



AMERICAN ENERGY
MARCELLUS

July 30, 2015

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

**RE: G70-A Class II Administrative Update Application
Long 408/409 Well Pad
American Energy – Marcellus, LLC**

Dear Director Durham:

American Energy – Marcellus, LLC (AEM) is pleased to submit the enclosed application for a General Permit G70-A Class II Administrative Update for the Long 408/409 well pad near Wileyville in Wetzel County, West Virginia. The original and two copies of the complete application package are enclosed.

A check for the application fee in the amount of \$1,300.00 made payable to the WVDEP – Division of Air Quality is also included with this package.

A public notice for the proposed project will be published in *The Wetzel Chronicle* as soon as possible. AEM will forward the original Affidavit of Publication to the Agency's attention once it is received from the publisher.

If you have any questions about the information submitted or if you would like to discuss this project, please do not hesitate to contact Evan Foster, EH&S Air Compliance Specialist, at (405) 418-8094.

Sincerely,

Tim Cummings
VP – Operations, AEM

cc: Grant Morgan, ERM – Grant.morgan@erm.com

Enclosures



AMERICAN ENERGY
MARCELLUS

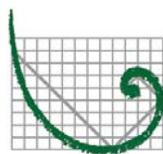
American Energy Marcellus, LLC

**G70-A General Air Permit, Class II Administrative
Update**

Long 408/409 Natural Gas Production Site

Wileyville, West Virginia

Prepared By:



ERM

ENVIRONMENTAL RESOURCES MANAGEMENT, Inc.
Hurricane, West Virginia

August 2015

INTRODUCTION

American Energy Marcellus, LLC (AEM) is submitting this G70-A Class II Administrative Update to the WVDEP's Division of Air Quality for the Long 408/409 natural gas production facility located in Wetzel County, West Virginia. This application addresses the operational activities associated with the production of natural gas and condensates at the Long 408/409 Site.

FACILITY DESCRIPTION

The AEM Long 408/409 natural gas production site operates in Wetzel County, WV and consists of eleven (11) natural gas wells. Natural gas and liquids (including water and condensates) are extracted from underground deposits. The natural gas will be transported from the wells to a gas line for compression and additional processing, as necessary. The produced liquids are stored in storage vessels.

The applicant is currently authorized to operate the following pieces of equipment under Permit G70-A009A:

- Eleven (11) GPU burners each rated at 1.0 MMBtu/hr heat input;
- Two (2) flash separator line heaters each rated at 1.0 MMBtu/hr heat input;
- Eight (8) 210 barrel (bbl) produced water tanks;
- Eight (8) 210 barrel (bbl) condensate tanks;
- One (1) condensate stabilizer line heater rated at 0.75 MMBtu/hr heat input;
- One (1) Enclosed Combustion Device with a capacity of 35.42 MMBtu/hr;
- One (1) Produced Water Tank Truck Loading Operations;
- One (1) Condensate Tank Truck Loading Operations; and
- One (1) Cummins G8.3 Reciprocating Compressor Engine rated at 118 bhp.

With this application for a Class II Administrative Update, the applicant seeks the authority to make the following after-the-fact updates:

- Addition of one (1) Hipower Natural Gas Prime-power Generator rated at 47 bhp ; and
- Addition of one (1) Cummins G8.3 Reciprocating Compressor Engine rated at 118 bhp.

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

STATEMENT OF AGGREGATION

The Long 408/409 facility is located in Wetzel County, WV and operated by AEM. Stationary sources of air pollutants may require aggregation of total emission levels to evaluate the potential applicability of Title I, Parts C and D preconstruction permitting programs and the Title V operating permit program if these sources share the same industrial grouping, are operating under common control, and are classified as contiguous or adjacent properties. AEM will operate the Long 408/409 facility with the same industrial grouping as nearby facilities, and some of these facilities are under common control. AEM, however, is not subject to the aggregation of stationary emission sources because these sites do not meet the definition of contiguous or adjacent facilities.

The Long 408/409 facility will operate under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding wells and compressor stations operated by AEM that share the same two-digit major SIC code of 13 for Crude Petroleum and Natural Gas Extraction. Therefore, the Long 408/409 Facility does share the same SIC codes as the surrounding wells and compressor stations.

AEM is the sole operator of the Long 408/409 pad. AEM is also the sole operator of other production sites and compressor stations in the area. Therefore, AEM does qualify as having nearby operations under common control.

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.

Based on the above reasoning, AEM is not subject to the aggregation of stationary emission sources since the stationary sources are not considered contiguous or adjacent facilities. This aggregation determination is consistent with the aggregation analysis provided by WVDAQ during the issuance of the current permit, G70-A009A. The aggregation analysis is not altered with the submittal of this Class II Administrative Update.

REGULATORY DISCUSSION

This section outlines the State air quality regulations that could be reasonably expected to apply to the Long 408/409 facility and makes an applicability determination for each regulation based on activities conducted at the site and the emissions of regulated air pollutants. This review is presented to supplement and/or add clarification to the information provided in the WVDEP G70-A permit application forms.

The West Virginia State Regulations address applicable state (i.e. State Implementation Plan) rules as well as federal regulations, including Title I

Prevention of Significant Deterioration Nonattainment New Source Review preconstruction permitting, Title V, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants. The regulatory requirements in reference to Long 408/ 409 are described in detail in the below section.

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 are indirect heat exchangers that combust natural gas. Such units are subject to 10% opacity as a six-minute block average limitation, but are exempt from most other requirements in the rule aside from discretionary testing requirements.

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 Long 408/409 facility are subject to this requirement. Based on the nature of the process at the wellpad, the presence of objectionable odors is unlikely.

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

The enclosed combustion device located on the Long 408/409 natural gas production site is subject to this regulation. Per 45 CSR 6-4.3, opacity of emissions from the enclosed combustion device shall not exceed 20 percent, except as provided by 4.4. Particulate matter emissions from this unit will not exceed the levels calculated in accordance with 6-4.1. The enclosed combustion device is not being altered with the submission of this Class II Administrative Update.

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

The line heaters are indirect heat exchangers that combust natural gas. Such units are subject to the 2,000 ppm_v sulfur dioxide concentration limitation but are exempt from most other requirements in the rule aside from discretionary testing requirements. Compliance with the allowable sulfur dioxide concentration limitations is based on a block (3) hour averaging time.

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

This G70-A Class II Administrative Update is being submitted for the operational activities associated with AEM's production of natural gas.

45 CSR 14 / 45 CSR 19 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration / Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contributed to Non-attainment

Federally regulated construction permitting programs regulate new and modified major sources of regulated pollutants. The G70-A applicability criteria exclude facilities that meet the definition of a major source as defined in 45 CSR 19 from being eligible for the general permit.

Operation of equipment at the Long 408/409 facility will not exceed major source emission thresholds established by these permitting programs. AEM will monitor future construction and modification activities at the site closely and will compare any future increase in emissions with major source thresholds to ensure these activities will not trigger these programs.

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

45CSR 16 applies to all registrants with affected facilities that are subject to any of the NSPS requirements described in more detail in the Federal Regulations section. Applicable requirements of NSPS, Subparts JJJJ and OOOO are included in the G70-A general permit.

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 with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAPs, and 100 tpy of all other regulated pollutants.

The potential emissions of all regulated pollutants are below the corresponding threshold(s) at this facility. The facility is not a major source with respect to the Title V operating permit 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 described in more detail in the Federal Regulations section. Applicable requirements of NESHAPS, Subpart ZZZZ and HH are included in the G70-A general permit.

FEDERAL REGULATIONS

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

Subpart JJJJ established standards and compliance schedules for the control of volatile organic compounds (VOC), Nitrogen Oxides (NO_x), and Carbon Monoxide (CO) emissions from affected facilities that commence construction, modification, or reconstruction after June 12, 2006. The applicable provisions and requirements of Subpart JJJJ are included under the G70-A permit.

The Hi-Power natural gas-fired generator installed at the Long 408/409 Site and included with this Class II Administrative Update is subject to the requirements of this Rule. The generator is a spark ignition internal combustion engine that commenced construction in 2015 and was manufactured in 2014. This engine is subject to an emission limit of 3.8 g/KW-hr for HC+NO_x. This engine has received EPA Certification with regards to Subpart JJJJ, which is included in this permit application.

The Cummins G8.3 natural gas-fired compression engine installed at the Long 408/409 Site and included with this Class II Administrative Update is subject to the requirements of this Rule. The compressor engine is a spark ignition internal combustion engine that commenced construction in 2015 and was manufactured on November 3, 2008. This engine is subject to an emission limit of 2.00 g/hp-hr NO_x, 4.0 g/hp-hr CO, and 1.0 g/hp-hr VOCs.

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 (SO₂) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. The applicable provisions and requirements of Subpart OOOO are included under the G70-A permit.

The storage vessels permitted at the Long 408/409 facility are not amended with the submission of this Class II Administrative Update. Based upon the G70-A009A issued by the WVDAQ, the Long 408/409 facility qualify as a storage vessel affected facility.

Pneumatic devices installed at the Long 408/409 facility that do not meet the affected facility definitions as specified by EPA. Any pneumatic controller installed at this facility will be intermittent bleed devices. Therefore, there will not be any pneumatic controller affected facilities located at this site.

No additional NSPS are currently applicable to this facility.

40 CFR 63, Subpart ZZZZ (National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)

AEM will operate the 118 bhp natural gas-fired reciprocating internal combustion to provide compression to vapors that flash in the condensate flash vessel. This engine was manufactured after July 1, 2008 and therefore will comply with 40 CFR 63 Subpart ZZZZ by complying with 40 CFR 60 Subpart JJJ.

The following NESHAP included in the G70-A permit are not applicable to the Long 408/409 Site:

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



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

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

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

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

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

SECTION I. GENERAL INFORMATION

1. Name of applicant (as registered with the WV Secretary of State's Office): American Energy – Marcellus, LLC		2. Federal Employer ID No. (FEIN): 46-5580354	
3. Applicant's mailing address: 301 NW 63rd. St., Suite 600 Oklahoma City, OK 73116		4. Applicant's physical address: 1220 Long Ridge Road, Wileyville, WV	
5. If applicant is a subsidiary corporation, please provide the name of parent corporation:			
6. WV BUSINESS REGISTRATION. Is the applicant a resident of the State of West Virginia? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO – IF YES, provide a copy of the Certificate of Incorporation/ Organization / Limited Partnership (one page) including any name change amendments or other Business Registration Certificate as Attachment A. – IF NO, provide a copy of the Certificate of Authority / Authority of LLC / Registration (one page) including any name change amendments or other Business Certificate as Attachment A.			

SECTION II. FACILITY INFORMATION

7. Type of plant or facility (stationary source) to be constructed, modified, relocated or administratively updated (e.g., coal preparation plant, primary crusher, etc.): Oil and natural gas production facility	8a. Standard Industrial Classification Classification (SIC) code: 1311	AND	8b. North American Industry System (NAICS) code: 211111
9. DAQ Plant ID No. (for existing facilities only): 103-00080	10. List all current 45CSR13 and other General Permit numbers associated with this process (for existing facilities only): G70-A009A		

A: PRIMARY OPERATING SITE INFORMATION

11A. Facility name of primary operating site: Long 408/409 _____	12A. Address of primary operating site: Mailing: 301 NW 63rd St., Suite 600, Oklahoma City, OK 73116 Physical: 1220 Long Ridge Road, Wileyville, WV	
13A. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO – IF YES, please explain: <u>LEASE</u> _____ – IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.		
14A. – For Modifications or Administrative Updates at an existing facility, please provide directions to the present location of the facility from the nearest state road; – For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a MAP as Attachment F . Route 7 East out of New Martinsville towards Morgantown, Bear right on Route 20 toward Pine Grove, left onto North Fork C/R 15/17, left onto Barker Run C/R 17, right onto Hoyt Ridge C/R 58, right on lease road. _____		
15A. Nearest city or town: Wileyville	16A. County: Wetzel	17A. UTM Coordinates: Northing (KM): 4,381.65 Easting (KM): 527.912 Zone: 17
18A. Briefly describe the proposed new operation or change (s) to the facility: AEM submits this Class II Administrative Update for an after-the-fact addition of a natural gas generator and a compressor engine. Please see Attachment B for a complete process description.		19A. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: 39.58411 Longitude: -80.67497

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

11B. Name of 1 st alternate operating site: <u>N/A</u> _____	12B. Address of 1 st alternate operating site: Mailing: _____ Physical: _____ _____
13B. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? 9 YES 9 NO – IF YES, please explain: _____ _____ – IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.	
14B. – For Modifications or Administrative Updates at an existing facility, please provide directions to the present location of the facility from the nearest state road; – For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a MAP as Attachment F . _____ _____ _____	

15B. Nearest city or town:	16B. County:	17B. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
18B. Briefly describe the proposed new operation or change (s) to the facility:		19B. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____

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

11C. Name of 2 nd alternate operating site: _____ N/A _____	12C. Address of 2 nd alternate operating site: Mailing: _____ Physical: _____
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13C. Does the applicant own, lease, have an option to buy, or otherwise have control of the proposed site? 9 YES 9 NO

— IF YES, please explain: _____

— IF NO, YOU ARE NOT ELIGIBLE FOR A PERMIT FOR THIS SOURCE.

14C. — For **Modifications or Administrative Updates** at an existing facility, please provide directions to the present location of the facility from the nearest state road;

— For Construction or Relocation permits, please provide directions to the proposed new site location from the nearest state road. Include a **MAP as Attachment F**.

