must be completed) - Attachment A

Siting Criteria Waiver (if applicable) - Attachment B

Current Business Certificate - Attachment C

Process Flow Diagram - Attachment D

Process Description - Attachment E

Plot Plan - Attachment F

Area Map - Attachment G

G70-D Section Applicability Form - Attachment H

Emission Units/ERD Table - Attachment I



west virginia department of environmental protection

Division of Air Quality  
601 57<sup>th</sup> Street SE  
Charleston, WV 254  
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Fax (304) 926-0479  
www.dep.wv.gov

## G70-D GENERAL PERMIT REGISTRATION APPLICATION

PREVENTION AND CONTROL OF AIR POLLUTION IN REGARD TO THE CONSTRUCTION, MODIFICATION, RELOCATION, ADMINISTRATIVE UPDATE AND OPERATION OF NATURAL GAS PRODUCTION FACILITIES LOCATED AT THE WELL SITE

- |  |   |
|--|---|
| <input type="checkbox"/> CONSTRUCTION            | <input type="checkbox"/> CLASS I ADMINISTRATIVE UPDATE  |
| <input checked="" type="checkbox"/> MODIFICATION | <input type="checkbox"/> CLASS II ADMINISTRATIVE UPDATE |
| <input type="checkbox"/> RELOCATION              |   |

Fugitive Emissions Summary Sheet – Attachment J

Gas Well Affected Facility Data Sheet (if applicable) – Attachment K

Storage Vessel(s) Data Sheet (include gas sample data, USEPA Tanks, simulation software (e.g. ProMax, E&P Tanks, HYSYS, etc.), etc. where applicable) – Attachment L

Natural Gas Fired Fuel Burning Unit(s) Data Sheet (GPUs, Heater Treaters, In-Line Heaters if applicable) – Attachment M

Internal Combustion Engine Data Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment N

Tanker Truck/Rail Car Loading Data Sheet (if applicable) – Attachment O

Glycol Dehydration Unit Data Sheet(s) (include wet gas analysis, GRI- GLYCalc<sup>TM</sup> input and output reports and information on reboiler if applicable) – Attachment P

Pneumatic Controllers Data Sheet – Attachment Q

Pneumatic Pump Data Sheet – Attachment R

Air Pollution Control Device/Emission Reduction Device(s) Sheet(s) (include manufacturer performance data sheet(s) if applicable) – Attachment S

Emission Calculations (please be specific and include all calculation methodologies used) – Attachment T

Facility-wide Emission Summary Sheet(s) – Attachment U

Class I Legal Advertisement – Attachment V

One (1) paper copy and two (2) copies of CD or DVD with pdf copy of application and attachments

**All attachments must be identified by name, divided into sections, and submitted in order.**

# **Attachment A**

## ATTACHMENT A - SINGLE SOURCE DETERMINATION FORM

Classifying multiple facilities as one “stationary source” under 45CSR13, 45CSR14, and 45CSR19 is based on the definition of Building, structure, facility, or installation as given in §45-14-2.13 and §45-19-2.12. The definition states:

*“Building, Structure, Facility, or Installation” means all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant-emitting activities are a part of the same industrial grouping if they belong to the same “Major Group” (i.e., which have the same two (2)-digit code) as described in the Standard Industrial Classification Manual, 1987 (United States Government Printing Office stock number GPO 1987 0-185-718:QL 3).*

The Source Determination Rule for the oil and gas industry was published in the Federal Register on June 3, 2016 and will become effective on August 2, 2016. EPA defined the term “adjacent” and stated that equipment and activities in the oil and gas sector that are under common control will be considered part of the same source if they are located on the same site or on sites that share equipment and are within ¼ mile of each other.

Is there equipment and activities in the same industrial grouping (defined by SIC code)?

Yes  No

Is there equipment and activities under the control of the same person/people?

Yes  No

Is there equipment and activities located on the same site or on sites that share equipment and are within ¼ mile of each other?

Yes  No

**Attachment B -  
Not Applicable**

# **Attachment C**

# State of West Virginia



## Certificate

*I, Natalie E. Tennant, Secretary of State of the  
State of West Virginia, hereby certify that*

by the provisions of the West Virginia Code, Articles of Merger were received and filed,  
MERGING NOBLE ENERGY MARKETING, INC., A QUALIFIED DE ORGANIZATION, WITH AND INTO NOBLE ENERGY,  
INC., A QUALIFIED DE ORGANIZATION.

Therefore, I hereby issue this

### CERTIFICATE OF MERGER



*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
December 15, 2010*

*Natalie E. Tennant*

Secretary of State



State of Delaware  
Secretary of State  
Division of Corporations  
Delivered 06:59 PM 12/17/2009  
FILED 06:59 PM 12/17/2009  
SRV 091114165 - 0738126 FILE

**CERTIFICATE OF MERGER  
OF  
NOBLE ENERGY MARKETING, INC.  
(a Delaware corporation)  
WITH AND INTO  
NOBLE ENERGY, INC.  
(a Delaware corporation)**

Pursuant to Title 8, Section 251(c) of the Delaware General Corporation Law, the undersigned corporation hereby certifies the following:

1. The name of the surviving corporation is Noble Energy, Inc., a Delaware corporation, and the name of the corporation being merged into the surviving corporation is Noble Energy Marketing, Inc., a Delaware corporation.
2. The Agreement of Merger has been approved, adopted, certified, executed, and acknowledged by each of the constituent corporations.
3. The name of the surviving corporation is Noble Energy, Inc., a Delaware corporation.
4. The Certificate of Incorporation of Noble Energy, Inc. shall be the Certificate of Incorporation of the surviving corporation.
5. The merger is to become effective at 11:59 p.m. Eastern time on December 31, 2009.
6. A copy of the Agreement of Merger is on file at the place of business of Noble Energy, Inc., which is located at 100 Glenborough Drive, Suite 100, Houston, Texas 77067.
7. Upon request, a copy of the Agreement of Merger will be furnished by Noble Energy, Inc., without cost, to any stockholder of the constituent corporations.

IN WITNESS WHEREOF, the undersigned has caused this Certificate of Merger to be executed by its duly authorized officer as of the 16th day of December, 2009.

**NOBLE ENERGY, INC.**

By: /s/ David L. Stover  
Name: David L. Stover  
Title: Vice President

# Delaware

PAGE 1

*The First State*

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF MERGER, WHICH MERGES:

"NOBLE ENERGY MARKETING, INC.", A DELAWARE CORPORATION, WITH AND INTO "NOBLE ENERGY, INC." UNDER THE NAME OF "NOBLE ENERGY, INC.", A CORPORATION ORGANIZED AND EXISTING UNDER THE LAWS OF THE STATE OF DELAWARE, AS RECEIVED AND FILED IN THIS OFFICE THE SEVENTEENTH DAY OF DECEMBER, A.D. 2009, AT 6:59 O'CLOCK P.M.

AND I DO HEREBY FURTHER CERTIFY THAT THE EFFECTIVE DATE OF THE AFORESAID CERTIFICATE OF MERGER IS THE THIRTY-FIRST DAY OF DECEMBER, A.D. 2009, AT 11:59 O'CLOCK P.M.

**FILED**

DEC 15 2010


IN THE OFFICE OF  
SECRETARY OF STATE



0738126 8100M

101192174

You may verify this certificate online  
at [corp.delaware.gov/authvwr.shtml](http://corp.delaware.gov/authvwr.shtml)

  
Jeffrey W. Bullock, Secretary of State  
AUTHENTICATION: 8430215

DATE: 12-15-10

AC

# State of West Virginia



## Certificate

*I, Natalie E. Tennant, Secretary of State of the  
State of West Virginia, hereby certify that*

**NOBLE ENERGY MARKETING, INC.**

**Control Number: 99D1Z**

a corporation formed under the laws of Delaware has filed its "Application for Certificate of Authority" to transact business in West Virginia as required by the provisions of the West Virginia Code. I hereby declare the organization to be registered as a foreign corporation from its effective date of January 29, 2009.

Therefore, I issue this

### **CERTIFICATE OF AUTHORITY**

to the corporation authorizing it to transact business in West Virginia



*Given under my hand and the  
Great Seal of the State of  
West Virginia on this day of  
January 29, 2009*

*Natalie E. Tennant*

Secretary of State

FILED

Stamps

JAN 29 2009



IN THE OFFICE OF  
SECRETARY OF STATE  
WEST VIRGINIA

Nathalie E. Tennant  
Secretary of State  
State Capitol  
1900 Kanawha Blvd. E.  
Charleston, WV 25305  
FILE ONE ORIGINAL  
FEE\$ PER SCHEDULE

**CERTIFICATE OF  
AUTHORITY**

Penney Baker, Manager  
Corporations Division  
Tel. (304) 538-8000  
Fax (304) 538-2381  
www.wvssa.com  
Hours: 8:30am-5:00pm  
PLEASE READ INSTRUCTIONS

CTRL # \_\_\_\_\_

**1. HOME STATE INFORMATION:**

- a. The name of the corporation as it is registered in its home state is: Noble Energy Marketing, Inc.
- b. State of Delaware Date of Incorporation January 18, 1994 Duration (if yrs. or periods) Perpetual  
Warning: The reporting requirements in West Va. will not not until a withdrawal is filed. (if an insurance company)
- c. NAIC # \_\_\_\_\_

**2. PRINCIPAL OFFICE INFORMATION:**

- a. Address of the principal office of the corporation:  
No. & Street 100 Glenborough Drive, Suite 100  
Houston, TX 77067  
City/State/Zip \_\_\_\_\_
- b. Mailing address, if different, from above address:  
Street/PO Box \_\_\_\_\_  
City/State/Zip \_\_\_\_\_

**3. WEST VIRGINIA INFORMATION:**

- a. Corporate name to be used in W. Va.:  
(check one, follow instructions)  
 Home state name as listed on line 1.a. above, if available.  
 DBA name
- b. Address of registered office in West Virginia, if any:  
No. & Street 707 Virginia Street East  
Charleston, WV 25301  
City/State/Zip \_\_\_\_\_
- c. Mailing address in WV, if different, from above:  
Street/PO Box \_\_\_\_\_  
City/State/Zip \_\_\_\_\_
- d. Proposed purpose(s) for transaction of business in WV:  
Oil & gas

**4. AGENT OF PROCESS:**

Properly designated person to whom notice of process may be sent, if any:

Name C T Corporation System  
Address 707 Virginia Street East, Charleston, WV 25301

5. CORPORATE STATUS INFORMATION:

- a. Corporation is organized as (check one):  For profit  
 Non-profit

b. Directors and Officers: (Add extra page if necessary; please list all officers)

Officer Name Address

Please see attached list.

---

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6. The number of acres of land it holds or expects to hold in West Virginia is: \_\_\_\_\_

7. Contact and Signature Information

- a. Janet Pagan 281.872.3100  
Contact Name Phone Number
- b. Kirk A. Moore Assistant Secretary  
Print or type name of signer Title or Capacity of Signer
- c. Signature of Signer: Kirk A. Moore Date: Jan 28, 2009

**NOBLE ENERGY MARKETING, INC.**  
a Delaware corporation

**Directors**

Charles D. Davidson  
100 Glenborough Drive, Suite 100  
Houston, Texas 77067

Chris Tong  
100 Glenborough Drive, Suite 100  
Houston, Texas 77067

Arnold J. Johnson  
100 Glenborough Drive, Suite 100  
Houston, Texas 77067

**Officers**

<b><u>Name</u></b>	<b><u>Title(s)</u></b>	<b><u>Address</u></b>
Charles D. Davidson	Chief Executive Officer	100 Glenborough Drive, Suite 100 Houston, Texas 77067
David L. Stover	Vice President	100 Glenborough Drive, Suite 100 Houston, Texas 77067
Arnold J. Johnson	Vice President, General Counsel, and Secretary	100 Glenborough Drive, Suite 100 Houston, Texas 77067
Chris Tong	Vice President - Finance and Treasurer	100 Glenborough Drive, Suite 100 Houston, Texas 77067
Kirk A. Moore	Assistant Secretary	100 Glenborough Drive, Suite 100 Houston, Texas 77067

# Delaware

PAGE 1

*The First State*

I, JEFFREY W. BULLOCK, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY "NOBLE ENERGY MARKETING, INC." IS DULY INCORPORATED UNDER THE LAWS OF THE STATE OF DELAWARE AND IS IN GOOD STANDING AND HAS A LEGAL CORPORATE EXISTENCE SO FAR AS THE RECORDS OF THIS OFFICE SHOW, AS OF THE TWENTY-NINTH DAY OF JANUARY, A.D. 2009.

