



Tug Hill Operating, LLC  
Yoho Well Pad  
Plant ID No. 103-00074  
New Martinsville, West Virginia  
**Supporting Attachments for  
R13 Class I Administrative Update**

June 2016



global environmental solutions

**R13 Class I Administrative Update**  
**Yoho Well Pad, Plant ID No. 103-00074**  
**New Martinsville, West Virginia**

Prepared for:

**Tug Hill Operating**  
1320 S. University, Suite 500  
Fort Worth, TX 76107

This document has been prepared by SLR International Corporation. The material and data in this permit application were prepared under the supervision and direction of the undersigned.

A handwritten signature in blue ink, appearing to read "N. Lanham", written over a horizontal line.

Nathaniel L. Lanham  
Senior Environmental Specialist

A handwritten signature in blue ink, appearing to read "Jesse Hanshaw", written over a horizontal line.

Jesse Hanshaw P.E.  
Principal Engineer



June 24, 2016

William F. Durham  
 Director  
 WVDEP, Division of Air Quality  
 601 – 57<sup>th</sup> Street  
 Charleston, West Virginia 25304

Re: Rule 13 Class I Administrative Update – R13-3132A  
 Yoho Pad, (I.D. 103-00073) Tug Hill Operating

Dear Mr. Durham,

Tug Hill Operating, LLC (Tug Hill) is submitting the attached Rule 13 Class I Administrative Update for Yoho Pad, (I.D. 103-00073) to reflect the diminished condensate production at the Yoho Pad. These changes in operation involve the (after the fact) removal of an enclosed combustor. Due to the nature of these changes emission estimates have predicted emissions below permitting thresholds and the update to this Rule 13 should appropriately be addressed through this Class 1 Administrative Application. Both storage vessels will continue to be utilized for brine water storage and the condensate tank will be relabeled.

The changes in the facility's potential to emit (PTE) are described in the table below:

**Proposed Difference in Emissions**

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e *	Total HAPs
(ton/yr)	-0.370	-0.166	-0.096	-0.176	0.022	0.021	-21.826	-	-0.455
(lb/hr)	-6.240	-1.854	-0.204	-0.014	0.226	-0.188	-21.929	-	-0.782

If any additional information is needed, please contact myself or Nate Lanham by telephone at (304) 932-3107 or by e-mail at [nlanham@slrconsulting.com](mailto:nlanham@slrconsulting.com).



Sincerely,

A handwritten signature in black ink, appearing to read "GRADLER", written in a cursive style.

Geoff Radler, Tug Hill Operating, LLC  
Vice President of Operations

cc Nathaniel L. Lanham, SLR  
Doug Hammell, WVDEP DAQ Enforcement



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**DIVISION OF AIR QUALITY**  
 601 57<sup>th</sup> Street, SE  
 Charleston, WV 25304  
 (304) 926-0475 [www.dep.wv.gov/dag](http://www.dep.wv.gov/dag)

**APPLICATION FOR NSR PERMIT  
 AND  
 TITLE V PERMIT REVISION  
 (OPTIONAL)**

PLEASE CHECK ALL THAT APPLY TO NSR (45CSR13) (IF KNOWN):

- CONSTRUCTION     MODIFICATION  
 RELOCATION          
 CLASS I ADMINISTRATIVE UPDATE     TEMPORARY  
 CLASS II ADMINISTRATIVE UPDATE     AFTER-THE-FACT

PLEASE CHECK TYPE OF 45CSR30 (TITLE V) REVISION (IF ANY):

- ADMINISTRATIVE AMENDMENT     MINOR  
 MODIFICATION     SIGNIFICANT MODIFICATION

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS ATTACHMENT S TO THIS APPLICATION

**FOR TITLE V FACILITIES ONLY:** Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

**Section I. General**

1. Name of applicant (as registered with the WV Secretary of State's Office):  
 Tug Hill Operating LLC

2. Federal Employer ID No. (FEIN):  
**61-1664910**

3. Name of facility (if different from above):  
 Yoho Pad

4. The applicant is the:  
 OWNER     OPERATOR     BOTH

5A. Applicant's mailing address:  
 1320 S. University Drive | Suite 500 | Fort Worth, TX 76107

5B. Facility's present physical address:  
 New Martinsville, Wetzel County, West Virginia

6. West Virginia Business Registration. Is the applicant a resident of the State of West Virginia?     YES     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 L.L.C./Registration (one page) including any name change amendments or other Business Certificate as Attachment A.