15C. Nearest city or town:	16C. County:	17C. UTM Coordinates: Northing (KM): _____ Easting (KM): _____ Zone: _____
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18C. Briefly describe the proposed new operation or change (s) to the facility:	19C. Latitude & Longitude Coordinates (NAD83, Decimal Degrees to 5 digits): Latitude: _____ Longitude: _____
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20. Provide the date of anticipated installation or change: <input checked="" type="checkbox"/> If this is an After-The-Fact permit application, provide the date upon which the proposed change did happen: : _____ 12 / _____ / 2014	21. Date of anticipated Start-up if registration is granted: NA
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22. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application if other than 8760 hours/year. (Note: anything other than 24/7/52 may result in a restriction to the facility's operation).

Hours per day 24 Days per week 7 Weeks per year 52 Percentage of operation 100%

SECTION III. ATTACHMENTS AND SUPPORTING DOCUMENTS

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

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

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

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

- ATTACHMENT A : CURRENT BUSINESS CERTIFICATE
- ATTACHMENT B: PROCESS DESCRIPTION
- ATTACHMENT C: DESCRIPTION OF FUGITIVE EMISSIONS
- ATTACHMENT D: PROCESS FLOW DIAGRAM
- ATTACHMENT E: PLOT PLAN
- ATTACHMENT F: AREA MAP
- ATTACHMENT G: EQUIPMENT DATA SHEETS AND REGISTRATION SECTION APPLICABILITY FORM
- ATTACHMENT H: AIR POLLUTION CONTROL DEVICE SHEETS
- ATTACHMENT I: EMISSIONS CALCULATIONS
- ATTACHMENT J: CLASS I LEGAL ADVERTISEMENT
- ATTACHMENT K: ELECTRONIC SUBMITTAL
- ATTACHMENT L: GENERAL PERMIT REGISTRATION APPLICATION FEE
- ATTACHMENT M: SITING CRITERIA WAIVER (NOT INCLUDED)

- ATTACHMENT N: MATERIAL SAFETY DATA SHEETS (MSDS)
- ATTACHMENT O: EMISSIONS SUMMARY SHEETS
- OTHER SUPPORTING DOCUMENTATION NOT DESCRIBED ABOVE (Equipment Drawings, Aggregation Discussion, etc.) (NOT INCLUDED)

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

SECTION IV. CERTIFICATION OF INFORMATION

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

FOR A CORPORATION (domestic or foreign)

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

FOR A PARTNERSHIP

I certify that I am a General Partner

FOR A LIMITED LIABILITY COMPANY

I certify that I am a General Partner or General Manager

FOR AN ASSOCIATION

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

FOR A JOINT VENTURE

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

FOR A SOLE PROPRIETORSHIP

I certify that I am the Owner and Proprietor

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

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

Signature _____
(please use blue ink) Responsible Official Date

Name & Title **Tim Cummings, VP – Operations, AEM**
(please print or type)

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

Applicant's Name **American Energy – Marcellus, LLC.**

Phone & Fax **(405) 608-5491**
Phone Fax

Email **tim.cummings@aep-lp.com**

Attachment A

State of West Virginia



Certificate

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

AMERICAN ENERGY-MARCELLUS, LLC

Control Number: 9A5GM

a limited liability company, organized under the laws of the State of Oklahoma has filed its "Application for Certificate of Authority" in my office according to the provisions of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a foreign limited liability company from its effective date of May 6, 2014, until a certificate of cancellation is filed with our office.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

to the limited liability company 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 May 6, 2014

Natalie E. Tennant

Secretary of State



Attachment B

Attachment B

Process Description

This Class II Administrative Update is being filed for American Energy – Marcellus, LLC (AEM) and addresses operational activities associated with the Long 408 - 409 natural gas production site. Incoming raw natural gas from the eleven (11) wells enters the site through a pipeline. The raw gas is first routed through the 1.0 MMBtu/hr gas production units (GPUs) (1S to 11S) where the first stage of fluid separation occurs. The GPUs separate the well stream flow into a high pressure gas vapor product, while generating a high pressure natural gas stream and condensate liquid stream. In the second stage of separation, the liquid streams are routed through two (2) 1.0 MMbtu/hr line heaters (28S to 29S) to two low pressure flash separators where condensate and produced water are separated. The flash from the low pressure separators is captured via two (2) flash gas compressors driven by the natural gas-fired engines (35S and 37S) and is routed to the sales gas pipeline. Produced water from the separators is sent to eight (8) 210-bbl produced water storage tanks (20S to 27S). The condensate from the separators is sent to the eight (8) 210-bbl condensate storage tanks (12S to 19S).

The natural gas stream will exit the facility for transmission via pipeline. Condensate and produced water is transported offsite via truck. Working and breathing losses and flashing emissions from the eight (8) 210-bbl produced water storage tanks, eight (8) 210-bbl condensate storage tanks, and truck loading emissions (produced water 32S and condensate 33S) will be routed to the onsite enclosed combustor (31S).

With this Class II Administrative Update, AEM seeks to authorize the operation of one (1) Hipower Natural Gas Prime-power natural Gas Generator (38S) rated at 47 bhp, and (1) additional Cummins G8.3 Reciprocating Compressor Engine rated at 118 bhp (35S).

A process flow diagram is included as Attachment D.

Attachment C

Attachment C

G70-A General Permit Description of Fugitive Emissions

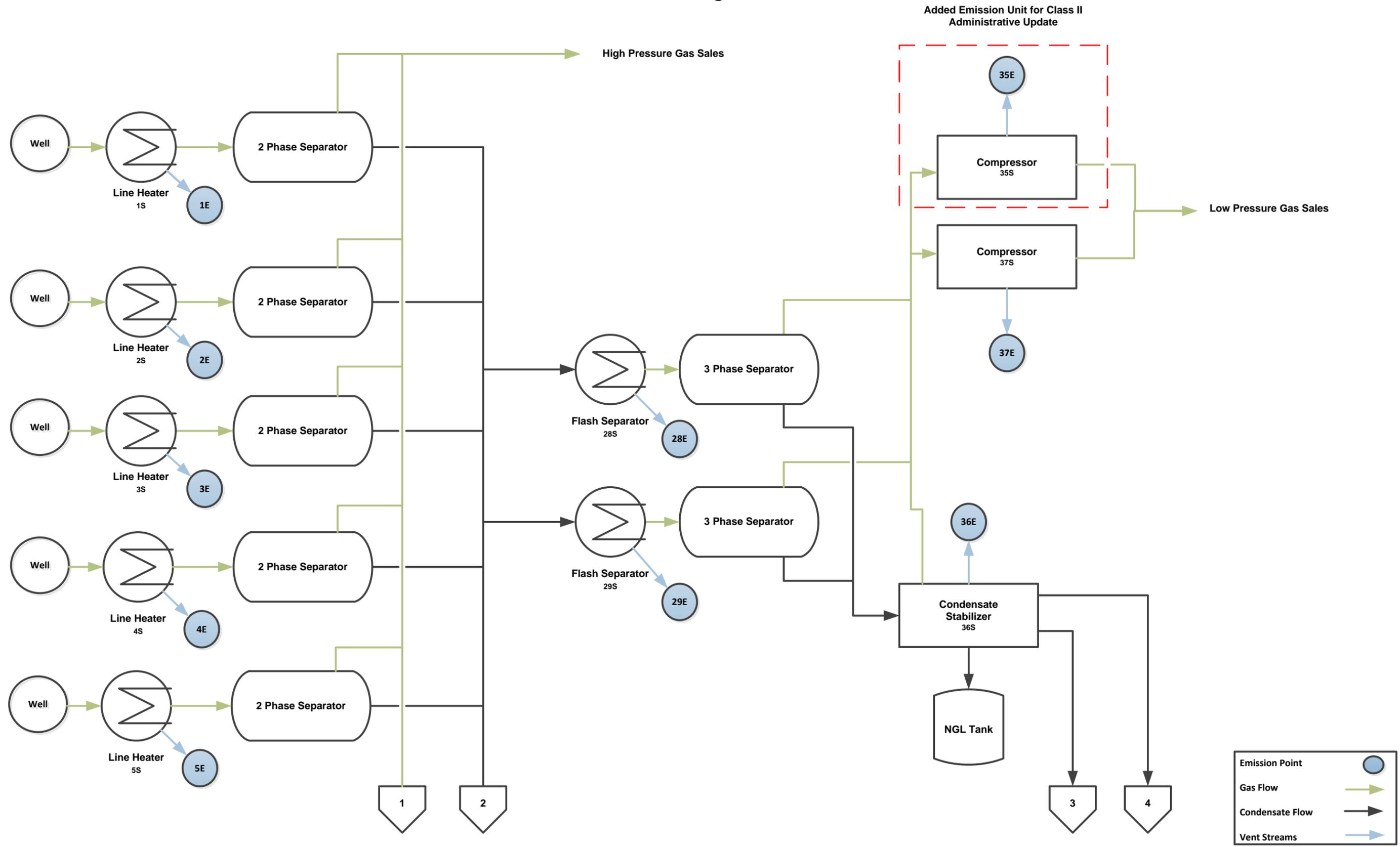
This permit application is being filed for American Energy – Marcellus, LLC (AEM) and addresses operational activities associated with the Long 408/409 natural gas production facility. Fugitive emissions are not being altered as a part of the Class II Administrative Update.