AND I DO HEREBY FURTHER CERTIFY THAT THE SAID "NOBLE ENERGY MARKETING, INC." WAS INCORPORATED ON THE EIGHTEENTH DAY OF JANUARY, A.D. 1994.

AND I DO HEREBY FURTHER CERTIFY THAT THE ANNUAL REPORTS HAVE BEEN FILED TO DATE.


AND I DO HEREBY FURTHER CERTIFY THAT THE FRANCHISE TAXES HAVE BEEN PAID TO DATE.

2372438 8300

090081032

You may verify this certificate online  
at [corp.delaware.gov/authvar.shtml](http://corp.delaware.gov/authvar.shtml)



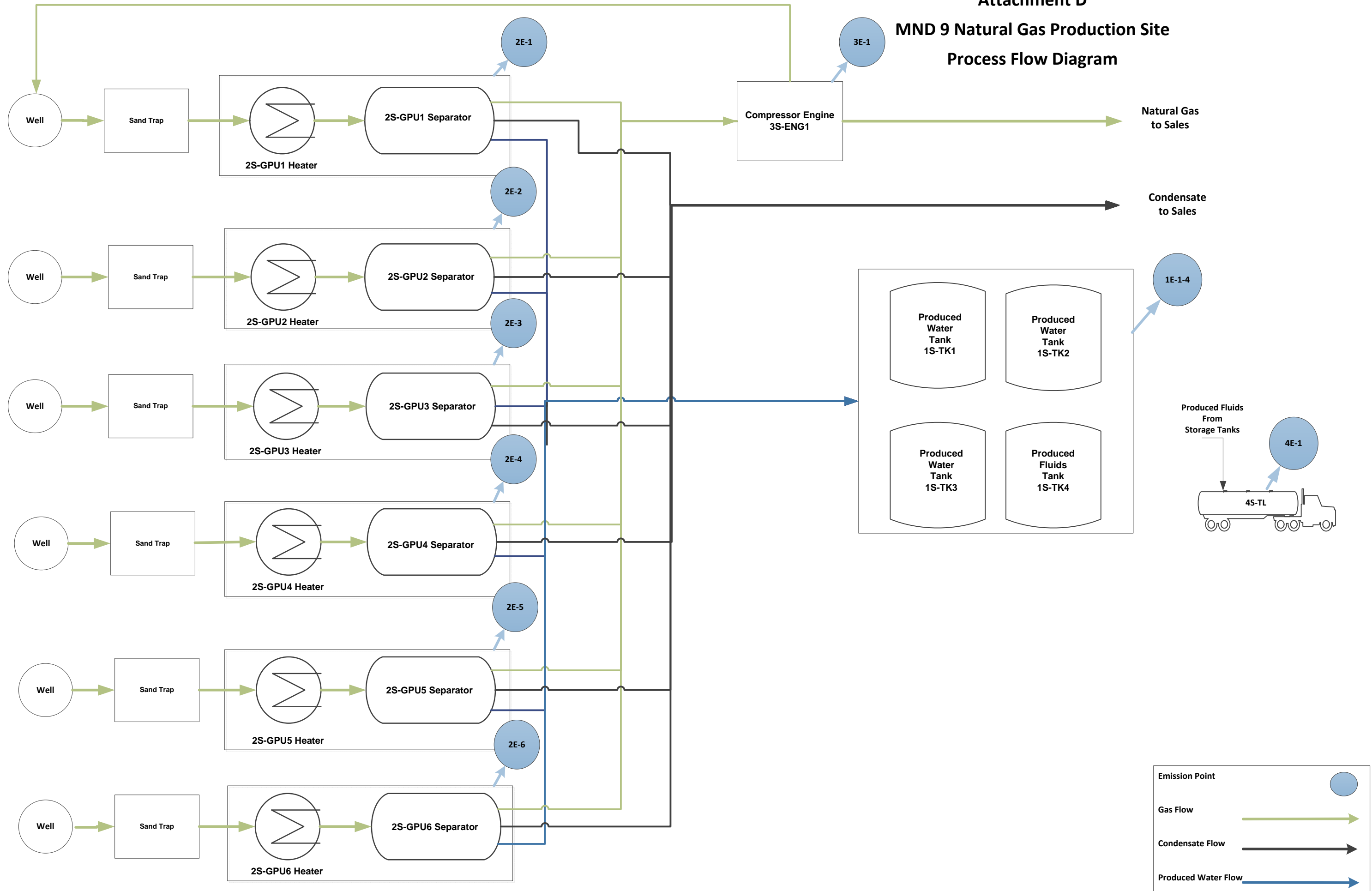
  
Jeffrey W. Bullock, Secretary of State  
AUTHENTICATION: 7106879

DATE: 01-29-09

# **Attachment D**



**Attachment D**  
**MND 9 Natural Gas Production Site**  
**Process Flow Diagram**



# **Attachment E**

## **Attachment E**

### **Process Description**

This permit application is being filed for Noble Energy Inc. for the production of condensate, gas, and produced water from six (6) production wellheads and associated well equipment at the Moundsville 9 (MND 9) natural gas production site.

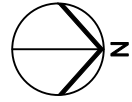
Natural gas, condensate, and produced water flows from six (6) wellheads through six (6) gas production units (GPU) and heaters (2S-GPU1-6) where three phase separation occurs. The natural gas and condensate from the GPUs will exit the site via a sales gas pipeline. Produced water from the separators flows into four (4) Produced Water Tanks (1S-TK1-4). Produced water is transported off-site via tanker trucks. Emissions from the Produced Water Tanks and tanker truck loading activities are vented to the atmosphere.

A two hundred eleven (211) horsepower CAT G3306TAA engine (3S-ENG1) will be used to pull gas off the sales gas pipeline to reinject natural gas into a single well to aide in unloading fluids from the production well. The engine will also aide in routing gas to the sales pipeline.

A process flow diagram is included as Attachment D.

# **Attachment F**

Coordinates  
Latitude: 39.83150  
Longitude: -80.78710  
Elevation: 1,240 ft  
Drawn: 4/10/2017

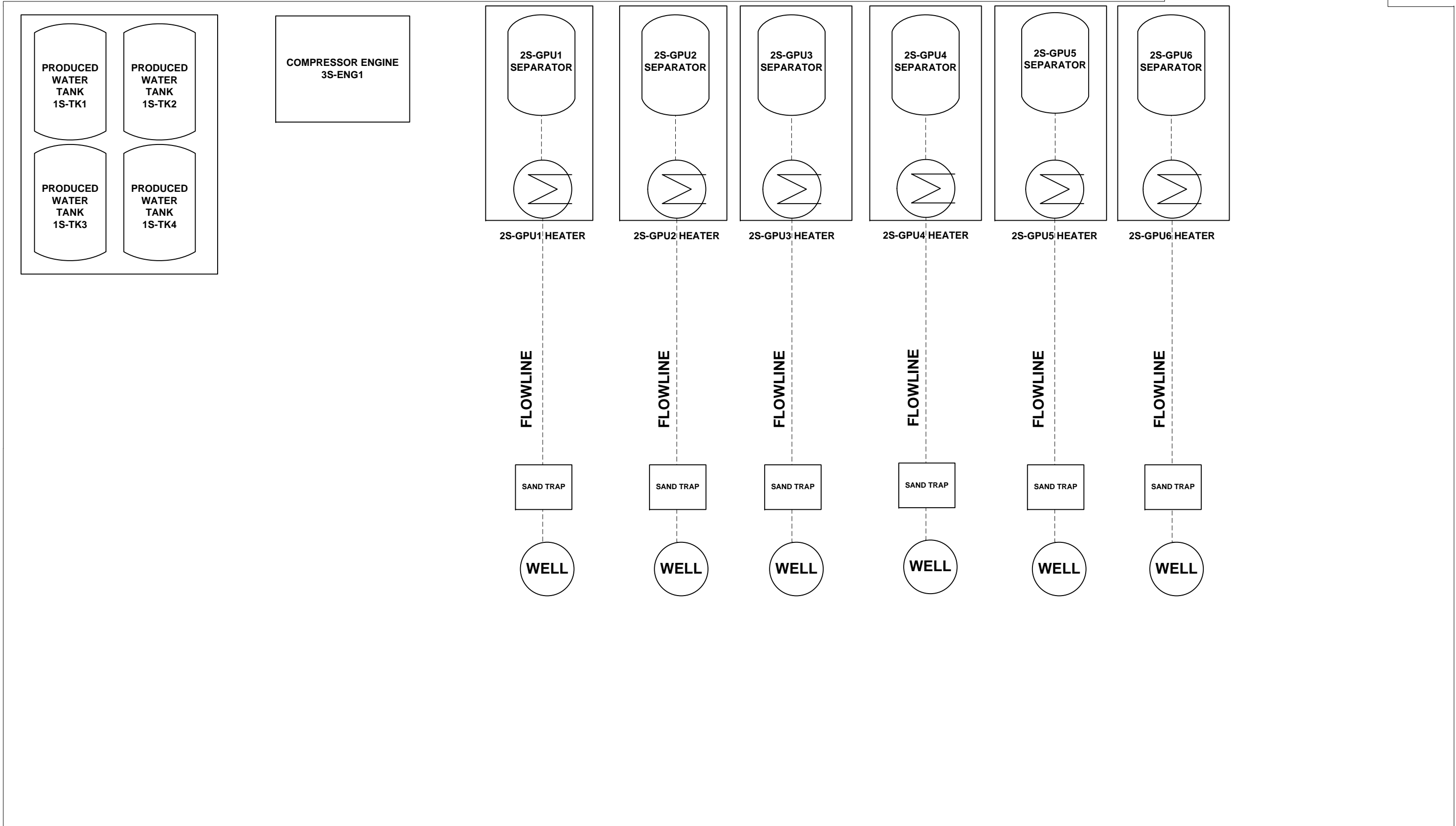


### Attachment F

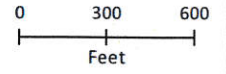
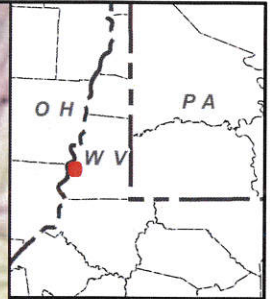
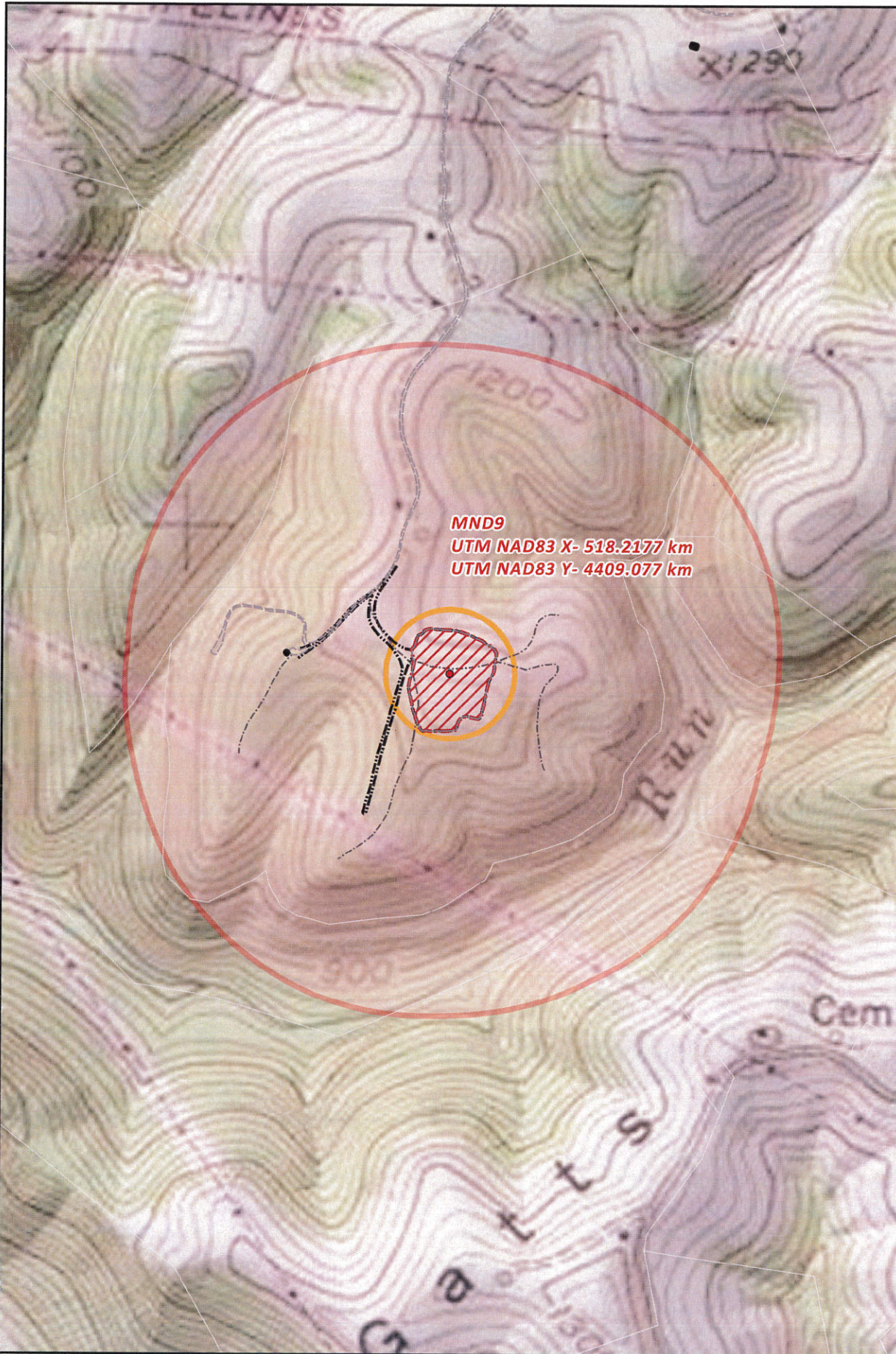
### Plot Plan