7. If applicant is a subsidiary corporation, please provide the name of parent corporation: N/A

8. Does the applicant own, lease, have an option to buy or otherwise have control of the proposed site?     YES     NO      
 If YES, please explain:    Applicant owns the site.

If NO, you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be constructed, modified, relocated, administratively updated or temporarily permitted (e.g., coal preparation plant, primary crusher, etc.): Well Pad Facility – Natural Gas

10. North American Industry Classification System (NAICS) code for the facility:  
 21111

### Section III. Certification of Information

**34. Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable Authority Form below:

- Authority of Corporation or Other Business Entity Authority of  Partnership  
 Authority of Governmental Agency Authority of Limited  Partnership

Submit completed and signed Authority Form as Attachment R.

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

**35A. Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§302.28) or Authorized Representative shall check the appropriate box and sign below.

**Certification of Truth, Accuracy, and Completeness**

I, the undersigned  Responsible Official /  Authorized Representative, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

**Compliance Certification**

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE \_\_\_\_\_

*(Please use blue ink)*

DATE: \_\_\_\_\_

*7.19.2016*

*(Please use blue ink)*

Printed name of signee: Geoffrey Radler

35C. Title: V.P. Production 35B.

35D. E-mail: <a href="mailto:gradler@tug-hilltop.com">gradler@tug-hilltop.com</a>	36E. Phone: 817.632.5200	36F. FAX: 817.632. 5220
36A. Printed name of contact person (if different from above): Nate Lanham		36B. Title: SLR< Consultant
36C. E-mail: <a href="mailto:nlanham@slrconsulting.com">nlanham@slrconsulting.com</a>	36D. Phone: 304-932-3107	36E. FAX: 681-205-8969

**PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>Attachment A: Business Certificate</li> <li>Attachment B: Map(s)</li> <li>Attachment C: Installation and Start Up Schedule</li> <li>Attachment D: Regulatory Discussion</li> <li>Attachment E: Plot Plan</li> <li>Attachment F: Detailed Process Flow Diagram(s)</li> <li>Attachment G: Process Description</li> <li>Attachment H: Material Safety Data Sheets (MSDS)</li> <li>Attachment I: Emission Units Table</li> <li>Attachment J: Emission Points Data Summary Sheet</li> </ul> | <ul style="list-style-type: none"> <li>Attachment K: Fugitive Emissions Data Summary Sheet</li> <li>Attachment L: Emissions Unit Data Sheet(s)</li> <li>Attachment M: Air Pollution Control Device Sheet(s)</li> <li>Attachment N: Supporting Emissions Calculations</li> <li>Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans</li> <li>Attachment P: Public Notice</li> <li>Attachment Q: Business Confidential Claims</li> <li>Attachment R: Authority Forms</li> <li>Attachment S: Title V Permit Revision Information</li> <li>Application Fee</li> </ul> |
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## CONTENTS

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### ATTACHMENTS

- ATTACHMENT A AREA MAP
- ATTACHMENT B PROCESS FLOW DIAGRAM
- ATTACHMENT C PROCESS DESCRIPTION
- ATTACHMENT D MATERIAL SAFETY DATA SHEETS (MSDS)
- ATTACHMENT E SUPPORTING CALCULATIONS
- ATTACHMENT F AUTHORITY OF CORPORATION (ATTACHMENT R)