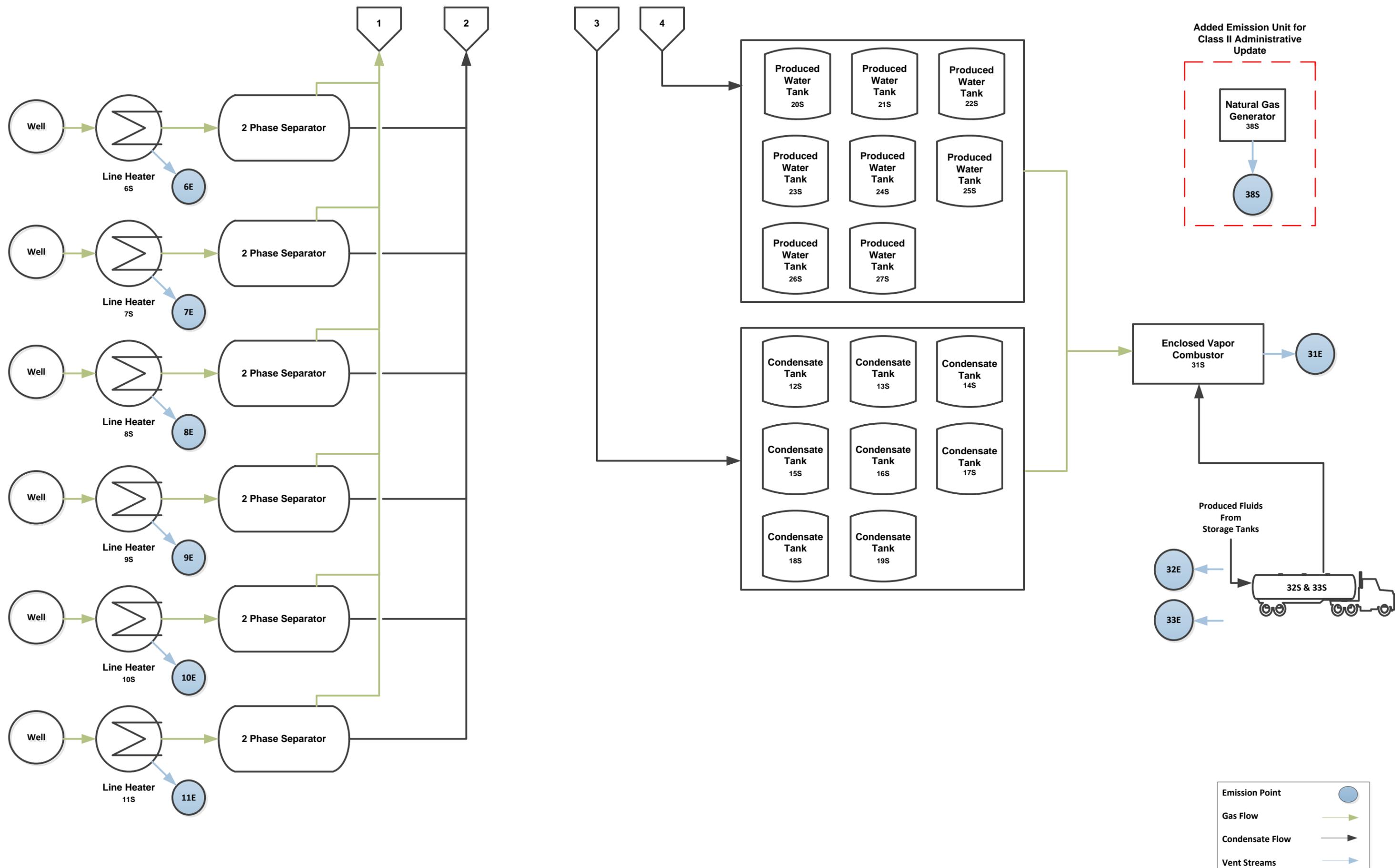
Attachment D

Attachment D

Long 408/409 Natural Gas Production

Process Flow Diagram



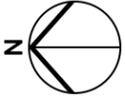


Attachment E

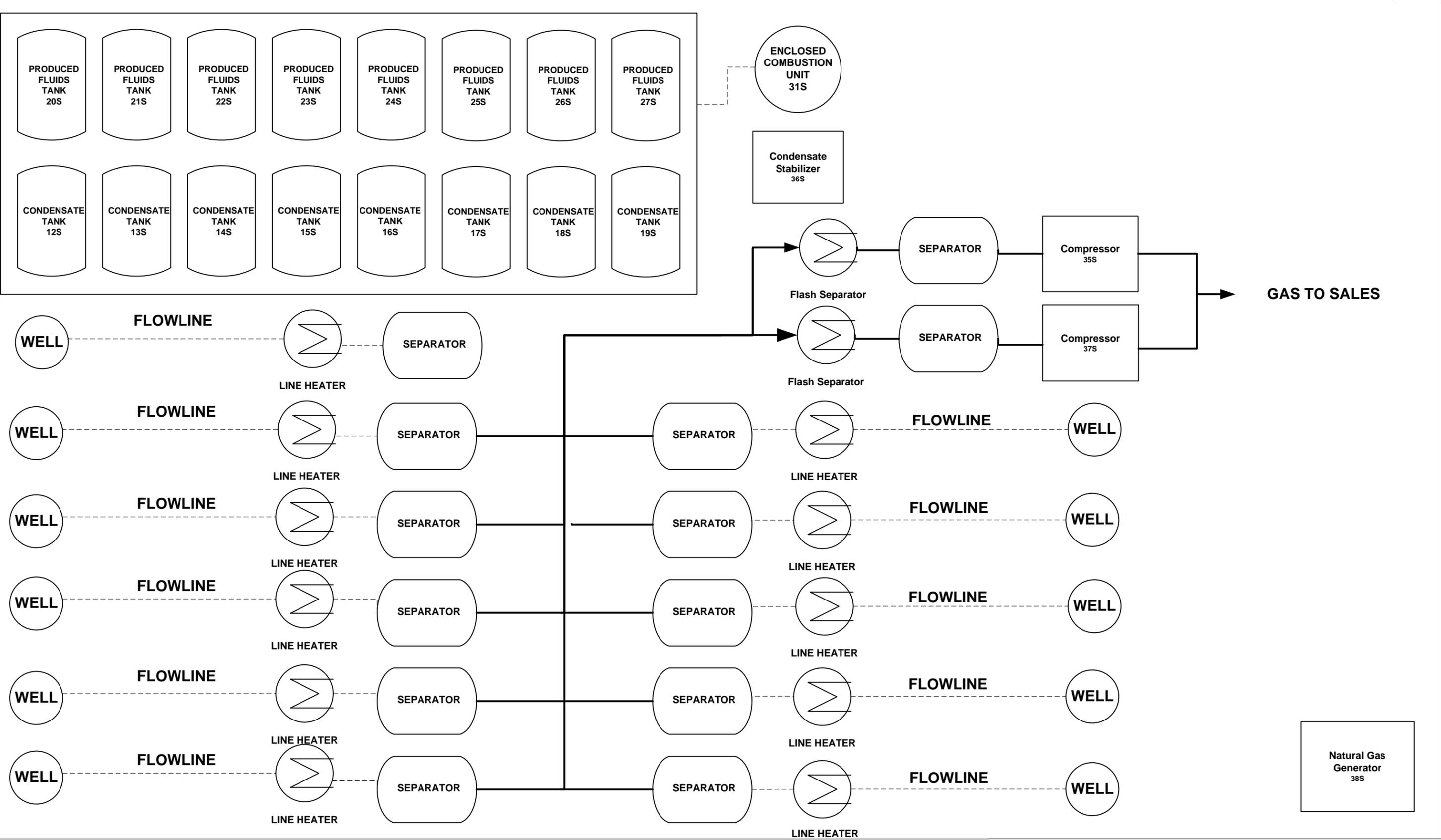
Attachment E

Plot Plan

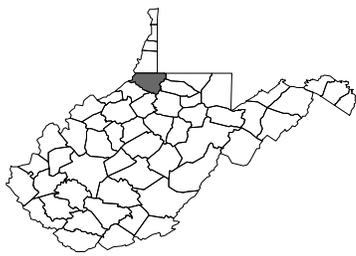
Long 408/409 Natural Gas Production Site



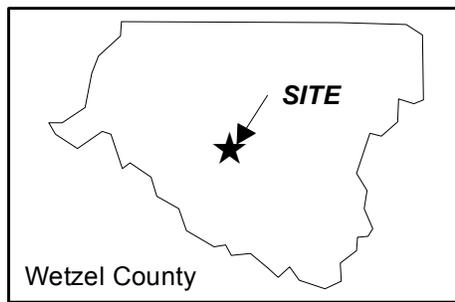
TRUCK ENTRANCE



Attachment F



West Virginia



Wetzel County



LAT. 39.58411 LON. -80.67497
 WETZEL COUNTY
 WEST VIRGINIA



Copyright © 2013 National Geographic Society, I-cubed

USGS 1:24K 7.5' Quadrangle: Pine Grove, WV

SITE LOCATION MAP



Long 408/409
 American Energy Marcellus, LLC
 Wetzel County, West Virginia

GIS Review: GAM

CHK'D: GAM

0293766.02

Drawn By:
 SRV-7/23/15

Environmental Resources Management

ATTACHMENT F

Attachment G

NATURAL 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).

Please provide the API number(s) for each NG well at this facility:	
47-103-02887	47-103-02880
47-103-02888	47-103-02881
47-103-02889	47-103-02882
47-103-02890	47-103-02883
47-103-02891	
47-103-02878	
47-103-02879	

Note: This is the same API 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 (American Petroleum Institute) 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.

NATURAL GAS-FIRED COMPRESSOR ENGINE (RICE) EMISSION UNIT DATA SHEET

Complete this section for any natural gas-fired reciprocating internal combustion engine.

Emission Unit (Source) ID No. ¹		38S					
Emission Point ID No. ²		38E					
Engine Manufacturer and Model		Hipower HRGM 30 T6					
Manufacturer's Rated bhp/rpm		47 bhp / 1,800 rpm					
Source Status ³		NS					
Date Installed/Modified/Removed ⁴		2015					
Engine Manufactured/Reconstruction Date ⁵		2014					
Is this engine subject to 40CFR60, Subpart JJJJ?		Yes					
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60, Subpart JJJJ? (Yes or No) ⁶		Yes					
Is this engine subject to 40CFR63, Subpart ZZZZ? (yes or no)		No					
Engine, Fuel and Combustion Data	Engine Type ⁷	LB4S					
	APCD Type ⁸	None					
	Fuel Type ⁹	PQ					
	H ₂ S (gr/100 scf)	0.25					
	Operating bhp/rpm	47 bhp / 1,800 rpm					
	BSFC (Btu/bhp-hr)	8,680					
	Fuel throughput (ft ³ /hr)	400					
	Fuel throughput (MMft ³ /yr)	3.5					
	Operation (hrs/yr)	8,760					
Reference ¹⁰	Potential Emissions ¹¹	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
EPA Certification	NO _x	0.37	1.63				
EPA Certification	CO	0.61	2.68				
EPA Certification	VOC	0.37	1.63				
AP-42	SO ₂	<0.001	0.001				
AP-42	PM ₁₀	0.01	0.02				
AP-42	Formaldehyde	0.03	0.12				
MRR ¹²	Proposed Monitoring:	AEM will comply with all monitoring requirements set forth in the issued permit.					
	Proposed Recordkeeping:	AEM will comply with all recordkeeping requirements set forth in the issued permit.					
	Proposed Reporting:	AEM will comply with all reporting requirements set forth in the issued permit.					

NATURAL GAS-FIRED COMPRESSOR ENGINE (RICE) EMISSION UNIT DATA SHEET

Complete this section for any natural gas-fired reciprocating internal combustion engine.

Emission Unit (Source) ID No. ¹		37S					
Emission Point ID No. ²		35E					
Engine Manufacturer and Model		USA Compressor Engine/ Cummins 5161 G8.3 /H302					
Manufacturer's Rated bhp/rpm		118 bhp / 1,800 rpm					
Source Status ³		New					
Date Installed/Modified/Removed ⁴		2015					
Engine Manufactured/Reconstruction Date ⁵		2015					
Is this engine subject to 40CFR60, Subpart JJJJ?		Yes					
Is this a Certified Stationary Spark Ignition Engine according to 40CFR60, Subpart JJJJ? (Yes or No) ⁶		Yes					
Is this engine subject to 40CFR63, Subpart ZZZZ? (yes or no)		Yes (JJJJ Only)					
Engine, Fuel and Combustion Data	Engine Type ⁷	RB4S					
	APCD Type ⁸	NSCR					
	Fuel Type ⁹	PQ					
	H ₂ S (gr/100 scf)	N/A					
	Operating bhp/rpm	118 bhp / 1,800 rpm					
	BSFC (Btu/bhp-hr)	8,924					
	Fuel throughput (ft ³ /hr)	819.48					
	Fuel throughput (MMft ³ /yr)	7.18					
	Operation (hrs/yr)	8,760					
Reference ¹⁰	Potential Emissions ¹¹	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr
EPA Certification	NO _x	0.51	2.22				
EPA Certification	CO	1.05	4.61				
EPA Certification	VOC	0.26	1.14				
AP-42	SO ₂	<0.001	0.003				
AP-42	PM ₁₀	0.02	0.09				
AP-42	Formaldehyde	0.02	0.09				
MRR ¹²	Proposed Monitoring:	AEM will comply with all monitoring requirements set forth in the issued permit.					
	Proposed Recordkeeping:	AEM will comply with all recordkeeping requirements set forth in the issued permit.					
	Proposed Reporting:	AEM will comply with all reporting requirements set forth in the issued permit.					

Attachment H

Attachment M

Air Pollution Control Devices

There are air pollution control devices at the Long 408/409 Site impacted by this Class II Administrative Update. The flash gas compressor RICE engine will utilize nonselective catalytic reduction (NSCR), which is considered integral to the design of the equipment.

Attachment I

Natural Gas Compressor Engine (37S)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Catalytic Converter Reduction Percentage	Precombustion Hourly Emissions (lb/hr)	Precombustion Annual Emissions (tpy)	Post-Combustion Hourly Emissions (lb/hr)	Post-Combustion Annual Emissions (tpy)
VOC's	1.00E+00	g/bhp-hr	NSPS JJJJ	118.0	8,924	1,285	8,760	0%	0.26	1.14	0.26	1.14
Formaldehyde	2.00E-02	lb/MMBtu	Vendor Guarantee	118.0	8,924	1,285	8,760	0%	0.02	0.09	0.02	0.09
Benzene	1.58E-03	lb/MMBtu	AP-42 Chapter 3.2	118.0	8,924	1,285	8,760	0%	0.002	0.007	0.002	0.007
Toluene	5.58E-04	lb/MMBtu	AP-42 Chapter 3.2	118.0	8,924	1,285	8,760	0%	<0.001	0.003	<0.001	0.003
Ethylbenze	2.48E-05	lb/MMBtu	AP-42 Chapter 3.2	118.0	8,924	1,285	8,760	0%	<0.001	<0.001	<0.001	<0.001
Xylene	1.95E-04	lb/MMBtu	AP-42 Chapter 3.2	118.0	8,924	1,285	8,760	0%	<0.001	<0.001	<0.001	<0.001
CO	8.60	g/bhp-hr	Vendor Guarantee	118.0	8,924	1,285	8,760	53%	2.24	9.80	1.05	4.61
NOx	13.00	g/bhp-hr	Vendor Guarantee	118.0	8,924	1,285	8,760	85%	3.38	14.82	0.51	2.22
PM ₁₀	1.94E-02	lb/MMBtu	Vendor Guarantee	118.0	8,924	1,285	8,760	0%	0.02	0.09	0.02	0.09
SO ₂	5.88E-04	lb/MMBtu	AP-42 Chapter 3.2	118.0	8,924	1,285	8,760	0%	<0.001	0.003	<0.001	0.003
CO ₂	452.00	g/bhp-hr	Vendor Guarantee	118.0	8,924	1,285	8,760	0%	117.61	515.11	117.61	515.11
CH ₄	0.23	lb/MMBtu	Vendor Guarantee	118.0	8,924	1,285	8,760	0%	0.24	1.06	0.24	1.06
N ₂ O	0.0001	kg N ₂ O / MMBtu	40 CFR Subpart C	118.0	8,924	1,285	8,760	0%	<0.001	<0.001	<0.001	<0.001
Total HAPs									0.02	0.10	0.02	0.10
Total CO ₂ e									123.73	541.93	123.73	541.93

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one NG compressor.
- Greenhouse Gas Emissions are calculated based on Vendor Guarantees and 40 CFR 98 Subpart C Table C-2 emission factors.
- AP-42, Chapter 3.2, Table 3.2-3 - Uncontrolled Emission Factors for 4-Stroke Rich Burn Engines
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO₂ equivalency solved for using Global Warming Potentials found in 40 CFR 98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298
- Vendor Guarantee Emissions are listed in Attachment I
- Vendor Guarantee Emissions are converted from g/kW-hr to g/bhp-hr. 1 kW = 1.34 bhp

Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/10⁶ scf) ÷ Heating Value of Natural Gas (Btu/scf) x Boiler Rating (MMBtu/hr)

Natural Gas Generator (38S)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Fuel Consumption (Btu/bhp-hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions. (lb/hr)	Max. Annual Emissions. (tpy)
VOC's	3.6	g/bhp-hr	Vendor Guarantee (EPA Certification)	47.0	10,936	1,285	8,760	0.37	1.63
Hexane	1.11E-03	lb/MMBtu	AP-42 Chapter 3.2	47.0	10,936	1,285	8,760	<0.001	0.002
Formaldehyde	5.28E-02	lb/MMBtu	AP-42 Chapter 3.2	47.0	10,936	1,285	8,760	0.03	0.12
Benzene	4.40E-04	lb/MMBtu	AP-42 Chapter 3.2	47.0	10,936	1,285	8,760	<0.001	<0.001
Toluene	4.08E-04	lb/MMBtu	AP-42 Chapter 3.2	47.0	10,936	1,285	8,760	<0.001	<0.001
Ethylbenze	3.97E-05	lb/MMBtu	AP-42 Chapter 3.2	47.0	10,936	1,285	8,760	<0.001	<0.001
Xylene	1.84E-04	lb/MMBtu	AP-42 Chapter 3.2	47.0	10,936	1,285	8,760	<0.001	<0.001
CO	5.90	g/bhp-hr	Vendor Guarantee (EPA Certification)	47.0	10,936	1,285	8,760	0.61	2.68
NOx	3.60	g/bhp-hr	Vendor Guarantee (EPA Certification)	47.0	10,936	1,285	8,760	0.37	1.63
PM ₁₀	9.91E-03	lb/MMBtu	AP-42 Chapter 3.2	47.0	10,936	1,285	8,760	0.01	0.02
SO ₂	5.88E-04	lb/MMBtu	AP-42 Chapter 3.2	47.0	10,936	1,285	8,760	<0.001	0.001
CO ₂	53.06	kg CO ₂ / MMBtu	40 CFR Subpart C	47.0	10,936	1,285	8,760	57.77	253.03
CH ₄	0.001	kg CH ₄ / MMBtu	40 CFR Subpart C	47.0	10,936	1,285	8,760	0.001	0.005
N ₂ O	0.0001	kg N ₂ O / MMBtu	40 CFR Subpart C	47.0	10,936	1,285	8,760	<0.001	<0.001
Total HAPs								0.03	0.12
Total CO ₂ e								57.83	253.30