### MND 9 Natural Gas Production Site

TRUCK ENTRANCE



# **Attachment G**



Main Data Frame Projection:  
NAD 1983 UTM Zone 17N

Units: Meter

Author: devinreighton  
Date Created: 10/6/2016

- Approx. Pad Center
- Built Road
- Existing Road
- Trail
- Existing Buildings
- Well Pad Boundary
- 1/4 mi. Pad Extent Buffer
- 300 ft Pad Center Buffer
- Surface Parcels (Resolved)

Disclaimer: All data is licensed for Noble Energy, Inc. use only. Noble Energy, Inc. makes every effort to ensure this map is free of errors, but does not warrant the map or its features are either spatially or temporally accurate or fit for a particular use. Noble Energy, Inc. provides this map without any warranty of any kind

# **Attachment H**



## ATTACHMENT H – G70-D SECTION APPLICABILITY FORM

### General Permit G70-D Registration Section Applicability Form

General Permit G70-D was developed to allow qualified applicants to seek registration for a variety of sources. These sources include gas well affected facilities, storage vessels, gas production units, in-line heaters, heater treaters, glycol dehydration units and associated reboilers, pneumatic controllers, pneumatic pumps, reciprocating internal combustion engines (RICEs), tank truck/rail car loading, fugitive emissions, completion combustion devices, flares, enclosed combustion devices, and vapor recovery systems. All registered facilities will be subject to Sections 1.0, 2.0, 3.0, and 4.0.

General Permit G70-D allows the registrant to choose which sections of the permit they are seeking registration under. Therefore, please mark which additional sections that you are applying for registration under. If the applicant is seeking registration under multiple sections, please select all that apply. Please keep in mind, that if this registration is approved, the issued registration will state which sections will apply to your affected facility.

<b>GENERAL PERMIT G70-D APPLICABLE SECTIONS</b>	
<input checked="" type="checkbox"/> Section 5.0	Gas and Oil Well Affected Facility (NSPS, Subpart OOOO/OOOOa)
<input checked="" type="checkbox"/> Section 6.0	Storage Vessels Containing Condensate and/or Produced Water <sup>1</sup>
<input type="checkbox"/> Section 7.0	Storage Vessel Affected Facility (NSPS, Subpart OOOO/OOOOa)
<input type="checkbox"/> Section 8.0	Control Devices and Emission Reduction Devices not subject to NSPS Subpart OOOO/OOOOa and/or NESHAP Subpart HH
<input checked="" type="checkbox"/> Section 9.0	Small Heaters and Reboilers not subject to 40CFR60 Subpart Dc
<input type="checkbox"/> Section 10.0	Pneumatic Controllers Affected Facility (NSPS, Subpart OOOO/OOOOa)
<input type="checkbox"/> Section 11.0	Pneumatic Pump Affected Facility (NSPS, Subpart OOOOa)
<input type="checkbox"/> Section 12.0	Fugitive Emissions GHG and VOC Standards (NSPS, Subpart OOOOa)
<input checked="" type="checkbox"/> Section 13.0	Reciprocating Internal Combustion Engines, Generator Engines
<input checked="" type="checkbox"/> Section 14.0	Tanker Truck/Rail Car Loading <sup>2</sup>
<input type="checkbox"/> Section 15.0	Glycol Dehydration Units <sup>3</sup>

*1 Applicants that are subject to Section 6 may also be subject to Section 7 if the applicant is subject to the NSPS, Subparts OOOO or OOOOa control requirements or the applicable control device requirements of Section 8.*

*2 Applicants that are subject to Section 14 may also be subject to control device and emission reduction device requirements of Section 8.*

*3 Applicants that are subject to Section 15 may also be subject to the requirements of Section 9 (reboilers). Applicants that are subject to Section 15 may also be subject to control device and emission reduction device requirements of Section 8.*

# **Attachment I**

## ATTACHMENT I – EMISSION UNITS / EMISSION REDUCTION DEVICES (ERD) TABLE

Include ALL emission units and air pollution control devices/ERDs that will be part of this permit application review. Do not include fugitive emission sources in this table. Deminimis storage tanks shall be listed in the Attachment L table. This information is required for all sources regardless of whether it is a construction, modification, or administrative update.

Emission Unit ID <sup>1</sup>	Emission Point ID <sup>2</sup>	Emission Unit Description	Year Installed	Manufac. Date <sup>3</sup>	Design Capacity	Type <sup>4</sup> and Date of Change	Control Device(s) <sup>5</sup>	ERD(s) <sup>6</sup>
1S-TK1	1E-1	Produced Water Tank 1	2016	2016	400 bbl	Existing	N/A	N/A
1S-TK2	1E-2	Produced Water Tank 2	2016	2016	400 bbl	Existing	N/A	N/A
1S-TK3	1E-3	Produced Water Tank 3	2016	2016	400 bbl	Existing	N/A	N/A
1S-TK4	1E-4	Produced Water Tank 4	2016	2016	400 bbl	Existing	N/A	N/A
2S-GPU1	2E-1	GPU Heater 1	2016	2016	1.0 MMBtu/hr	Existing	N/A	N/A
2S-GPU2	2E-2	GPU Heater 2	2016	2016	1.0 MMBtu/hr	Existing	N/A	N/A
2S-GPU3	2E-3	GPU Heater 3	2016	2016	1.0 MMBtu/hr	Existing	N/A	N/A
2S-GPU4	2E-4	GPU Heater 4	2016	2016	1.0 MMBtu/hr	Existing	N/A	N/A
2S-GPU5	2E-5	GPU Heater 5	2016	2016	1.0 MMBtu/hr	Existing	N/A	N/A
2S-GPU6	2E-6	GPU Heater 6	2016	2016	1.0 MMBtu/hr	Existing	N/A	N/A
3S-ENG1	3E-1	CAT G3306TAA Engine	2017	2008	211 hp	New	NSCR	N/A*
4S-TL	4E-1	Tanker Truck Loading	2016	2016	221,524 bbl Produced Water/yr	Existing	N/A	N/A

<sup>1</sup> For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S,... or other appropriate designation.

<sup>2</sup> For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

<sup>3</sup> When required by rule

<sup>4</sup> New, modification, removal, existing

<sup>5</sup> For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

<sup>6</sup> For ERDs use the following numbering system: 1D, 2D, 3D,... or other appropriate designation.

# **Attachment J**

## ATTACHMENT J – FUGITIVE EMISSIONS SUMMARY SHEET

Sources of fugitive emissions may include loading operations, equipment leaks, blowdown emissions, etc.  
Use extra pages for each associated source or equipment if necessary.

Source/Equipment: MND 9 Natural Gas Production Facility

Leak Detection Method Used		<input type="checkbox"/> Audible, visual, and olfactory (AVO) inspections		<input checked="" type="checkbox"/> Infrared (FLIR) cameras		<input type="checkbox"/> Other (please describe)		<input type="checkbox"/> None required	
Component Type	Closed Vent System	Count	Source of Leak Factors (EPA, other (specify))	Stream type (gas, liquid, etc.)	Estimated Emissions (tpy)				
					VOC	HAP	GHG (methane, CO <sub>2</sub> e)		
Pumps	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>2</b>	<b>EPA</b>	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>		
Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>154</b>	<b>EPA</b>	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	<b>1.32</b>	<b>0.10</b>	<b>18.17</b>		
Safety Relief Valves	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>0</b>	<b>EPA</b>	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>		
Open Ended Lines	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>10</b>	<b>EPA</b>	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	<b>0.05</b>	<b>&lt;0.01</b>	<b>2.25</b>		
Sampling Connections	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>0</b>	<b>EPA</b>	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>		
Connections (Not sampling)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>700</b>	<b>EPA</b>	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	<b>0.82</b>	<b>0.07</b>	<b>4.31</b>		
Compressors	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>0</b>	<b>EPA</b>	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input type="checkbox"/> Both	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>		
Flanges	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>140</b>	<b>EPA</b>	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	<b>0.07</b>	<b>&lt;0.01</b>	<b>1.55</b>		
Other <sup>1</sup>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<b>30</b>	<b>EPA</b>	<input type="checkbox"/> Gas <input type="checkbox"/> Liquid <input checked="" type="checkbox"/> Both	<b>2.30</b>	<b>0.21</b>	<b>10.96</b>		

<sup>1</sup> Other equipment types may include compressor seals, relief valves, diaphragms, drains, meters, etc.

Please provide an explanation of the sources of fugitive emissions (e.g. pigging operations, equipment blowdowns, pneumatic controllers, etc.):

**N/A**

Please indicate if there are any closed vent bypasses (include component):

**N/A**

Specify all equipment used in the closed vent system (e.g. VRU, ERD, thief hatches, tanker truck/rail car loading, etc.)

**N/A**

# **Attachment K**

**ATTACHMENT K – GAS WELL AFFECTED FACILITY DATA SHEET**

Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).

<b>API Number</b>	<b>Date of Flowback</b>	<b>Date of Well Completion</b>	<b>Green Completion and/or Combustion Device</b>	<b>Subject to OOOO or OOOOa?</b>
47-051-01625	9/22/2014	10/13/2014	Green Completion	OOOO
47-051-01626	9/22/2014	10/13/2014	Green Completion	OOOO
47-051-01627	10/9/2014	10/13/2014	Green Completion	OOOO
47-051-01676	9/21/2014	10/9/2014	Green Completion	OOOO
47-051-01628	10/8/2014	10/8/2014	Green Completion	OOOO
47-051-01629	9/23/2014	10/9/2014	Green Completion	OOOO

*Note: If future wells are planned and no API number is available please list as PLANNED. If there are existing wells that commenced construction prior to August 23, 2011, please acknowledge as existing.*

*This is the same API (American Petroleum Institute) well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number may be provided on the application without the state code (047).*

*Every oil and gas well permitted in West Virginia since 1929 has been issued an API number. This API is used by agencies to identify and track oil and gas wells.*

*The API number has the following format: 047-001-00001*

*Where,*

- 047 = State code. The state code for WV is 047.*
- 001 = County Code. County codes are odd numbers, beginning with 001 (Barbour) and continuing to 109 (Wyoming).*
- 00001= Well number. Each well will have a unique well number.*



# **Attachment L**

## ATTACHMENT L – STORAGE VESSEL DATA SHEET

Complete this data sheet if you are the owner or operator of a storage vessel that contains condensate and/or produced water. This form must be completed for *each* new or modified bulk liquid storage vessel(s) that contains condensate and/or produced water. (If you have more than one (1) identical tank (i.e. 4-400 bbl condensate tanks), then you can list all on one (1) data sheet). **Include gas sample analysis, flashing emissions, working and breathing losses, USEPA Tanks, simulation software (ProMax, E&P Tanks, HYSYS, etc.), and any other supporting documents where applicable.**