# **APPLICATION FOR PERMIT**

## **R13 Class I Administrative Update**

**Yoho Well Pad  
New Martinsville, West Virginia**

**Tug Hill Operating  
1320 S. University, Suite 500  
Fort Worth, TX 76107**



WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**DIVISION OF AIR QUALITY**  
 601 57<sup>th</sup> Street, SE  
 Charleston, WV 25304  
 (304) 926-0475  
[www.dep.wv.gov/daq](http://www.dep.wv.gov/daq)

**APPLICATION FOR NSR PERMIT  
 AND  
 TITLE V PERMIT REVISION  
 (OPTIONAL)**

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

- CONSTRUCTION     MODIFICATION     RELOCATION  
 CLASS I ADMINISTRATIVE UPDATE     TEMPORARY  
 CLASS II ADMINISTRATIVE UPDATE     AFTER-THE-FACT

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

- ADMINISTRATIVE AMENDMENT     MINOR MODIFICATION  
 SIGNIFICANT MODIFICATION

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS ATTACHMENT S TO THIS APPLICATION

**FOR TITLE V FACILITIES ONLY:** Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

**Section I. General**

1. Name of applicant (as registered with the WV Secretary of State's Office): Tug Hill Operating LLC		2. Federal Employer ID No. (FEIN): <b>38353164</b>	
3. Name of facility (if different from above): Yoho Pad		4. The applicant is the: <input type="checkbox"/> OWNER <input type="checkbox"/> OPERATOR <input checked="" type="checkbox"/> BOTH	
5A. Applicant's mailing address: 1320 S. University Drive   Suite 500   Fort Worth, TX 76107		5B. Facility's present physical address: New Martinsville, Wetzel County, West Virginia	
6. <b>West Virginia Business Registration.</b> Is the applicant a resident of the State of West Virginia? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - If YES, provide a copy of the <b>Certificate of Incorporation/Organization/Limited Partnership</b> (one page) including any name change amendments or other Business Registration Certificate as <b>Attachment A</b> . - If NO, provide a copy of the <b>Certificate of Authority/Authority of L.L.C./Registration</b> (one page) including any name change amendments or other Business Certificate as <b>Attachment A</b> .			
7. If applicant is a subsidiary corporation, please provide the name of parent corporation: <b>N/A</b>			
8. Does the applicant own, lease, have an option to buy or otherwise have control of the <i>proposed site</i> ? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO - If YES, please explain: <b>Applicant owns the site.</b> - If NO, you are not eligible for a permit for this source.			
9. Type of plant or facility (stationary source) to be <b>constructed, modified, relocated, administratively updated or temporarily permitted</b> (e.g., coal preparation plant, primary crusher, etc.): <b>Well Pad Facility – Natural Gas</b>		10. North American Industry Classification System (NAICS) code for the facility: <b>211111</b>	
11A. DAQ Plant ID No. (for existing facilities only): <b>103-00073</b>		11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): <b>R13-3132A</b>	

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

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** 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 B**.

From State Route 2 North, take a right onto State Route 7 at New Martinsville. Stay on State Route 7 until making a right onto State Route 20. Travel about 1.5 miles on State Route 20 and make a right onto Thomas Lane. The well pad is on the right side of the road.

12.B. New site address (if applicable): NA	12C. Nearest city or town: NA	12D. County: NA
12.E. UTM Northing (KM): 4,383.341	12F. UTM Easting (KM): 514.882	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:  
Applicant has acquired facility from previous operator (Gastar Exploration, LLC) and is administratively changing names a company representative, signature authority. Removal of the Vapor Combustor/Flare.

14A. Provide the date of anticipated installation or change: <b>Upon submitted of Class I Administrative Update</b> - If this is an <b>After-The-Fact</b> permit application, provide the date upon which the proposed change did happen: 01/01/2016	01
---	----

14C. Provide a **Schedule** of the planned **Installation of/Change to** and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:

Hours Per Day 24      Days Per Week 7      Weeks Per Year 52

16. Is demolition or physical renovation at an existing facility involved?     **YES**       **NO**

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see [www.epa.gov/ceppo](http://www.epa.gov/ceppo)), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18. **Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (*if known*). A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance (*if known*). Provide this information as **Attachment D**.