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one NG generator.
- Greenhouse Gas Emissions are calculated using 40 CFR 98 Subpart C Table C-1 and C-2 emission factors.
- AP-42, Chapter 3.2, Table 3.2-2 - Uncontrolled Emission Factors for 4-Stroke Lean Burn Engines
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- CO₂ equivalency solved for using Global Warming Potentials found in 40 CFR 98 Table A-1 (Updated January 2014). GWP CO₂=1, GWP CH₄=25, GWP N₂O=298
- Vendor Guarantee Emissions are listed in Attachment I
- Vendor Guarantee Emissions are converted from g/kW-hr to g/bhp-hr. 1 kW = 1.34 bhp

Example Equations:

Max. Hourly Emission Rate (lb/hr) = Emission Factor (lb/10⁶ scf) ÷ Heating Value of Natural Gas (Btu/scf) x Boiler Rating (MMBtu/hr)

Total Long 408-409 Change in Emission Levels

Emission Sources	VOCs		HAPs		CO		NO _x		PM		SO ₂		CO ₂		CH ₄		N ₂ O		CO ₂ e	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Generator (38S)	0.37	1.63	0.03	0.12	0.61	2.68	0.37	1.63	0.01	0.02	<0.001	0.001	57.77	253.03	0.001	0.005	<0.001	<0.001	57.83	253.30
Natural Gas Compressor (37S)	0.26	1.14	0.02	0.10	1.05	4.61	0.51	2.22	0.02	0.09	<0.001	0.003	117.61	515.11	0.24	1.06	<0.001	<0.001	123.73	541.93
Totals	0.63	2.77	0.05	0.22	1.66	7.28	0.88	3.86	0.03	0.11	0.002	0.004	175.38	768.15	0.24	1.07	0.002	0.002	181.56	795.22

Emission Sources	HAPs		Hexane		Benzene		Toluene		Ethylbenzene		Xylenes		Formaldehyde	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Generator (38S)	0.03	0.12	0.001	0.002	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.03	0.12
Natural Gas Compressor (37S)	0.02	0.10	0.000	0.000	0.002	0.007	0.001	0.003	0.000	0.000	0.000	0.001	0.02	0.09
Totals	0.05	0.22	0.001	0.002	0.002	0.008	0.001	0.003	0.000	0.000	0.002	0.001	0.05	0.21

USA Compression Unit 5161 G8.3/H302

Engine Serial Number :	46930956	Engine Manufactured Date :	11/03/2008
Max HP :	118	Max RPM :	1800
Number of Engine Cylinders :	6	Total Displacement (in3) :	505
Combustion Type & Setting :	4 Stroke Rich Burn	Fuel Delivery Method:	Carburetor
Compression Ratio :	10.5:1	Combustion Air Treatment :	Naturally Aspirated
Engine Modified/Reconstructed? :	Tier 1 - EMD after 7/1/2008		
Compressor Frame Serial # :		Unit Packaged Date :	11/24/2008
Compressor Frame Max RPM :	1800	# of Compressor Throws :	2

AIR ENVIRONMENTAL REGULATIONS

County and State Selected for Quote:	Wetzel	WV	
NSPS JJJJ	NOx 2.00 g/hp-hr	CO 4.0 g/hp-hr	VOC 1.0 g/hp-hr
Ozone Non-Attainment / General Permit	NOx g/hp-hr	CO g/hp-hr	VOC g/hp-hr CH2O g/hp-hr

RAW ENGINE EMISSIONS

(based on assumption of burning 900-970 LHV BTU/SCF or 80-85 Fuel Methane # Fuel Gas with little to no H2S)

Fuel Consumption : 8,924 HHV BTU/bhp-hr

	<u>g/bhp-hr</u>	<u>lb/MMBTU</u>	<u>lb/hr</u>	<u>TPY</u>
Nitrogen Oxides (NOx) :	13.00		3.382	14.813
Carbon Monoxide (CO) :	8.60		2.237	9.798
Volatile Organic Compounds (NMNEHC excluding CH2O) :		0.03	0.031	0.136
Formaldehyde (CH2O) :		0.02	0.022	0.096
Particulate Matter (PM) Filterable+Condensable :		0.0194	0.020	0.090
Sulfur Dioxide (SO2) :		0.0006	0.001	0.003
	<u>g/bhp-hr</u>	<u>lb/MMBTU</u>	<u>lb/hr</u>	<u>Metric Tonne/yr</u>
Carbon Dioxide (CO2) :	452.00		117.58	467.14
Methane (CH4) :		0.23	0.24	0.96

CONTROLLED EMISSIONS

Catalytic Converter Make and Model: VXC-1408-04-HSG
 Catalyst Element Type: 3-Way
 Number of Catalyst Elements currently in Housing: 1
 Air/Fuel Ratio Control : Yes
 Other Engine Emissions Control Equipment :

	<u>% Reduction Required to Comply with JJJJ & Non-Attainment / General Permit Limits</u>		<u>lb/hr</u>	<u>TPY</u>
Nitrogen Oxides (NOx) :	85		0.520	2.279
Carbon Monoxide (CO) :	53		1.041	4.558
Volatile Organic Compounds (NMNEHC excluding CH2O) :	0		0.031	0.136
Formaldehyde (CH2O) :	0		0.022	0.096
Particulate Matter (PM) Filterable+Condensable :	0		0.020	0.090
Sulfur Dioxide (SO2) :	0		0.001	0.003
	<u>% Reduction Required to Comply with JJJJ & Non-Attainment / General Permit Limits</u>		<u>lb/hr</u>	<u>Metric Tonne/yr</u>
Carbon Dioxide (CO2) :	0		117.58	467.14
Methane (CH4) :	0		0.24	0.96

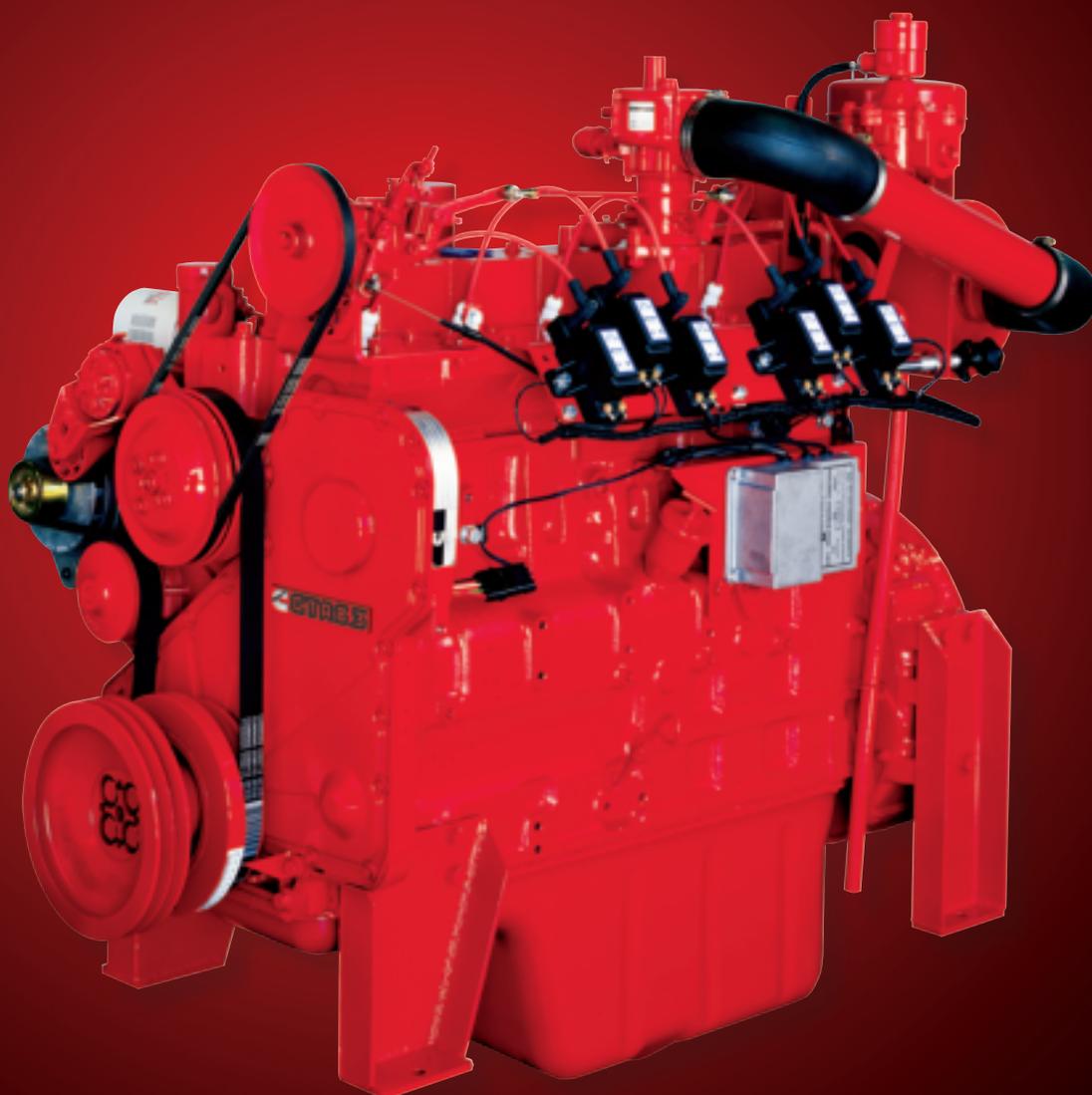
1) g/bhp-hr are based on Engine Manufacturer Specifications assuming a "Pipeline Quality" fuel gas composition, 1200 ft elevation, and 100- 110 F Max Air Inlet. Note that g/bhp-hr values are based on 100% engine load operation and some g/hp-hr values are Nominal and are not representative of Not- To-Exceed values. It is recommended to apply safety factor (i.e. increase the value by a nominal percentage) to the g/hp-hr values for Air Permitting to allow for operational flexibility and variations in fuel gas composition .

2) lb/MMBTU emission Factors are based on EPA's AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines).



G8.3 And GTA8.3.

Natural Gas Engines For Gas Compression.



G8.3 And GTA8.3.

Designed specifically for the oil and gas market, the G8.3 and GTA8.3 deliver exceptional dependability and low cost of operation in artificial lift, gas lift and wellhead compression applications. The G8.3 is naturally aspirated for power and responsiveness, with multiple ratings to tailor performance to meet application and environmental needs. The GTA8.3 is turbocharged and aftercooled for enhanced power and better performance at higher elevations.

Standard Features And Benefits.

Base engine – Most major components, including the block, crank, cam, gears and liners, are common with the proven C Series diesel, with over 20 years of proven dependable service in a wide range of industrial applications. Heads and cylinders designed specifically for natural gas operation provide optimal air flow, fuel flow and combustion. Both the G8.3 and GTA8.3 have a factory warranty of 1 year/unlimited hours.

Flywheel and flywheel housing – The SAE flywheel is machined from cast iron. The flywheel housing is machined to accommodate starter-mounting.

Power Take-Off (PTO) – A two-groove front pulley is standard for driving the compressor cooler fan. An optional front stub shaft is available.

Air handling – The turbocharger design delivers maximum performance and life. It includes a factory-installed heavy-duty air cleaner.

Fuel system – An IMPCO® carburetor provides stable operation and fuel tracking across a range of fuel qualities and through all load ranges.

Speed control – A belt-driven governor provides adjustable speed and stable control under all load conditions. Electronic governor options are available.

Ignition system – A capacitive-discharge ignition module delivers dependable spark performance and easy timing adjustment. The easily accessible spark-plug location and a single coil per cylinder improve serviceability.

Starting system – The standard system features a robust Delco Remy® 39MT 24-volt starter with an SAE #3 mounting flange. A gas starter is optional.

Electrical system – Includes a 24-volt alternator.

Lubrication system – A deep, full-length, high-capacity oil pan offers extended drain intervals. Combo full-flow and bypass oil filters reduce maintenance costs while extending service intervals.

Cooling system – A durable gear-driven jacket water pump maintains steady coolant flow through the engine. The integrated coolant filter adds corrosion protection. The GTA8.3 utilizes a separate thermostat-controlled aftercooling circuit to maintain lower intake manifold temperatures.

Exhaust system – The dry exhaust manifold is standard on the G8.3. The water-cooled manifold, which reduces surface heat and exhaust gas temperatures, is standard on the GTA8.3 and optional on the G8.3.

G8.3 And GTA8.3 Specifications. In-Line, 6-Cylinder, 4-Cycle, Natural Gas.

Number of Cylinders	6	
Displacement	505 cu in	8.3 L
Bore and Stroke	4.49 in x 5.32 in	114 mm x 135 mm
Aspiration	Turbocharged and aftercooled	
Oil Pan Capacity	9 U.S. gal	34 L
Coolant Capacity	2.9 U.S. gal	10.9 L
Length	52.5 in	1,334 mm
Width	34.3 in	871 mm
Height	51.8 in	1,315 mm
Weight (Dry)	1,650 lb	748 kg

Ratings Gross Horsepower (Without Fan).