**The following information is REQUIRED:**

- Composition of the representative sample used for the simulation
- For each stream that contributes to flashing emissions:
  - Temperature and pressure (inlet and outlet from separator(s))
  - Simulation-predicted composition
  - Molecular weight
  - Flow rate
- Resulting flash emission factor or flashing emissions from simulation
- Working/breathing loss emissions from tanks and/or loading emissions if simulation is used to quantify those emissions

*Additional information may be requested if necessary.*

**GENERAL INFORMATION (REQUIRED)**

1. Bulk Storage Area Name <b>Produced Water Storage</b>	2. Tank Name <b>Produced Water Tank 1-4</b>
3. Emission Unit ID number <b>1S-TK1-4</b>	4. Emission Point ID number <b>1E-1-4</b>
5. Date Installed , Modified or Relocated ( <i>for existing tanks</i> ) <b>2016</b> Was the tank manufactured after August 23, 2011 and on or before September 18, 2015? <input type="checkbox"/> Yes <input type="checkbox"/> No Was the tank manufactured after September 18, 2015? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Type of change: <input type="checkbox"/> New construction <input type="checkbox"/> New stored material <input type="checkbox"/> Other <input type="checkbox"/> Relocation
7A. Description of Tank Modification ( <i>if applicable</i> ) <b>N/A</b>	
7B. Will more than one material be stored in this tank? <i>If so, a separate form must be completed for each material.</i> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
7C. Was USEPA Tanks simulation software utilized? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>If Yes, please provide the appropriate documentation and items 8-42 below are not required.</i>	




<sup>1</sup> EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

<b>TANK CONSTRUCTION AND OPERATION INFORMATION</b>			
21. Tank Shell Construction: <input type="checkbox"/> Riveted <input type="checkbox"/> Gunitite lined <input type="checkbox"/> Epoxy-coated rivets <input type="checkbox"/> Other (describe)			
21A. Shell Color:	21B. Roof Color:	21C. Year Last Painted:	
22. Shell Condition (if metal and unlined): <input type="checkbox"/> No Rust <input type="checkbox"/> Light Rust <input type="checkbox"/> Dense Rust <input type="checkbox"/> Not applicable			
22A. Is the tank heated? <input type="checkbox"/> Yes <input type="checkbox"/> No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?	
23. Operating Pressure Range (psig): <b>Must be listed for tanks using VRUs with closed vent system.</b>			
24. Is the tank a <b>Vertical Fixed Roof Tank</b> ? <input type="checkbox"/> Yes <input type="checkbox"/> No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):	
25. Complete item 25 for <b>Floating Roof Tanks</b> <input type="checkbox"/> Does not apply <input type="checkbox"/>			
25A. Year Internal Floaters Installed:			
25B. Primary Seal Type ( <i>check one</i> ): <input type="checkbox"/> Metallic (mechanical) shoe seal <input type="checkbox"/> Liquid mounted resilient seal <input type="checkbox"/> Vapor mounted resilient seal <input type="checkbox"/> Other (describe):			
25C. Is the Floating Roof equipped with a secondary seal? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25D. If yes, how is the secondary seal mounted? ( <i>check one</i> ) <input type="checkbox"/> Shoe <input type="checkbox"/> Rim <input type="checkbox"/> Other (describe):			
25E. Is the floating roof equipped with a weather shield? <input type="checkbox"/> Yes <input type="checkbox"/> No			
25F. Describe deck fittings:			
26. Complete the following section for <b>Internal Floating Roof Tanks</b> <input type="checkbox"/> Does not apply			
26A. Deck Type: <input type="checkbox"/> Bolted <input type="checkbox"/> Welded		26B. For bolted decks, provide deck construction:	
26C. Deck seam. Continuous sheet construction: <input type="checkbox"/> 5 ft. wide <input type="checkbox"/> 6 ft. wide <input type="checkbox"/> 7 ft. wide <input type="checkbox"/> 5 x 7.5 ft. wide <input type="checkbox"/> 5 x 12 ft. wide <input type="checkbox"/> other (describe)			
26D. Deck seam length (ft.):	26E. Area of deck (ft <sup>2</sup> ):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:
27. Closed Vent System with VRU? <input type="checkbox"/> Yes <input type="checkbox"/> No			
28. Closed Vent System with Enclosed Combustor? <input type="checkbox"/> Yes <input type="checkbox"/> No			
<b>SITE INFORMATION</b>			
29. Provide the city and state on which the data in this section are based:			
30. Daily Avg. Ambient Temperature (°F):		31. Annual Avg. Maximum Temperature (°F):	
32. Annual Avg. Minimum Temperature (°F):		33. Avg. Wind Speed (mph):	
34. Annual Avg. Solar Insulation Factor (BTU/ft <sup>2</sup> -day):		35. Atmospheric Pressure (psia):	
<b>LIQUID INFORMATION</b>			
36. Avg. daily temperature range of bulk liquid (°F):	36A. Minimum (°F):	36B. Maximum (°F):	

37. Avg. operating pressure range of tank (psig):	37A. Minimum (psig):	37B. Maximum (psig):
38A. Minimum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):	
39A. Avg. liquid surface temperature (°F):	39B. Corresponding vapor pressure (psia):	
40A. Maximum liquid surface temperature (°F):	40B. Corresponding vapor pressure (psia):	
41. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.		
41A. Material name and composition:		
41B. CAS number:		
41C. Liquid density (lb/gal):		
41D. Liquid molecular weight (lb/lb-mole):		
41E. Vapor molecular weight (lb/lb-mole):		
41F. Maximum true vapor pressure (psia):		
41G. Maximum Reid vapor pressure (psia):		
41H. Months Storage per year. From:                      To:		
42. Final maximum gauge pressure and temperature prior to transfer into tank used as inputs into flashing emission calculations.		

## STORAGE TANK DATA TABLE

**List all deminimis storage tanks (i.e. lube oil, glycol, diesel etc.)**

Source ID # <sup>1</sup>	Status <sup>2</sup>	Content <sup>3</sup>	Volume <sup>4</sup>

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the well site. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:  
          EXIST Existing Equipment  
          NEW Installation of New Equipment  
          REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, diesel, mercaptan etc.
4. Enter the maximum design storage tank volume in gallons.

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

**Identification**

User Identification:	Noble Energy - MND 9
City:	Moundsville
State:	West Virginia
Company:	Noble Energy
Type of Tank:	Vertical Fixed Roof Tank
Description:	

**Tank Dimensions**

Shell Height (ft):	18.00
Diameter (ft):	12.00
Liquid Height (ft) :	18.00
Avg. Liquid Height (ft):	9.00
Volume (gallons):	16,000.00
Turnovers:	138.45
Net Throughput(gal/yr):	2,326,002.00
Is Tank Heated (y/n):	N

**Paint Characteristics**

Shell Color/Shade:	Gray/Medium
Shell Condition	Good
Roof Color/Shade:	Gray/Medium
Roof Condition:	Good

**Roof Characteristics**

Type:	Cone
Height (ft)	0.00
Slope (ft/ft) (Cone Roof)	0.06

**Breather Vent Settings**

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

Meterological Data used in Emissions Calculations: Pittsburgh, Pennsylvania (Avg Atmospheric Pressure = 14.11 psia)

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

**Noble Energy - MND 9 - Vertical Fixed Roof Tank**  
**Moundsville, West Virginia**

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Produced Water	All	58.50	49.32	67.67	53.39	0.2565	0.1850	0.3514	20.7276			18.23	
Gasoline (RVP 10)						5.0362	4.1975	6.0042	66.0000	0.0145	0.1797	92.00	Option 4: RVP=10, ASTM Slope=3
Water						0.2427	0.1734	0.3351	18.0200	0.9855	0.8203	18.02	Option 2: A=8.10765, B=1750.286, C=235

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

**Noble Energy - MND 9 - Vertical Fixed Roof Tank**  
**Moundsville, West Virginia**

Annual Emission Calculations	
Standing Losses (lb):	25.1360
Vapor Space Volume (cu ft):	1,031.4477
Vapor Density (lb/cu ft):	0.0010
Vapor Space Expansion Factor:	0.0785
Vented Vapor Saturation Factor:	0.8897
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,031.4477
Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	9.1200
Tank Shell Height (ft):	18.0000
Average Liquid Height (ft):	9.0000
Roof Outage (ft):	0.1200
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1200
Roof Height (ft):	0.0000
Roof Slope (ft/ft):	0.0600
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0010
Vapor Molecular Weight (lb/lb-mole):	20.7276
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2565
Daily Avg. Liquid Surface Temp. (deg. R):	518.1654
Daily Average Ambient Temp. (deg. F):	50.3083
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	513.0583
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,202.9556
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0785
Daily Vapor Temperature Range (deg. R):	36.6923
Daily Vapor Pressure Range (psia):	0.1665
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2565
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1850
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.3514
Daily Avg. Liquid Surface Temp. (deg R):	518.1654
Daily Min. Liquid Surface Temp. (deg R):	508.9923
Daily Max. Liquid Surface Temp. (deg R):	527.3385
Daily Ambient Temp. Range (deg. R):	19.1500
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8897
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2565
Vapor Space Outage (ft):	9.1200



Working Losses (lb):	112.8524
Vapor Molecular Weight (lb/lb-mole):	20.7276
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2565
Annual Net Throughput (gal/yr.):	2,326,002.0000
Annual Turnovers:	138.4525
Turnover Factor:	0.3833
Maximum Liquid Volume (gal):	16,000.0000
Maximum Liquid Height (ft):	18.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	137.9884

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

**Emissions Report for: Annual**

**Noble Energy - MND 9 - Vertical Fixed Roof Tank**  
**Moundsville, West Virginia**

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Produced Water	112.85	25.14	137.99
Water	92.57	20.62	113.19
Gasoline (RVP 10)	20.28	4.52	24.79

# **Attachment M**

**ATTACHMENT M – SMALL HEATERS AND REBOILERS NOT SUBJECT TO  
40CFR60 SUBPART DC  
DATA SHEET**

Complete this data sheet for each small heater and reboiler not subject to 40CFR60 Subpart Dc at the facility. *The Maximum Design Heat Input (MDHI) must be less than 10 MMBTU/hr.*

<b>Emission Unit ID#<sup>1</sup></b>	<b>Emission Point ID#<sup>2</sup></b>	<b>Emission Unit Description (manufacturer, model #)</b>	<b>Year Installed/Modified</b>	<b>Type<sup>3</sup> and Date of Change</b>	<b>Maximum Design Heat Input (MMBTU/hr)<sup>4</sup></b>	<b>Fuel Heating Value (BTU/scf)<sup>5</sup></b>
2S-GPU1	2E-1	GPU Heater 1	2016	Existing	1.00	1220
2S-GPU2	2E-2	GPU Heater 2	2016	Existing	1.00	1220
2S-GPU3	2E-3	GPU Heater 3	2016	Existing	1.00	1220
2S-GPU4	2E-4	GPU Heater 4	2016	Existing	1.00	1220
2S-GPU5	2E-5	GPU Heater 5	2016	Existing	1.00	1220
2S-GPU6	2E-6	GPU Heater 6	2016	Existing	1.00	1220

<sup>1</sup> Enter the appropriate Emission Unit (or Source) identification number for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S...or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the Glycol Dehydration Unit Data Sheet.

<sup>2</sup> Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E...or other appropriate designation.

<sup>3</sup> New, modification, removal

<sup>4</sup> Enter design heat input capacity in MMBtu/hr.

<sup>5</sup> Enter the fuel heating value in BTU/standard cubic foot.