Engine Model	Emissions Capability Note	Continuous Rating C/R (Note)	Continuous Rating hp (kW) @ rpm		
			1500	1800	2200
G8.3	1, 3	10.5:1	–	99 (74)	–
		10.5:1	99 (74)	118 (88)	135 (101)
GTA8.3	2	8.5:1	–	175 (130)	–
		8.5:1	–	190 (142)	–

(1) This engine is capable of operating with a Three-Way Catalyst (TWC) at this rating. It is the responsibility of the owner/operator to upgrade the engine with an air/fuel ratio controller and a TWC capable of meeting New Source Performance Standards for spark-ignited engines (SI NSPS) regulations. The owner/operator is required to conduct site compliance testing and submit documentation per Environmental Protection Agency (EPA) SI NSPS requirements.

(2) This engine does not have a catalyst rating, and is not capable of meeting the U.S. EPA SI NSPS. This engine is offered only for use outside the U.S., in regions that do not have low-emissions requirements.

(3) Catalyst rating.

Every Question. Answered.

Your Cummins distributor can provide you with additional details, answer questions and make recommendations for the best configuration of a Cummins G8.3 or GTA8.3 engine for your gas compression needs. See cumminsengines.com to locate the distributor nearest you.

IMPCO is a registered trademark of IMPCO Technologies, Inc. Delco Remy is a registered trademark of General Motors LLC.



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Attachment J

Attachment J

AIR QUALITY PERMIT NOTICE Notice of Application

Notice is given that American Energy – Marcellus, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a General Permit G70-A Class II Administrative Update application for a natural gas production operation located on 1220 Long Ridge Road, Wileyville, in Wetzel County, West Virginia. The latitude and longitude coordinates are: 39.58411, -80.67497.

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

Hazardous Air Pollutants (HAPs) = 0.22 tpy
Volatile Organic Compounds (VOCs) = 2.77 tpy
Carbon Monoxide (CO) = 7.28 tpy
Nitrogen Oxides (NO_x) = 3.86 tpy
Particulate Matter (PM) = 0.11 tpy
Sulfur Dioxide (SO₂) = 0.004 tpy
Carbon Dioxide Equivalents (CO₂e) = 795.22 tpy

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

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

Dated this the XX day of July, 2015.

By: American Energy – Marcellus, LLC
Tim Cummings
Director – Operations, AEM
301 NW 63rd St. Suite 600
Oklahoma City, OK 73116

Attachment K

Attachment K
G70-A General Permit Electronic Submittal

American Energy – Marcellus, LLC has chosen not to submit this G70-A General Permit Application electronically. One (1) original copy and two (2) complete PDF versions on CD-ROM of this application have been delivered to the WVDEP Division of Air Quality.

Attachment L

Attachment L
G70-A General Permit Application Fee

An application fee of \$1,300 is being submitted by American Energy – Marcellus, LLC with this G70-A General Permit Class II Administrative Update.

Attachment M

Attachment M
G70-A General Permit Siting Criteria Waiver

There are no dwellings within 300 ft of the proposed facility. A Siting Criteria Waiver is not applicable to the Long 408 - 409 natural gas facility.

Attachment N



Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Natural Gas Liquids
SDS Number:	786340
Synonyms/Other Means of Identification:	Natural Gas Liquids, Raw Natural Gas Liquids, Ethane Free Plant Condensate Raw NGL EPBC Mix PBC Mix Y-Grade Gas Liquids
MARPOL Annex I Category:	Naphthas and Condensates
Intended Use:	Feedstock
Manufacturer:	American Energy Partners 301 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 844-210-6000 URL: www.americanenergypartners.com

Section 2: Hazard(s) Identification

Classification

H224 -- Flammable liquids -- Category 1
H315 -- Skin corrosion/irritation -- Category 2
H304 -- Aspiration Hazard -- Category 1
H336 -- Specific target organ toxicity (single exposure) -- Category 3
H350 -- Carcinogenicity -- Category 1B
H411 -- Hazardous to the aquatic environment, chronic toxicity -- Category 2

Hazards not Otherwise Classified

May contain or release poisonous hydrogen sulfide gas

Label Elements



DANGER

Extremely flammable liquid and vapor. (H224)*

Causes skin irritation. (H315)*

May contain or release poisonous hydrogen sulfide gas

May be fatal if swallowed and enters airways. (H304)*

May cause drowsiness or dizziness. (H336)*

May cause cancer. (H350)*

Toxic to aquatic life with long lasting effects. (H411)*

Precautionary Statement(s):

Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Keep container tightly closed. (P233)*
Ground/bond container and receiving equipment. (P240)*
Use with explosion-proof equipment. (P241)*
Use only non-sparking tools. (P242)*
Take precautionary measures against static discharge. (P243)*
Avoid breathing dust/fume/gas/mist/vapours/spray. (P261)*
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF ON SKIN: Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. (P303+P361+P353)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
If skin irritation occurs: Get medical advice/attention. (P313)*
Take off contaminated clothing and wash before reuse. (P362)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304+P340)*
Call a POISON CENTER or doctor/physician if you feel unwell. (P312)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
Store in a well-ventilated place. Keep cool.(P403+P235)*
Store locked up. (P405)*
Dispose of contents/container to approved disposal facility. (P501)*

**(Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration ¹
Natural gas (petroleum), raw liq. mix	64741-48-6	100
n-Hexane	110-54-3	5-25
Benzene	71-43-2	0.1-5
Hydrogen Sulfide	7783-06-4	<1

Total Sulfur: > 0.5 wt%

¹ All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing, and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Wash contaminated clothing before reuse.

Inhalation (Breathing): If respiratory symptoms or other symptoms of exposure develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If symptoms persist, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. For adults the dose is 10 mL of a 3% NaNO₂ solution (0.5 gm NaNO₂ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

Section 5: Fire-Fighting Measures



NFPA 704 Hazard Class

Health: 1 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. May contain or release poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H₂S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. May contain or release dangerous levels of hydrogen sulfide. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid breathing vapors or mists. Use only outdoors or in well-ventilated area. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Conditions for safe storage: This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H₂S, and flammability prior to entry. Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Natural gas (petroleum), raw liq. mix	TWA: 300 ppm (as Gasoline)	TWA: 400 mg/m ³ TWA: 100 ppm	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (American Energy Guidelines)
n-Hexane	TWA: 50 ppm Skin	TWA: 500 ppm TWA: 1800 mg/m ³	---
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	---
Hydrogen Sulfide	STEL: 5 ppm TWA: 1 ppm	Ceiling: 20 ppm	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (American Energy Guidelines)

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such as chemical resistant boots, aprons, arm covers, hoods, coveralls, or encapsulated suits. Suggested protective materials: Nitrile

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Colorless
Physical Form:	Liquid
Odor:	Gasoline; Rotten egg / sulfurous
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	150 - 200 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	No data
Melting/Freezing Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	(estimated) 0.5 - 0.7 @ 68°F / 20°C
Percent Volatile:	100%
Evaporation Rate (nBuAc=1):	No data
Flash Point:	< -99 °F / < -73 °C
Test Method:	(estimate)
Lower Explosive Limits (vol % in air):	No data
Upper Explosive Limits (vol % in air):	No data
Auto-ignition Temperature:	No data

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

<u>Acute Toxicity</u>	<u>Hazard</u>	<u>Additional Information</u>	<u>LC50/LD50 Data</u>
Inhalation	Expected to have a low degree of toxicity by inhalation	May contain or release poisonous hydrogen sulfide gas - see Other Comments.	> 5.2 mg/L (vapor)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

Aspiration Hazard: May be fatal if swallowed and enters airways.

Skin Corrosion/Irritation: Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation. .

Signs and Symptoms: Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: May cause cancer Based on component information.

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Other Comments: This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Information on Toxicological Effects of Components

Natural gas (petroleum), raw liq. mix

Carcinogenicity: Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow-up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional processes and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

Target Organs: Two year inhalation studies of wholly vaporized unleaded gasoline, and 90 days studies of various petroleum naphthas, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.

Reproductive Toxicity: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two-generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.

n-Hexane

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.

Reproductive Toxicity: Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.

Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Cyclohexane

Reproductive Toxicity: Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

Section 12: Ecological Information

Toxicity: Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

Persistence per IOPC Fund definition: Non-Persistent

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.

Mobility in Soil: On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D001 - Ignitability characteristic
- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description:	<i>If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:</i> UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., 2.1; ; <i>If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:</i> UN3295, Hydrocarbons, liquid, n.o.s., 3, I or II [I if BP < 95° F (35° C); II if BP > 95° F]
Non-Bulk Package Marking:	<i>Must be consistent with shipping description, either:</i> Hydrocarbon gas mixture, liquefied, n.o.s., UN1965 <i>or</i> Hydrocarbons, liquid, n.o.s., UN3295
Non-Bulk Package Labeling:	<i>For UN1965:</i> Flammable gas <i>For UN3295:</i> Flammable liquid
Bulk Package/Placard Marking:	<i>For UN1965:</i> Flammable gas / 1965 <i>For UN3295:</i> Flammable / 3295
Packaging - References:	<i>For UN1965:</i> 49 CFR: 173.306; 173.304; 173.314 & .315 <i>For UN3295:</i> 49 CFR 173.150; 173.201; 173.243 [PG I] <i>-or-</i> 49 CFR 173.150; 173.202; 173.242 [PG II] <i>(Exceptions; Non-bulk; Bulk)</i>
Hazardous Substance:	See Section 15 for RQ's
Emergency Response Guide:	<i>UN1965</i> - 115; <i>UN3295</i> - 128;
Note:	<i>The following alternate shipping description order may be used until January 1, 2013:</i> Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group <i>Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable</i> <i>Other shipping description elements may be required for DOT compliance.</i>

International Maritime Dangerous Goods (IMDG)

Shipping Description:	<i>If boiling point is < 20° C shipping description is:</i> UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., (Propane , Butane), 2.1 <i>If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) shipping description is:</i> UN3295, Hydrocarbons, liquid, n.o.s., 3, I or II (FP° C cc), [where FP is the material's flash point in degrees C cc.] [I if BP < 95° F (35° C); II if BP > 95° F];
Non-Bulk Package Marking:	<i>Must be consistent with shipping description, either:</i> Hydrocarbon gas mixture, liquefied, n.o.s., (Propane, Butane), UN1965 <i>or</i> Hydrocarbons, liquid, n.o.s., UN3295
Labels:	<i>For UN1965:</i> Flammable gas <i>For UN3295:</i> Flammable liquid
Placards/Marking (Bulk):	<i>For UN1965:</i> Flammable gas / 1965 <i>For UN3295:</i> Flammable / 3295
Packaging - Non-Bulk:	<i>For UN1965:</i> P200 <i>For UN3295:</i> P001
EMS:	<i>For UN1965:</i> F-D, S-U <i>For UN3295:</i> F-E, S-D
Note:	<i>If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.</i>

International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)

UN/ID #: UN1965 or UN3295

Proper Shipping Name: *For UN1965:* Hydrocarbon gas mixture, liquefied, n.o.s. (Propane, Butane)
For UN3295: Hydrocarbons, liquid, n.o.s.

Hazard Class/Division: *For UN1965:* 2.1
For UN3295: 3

Subsidiary risk: None
Packing Group: *For UN1965:* None
For UN3295: I or II [*Determined by IATA 3.3.2*]

Non-Bulk Package Marking: *For UN1965:* Hydrocarbon gas mixture, liquefied, n.o.s. (Propane, Butane), UN1965
For UN3295: Hydrocarbons, liquid, n.o.s., UN3295

Labels: *For UN1965:* Flammable gas , Cargo Aircraft Only
For UN3295: Flammable liquid

ERG Code: *For UN1965:* 10L or *For UN3295:* 3H
 LTD. QTY

		Passenger Aircraft	Cargo Aircraft Only
Packaging Instruction #:	<i>UN1965</i> - Forbidden <i>UN3295</i> - Forbidden - [PG I] Y341 - [PG II]	<i>UN1965</i> - Forbidden <i>UN3295</i> - 351 - [PG I] 353 - [PG II]	<i>UN1965</i> - 200 <i>UN3295</i> - 361 - [PG I] 364 - [PG II]
Max. Net Qty. Per Package:	<i>UN3295</i> - Forbidden - [PG I] 1L - [PG II]	<i>UN3295</i> - 1L - [PG I] 5 L - [PG II]	<i>UN1965</i> - 150 kg <i>UN3295</i> - 30 L - [PG I] 60 L - [PG II]

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

Component	TPQ	EPCRA RQ
Hydrogen Sulfide	500 lb	100 lb

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health: Yes
Chronic Health: Yes
Fire Hazard: Yes
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration ¹	de minimis
n-Hexane	5-25	1.0%
Toluene	1-5	1.0%
Benzene	0.1-5	0.1%
Cyclohexane	0-3	1.0%

EPA (CERCLA) Reportable Quantity (in pounds):

EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:

Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant

International Hazard Classification

Canada:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:

B2 - Flammable Liquids
D2A
D2B

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: EAR99

Section 16: Other Information

Date of Issue:	20-Sep-2014
Status:	FINAL
Previous Issue Date:	20-Sep-2014
Revised Sections or Basis for Revision:	Identified Hazards (Section 2) Precautionary Statement(s) (Section 2) First Aid (Section 4)Exposure limits (Section 8) Shipping information (Section 14) Regulatory information (Section 15)
SDS Number:	786340

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.



AMERICAN ENERGY
PARTNERS

Crude Condensate

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name:	Crude Condensate
SDS Number:	730370
Synonyms/Other Means of Identification:	Natural Gas Condensates, Petroleum Crude Oil Condensate Gas Drips
MARPOL Annex I Category:	Naphthas and Condensates
Intended Use:	Feedstock
Manufacturer:	American Energy Partners 301 N.W. 63rd Oklahoma City, OK 73116
Emergency Health and Safety Number:	Chemtrec: 800-424-9300 (24 Hours)
SDS Information:	Phone: 844-210-6000 URL: www.americanenergypartners.com

Section 2: Hazard(s) Identification

Classification

H224 -- Flammable liquids -- Category 1
H304 -- Aspiration Hazard -- Category 1
H315 -- Skin corrosion/irritation -- Category 2
H332 -- Acute toxicity, Inhalation -- Category 4
H336 -- Specific target organ toxicity (single exposure) -- Category 3
H350 -- Carcinogenicity -- Category 1B
H411 -- Hazardous to the aquatic environment, chronic toxicity -- Category 2

Hazards not Otherwise Classified

May contain or release poisonous hydrogen sulfide gas

Label Elements



DANGER

Extremely flammable liquid and vapor. (H224)*
Causes skin irritation. (H315)*
May be fatal if swallowed and enters airways. (H304)*
Contains poisonous hydrogen sulfide gas
Harmful if inhaled. (H332)*
May cause drowsiness or dizziness. (H336)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H411)*

Precautionary Statement(s):

Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Keep away from heat/sparks/open flames/hot surfaces. - No smoking. (P210)*
Keep container tightly closed. (P233)*
Keep cool. (P235)*
Ground/bond container and receiving equipment. (P240)*
Use with explosion-proof equipment. (P241)*
Use only non-sparking tools. (P242)*
Take precautionary measures against static discharge. (P243)*
Avoid breathing dust/fume/gas/mist/vapours/spray. (P261)*
Wash thoroughly after handling. (P264)*
Use only outdoors or in a well-ventilated area. (P271)*
Avoid release to the environment. (P273)*
Wear protective gloves / protective clothing / eye protection / face protection. (P280)*
IF ON SKIN: Remove/Take off immediately all contaminated clothing. (P361)* Wash with plenty of soap and water. (P352)*
If skin irritation occurs: Get medical advice/attention. (P313)*
Take off contaminated clothing and wash before reuse. (P362)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P340)*
Call a POISON CENTER or doctor/physician if you feel unwell. (P312)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P310)*
Do NOT induce vomiting. (P331)*
In case of fire: Use dry chemical, carbon dioxide, or foam for extinction.(P370+P378)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

**(Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CASRN	Concentration ¹
Natural Gas Condensate ..C2-20	64741-47-5	100
Toluene	108-88-3	1-7
Hydrogen Sulfide	7783-06-4	0.1-5
Benzene	71-43-2	<5

¹ All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Crude oil, natural gas and natural gas condensate can contain minor amounts of sulfur, nitrogen and oxygen containing organic compounds as well as trace amounts of heavy metals like mercury, arsenic, nickel, and vanadium. Composition can vary depending on the source of crude.

Section 4: First Aid Measures

Eye Contact: If irritation or redness develops from exposure, flush eyes with clean water. If symptoms persist, seek medical attention.

Skin Contact: Remove contaminated shoes and clothing, and flush affected area(s) with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops, seek medical attention. Wash contaminated clothing before reuse.

Inhalation (Breathing): Immediately move victim away from exposure and into fresh air in a position comfortable for breathing. If respiratory symptoms or other symptoms of exposure develop, seek immediate medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. If victim is drowsy or unconscious and vomiting, place on the left side with the head down. If possible, do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: At high concentrations hydrogen sulfide may produce pulmonary edema, respiratory depression, and/or respiratory paralysis. The first priority in treatment should be the establishment of adequate ventilation and the administration of 100% oxygen. Animal studies suggest that nitrites are a useful antidote, however, documentation of the efficacy of nitrites in humans is lacking. If the diagnosis of hydrogen sulfide poisoning is confirmed and if the patient does not respond rapidly to supportive care, the use of nitrites may be an effective antidote if delivered within the first few minutes of exposure. For adults the dose is 10 mL of a 3% NaNO₂ solution (0.5 gm NaNO₂ in 15 mL water) I.V. over 2-4 minutes. The dosage should be adjusted in children or in the presence of anemia, and methemoglobin levels, arterial blood gases, and electrolytes should be monitored closely.

Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in persons exposed to high concentrations of hydrocarbon solvents (e.g., in enclosed spaces or with deliberate abuse). The use of other drugs with less arrhythmogenic potential should be considered. If sympathomimetic drugs are administered, observe for the development of cardiac arrhythmias.

Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Other Comments: Before attempting rescue, first responders should be alert to the possible presence of hydrogen sulfide, a poisonous gas with the smell of rotten eggs, and should consider the need for respiratory protection (see Section 8). Remove casualty to fresh air as quickly as possible. Immediately begin artificial respiration if breathing has ceased. Consider whether oxygen administration is needed. Obtain medical advice for further treatment.

Section 5: Fire-Fighting Measures



NFPA 704 Hazard Class

Health: 2 **Flammability:** 4 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: Extremely flammable. This material can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment, and electronic devices such as cell phones, computers, calculators, and pagers which have not been certified as intrinsically safe). Vapors may travel considerable distances to a source of ignition where they can ignite, flash back, or explode. May create vapor/air explosion hazard indoors, in confined spaces, outdoors, or in sewers. This product will float and can be reignited on surface water. Vapors are heavier than air and can accumulate in low areas. If container is not properly cooled, it can rupture in the heat of a fire. Hazardous combustion/decomposition products, including hydrogen sulfide, may be released by this material when exposed to heat or fire. Use caution and wear protective clothing, including respiratory protection.

Extinguishing Media: Dry chemical, carbon dioxide, or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Hydrogen sulfide and oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: Extremely flammable. Spillages of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release if safe to do so. The use of explosion-proof electrical equipment is recommended. Contains poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H₂S around the spilled product is suspected, additional or special actions may be warranted, including access restrictions and use of protective equipment. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from ignition sources such as heat/sparks/open flame – No smoking. Take precautionary measures against static discharge. Nonsparking tools should be used. Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Wear protective gloves/clothing and eye/face protection. May contain or release dangerous levels of hydrogen sulfide. Use only outdoors or in well-ventilated area. Avoid breathing vapors or mists. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Extremely Flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas. Open container slowly to relieve any pressure. Electrostatic charge may accumulate and create a hazardous condition when handling or processing this material. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. The use of explosion-proof electrical equipment is recommended and may be required (see appropriate fire codes). Refer to NFPA-70 and/or API RP 2003 for specific bonding/grounding requirements. Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

Mercury and other heavy metals may be present in trace quantities in crude oil, raw natural gas, and condensates. Production and processing of these materials can lead to "drop-out" of elemental mercury in enclosed vessels and pipe work, typically at the low point of any process equipment because of its density. Mercury may also occur in other process system deposits such as sludges, sands, scales, waxes, and filter media. Personnel engaged in work with equipment where mercury deposits might occur (confined space entry, sampling, opening drain valves, draining process lines, etc), may be exposed to a mercury hazard (see sections 3 and 8).

Static Accumulation Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding of tanks, transfer piping, and storage tank level floats are necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating and accumulating an electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. Special care should be given to ensure that special slow load procedures for "switch loading" are followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha). For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.

Conditions for safe storage: This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H₂S, and flammability prior to entry. Keep container(s) tightly closed and properly labeled. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Store only in approved containers. Post area "No Smoking or Open Flame." Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	Other
Natural Gas Condensate ..C2-20	TWA: 300 ppm (as Gasoline)	TWA: 400 mg/m ³ TWA: 100 ppm	0.5 ppm TWA8hr (as benzene) 0.25 ppm TWA12hr (as benzene) 2.5 ppm STEL (as benzene) (American Energy Guidelines)
Toluene	TWA: 20 ppm	Ceiling: 300 ppm TWA: 200 ppm	---
Hydrogen Sulfide	STEL: 5 ppm TWA: 1 ppm	Ceiling: 20 ppm	TWA: 5 ppm 8hr TWA: 2.5 ppm 12hr STEL: 15 ppm (American Energy Guidelines)
Benzene	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 10 ppm TWA: 1 ppm	---

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Depending on exposure and use conditions, additional protection may be necessary to prevent skin contact including use of items such as chemical resistant boots, aprons, arm covers, hoods, coveralls, or encapsulated suits. Suggested protective materials: Nitrile

Respiratory Protection: A NIOSH approved, self-contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode should be used in situations of oxygen deficiency (oxygen content less than 19.5 percent), unknown exposure concentrations, or situations that are immediately dangerous to life or health (IDLH).

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use.

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Workplace monitoring plans should consider the possibility that heavy metals such as mercury may concentrate in processing vessels and equipment presenting the possibility of exposure during various sampling and maintenance operations. Implement appropriate respiratory protection and the use of other protective equipment as dictated by monitoring results (See Sections 2 and 7).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Amber to dark brown
Physical Form:	Liquid
Odor:	Rotten egg / sulfurous; Petroleum.
Odor Threshold:	No data
pH:	Not applicable
Vapor Pressure:	5-15 psia (Reid VP) @ 100°F / 37.8°C
Vapor Density (air=1):	1
Initial Boiling Point/Range:	-20 to 800 °F / -29 to 427 °C
Melting/Freezing Point:	No data
Solubility in Water:	Negligible
Partition Coefficient (n-octanol/water) (Kow):	No data
Specific Gravity (water=1):	0.6 - 0.8 @ 60°F (15.6°C)
Bulk Density:	6.25 lbs/gal
VOC Content(%):	50
Evaporation Rate (nBuAc=1):	1
Flash Point:	-51 °F / -46 °C
Test Method:	Pensky-Martens Closed Cup (PMCC), ASTM D93, EPA 1010
Lower Explosive Limits (vol % in air):	1.1
Upper Explosive Limits (vol % in air):	6.0
Auto-ignition Temperature:	590 °F / 310 °C

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid high temperatures and all sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing agents and strong reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

<u>Acute Toxicity</u>	<u>Hazard</u>	<u>Additional Information</u>	<u>LC50/LD50 Data</u>
Inhalation	Harmful if inhaled	Contains poisonous hydrogen sulfide gas. See Signs and Symptoms.	10 mg/L (vapor, estimated)
Skin Absorption	Unlikely to be harmful		> 2 g/kg
Ingestion (Swallowing)	Unlikely to be harmful		> 5 g/kg

Aspiration Hazard: May be fatal if swallowed and enters airways.

Skin Corrosion/Irritation: Causes skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes mild eye irritation. .

Signs and Symptoms: Effects of overexposure can include slight irritation of the respiratory tract, nausea, vomiting, and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued exposure to high concentrations can result in vomiting, cardiac irregularities and sudden loss of consciousness.

This material contains hydrogen sulfide, a poisonous gas with the smell of rotten eggs. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (sensitivity to light), and pulmonary edema (fluid accumulation in the lungs). Severe exposures can result in nausea, vomiting, muscle weakness or cramps, headache, disorientation and other signs of nervous system depression, irregular heartbeats, convulsions, respiratory failure, and death.

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): Not expected to cause organ effects from repeated exposure.

Carcinogenicity: May cause cancer

Germ Cell Mutagenicity: Not expected to cause heritable genetic effects.

Reproductive Toxicity: Not expected to cause reproductive toxicity.

Information on Toxicological Effects of Components

Natural Gas Condensate ..C2-20

Carcinogenicity: Two year inhalation studies of vaporized unleaded gasoline produced an increased incidence of kidney tumors in male rats and liver tumors in female mice. Repeated skin application of various petroleum naphthas in mice for two years resulted in an increased incidence of skin tumors but only in the presence of severe skin irritation. Follow-up mechanistic studies suggest that the occurrence of these tumors may be the consequence of promotional processes and not relevant to human risk assessment. Epidemiology data collected from a study of more than 18,000 petroleum marketing and distribution workers showed no increased risk of leukemia, multiple myeloma, or kidney cancer from gasoline exposure. Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

Target Organs: Two year inhalation studies of wholly vaporized unleaded gasoline, and 90 days studies of various petroleum naphthas, did not produce significant target organ toxicity in laboratory animals. Nephropathy in male rats, characterized by the accumulation of alpha-2-u- globulin in epithelial cells of the proximal tubules was observed, however follow-up studies suggest that these changes are unique to the male rat.

Reproductive Toxicity: No evidence of developmental toxicity was found in pregnant laboratory animals (rats and mice) exposed to high vapor concentrations of unleaded gasoline and petroleum naphthas via inhalation. A two-generation reproductive toxicity study of vapor recovery gasoline did not adversely affect reproductive function or offspring survival and development.

Xylenes

Target Organs: Rats exposed to xylenes at 800, 1000 or 1200 ppm 14 hours daily for 6 weeks demonstrated high frequency hearing loss. Another study in rats exposed to 1800 ppm 8 hours daily for 5 days demonstrated middle frequency hearing loss.

Reproductive Toxicity: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions, but no evidence of teratogenicity.

Toluene

Carcinogenicity: Exposure of rats and mice to toluene at concentrations ranging from 120-1200 ppm for two years did not demonstrate evidence of carcinogenicity. Toluene has not been listed as a carcinogen by IARC.

Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.

Reproductive Toxicity: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. Decreased fetal body weight and increased skeletal variations in both inhalation and oral studies, but only at doses that were maternally toxic. No fetal toxicity was seen at doses that were not maternally toxic. Decreased sperm counts have been observed in male rats in the absence of a reduction in fertility. Toluene has been reported to cause mental or growth retardation in the children of solvent abusers who directly inhale toluene during pregnancy.

Cyclohexane

Reproductive Toxicity: Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

n-Hexane

Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone.

Reproductive Toxicity: Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Ethyl Benzene

Carcinogenicity: Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has been listed as a possible human carcinogen by IARC.

Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilic foci, hypertrophy, necrosis), lung (alveolar epithelium metaplasia), thyroid (hyperplasia), thyroid (hyperplasia) and pituitary (hyperplasia). In animal models (particularly rats), ethyl benzene affects the auditory function mainly in the cochlear mid-frequency range and ototoxicity was observed after combined exposure to noise and ethyl benzene. There is no evidence of either ethyl benzene-induced hearing losses or ototoxicity with combined exposure to ethyl benzene and noise in workers.

Section 12: Ecological Information

Toxicity: Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/L and mostly in the range 1-100 mg/L. These tests were carried out on water accommodated fractions, in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition. These substances should be regarded as toxic to aquatic organisms, with the potential to cause long term adverse effects in the aquatic environment. Classification: H411; Chronic Cat 2.

Persistence and Degradability: The hydrocarbons in this material are not readily biodegradable but are regarded as inherently biodegradable since their hydrocarbon components can be degraded by microorganisms.

Bioaccumulative Potential: Log Kow values measured for the hydrocarbon components of this material range from 3 to greater than 6 and therefore are regarded as having the potential to bioaccumulate. In practice, metabolic processes or physical properties may prevent this effect or limit bioavailability.

Mobility in Soil: On release to water, hydrocarbons will float on the surface and since they are sparingly soluble, the only significant loss is volatilization to air. In air, these hydrocarbons are photodegraded by reaction with hydroxyl radicals with half lives varying from 6.5 days for benzene to 0.5 days for n-dodecane.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D001 - Ignitability characteristic
- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping Description:	<p><i>If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is > 8.8 molar % shipping description is:</i> UN3160, Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulfide; ; Liquefied Petroleum Gas), 2.3; , (2.1), Inhalation Hazard Zone X <i>If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:</i> UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., 2.1 <i>If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:</i> UN1267, Petroleum crude oil, 3, I or II [I if BP < 35° C (95° F); II if BP > 35° C]</p>
Non-Bulk Package Marking:	<p><i>Must be consistent with shipping description, either:</i> Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulfide, Liquefied petroleum gas), UN3160 <i>or</i> Hydrocarbon gas mixture, liquefied, n.o.s., UN1965 <i>or</i> Petroleum crude oil, UN1267</p>
Non-Bulk Package Labeling:	<p><i>For UN3160:</i> Poison gas and Flammable gas <i>For UN1965:</i> Flammable gas <i>For UN1267:</i> Flammable liquid</p>
Bulk Package/Placard Marking:	<p><i>For UN3160:</i> Poison gas / 3160 and Flammable gas <i>For UN1965:</i> Flammable gas / 1965 <i>For UN1267:</i> Flammable / 1267</p>
Packaging - References:	<p><i>For UN3160:</i> None; 49 CFR 173.304; 173.314 & .315 <i>For UN1965:</i> 49 CFR: 173.306; 173.304; 173.314 & .315 <i>For UN1267:</i> 49 CFR 173.150; 173.201; 173.243 [PG I] <i>-or-</i> 49 CFR 173.150; 173.202; 173.242 [PG II] (Exceptions; Non-bulk; Bulk)</p>
Hazardous Substance:	<p>The EPA's Petroleum Exclusion applies to Section 2 and/or 15 components which are listed in 49 CFR 172.101, Table 1 to Appendix A.</p>
Emergency Response Guide:	<p>UN3160 - 119; UN1965 - 115; UN1267 - 128; Replace X in shipping description with: D if Molar % H2S is from 8.8% to 14.8% C if Molar % H2S is from 14.9% to 44.4% B if Molar % H2S is from 44.5% to 100.0%</p>
Note:	<p>Container(s) greater than 5 liters (liquids) or 5 kilograms (solids), shipped by water mode and ALL bulk shipments may require the shipping description to contain the "Marine Pollutant" notation [49 CFR 172.203(I)] and the container(s) to display the [Marine Pollutant Mark] [49 CFR 172.322].</p> <p>The following alternate shipping description order may be used until January 1, 2013: Proper Shipping name, Hazard Class or Division, (Subsidiary Hazard if any), UN or NA number, Packing Group Other shipping description elements may be required for DOT compliance. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code: Not applicable</p>

International Maritime Dangerous Goods (IMDG)

Shipping Description:	<i>If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is > 8.8 molar % shipping description is:</i> UN3160, Liquefied gas, toxic, flammable, n.o.s (Hydrogen sulphide , Liquefied Petroleum Gas), 2.3,; , (2.1) <i>If vapor pressure is > 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:</i> UN1965, Hydrocarbon gas mixture, liquefied, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), 2.1; <i>If vapor pressure is <= 300 kPa (43.5 psia) at 50° C (122° F) and H2S is < 8.8 molar % shipping description is:</i> UN1267, Petroleum crude oil, 3, I or II [I if IBP < 35° C (95° F); II if IBP > 35° C] (-46° C);
Non-Bulk Package Marking:	<i>Must be consistent with shipping description, either:</i> Liquefied gas, toxic, flammable, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), UN3160 <i>or</i> Hydrocarbon gas mixture, liquefied, n.o.s., (Hydrogen sulphide, Liquefied petroleum gas), UN1965 <i>or</i> Petroleum crude oil, UN1267
Labels:	<i>For UN3160:</i> Toxic gas and Flammable gas <i>For UN1965:</i> Flammable gas <i>For UN1267:</i> Flammable liquid
Placards/Marking (Bulk):	<i>For UN3160:</i> Toxic gas / 3160 and Flammable gas <i>For UN1965:</i> Flammable gas / 1965 <i>For UN1267:</i> Flammable / 1267
Packaging - Non-Bulk:	<i>For UN3160 & UN1965:</i> P200 <i>For UN1267:</i> P001
EMS:	<i>For UN3160 & UN1965:</i> F-D, S-U <i>For UN1267:</i> F-E, S-E
Note:	<i>If container(s) is greater than 5 liters (liquids) or 5 kilograms (solids), shipment may require the shipping description to contain the "Marine Pollutant" description [IMDG 5.4.1.4.3.5] and the container(s) to display the Marine Pollutant mark [IMDG 5.2.1.6]. U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25. If transported in bulk by marine vessel in international waters, product is being carried under the scope of MARPOL Annex I.</i>
<u>International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)</u>	
UN/ID #:	UN3160 - <i>Forbidden</i> UN1965 <i>or</i> UN1267
Proper Shipping Name:	<i>For UN1965:</i> Hydrocarbon gas mixture, liquefied, n.o.s. (Liquefied petroleum gas, Hydrogen sulphide) <i>For UN1267:</i> Petroleum crude oil
Hazard Class/Division:	<i>For UN1965:</i> 2.1 <i>For UN1267:</i> 3
Subsidiary risk:	None
Packing Group:	<i>For UN1965:</i> None <i>For UN1267:</i> I or II [<i>Determined by IATA 3.3.2</i>]
Non-Bulk Package Marking:	<i>For UN1965:</i> Hydrocarbon gas mixture, liquefied, n.o.s. (Liquefied petroleum gas, Hydrogen sulphide), UN1965 <i>For UN1267:</i> Petroleum crude oil, UN1267
Labels:	<i>For UN1965:</i> Flammable gas , Cargo Aircraft Only <i>For UN1267:</i> Flammable liquid
ERG Code:	<i>For UN1965:</i> 10L <i>or For UN1267:</i> 3L LTD. QTY Passenger Aircraft Cargo Aircraft Only

Packaging Instruction #:	<i>UN1965</i> - Forbidden <i>UN1267</i> - Forbidden - [<i>PG I</i>] Y341 - [<i>PG II</i>]	<i>UN1965</i> - Forbidden <i>UN1267</i> - 351 - [<i>PG I</i>] 353 - [<i>PG II</i>]	<i>UN1965</i> - 200 <i>UN1267</i> - 361 - [<i>PG I</i>] 364 - [<i>PG II</i>]
Max. Net Qty. Per Package:	<i>UN1267</i> - None (PG I); 1L (PG II)	<i>UN1267</i> - 1L - [<i>PG I</i>] 5 L - [<i>PG II</i>]	<i>UN1965</i> - 150 kg <i>UN1267</i> - 30 L - [<i>PG I</i>] 60 L - [<i>PG II</i>]

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material contains the following chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372:

Component	TPQ	EPCRA RQ
Hydrogen Sulfide	500 lb	100 lb

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health:	Yes
Chronic Health:	Yes
Fire Hazard:	Yes
Pressure Hazard:	No
Reactive Hazard:	No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration ¹	de minimis
Xylenes	1-8	1.0%
Toluene	1-7	1.0%
Cyclohexane	1-5	1.0%
Benzene	<5	0.1%
n-Hexane	2-4	1.0%
Ethyl Benzene	1-3	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):

EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

California Proposition 65:

Warning: This material may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects or other reproductive harm, and which may be subject to the warning requirements of California Proposition 65 (CA Health & Safety Code Section 25249.5):

Component	Type of Toxicity
Toluene	Developmental Toxicant Female Reproductive Toxicant
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant
Ethyl Benzene	Cancer

International Hazard Classification

Canada:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:

B2 - Flammable Liquids
 D2A
 D2B

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue:	20-Sep-2014
Status:	FINAL
Previous Issue Date:	20-Sep-2014
Revised Sections or Basis for Revision:	Identified Hazards (Section 2) Precautionary Statement(s) (Section 2) First Aid (Section 4) Exposure limits (Section 8) Shipping information (Section 14) Regulatory information (Section 15)
SDS Number:	730370

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.



AMERICAN ENERGY
PARTNERS

Produced Brine Water

Safety Data Sheet

Section 1: Identification of the substance or mixture and of the supplier

Product Name: Produced Brine Water
SDS Number: 401320
Intended Use: Process Water
Manufacturer: American Energy Partners
301 N.W. 63rd
Oklahoma City, OK 73116
Emergency Health and Safety Number: Chemtrec: 800-424-9300 (24 Hours)
SDS Information: Phone: 844-210-6000
URL: www.americanenergypartners.com

Section 2: Hazard(s) Identification

Classification

H302 -- Harmful if swallowed -- Category 1
H319 -- Eye damage/irritation -- Category 2
H316 -- Causes mild skin irritation -- Category 1
H332 -- Harmful if inhaled -- Category 1
H350 -- Carcinogenicity -- Category 1A
H412 -- May cause chronic harmful effects to aquatic life -- Category 2

Label Elements



DANGER

Causes serious eye irritation. (H319)*
Harmful if swallowed. (H302)*
Harmful if inhaled. (H332)*
May cause cancer. (H350)*
Toxic to aquatic life with long lasting effects. (H412)*

Precautionary Statement(s):

Obtain special instructions before use. (P201)*
Do not handle until all safety precautions have been read and understood. (P202)*
Do not breathe dust/fume/gas/mist/vapours/spray. (P261)
Wash thoroughly after handling. (P264)*
Do not eat, drink, or smoke when using this product. (P270)*
Avoid release to the environment. (P273)*
Use outdoors in a well ventilated space (P271)
Wear protective gloves / protective clothing / eye protection. (P281)*
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. (P305+P351+P338*)
If eye irritation persists: Get medical advice/attention. (P313)*
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P301+P312)*
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304 + P340)*
Get medical advice/attention if you feel unwell. (P314)*
Collect spillage. (P391)*
Store locked up. (P405)*
Store in a well-ventilated place. Keep container tightly closed. (P403+P233)*
Dispose of contents/container to approved disposal facility. (P501)*

**(Applicable GHS hazard code.)*

Section 3: Composition / Information on Ingredients

Component	CAS#	Concentration ¹
Water	7732-18-5	80-100%
Sodium chloride	91-20-3	<20%
Benzene	71-43-2	<2%

All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Section 4: First Aid Measures

Eye Contact: For direct contact, remove contact lenses if present and easy to do. Immediately hold eyelids apart and flush the affected eye(s) with clean water for at least 20 minutes. Seek immediate medical attention.

Skin Contact: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water or a waterless hand cleaner. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory symptoms develop, move victim away from source of exposure and into fresh air in a position comfortable for breathing. If breathing is difficult, oxygen or artificial respiration should be administered by qualified personnel. If symptoms persist, seek medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

Most important symptoms and effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue.

Delayed: Dry skin and possible irritation with repeated or prolonged exposure.

Notes to Physician: Federal regulations (29 CFR 1910.1028) specify medical surveillance programs for certain exposures to benzene above the action level or PEL (specified in Section (i)(1)(i) of the Standard). In addition, employees exposed in an emergency situation shall, as described in Section (i)(4)(i), provide a urine sample at the end of the shift for measurement of urine phenol.

Section 5: Fire-Fighting Measures



NFPA 704 Hazard Class

Health: 1 **Flammability:** 1 **Instability:** 0 (0-Minimal, 1-Slight, 2-Moderate, 3-Serious, 4-Severe)

Unusual Fire & Explosion Hazards: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of a fire.

Extinguishing Media: Dry chemical, carbon dioxide, foam, or water spray is recommended. Water or foam may cause frothing of materials heated above 212°F / 100°C. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

Fire Fighting Instructions: For fires beyond the initial stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, a self contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8).

Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done safely. Move undamaged containers from immediate hazard area if it can be done safely. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water, if it can be done safely. Avoid spreading burning liquid with water used for cooling purposes.

Hazardous Combustion Products: Combustion may yield smoke, carbon monoxide, and other products of incomplete combustion. Oxides of nitrogen and sulfur may also be formed.

See Section 9 for Flammable Properties including Flash Point and Flammable (Explosive) Limits

Section 6: Accidental Release Measures

Personal Precautions: This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. Stay upwind and away from spill/release. Avoid direct contact with material. For large spillages, notify persons down wind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant (see Section 8). See Sections 2 and 7 for additional information on hazards and precautionary measures.