# **Attachment N**

## ATTACHMENT N – INTERNAL COMBUSTION ENGINE DATA SHEET

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

Emission Unit ID# <sup>1</sup>		<b>3S-ENG1</b>					
Engine Manufacturer/Model		<b>CAT G3306TAA</b>					
Manufacturers Rated bhp/rpm		<b>211 hp</b>					
Source Status <sup>2</sup>		<b>NS</b>					
Date Installed/ Modified/Removed/Relocated <sup>3</sup>		<b>2017</b>					
Engine Manufactured /Reconstruction Date <sup>4</sup>		<b>2008</b>					
Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable) <sup>5</sup>		<input checked="" type="checkbox"/> 40CFR60 Subpart JJJ <input type="checkbox"/> JJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	<input type="checkbox"/> 40CFR60 Subpart JJJ <input type="checkbox"/> JJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources	<input type="checkbox"/> 40CFR60 Subpart JJJ <input type="checkbox"/> JJJ Certified? <input type="checkbox"/> 40CFR60 Subpart IIII <input type="checkbox"/> IIII Certified? <input type="checkbox"/> 40CFR63 Subpart ZZZZ <input type="checkbox"/> NESHAP ZZZZ/ NSPS JJJ Window <input type="checkbox"/> NESHAP ZZZZ Remote Sources			
Engine Type <sup>6</sup>		<b>4SLB</b>					
APCD Type <sup>7</sup>		<b>NSCR</b>					
Fuel Type <sup>8</sup>		<b>RG</b>					
H <sub>2</sub> S (gr/100 scf)							
Operating bhp/rpm		<b>211 hp</b>					
BSFC (BTU/bhp-hr)		<b>8622</b>					
Hourly Fuel Throughput		<b>1491.18</b> ft <sup>3</sup> /hr gal/hr		ft <sup>3</sup> /hr gal/hr		ft <sup>3</sup> /hr gal/hr	
Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator)		<b>13.06</b> MMft <sup>3</sup> /yr gal/yr		MMft <sup>3</sup> /yr gal/yr		MMft <sup>3</sup> /yr gal/yr	
Fuel Usage or Hours of Operation Metered		Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Yes <input type="checkbox"/> No <input type="checkbox"/>		Yes <input type="checkbox"/> No <input type="checkbox"/>	
Calculation Methodology <sup>9</sup>	Pollutant <sup>10</sup>	Hourly PTE (lb/hr) <sup>11</sup>	Annual PTE (tons/year) <sub>ii</sub>	Hourly PTE (lb/hr) <sup>11</sup>	Annual PTE (tons/year) <sub>ii</sub>	Hourly PTE (lb/hr) <sup>11</sup>	Annual PTE (tons/year) <sub>ii</sub>
<b>MD</b>	NO <sub>x</sub>	<b>0.23</b>	<b>1.02</b>				
<b>MD</b>	CO	<b>0.23</b>	<b>1.02</b>				
<b>MD</b>	VOC	<b>0.23</b>	<b>1.02</b>				
<b>AP</b>	SO <sub>2</sub>	<b>&lt;0.01</b>	<b>&lt;0.01</b>				
<b>AP</b>	PM <sub>10</sub>	<b>&lt;0.01</b>	<b>&lt;0.01</b>				
<b>AP</b>	Formaldehyde	<b>0.10</b>	<b>0.42</b>				
<b>AP</b>	Total HAPs	<b>0.10</b>	<b>0.44</b>				
<b>API/MD/AP</b>	GHG (CO <sub>2</sub> e)	<b>249.56</b>	<b>1093.08</b>				

<sup>1</sup> Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion engine/generator engine located at the well site. Multiple engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated

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

2 Enter the Source Status using the following codes:

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

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

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

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

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

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

2SLB	Two Stroke Lean Burn	4SRB	Four Stroke Rich Burn
4SLB	Four Stroke Lean Burn		

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

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

8 Enter the Fuel Type using the following codes:

PQ	Pipeline Quality Natural Gas	RG	Raw Natural Gas /Production Gas	D	Diesel
----	------------------------------	----	---------------------------------	---	--------

9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

MD	Manufacturer's Data	AP	AP-42		
GR	GRI-HAPCalc <sup>TM</sup>	OT	Other		(please list)

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

11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

**Engine Air Pollution Control Device**  
**(Emission Unit ID#           , use extra pages as necessary)**

Air Pollution Control Device Manufacturer's Data Sheet included?  
 Yes     No

NSCR                                       SCR                                       Oxidation Catalyst

Provide details of process control used for proper mixing/control of reducing agent with gas stream:

Manufacturer: <b>EMIT Technologies</b>	Model #: <b>EAS-1450T-0505F-D1SEE</b>
Design Operating Temperature:            °F	Design gas volume:            scfm
Service life of catalyst:	Provide manufacturer data? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Volume of gas handled:            acfm at            °F	Operating temperature range for NSCR/Ox Cat: From            °F to            °F
Reducing agent used, if any:	Ammonia slip (ppm):

Pressure drop against catalyst bed (delta P):            inches of H<sub>2</sub>O

Provide description of warning/alarm system that protects unit when operation is not meeting design conditions:

Is temperature and pressure drop of catalyst required to be monitored per 40CFR63 Subpart ZZZZ?  
 Yes     No

How often is catalyst recommended or required to be replaced (hours of operation)?

How often is performance test required?  
 Initial  
 Annual  
 Every 8,760 hours of operation  
 Field Testing Required  
 No performance test required. If so, why (please list any maintenance required and the applicable sections in NSPS/GACT,



# G3306 TA

GAS COMPRESSION APPLICATION

## GAS ENGINE SITE SPECIFIC TECHNICAL DATA G3306TAA Information



ENGINE SPEED (rpm):	1800	FUEL SYSTEM:	HPG IMPCO
COMPRESSION RATIO:	8.0:1	<b>SITE CONDITIONS:</b>	
AFTERCOOLER WATER INLET (°F):	90	FUEL:	Field Gas
JACKET WATER OUTLET (°F):	210	FUEL PRESSURE RANGE(psig):	12.0-24.9
COOLING SYSTEM:	JW+OC, AC	FUEL METHANE NUMBER:	62.2
IGNITION SYSTEM:	MAG	FUEL LHV (Btu/scf):	1027
EXHAUST MANIFOLD:	WC	ALTITUDE(ft):	1000
COMBUSTION:	Standard	MAXIMUM INLET AIR TEMPERATURE(°F):	100
EXHAUST O2 EMISSION LEVEL %:	2.0	NAMEPLATE RATING:	211 bhp@1800rpm
SET POINT TIMING:	29.9		

RATING	NOTES	LOAD	MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
			100%	100%	75%	51%
ENGINE POWER	(1)	bhp	211	206	154	105
INLET AIR TEMPERATURE		°F	87	100	100	100

ENGINE DATA						
FUEL CONSUMPTION (LHV)	(2)	Btu/bhp-hr	7803	7855	8433	9344
FUEL CONSUMPTION (HHV)	(2)	Btu/bhp-hr	8622	8680	9319	10325
AIR FLOW	(3)(4)	lb/hr	1464	1437	1159	881
AIR FLOW WET (77°F, 14.7 psia)	(3)(4)	scfm	330	324	261	199
INLET MANIFOLD PRESSURE	(5)	in Hg(abs)	39.0	38.3	31.1	23.4
EXHAUST STACK TEMPERATURE	(6)	°F	1068	1066	1041	995
EXHAUST GAS FLOW (@ stack temp, 14.5 psia)	(7)(4)	ft3/min	1040	1020	809	596
EXHAUST GAS MASS FLOW	(7)(4)	lb/hr	1542	1515	1222	929

EMISSIONS DATA						
NOx (as NO2)	(8)	g/bhp-hr	27.28	26.98	23.85	20.70
CO	(8)	g/bhp-hr	2.00	2.01	2.08	1.99
THC (mol. wt. of 15.84)	(8)	g/bhp-hr	0.98	0.98	1.01	1.21
NMHC (mol. wt. of 15.84)	(8)	g/bhp-hr	0.25	0.25	0.26	0.31
NMNEHC (VOCs) (mol. wt. of 15.84)	(8)(9)	g/bhp-hr	0.17	0.17	0.18	0.21
HCHO (Formaldehyde)	(8)	g/bhp-hr	0.15	0.15	0.15	0.16
CO2	(8)	g/bhp-hr	514	516	552	610
EXHAUST OXYGEN	(10)	% DRY	2.0	2.0	2.0	2.4

HEAT REJECTION						
HEAT REJ. TO JACKET WATER (JW)	(11)	Btu/min	8105	8062	7199	6146
HEAT REJ. TO ATMOSPHERE	(11)	Btu/min	1095	1077	867	656
HEAT REJ. TO LUBE OIL (OC)	(11)	Btu/min	1282	1275	1138	972
HEAT REJ. TO AFTERCOOLER (AC)	(11)(12)	Btu/min	1067	1067	564	234

HEAT EXCHANGER SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW+OC)	(12)	Btu/min	10454
TOTAL AFTERCOOLER CIRCUIT (AC)	(12)(13)	Btu/min	1120
A cooling system safety factor of 0% has been added to the heat exchanger sizing criteria.			

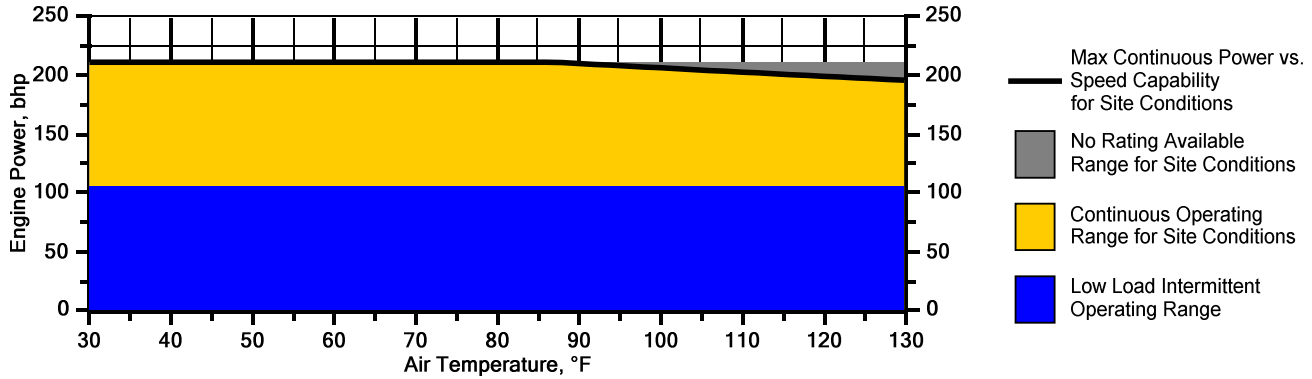
### CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature.  
 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature.  
 Max. rating is the maximum capability for the specified fuel at site altitude and reduced inlet air temperature.  
 Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

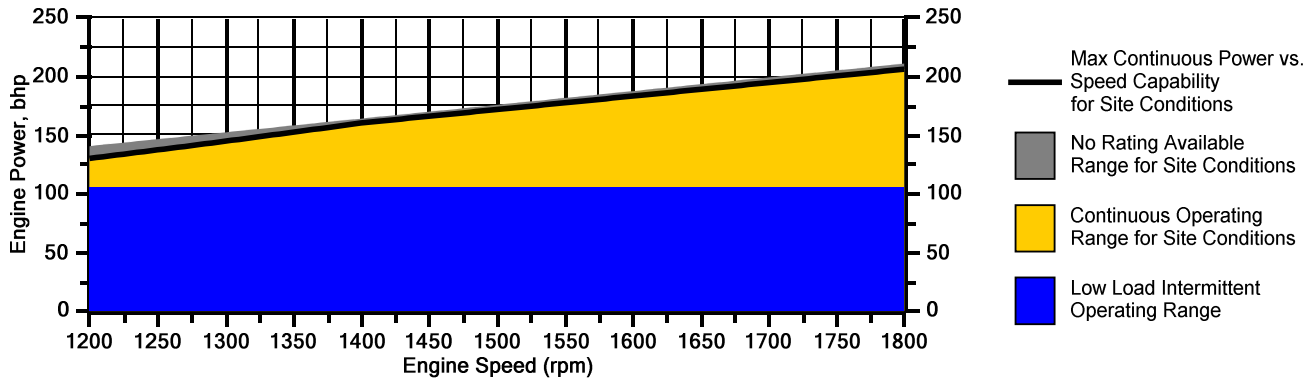
## Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1000 ft and 1800 rpm



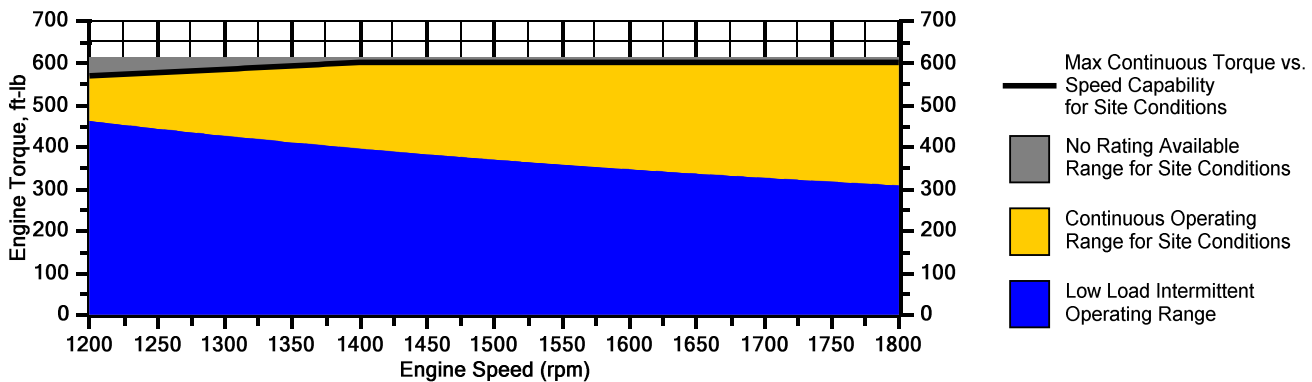
## Engine Power vs. Engine Speed

Data represents speed sweep at 1000 ft and 100 °F



## Engine Torque vs. Engine Speed

Data represents speed sweep at 1000 ft and 100 °F



Note: At site conditions of 1000 ft and 100°F inlet air temp., constant torque can be maintained down to 1400 rpm. The minimum speed for loading at these conditions is 1200 rpm.

### NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is  $\pm 3\%$  of full load.
2. Fuel consumption tolerance is  $\pm 4.0\%$  of full load data.
3. Undried air. Flow is a nominal value with a tolerance of  $\pm 5\%$ .
4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.
5. Inlet manifold pressure is a nominal value with a tolerance of  $\pm 5\%$ .
6. Exhaust stack temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of  $\pm 6\%$ .
8. Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than  $\pm 3$ . Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. Part load data may require engine adjustment.
9. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
10. Exhaust Oxygen tolerance is  $\pm 0.5$ .
11. Heat rejection values are nominal. Tolerances, based on treated water, are  $\pm 10\%$  for jacket water circuit,  $\pm 50\%$  for radiation,  $\pm 20\%$  for lube oil circuit, and  $\pm 5\%$  for aftercooler circuit.
12. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.
13. Heat exchanger sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	2.5211	2.5211
Methane	CH4	86.6340	86.6340
Ethane	C2H6	4.9767	4.9767
Propane	C3H8	3.5670	3.5670
Isobutane	iso-C4H10	0.0000	0.0000
Norbutane	nor-C4H10	1.8211	1.8211
Isopentane	iso-C5H12	0.0000	0.0000
Norpentane	nor-C5H12	0.4802	0.4802
Hexane	C6H14	0.0000	0.0000
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.0000	0.0000
Carbon Dioxide	CO2	0.0000	0.0000
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0000	100.0000

Fuel Makeup: Field Gas  
Unit of Measure: English

**Calculated Fuel Properties**

Caterpillar Methane Number: 62.2  
Lower Heating Value (Btu/scf): 1027  
Higher Heating Value (Btu/scf): 1135  
WOBBE Index (Btu/scf): 1274  
THC: Free Inert Ratio: 0  
RPC (%) (To 905 Btu/scf Fuel): 100%  
Compressibility Factor: 0.997  
Stoich A/F Ratio (Vol/Vol): 10.68  
Stoich A/F Ratio (Mass/Mass): 16.43  
Specific Gravity (Relative to Air): 0.650  
Specific Heat Constant (K): 1.297

**CONDITIONS AND DEFINITIONS**

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

**FUEL LIQUIDS**

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.



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**PREPARED FOR:**  
Natural Gas Services Group

**A. INFORMATION PROVIDED BY CATERPILLAR**

Engine:	G3306TAA
DIM Sheet:	DM5779
Compression Ratio:	8.0:1
RPM:	1800
Horsepower:	211
Fuel:	Natural Gas
Piping size:	5"
Annual Operating Hours:	8760
Exhaust Flow:	1026 CFM
Exhaust Temperature:	1041 °F
Allowable Engine Backpressure:	27" WC

**Emission Data**

NO <sub>x</sub> :	27.52	g/bhp-hr
CO:	1.52	g/bhp-hr
THC:	1.11	g/bhp-hr
NMHC:	0.34	g/bhp-hr
HCHO:	N/A	g/bhp-hr
Oxygen:	2.00	%

**B. POST CATALYST EMISSIONS TO BE ACHIEVED BY EMISSION CONTROL EQUIPMENT**

NO <sub>x</sub> :	<0.5 g/bhp-hr
CO:	<0.5 g/bhp-hr
VOC:	<0.5 g/bhp-hr

### C. CONTROL EQUIPMENT

#### CATALYTIC CONVERTER/SILENCER UNIT

Model	<b>EAS-1450T-0505F-D1SEE</b>
Catalyst Type	NSCR, Precious group metals
Manufacturer	EMIT Technologies, Inc.
Element Size	14.5" x 3.5"
Catalyst Elements	1
Housing Type	Dual Bed
Catalyst Installation	Accessible Housing
Construction	10 ga 304 Stainless Steel
Sample Ports	6 (0.5" NPT)
Inlet Connections	5" flat face flange
Outlet Connections	5" flat face flange
Configuration	Assume End In / End Out
Silencer	Integrated
Silencer Grade	Critical
Insertion Loss	20-25 dBA

#### AIR FUEL RATIO CONTROLLER

Part Number	<b>ENG-S-075</b>
Manufacturer	EMIT Technologies, Inc.
Description	<b>MODEL EDGE NG</b> CSA certified AFR controller kit complete with: <i>EDGE NG Air Fuel Ratio Controller enclosure featuring: graphical display of oxygen sensor voltage, position of the digital power valve and thermocouple temperatures. Multiscreen digital display of controller and engine parameters. Integrated high temperature shutdown, Modbus enabled, 4 wire heated O2 sensor, O2 weldment, 25' Wiring harnesses, Digital power valve, Operations manual</i> <b>SINGLE BANK ENGINE</b>
Digital Power Valve Size	0.75" NPT

### D. WARRANTY

EMIT Technologies, Inc. warrants that the goods supplied will be free from defects in workmanship by EMIT Technologies, Inc. for a period of one (1) year from date of shipment. EMIT Technologies, Inc. will not be responsible for any defects which result from improper use, neglect, failure to properly maintain or which are attributable to defects, errors or omissions in any drawings, specifications, plans or descriptions, whether written or oral, supplied to EMIT Technologies, Inc. by Buyer.

Catalyst performance will be guaranteed for a period of 1 year from installation, or 8760 operating hours, whichever comes first. The catalyst shall be operated with an automatic air/fuel ratio controller. The performance guarantee shall not cover the effects of excessive ash masking due to operation at low load, improper engine maintenance, or inappropriate lubrication oil. The performance guarantee shall not cover the effects of continuous engine misfires (cylinder or ignition) exposing the catalyst to excessive exothermic reaction temperatures.

The exhaust temperature operating range at the converter inlet is 600°F minimum for oxidation catalyst and 750°F for NSCR catalyst and 1250°F maximum.

If a high temperature shut down switch is not installed, thermal deactivation of catalyst at temperatures above 1300°F is not covered.

The catalyst conversion efficiencies (% reduction) will be guaranteed for engine loads of 50 to 100 percent.

Engine lubrication oil shall contain less than 0.6% ash (by weight) with a maximum allowable specific oil consumption of 0.01 gal/bhp-hr. The maximum ash loading on the catalyst shall be limited to 350 g/m<sup>3</sup>. Phosphorous and zinc additives are limited to 0.03% (by weight).

The catalyst must not be exposed to the following known poisoning agents, including: iron, nickel, sodium, chromium, arsenic, zinc, lead, phosphorous, silicon, potassium, magnesium, copper, tin, and mercury. Total poison concentrations in the gas are limited to 0.3 ppm.

# **Attachment O**

**ATTACHMENT O – TANKER TRUCK/RAIL CAR LOADING DATA SHEET**

Complete this data sheet for each new or modified bulk liquid transfer area or loading rack at the facility. This is to be used for bulk liquid transfer operations to tanker trucks/rail cars. Use extra pages if necessary.

***Truck/Rail Car Loadout Collection Efficiencies***

The following applicable capture efficiencies of a truck/rail car loadout are allowed:

- For tanker trucks/rail cars passing the MACT level annual leak test – 99.2%
- For tanker trucks/rail cars passing the NSPS level annual leak test – 98.7%
- For tanker trucks/rail cars not passing one of the annual leak tests listed above – 70%

Compliance with this requirement shall be demonstrated by keeping records of the applicable MACT or NSPS Annual Leak Test certification for *every* truck and railcar loaded/unloaded. This requirement can be satisfied if the trucking/rail car company provided certification that its entire fleet was compliant. This certification must be submitted in writing to the Director of the DAQ. These additional requirements must be noted in the Registration Application.

Emission Unit ID#: <b>4S-TL</b>	Emission Point ID#: <b>4E-1</b>	Year Installed/Modified: <b>2016</b>		
Emission Unit Description: <b>Tanker Truck Loading</b>				
<b>Loading Area Data</b>				
Number of Pumps: <b>1</b>	Number of Liquids Loaded: <b>1</b>	Max number of trucks/rail cars loading at one (1) time: <b>1</b>		
Are tanker trucks/rail cars pressure tested for leaks at this or any other location? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Not Required If Yes, Please describe:				
Provide description of closed vent system and any bypasses.				
Are any of the following truck/rail car loadout systems utilized? <input type="checkbox"/> Closed System to tanker truck/rail car passing a MACT level annual leak test? <input type="checkbox"/> Closed System to tanker truck/rail car passing a NSPS level annual leak test? <input type="checkbox"/> Closed System to tanker truck/rail car not passing an annual leak test and has vapor return?				
<b>Projected Maximum Operating Schedule (for rack or transfer point as a whole)</b>				
Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	<b>24</b>	<b>24</b>	<b>24</b>	<b>24</b>
Days/week	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>
<b>Bulk Liquid Data (use extra pages as necessary)</b>				
Liquid Name	<b>Produced Water</b>			
Max. Daily Throughput (1000 gal/day)	<b>25.48</b>			
Max. Annual Throughput (1000 gal/yr)	<b>9300.98</b>			
Loading Method <sup>1</sup>	<b>SP</b>			
Max. Fill Rate (gal/min)	<b>93.33</b>			
Average Fill Time (min/loading)	<b>180</b>			
Max. Bulk Liquid Temperature (°F)	<b>53.39</b>			
True Vapor Pressure <sup>2</sup>	<b>0.26</b>			





**Attachment P -  
Not Applicable**

# **Attachment Q**

**ATTACHMENT Q – PNEUMATIC CONTROLLERS  
DATA SHEET**

**Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?**

Yes     No

Please list approximate number.

**Are there any continuous bleed natural gas driven pneumatic controllers at this facility that commenced construction, modification or reconstruction after September 18, 2015?**

Yes     No

Please list approximate number.

**Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after August 23, 2011, and on or before September 18, 2015?**

Yes     No

Please list approximate number.

**Are there any continuous bleed natural gas driven pneumatic controllers at this facility with a bleed rate greater than 6 standard cubic feet per hour that are required based on functional needs, including but not limited to response time, safety and positive actuation that commenced construction, modification or reconstruction after September 18, 2015?**

Yes     No

Please list approximate number.