Environmental Precautions: Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard. Spills into or upon navigable waters, the contiguous zone, or adjoining shorelines that cause a sheen or discoloration on the surface of the water, may require notification of the National Response Center (phone number 800-424-8802).

Methods for Containment and Clean-Up: Notify relevant authorities in accordance with all applicable regulations. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Absorb spill with inert material such as sand or vermiculite, and place in suitable container for disposal. If spilled on water remove with appropriate methods (e.g. skimming, booms or absorbents). In case of soil contamination, remove contaminated soil for remediation or disposal, in accordance with local regulations.

Recommended measures are based on the most likely spillage scenarios for this material; however local conditions and regulations may influence or limit the choice of appropriate actions to be taken. See Section 13 for information on appropriate disposal.

Section 7: Handling and Storage

Precautions for safe handling: Keep away from flames and hot surfaces. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe vapors or mists. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment (see section 8).

Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. Do not wear contaminated clothing or shoes.

Conditions for safe storage: Keep container(s) tightly closed and properly labeled. This material may contain or release poisonous hydrogen sulfide gas. In a tank, barge, or other closed container, the vapor space above this material may accumulate hazardous concentrations of hydrogen sulfide. Check atmosphere for oxygen content, H₂S, and flammability prior to entry. Use and store this material in cool, dry, well-ventilated area away from heat and all sources of ignition. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

"Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Before working on or in tanks which contain or have contained this material, refer to OSHA regulations, ANSI Z49.1, and other references pertaining to cleaning, repairing, welding, or other contemplated operations.

Section 8: Exposure Controls / Personal Protection

Component	ACGIH	OSHA	NIOSH
Water (7732-18-5)	Not established	Not established	Not established
Sodium chloride (7647-14-5)	Not established	Not established	Not established
Benzene (71-43-2)	STEL: 2.5 ppm TWA: 0.5 ppm Skin	Ceiling: 25 ppm STEL: 5 ppm TWA: 1 ppm	STEL: 5 ppm TWA: 0.1 ppm

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

Eye/Face Protection: The use of eye protection (such as splash goggles) that meets or exceeds ANSI Z.87.1 is recommended when there is potential liquid contact to the eye. Depending on conditions of use, a face shield may be necessary.

Skin/Hand Protection: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the breakthrough performance of their products. Suggested protective materials: Nitrile

Respiratory Protection: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with organic vapor cartridges/canisters may be used.

A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (as directed by regulation or the manufacturer's instructions), in oxygen deficient (less than 19.5 percent oxygen) situations, or under conditions that are immediately dangerous to life and health (IDLH).

If benzene concentrations equal or exceed applicable exposure limits, OSHA requirements for personal protective equipment, exposure monitoring, and training may apply (29CFR1910.1028 - Benzene).

Other Protective Equipment: Eye wash and quick-drench shower facilities should be available in the work area. Thoroughly clean shoes and wash contaminated clothing before reuse.

Suggestions provided in this section for exposure control and specific types of protective equipment are based on readily available information. Users should consult with the specific manufacturer to confirm the performance of their protective equipment. Specific situations may require consultation with industrial hygiene, safety, or engineering professionals.

Section 9: Physical and Chemical Properties

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm). Data represent typical values and are not intended to be specifications.

Appearance:	Varies (clear / amber / brown)
Physical Form:	Liquid
Odor:	Petroleum
Odor Threshold:	No data
pH:	4.9-8.5
Vapor Pressure:	No data available
Vapor Density (air=1):	>1
Initial Boiling Point/Range:	212 °F / 100 °C
Melting/Freezing Point:	32 °F / 0 °C
Pour Point:	No data
Solubility in Water:	Infinintely
Partition Coefficient (n-octanol/water) (Kow):	>10
Specific Gravity (water=1):	1.0 -1.1 °API
Viscosity:	No data available
Evaporation Rate (nBuAc=1):	No data available
Flash Point:	No data available
Test Method:	Not applicable
Lower Explosive Limits (vol % in air):	1%
Upper Explosive Limits (vol % in air):	46%
Auto-ignition Temperature:	No data available

Section 10: Stability and Reactivity

Stability: Stable under normal ambient and anticipated conditions of use.

Conditions to Avoid: Avoid all possible sources of ignition. Prevent vapor accumulation.

Materials to Avoid (Incompatible Materials): Avoid contact with strong oxidizing and reducing agents.

Hazardous Decomposition Products: Not anticipated under normal conditions of use.

Hazardous Polymerization: Not known to occur.

Section 11: Toxicological Information

Information on Toxicological Effects of Substance/Mixture

<u>Acute Toxicity</u>	<u>Hazard</u>	<u>Additional Information</u>	<u>LC50/LD50 Data</u>
Inhalation	Expected to have a low degree of toxicity by inhalation		No data
Skin Absorption	Unlikely to be harmful		No data
Ingestion (Swallowing)	Unlikely to be harmful		No data

Aspiration Hazard: Not expected to be an aspiration hazard.

Skin Corrosion/Irritation: Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking.

Serious Eye Damage/Irritation: Causes serious eye irritation.

Signs and Symptoms: Effects of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue).

Skin Sensitization: Not expected to be a skin sensitizer.

Respiratory Sensitization: No information available.

Specific Target Organ Toxicity (Single Exposure): May cause drowsiness and dizziness.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure. Laboratory animal studies of hydrocarbon products by the dermal and inhalation exposure routes have demonstrated toxicity to the liver, blood, spleen and thymus

Carcinogenicity: May cause cancer, based on component information.

Germ Cell Mutagenicity: Inadequate information available.

Reproductive Toxicity: Inadequate information available.

Other Comments: This material may contain varying concentrations of polycyclic aromatic hydrocarbons (PAHs) which have been known to produce a phototoxic reaction when contaminated skin is exposed to sunlight. The effect is similar in appearance to an exaggerated sunburn, and is temporary in duration if exposure is discontinued. Continued exposure to sunlight can result in more serious skin problems including pigmentation (discoloration), skin eruptions (pimples), and possible skin cancers.

Information on Toxicological Effects of Components

Water

Carcinogenicity: No data available

Target Organs: No data available

Reproductive Toxicity: No data available

Germ Cell Mutagenicity: No data available

Sodium chloride

Carcinogenicity: No data available but sodium chloride has not been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Eyes, respiratory system, central nervous system

Reproductive Toxicity: No data available

Germ Cell Mutagenicity: No data available

Benzene

Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by IARC, the US National Toxicology Program and the US-Occupational Safety and Health Administration.

Target Organs: Prolonged or repeated exposures to benzene vapors can cause damage to the blood and blood forming organs, including disorders like leukopenia, thrombocytopenia, and aplastic anemia.

Reproductive Toxicity: Some studies in occupationally exposed women have suggested benzene exposure increased risk of miscarriage and stillbirth and decreased birth weight and gestational age. The size of the effects detected in these studies was small, and ascertainment of exposure and outcome in some cases relied on self-reports, which may limit the reliability of these results.

Germ Cell Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells. Exposure has also been associated with chromosomal aberrations in sperm cells in human and animal studies.

Section 12: Ecological Information

Toxicity: Not evaluated

Persistence and Degradability: Not evaluated

Persistence per IOPC Fund definition: Not evaluated

Bioaccumulative Potential: Not evaluated although the solubility and log KOW would indicate it has little bioaccumulative potential.

Mobility in Soil: Not evaluated although the solubility properties indicate produced water would be highly mobile throughout a system.

Other Adverse Effects: None anticipated.

Section 13: Disposal Considerations

The generator of a waste is always responsible for making proper hazardous waste determinations and needs to consider state and local requirements in addition to federal regulations.

This material, if discarded as produced, would not be a federally regulated RCRA "listed" hazardous waste. However, it would likely be identified as a federally regulated RCRA hazardous waste for the following characteristic(s) shown below. See Sections 7 and 8 for information on handling, storage and personal protection and Section 9 for physical/chemical properties. It is possible that the material as produced contains constituents which are not required to be listed in the MSDS but could affect the hazardous waste determination. Additionally, use which results in chemical or physical change of this material could subject it to regulation as a hazardous waste.

Container contents should be completely used and containers should be emptied prior to discard. Container residues and rinseates could be considered to be hazardous wastes.

EPA Waste Number(s)

- D018 - Toxicity characteristic (Benzene)

Section 14: Transport Information

U.S. Department of Transportation (DOT)

Shipping name: *Not regulated*

Note: Some states may require specific shipping labels. Contact each jurisdiction for more information.

Section 15: Regulatory Information

CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs (in pounds):

This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

CERCLA/SARA - Section 311/312 (Title III Hazard Categories)

Acute Health: Yes
Chronic Health: Yes
Fire Hazard: No
Pressure Hazard: No
Reactive Hazard: No

CERCLA/SARA - Section 313 and 40 CFR 372:

This material contains the following chemicals subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR 372:

Component	Concentration ¹	de minimis
Benzene	<2	0.1%

EPA (CERCLA) Reportable Quantity (in pounds):

EPA's Petroleum Exclusion applies to this material - (CERCLA 101(14)).

Warning: This material may contain detectable quantities of the following chemicals identified on federal and individual state hazardous substances list. Contact each jurisdiction for more information.

Component	Type of Toxicity
Benzene	Cancer Developmental Toxicant Male Reproductive Toxicant

International Hazard Classification:

Canada:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the Regulations.

WHMIS Hazard Class:

D2A
D2B

National Chemical Inventories

All components are either listed on the US TSCA Inventory, or are not regulated under TSCA
All components are either on the DSL, or are exempt from DSL listing requirements

U.S. Export Control Classification Number: 1C981

Section 16: Other Information

Date of Issue:
Status:

20-Sep-2014
FINAL

Revised Sections or Basis for Revision:

Identified Hazards (Section 2)
Precautionary Statement(s) (Section 2)
First Aid (Section 4)
Shipping information (Section 14)
Regulatory information (Section 15)

SDS Number:

401320

Guide to Abbreviations:

ACGIH = American Conference of Governmental Industrial Hygienists; CASRN = Chemical Abstracts Service Registry Number; CEILING = Ceiling Limit (15 minutes); CERCLA = The Comprehensive Environmental Response, Compensation, and Liability Act; EPA = Environmental Protection Agency; GHS = Globally Harmonized System; IARC = International Agency for Research on Cancer; INSHT = National Institute for Health and Safety at Work; IOPC = International Oil Pollution Compensation; LEL = Lower Explosive Limit; NE = Not Established; NFPA = National Fire Protection Association; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration; PEL = Permissible Exposure Limit (OSHA); SARA = Superfund Amendments and Reauthorization Act; STEL = Short Term Exposure Limit (15 minutes); TLV = Threshold Limit Value (ACGIH); TWA = Time Weighted Average (8 hours); UEL = Upper Explosive Limit; WHMIS = Worker Hazardous Materials Information System (Canada)

Disclaimer of Expressed and implied Warranties:

The information presented in this Material Safety Data Sheet is based on data believed to be accurate as of the date this Material Safety Data Sheet was prepared. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED ABOVE, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE. No responsibility is assumed for any damage or injury resulting from abnormal use or from any failure to adhere to recommended practices. The information provided above, and the product, are furnished on the condition that the person receiving them shall make their own determination as to the suitability of the product for their particular purpose and on the condition that they assume the risk of their use. In addition, no authorization is given nor implied to practice any patented invention without a license.

Attachment O

Attachment O
G70-A EMISSION SUMMARY SHEET

Emission Point ID No. (Must match Emission Units Table & Plot Plan)	Emission Point Type ¹	Emission Unit Vented Through This Point (Must match Emission Units Table & Plot Plan)		Air Pollution Control Device (Must match Emission Units Table & Plot Plan)		All Regulated Pollutants - Chemical Name/CAS ³ (Speciate VOCs & HAPS)	Maximum Potential Uncontrolled Emissions ⁴		Maximum Potential Controlled Emissions ⁵		Emission Form or Phase (At exit conditions, Solid, Liquid or Gas/Vapor)	Est. Method Used ⁶
		ID No.	Source	ID No.	Device Type		lb/hr	ton/yr	lb/hr	ton/yr		
37E	Upward Vertical Stack	37S	Natural Gas Compressor Engine	N/A	N/A	Total VOCs	0.26	1.14	0.26	1.14	Gas/Vapor	AP-42 / EPA Cert.
						NO _x	3.38	14.82	0.51	2.22		
						CO	2.24	9.80	1.05	4.61		
						PM ₁₀	0.02	0.09	0.02	0.09		
						Total HAPs	0.02	0.10	0.02	0.10		
						Formaldehyde	0.02	0.09	0.02	0.09		
						CO ₂	117.61	515.11	117.61	515.11		
						CH ₄	0.24	1.06	0.24	1.06		
CO _{2e}	123.73	541.93	123.73	541.93								
38E	Upward Vertical Stacks	38S	Generator	N/A	None	Total VOCs	0.37	1.63	0.37	1.63	Gas/Vapor	AP-42 / EPA Cert.
						NO _x	0.37	1.63	0.37	1.63		
						CO	0.61	2.68	0.61	2.68		
						PM ₁₀	0.01	0.02	0.01	0.02		
						Total HAPs	0.03	0.12	0.03	0.12		
						Formaldehyde	0.03	0.12	0.03	0.12		
						CO ₂	57.77	253.03	57.77	253.03		
						CH ₄	0.001	0.005	0.001	0.005		
CO _{2e}	57.83	253.30	57.83	253.30								

The EMISSION SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSIONS SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

¹ Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

² List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS₂, VOCs, H₂S, Inorganics, Lead, Organics, O₃, NO, NO₂, SO₂, SO₃, all applicable Greenhouse Gases (including CO₂ and methane), etc. **DO NOT LIST** H₂, H₂O, N₂, O₂, and Noble Gases

³ Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

⁴ Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

⁵ Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; M = modeling; O = other (specify).