# **Attachment R**



**Attachment S -  
Not Applicable**

# **Attachment T**



MND-9  
Emission Summary Sheet

Emission Unit ID Number	Source Description	Potential Emissions (tpy)																
		NOx	CO	VOC	SOx	PM	PM10	Formaldehyde	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylene	224-TMP	Total HAPS	CH <sub>4</sub>	CO <sub>2</sub>	CO <sub>2</sub> e
1S-TK1-4	4 - 400 bbl Prod Water Storage Tanks			2.32					0.0044	0.0000	0.0000	0.0001	0.0002	0.0022	0.0003	0.0005		0.0123
2S-GPU1-6	6 - 1.0 MMBtu/hr Heaters	2.15	1.81	0.12	0.01	0.16	0.16	0.0016	0.0388	0.0000	0.0001	0.0000	0.0000	0.0000	0.0407	0.0495	2584.92	2586.16
3S-ENG1	1 - 211 hp CATG3306TAA Engine	1.02	1.02	1.02	0.00	0.00	0.00	0.4207	0.0088	0.0035	0.0033	0.0003	0.0015	0.0020	0.4401	1.8327	1047.26	1093.08
TL	Produced Water Truck Loading Detail Sheet	---	---	0.38	---	---	---	---	0.0723	0.0000	0.0016	0.0000	0.0032	0.0032	0.0803	0.0011	---	0.03
FUG	Equip Component Fugitives Estimate	---	---	4.56	---	---	---	---	0.26	0.00	0.02	0.01	0.04	0.02	0.35	1.48	---	37.24
<b>Total Facility Emissions</b>		<b>3.17</b>	<b>2.83</b>	<b>8.40</b>	<b>0.02</b>	<b>0.16</b>	<b>0.16</b>	<b>0.42</b>	<b>0.39</b>	<b>0.01</b>	<b>0.03</b>	<b>0.01</b>	<b>0.04</b>	<b>0.02</b>	<b>0.91</b>	<b>3.37</b>	<b>3632.18</b>	<b>3716.52</b>

Potential Emissions (lb/hr)																	
NOx	CO	VOC	SOx	PM	PM10	Formaldehyde	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylene	224-TMP	Total HAPS	CH <sub>4</sub>	CO <sub>2</sub>	CO <sub>2</sub> e	
0.7244	0.6457	1.9183	0.0040	0.0375	0.0375	0.0964	0.0885	0.0017	0.0059	0.0013	0.0101	0.0053	0.2078	0.7685	829.2641	848.5195	

Potential Emissions (lb/day)																	
NOx	CO	VOC	SOx	PM	PM10	Formaldehyde	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylene	224-TMP	Total HAPS	CH <sub>4</sub>	CO <sub>2</sub>	CO <sub>2</sub> e	
17.3854	15.4969	46.0403	0.0965	0.9004	0.9004	2.3142	2.1245	0.0413	0.1423	0.0302	0.2427	0.1266	4.9866	18.4431	19902.3375	20364.4686	

WV air permit exemption criteria - any criteria pollutant	lb/hr	tpy	lb/day
	6	10.00	144.0

**MND-9  
Heater Detail Sheet**

Source ID Number		
Equipment ID	2S-GPU1-6	
SCC		
Equipment Usage	6 - 1.0 MMBtu/hr Heaters	
Equipment Make	Unknown	
Equipment Model	Unknown	
Serial Number	Unknown	
Installation Date	Unknown	
Emission Controls	None	
Fuel Heating Value	1220	Btu/scf
Design Heat Rate*	6.00	MMBtu/hr
Site Heat Rate*	6.00	MMBtu/hr
Potential Operation	8760	hr/yr
Potential Fuel Usage	43.08	MMscf/yr

\* These are heat release rates and not the duty for the heater

*Potential Emissions*

Pollutant	Emission Factor (lb/MMscf)	Nominal Rating (MMBtu/hr)	Hrs of Operation (hrs/yr)	Estimated Emissions		Source of Emission Factor
				(lb/hr)	(tpy)	
NOx	100.00	6.000	8760	0.49	2.15	AP-42 <sup>1</sup>
CO	84.00	6.000	8760	0.41	1.81	AP-42 <sup>1</sup>
VOC	5.50	6.000	8760	0.03	0.12	AP-42 <sup>2</sup>
SO2	0.60	6.000	8760	0.00	0.01	AP-42 <sup>2</sup>
PM10	7.60	6.000	8760	0.04	0.16	AP-42 <sup>2</sup>
Benzene	0.002	6.000	8760	0.00	0.0000	AP-42 <sup>3</sup>
Ethylbenzene	0.000	6.000	8760	0.00	0.0000	
Toluene	0.003	6.000	8760	0.00	0.0001	AP-42 <sup>3</sup>
Xylenes	0.000	6.000	8760	0.00	0.0000	
N-Hexane	1.80	6.000	8760	0.01	0.0388	AP-42 <sup>3</sup>
224-TMP	0.00	6.000	8760	0.00	0.0000	
Formaldehyde	0.08	6.000	8760	0.00	0.0016	AP-42 <sup>3</sup>
Total HAPs	1.89	6.000	8760	0.01	0.0407	AP-42 <sup>3</sup>
CO <sub>2</sub>	120000.00	6.000	8760	590.16	2584.92	AP-42 <sup>2</sup>
CH <sub>4</sub>	2.30	6.000	8760	0.01	0.05	AP-42 <sup>2</sup>
CO <sub>2</sub> e				590.45	2586.16	

<sup>1</sup> 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

<sup>2</sup> 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

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

**MND-9**  
**Engine Detail Sheet**

Emission Unit Number	3S-ENG1	Source Location	Zone:	Horizontal:	
Equipment ID	ENG1			Vertical:	
Source Description	1 - 211 hp CATG3306TAA Engine	Potential operation			8760 hr/yr
Engine Usage					
Engine Make	CAT	Potential fuel usage			13.06 MMscf/yr
Engine Model	G3306TAA				
Serial Number					
Manufacture Date	2008				
NSPS Applicability	Subject to JJJJ	Stack ID			
Engine Configuration	4 cycle, lean burn				
Emission Controls	NSCR				
ISO Rating		211 BHP			
Site Rating		BHP			
Fuel Heating Value		1220 Btu/scf			
Heat Rate		1.82 MMBtu/hr			
Engine Heat Rate		8622 Btu/hp-hr			
Permit Status	Permit Pending				

**Potential Emissions**

Pollutant	Emission Factor		Nominal Rating (hp)	Hrs of Operation (hrs/yr)	Estimated Emissions		Source of Emission Factor
	(lb/MMBtu)	(g/hp-hr)			(lb/hr)	(tpy)	
NOx		0.50	211	8760	0.23	1.02	Mfr Factors
CO		0.50	211	8760	0.23	1.02	Mfr Factors
VOC <sup>2</sup>		0.50	211	8760	0.23	1.02	Mfr Factors
CO <sub>2</sub>		514.00	211	8760	239.10	1047.26	Mfr Factors
SOx	5.88E-04		211	8760	0.00	0.00	AP-42 Ch. 3.2, table 3.2-2
PM	7.71E-05		211	8760	0.00	0.00	AP-42 Ch. 3.2, table 3.2-2
PM10	7.71E-05		211	8760	0.00	0.00	AP-42 Ch. 3.2, table 3.2-2
Formaldehyde	5.28E-02		211	8760	0.10	0.42	AP-42 Ch. 3.2, table 3.2-2
n-Hexane	1.11E-03		211	8760	0.00	0.01	AP-42 Ch. 3.2, table 3.2-2
Benzene	4.40E-04		211	8760	0.00	0.00	AP-42 Ch. 3.2, table 3.2-2
Toluene	4.08E-04		211	8760	0.00	0.00	AP-42 Ch. 3.2, table 3.2-2
Ethylbenzene	3.97E-05		211	8760	0.00	0.00	AP-42 Ch. 3.2, table 3.2-2
Xylene	1.84E-04		211	8760	0.00	0.00	AP-42 Ch. 3.2, table 3.2-2
2,2,4-Trimethylpentane	2.50E-04		211	8760	0.00	0.00	AP-42 Ch. 3.2, table 3.2-2
CH <sub>4</sub>	0.23		211	8760	0.42	1.83	API <sup>1</sup>
Total HAPs					0.10	0.44	
CO <sub>2e</sub>					249.56	1093.08	

<sup>1</sup>API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, Table 4-9

<sup>2</sup>Includes total hydrocarbons

Notes

**MND-9**  
**Tank Detail Sheet**

Source ID Number	1S-TK1-4	Source Location	Zone:	
Equipment ID			Horizontal:	
Tank Description	4 - 400 bbl Prod Water Storage Tanks		Vertical:	
Tank Usage	Produced Water Storage	Potential operation		8760 hr/yr
Tank Make				
Tank Capacity	400 bbl	Maximum water production		221,524 bbl/yr
Serial Number				1.45 % Oil
Date in Service				HYSYS Run, Water Out Based on SHL17 Sample
Tank Contents	Produced Water			3212.1 bbl/yr Oil
Emission Controls				0.01846 lb/bbl VOC from FESCO Flash Study 0.00056 lb/bbl BTEX from FESCO Flash Study
Tank Orientation	Vertical, above ground	Tank Construction	Welded	(Welded, Bolted, Fiberglass)
Shell Height / Length	18 ft	Roof color & condition	Gray/Medium, good	(eg. light brown, good)
Shell Diameter	12 ft	shell color & condition	Gray/Medium, good	(eg. white, fair)
Roof Slope	0.06	FR Primary Seal	N/A	
Roof Type (Cone, Dome, IFR, EFR, None)	Cone	FR Secondary Seal	N/A	
Permit Status		Vent pressure setting		0.03 +/- psig
		VOC Control Efficiency		%

**Potential Emissions**

Pollutant	CAS	Hrs of Operation (hrs/yr)	Estimated Uncontrolled Emissions <sup>1</sup> (lb/hr)	(tpy)	(lb/yr)	Source of Emission Factor
VOC	Flash	8760	0.47	2.04	4089.34	FESCO Flash Study
VOC	W&B	8760	0.06	0.28	551.96	TANKS 4.09d
Total BTEX		8760	0.01	0.06	124.05	FESCO Flash Study
Total				2.38		
	Weight %			tpy		
Benzene	0.06%			0.0000		
Ethybenzene	0.36%			0.0001		
Toluene	0.09%			0.0000		
Xylenes	0.73%			0.0002	0.000	
N-Hexane	18.58%			0.0044		
224-TMP	9.32%			0.0022		
CH4	2.07%			0.0005		
CO2e				0.01		
Total HAPs				0.01		

MND-9

Produced Water Truck Loading Detail Sheet

TL

Select Model Liquid ---> Gasoline RVP 10

or Enter These Factors Directly Below

P= psia true vapor pressure  
M= lb/lb-mol molecular weight of vapors

S= 0.6 saturation factor  
P= 6.2 psia true vapor pressure  
M= 66 lb/lb-mol molecular weight of vapors  
T= 70 °F temperature Use liquid bulk temperature from TANKs run.  
 $L_L = 5.77 \text{ lb/1000 gallo} = 12.46 * S * P * M / (T + 460)$   
 $L_L = 0.242 \text{ lb/bbl}$  Loading Losses

Production: 221,524 bbl/year Produced Water  
3,212 bbl/year oil based on 1.45% oil in the Produced Water  
8.80 bbl/day

Potential Emissions

Pollutant	Component Wt%	Component Emissions		Controlled		
		lb/bbl	lb/yr	(lb/yr)	(tpy)	
VOC	98%	0.237	761	0.3806	761	0.3806
TOTAL HAPS	20.6%	0.050	161	0.0803	161	0.0803
n-hexane	18.6%	0.045	145	0.0723	145	0.0723
224-TMP	0.8%	0.002	6	0.0032	6	0.0032
Benzene	0.1%	0.000	0	0.0000	0	0.0000
Toluene	0.4%	0.001	3	0.0016	3	0.0016
Ethylbenzene	0.1%	0.000	0	0.0000	0	0.0000
Xylene	0.7%	0.002	6	0.0032	6	0.0032

Pollutant	Emission Factor (lbs TOC/gal)	gal/bbl	bbl/yr	CH4 Emissions		tpy	CO <sub>2</sub> e	Source of Emission Factor
				lbs CH4/lbs TOC	lbs/yr <sup>1</sup>			
CH4	0.002	42	500	0.0528	2.22	0.00	0.03	API <sup>2</sup>

Notes

<sup>1</sup> EPA AP-42, Volume I, Fifth Edition - January 1995, Table 5.2-1, Saturation (S) Factors for Calculating Petroleum Liquid Loading Losses

<sup>2</sup>API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry, Table 5-12

Table 5.2-1. SATURATION (S) FACTORS FOR CALCULATING PETROLEUM LIQUID LOADING LOSSES

Cargo Carrier	Mode Of Operation	S Factor
Tank trucks and rail tank cars	Submerged loading of a clean cargo tank	0.50
	Submerged loading: dedicated normal service	0.60
	Submerged loading: dedicated vapor balance service	1.00
	Splash loading of a clean cargo tank	1.45
	Splash loading: dedicated normal service	1.45
	Splash loading: dedicated vapor balance service	1.00

Table 7.1-2. PROPERTIES (MV, PVA, WL) OF SELECTED PETROLEUM LIQUIDS

	Vapor MW lb/lbmole	Liquid lb/gal	True vapor pressure (psi) at various temperatures in °F						
			40	50	60	70	80	90	100
Crude oil RVP 5	50	7.1	1.8	2.3	2.8	3.4	4	4.8	5.7
Distillate fuel oil No.2	130	7.1	0.0031	0.0045	0.0065	0.009	0.012	0.016	0.022
Gasoline RVP 7	68	5.6	2.3	2.9	3.5	4.3	5.2	6.2	7.4
Gasoline RVP 7.8	68	5.6	2.5929	3.2079	3.9363	4.793	5.7937	6.9552	8.2952
Gasoline RVP 8.3	68	5.6	2.7888	3.444	4.2188	5.1284	6.1891	7.4184	8.8344
Gasoline RVP 10	66	5.6	3.4	4.2	5.2	6.2	7.4	8.8	10.5
Gasoline RVP 11.5	65	5.6	4.087	4.9997	6.069	7.3132	8.7519	10.4053	12.2949
Gasoline RVP 13	62	5.6	4.7	5.7	6.9	8.3	9.9	11.7	13.8
Gasoline RVP	62	5.6	4.932	6.0054	7.2573	8.7076	10.3774	12.2888	14.4646
Gasoline RVP	60	5.6	5.5802	6.774	8.1621	9.7656	11.6067	13.7085	16.0948
Jet kerosene	130	7	0.0041	0.006	0.0085	0.011	0.015	0.021	0.029
Jet naphtha (JP-4)	80	6.4	0.8	1	1.3	1.6	1.9	2.4	2.7
Residual oil No. 6	190	7.9	0.00002	0.00003	0.00004	0.00006	0.00009	0.00013	0.00019

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Equipt Component Fugitives Estimate

FUG

	Counts	Emission Factor <sup>2</sup> lb/hr/component	% Control Efficiency	% VOC	VOC Emissions		Benzene lb/yr	Toluene lb/yr	E-benzene lb/yr	Xylene lb/yr	n-Hexane lb/yr	224-TMP lb/yr	Total HAP Emissions tpy	%CH4	CH4 Emissions		CO <sub>2</sub> e tpy	
					lb/hr	tpy									lb/hr	tpy		
<b>Valve</b>						<b>1.32</b>												<b>18.17</b>
Gas/Vapor	35	0.00992	0	26.26	0.09	0.40	0.07	0.15	0.02	0.24	5.08	0.00	0.00	46.54	0.16	0.71		17.70
Light Liquid <sup>1</sup>	35	0.00551	0	100	0.19	0.84	1.94	10.39	2.53	19.51	128.56	13.51	0.09	2.07	0.00	0.02		0.44
Water/Oil	84	0.000216	0	100	0.02	0.08	0.18	0.98	0.24	1.84	12.10	0.00	0.01	2.07	0.00	0.00		0.04
<b>Pumps Seals</b>						<b>0.00</b>							<b>0.00</b>					<b>0.00</b>
Light Liquid	0	0.02866	0	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.07	0.00	0.00		0.00
Water/Oil	2	0.0000529	0	100	0.00	0.00	0.00	0.01	0.00	0.01	0.07	0.00	0.00	2.07	0.00	0.00		0.00
<b>Flanges</b>						<b>0.07</b>							<b>0.00</b>					<b>1.55</b>
Gas/Vapor	35	0.00086	0	26.26	0.01	0.03	0.01	0.01	0.00	0.02	0.44	0.00	0.00	46.54	0.01	0.06		1.53
Light Liquid	35	0.000243	0	100	0.01	0.04	0.09	0.46	0.11	0.86	5.67	0.60	0.00	2.07	0.00	0.00		0.02
Water/Oil	70	0.00000617		100	0.00	0.00	0.00	0.02	0.01	0.04	0.29	0.00	0.00	2.07	0.00	0.00		0.00
<b>Open-Ended Lines</b>						<b>0.05</b>							<b>0.00</b>					<b>2.25</b>
Gas/Vapor	10	0.00441	0	26.26	0.01	0.05	0.01	0.02	0.00	0.03	0.65	0.00	0.00	46.54	0.02	0.09		2.25
Light Liquid		0.00309	0	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.07	0.00	0.00		0.00
Water/Oil		0.0006	0	100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.07	0.00	0.00		0.00
<b>Other</b>						<b>2.30</b>							<b>0.21</b>					<b>10.96</b>
Gas/Vapor	10	0.0194	0	26.26	0.05	0.22	0.04	0.08	0.01	0.13	2.84	0.00	0.00	46.54	0.09	0.40		9.89
Light Liquid	10	0.0165	0	100	0.17	0.72	1.66	8.89	2.17	16.69	109.99	11.56	0.08	2.07	0.00	0.01		0.37
Water/Oil	10	0.0309	0	100	0.31	1.35	3.11	16.65	4.06	31.26	205.99	0.00	0.13	2.07	0.01	0.03		0.70
<b>Connectors</b>						<b>0.82</b>							<b>0.07</b>					<b>4.31</b>
Gas/Vapor	175	0.000441	0	26.26	0.02	0.09	0.02	0.03	0.00	0.05	1.13	0.00	0.00	46.54	0.04	0.16		3.93
Light Liquid	175	0.000463	0	100	0.08	0.35	0.82	4.37	1.06	8.20	54.01	5.68	0.04	2.07	0.00	0.01		0.18
Water/Oil	350	0.000243	0	100	0.09	0.37	0.86	4.58	1.12	8.61	56.70	0.00	0.04	2.07	0.00	0.01		0.19
<b>Total Emissions</b>						0.96	4.56	7.95	42.05	10.22	78.89	526.82	31.35	0.38		0.34	1.48	37.24

Note

1. Heavy liquids are defined as having vapor pressure 0.044 psia or less at 68 °F. Light Liquids are defined as having vapor pressure higher than 0.044 psia at 68 ° F.

2. Factors from EPA Document EPA-453/R-95-017, November 1995.

MND-9 HYSYS Analysis

606.92 bpd condensate from GPU  
 18.822 MMSCFD sales gas from GPU  
 No on-site condensate processing

GPU Streams				
	Inlet	Gas Out	Condensate Out	Water Out
			To Pipeline	
Vapor Frac	0.0000	1	0	0
Temperature (F)	82.11	70.00	70.00	70.00
Pressure (psig)	2000	300	300	300
Vapor Flow (MMSCFD)	19.26	18.82	-	-
Mass Flow (lb/hr)	64053.43	47818.40	7389.34	8845.69
Liquid Flow (bbl/day)	1141.13	-	855.99	606.92
Composition:				
Methane	0.52140	0.66978	0.08248	0
Ethane	0.16375	0.20477	0.12566	0
Propane	0.06655	0.07738	0.15564	0
i-Butane	0.00836	0.00856	0.04040	0
n-Butane	0.02416	0.02289	0.14966	0
i-Pentane	0.00506	0.00354	0.05377	0
n-Pentane	0.00683	0.00418	0.08341	0
n-Hexane	0.00779	0.00237	0.13816	0
n-Heptane	0.00285	0.00036	0.05960	0
n-Octane	0.00254	0.00012	0.05659	0
n-Nonane	0.00097	0.00002	0.02201	0
n-Decane	0.00038	0.00000	0.00866	0
C10+*	0.00049	0.00000	0.01135	0
Nitrogen	0.00275	0.00355	0.00014	0.000001
CO2	0.00087	0.00110	0.00031	0.000011
Oxygen	0.00004	0.00005	0.00000	0
H2O	0.18465	0.00124	0.00039	0.999988
Benzene	0.00003	0.00001	0.00048	0
Toluene	0.00012	0.00001	0.00252	0
E-Benzene	0.00002	0.000001	0.00055	0
o-Xylene	0.00020	0.00001	0.00440	0
Cyclohexane	0.00021	0.00005	0.00382	0

Model Inlet Streams			
	Gas	Condensate	Water
Vapor Frac	0	0	1
Temperature (F)	80	80	80
Pressure (psig)	2000	2000	2000
Vapor Flow (MMSCFD)	-	-	19.255289
Mass Flow (lb/hr)	4853.88	8892.35	50307.20
Liquid Flow (bbl/day)	531.02	610.11	-
Composition:			
Methane	0.05400	0.00000	0.65755
Ethane	0.09469	0.00000	0.20410
Propane	0.12269	0.00000	0.08035
i-Butane	0.03430	0.00000	0.00951
n-Butane	0.10949	0.00000	0.02717
i-Pentane	0.05480	0.00000	0.00470
n-Pentane	0.07729	0.00000	0.00625
n-Hexane	0.13339	0.00000	0.00574
n-Heptane	0.11689	0.00000	0.00000
n-Octane	0.10399	0.00000	0.00000
n-Nonane	0.03950	0.00000	0.00000
n-Decane	0.01540	0.00000	0.00000
C10+*	0.02020	0.00000	0.00000
Nitrogen	0.00000	0.00000	0.00348
CO2	0.00000	0.00000	0.00109
Oxygen	0.00000	0.00000	0.00005
H2O	0.00000	1.00000	0.00000
Benzene	0.00110	0.00000	0.00000
Toluene	0.00490	0.00000	0.00000
E-Benzene	0.00100	0.00000	0.00000
o-Xylene	0.00800	0.00000	0.00000
Cyclohexane	0.00840	0.00000	0.00000



# **Attachment U**

## ATTACHMENT U – FACILITY-WIDE CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	NO <sub>x</sub>		CO		VOC		SO <sub>2</sub>		PM <sub>10</sub>		PM <sub>2.5</sub>		CH <sub>4</sub>		GHG (CO <sub>2</sub> e)	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S-TK1-4	--	--	--	--	0.53	2.32	--	--	--	--	--	--	<0.01	<0.01	<0.01	0.01
2S-GPU1	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03	0.01	0.03	<0.01	0.01	98.41	431.03
2S-GPU2	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03	0.01	0.03	<0.01	0.01	98.41	431.03
2S-GPU3	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03	0.01	0.03	<0.01	0.01	98.41	431.03
2S-GPU4	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03	0.01	0.03	<0.01	0.01	98.41	431.03
2S-GPU5	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03	0.01	0.03	<0.01	0.01	98.41	431.03
2S-GPU6	0.08	0.36	0.07	0.30	<0.01	0.02	<0.01	<0.01	0.01	0.03	0.01	0.03	<0.01	0.01	98.41	431.03
3S-ENG1	0.23	1.02	0.23	1.02	0.23	1.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.42	1.83	429.56	1093.08
4S-TL	--	--	--	--	0.09	0.38	--	--	--	--	--	--	<0.01	<0.01	<0.01	0.03
<b>TOTAL</b>	0.72	3.17	0.65	2.83	0.88	3.84	<0.01	0.02	0.04	0.16	0.04	0.16	0.43	1.88	840.01	3679.28

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1.

Therefore, fugitive emissions shall not be included in the PTE above.

## ATTACHMENT U – FACILITY-WIDE HAP CONTROLLED EMISSIONS SUMMARY SHEET

List all sources of emissions in this table. Use extra pages if necessary.

Emission Point ID#	Formaldehyde		Benzene		Toluene		Ethylbenzene		Xylenes		Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S-TK1-4	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
2S-GPU1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2S-GPU2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2S-GPU3	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2S-GPU4	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2S-GPU5	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2S-GPU6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
3S-ENG1	0.10	0.42	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.10	0.44
4S-TL	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.07	0.08
<b>TOTAL</b>	0.10	0.42	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.10	0.53

Annual emissions shall be based on 8,760 hours per year of operation for all emission units except emergency generators.

According to 45CSR14 Section 2.43.e, fugitive emissions are not included in the major source determination because it is not listed as one of the source categories in Table 1. Therefore, fugitive emissions shall not be included in the PTE above.

# **Attachment V**

# AIR QUALITY PERMIT NOTICE

## Notice of Application

Notice is given that Noble Energy, Inc. has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a G-70D General Permit for construction of a natural gas production site located in Moundsville, Marshall, West Virginia. The latitude and longitude coordinates are: 39.83150 and -80.78710.

The applicant estimates the potential to discharge the following regulated air pollutants on a facility-wide basis will be:

Carbon Monoxide (CO) = 2.83 tpy  
Nitrogen Oxides (NO<sub>x</sub>) = 3.17 tpy  
Particulate Matter – Total = 0.16 tpy  
Sulfur Dioxide (SO<sub>2</sub>) = 0.02 tpy  
Volatile Organic Compounds (VOC) = 8.40 tpy  
Hexane = 0.39 tpy  
Hazardous Air Pollutants (HAPs) = 0.91 tpy  
Carbon Dioxide Equivalents (CO<sub>2e</sub>) = 3,716.52 tpy

Startup of operation is planned to begin on or about the 27<sup>th</sup> day of August, 2017. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57<sup>th</sup> Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 27<sup>th</sup> day of April, 2017.

By: Noble Energy, Inc.  
RJ Moses  
Operations Manager  
1000 Noble Energy Drive  
Cannonsburg, PA 15317