### **Section II. Additional attachments and supporting documents.**

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

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

21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to **Plot Plan Guidance**) .

- Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F**.

23. Provide a **Process Description** as **Attachment G**.

- Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

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

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H**.  
 – For chemical processes, provide a MSDS for each compound emitted to **the air**.

25. Fill out the **Emission Units Table** and provide it as **Attachment I**.

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J**.

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K**.

28. Check all applicable **Emissions Unit Data Sheets** listed below:

<input type="checkbox"/> Bulk Liquid Transfer Operations	<input type="checkbox"/> Haul Road Emissions	<input type="checkbox"/> Quarry
<input type="checkbox"/> Chemical Processes	<input type="checkbox"/> Hot Mix Asphalt Plant	<input type="checkbox"/> Solid Materials Sizing, Handling and Storage Facilities
<input type="checkbox"/> Concrete Batch Plant	<input type="checkbox"/> Incinerator	<input checked="" type="checkbox"/> Storage Tanks
<input type="checkbox"/> Grey Iron and Steel Foundry	<input type="checkbox"/> Indirect Heat Exchanger	
<input type="checkbox"/> General Emission Unit, specify		

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L**.

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

<input type="checkbox"/> Absorption Systems	<input type="checkbox"/> Baghouse	<input type="checkbox"/> Flare
<input type="checkbox"/> Adsorption Systems	<input type="checkbox"/> Condenser	<input type="checkbox"/> Mechanical Collector
<input type="checkbox"/> Afterburner	<input type="checkbox"/> Electrostatic Precipitator	<input type="checkbox"/> Wet Collecting System
<input type="checkbox"/> Other Collectors, specify		

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M**.

30. Provide all **Supporting Emissions Calculations** as **Attachment N**, or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O**.

➤ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and **Example Legal Advertisement** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

YES       NO

➤ If **YES**, identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "**Precautionary Notice – Claims of Confidentiality**" guidance found in the **General Instructions** as **Attachment Q**.

**Section III. Certification of Information**

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

<input checked="" type="checkbox"/> Authority of Corporation or Other Business Entity	<input type="checkbox"/> Authority of Partnership
<input type="checkbox"/> Authority of Governmental Agency	<input type="checkbox"/> Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R**.

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

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

**Certification of Truth, Accuracy, and Completeness**

I, the undersigned  **Responsible Official** /  **Authorized Representative**, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

**Compliance Certification**

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ <i>(Please use blue ink)</i>		DATE: _____ <i>(Please use blue ink)</i>
35B. Printed name of signee: Geoff Radler		35C. Title: V.P. Production
35D. E-mail: <a href="mailto:gradler@tug-hillop.com">gradler@tug-hillop.com</a>	36E. Phone: 817.632.5200	36F. FAX: 817.632. 5220
36A. Printed name of contact person (if different from above): Nate Lanham		36B. Title: SLR< Consultant
36C. E-mail: <a href="mailto:nlanham@slrconsulting.com">nlanham@slrconsulting.com</a>	36D. Phone: 304-932-3107	36E. FAX: 681-205-8969

**PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:**

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> Attachment A: Business Certificate               | <input type="checkbox"/> Attachment K: Fugitive Emissions Data Summary Sheet            |
| <input checked="" type="checkbox"/> Attachment B: Map(s)                             | <input type="checkbox"/> Attachment L: Emissions Unit Data Sheet(s)                     |
| <input type="checkbox"/> Attachment C: Installation and Start Up Schedule            | <input type="checkbox"/> Attachment M: Air Pollution Control Device Sheet(s)            |
| <input type="checkbox"/> Attachment D: Regulatory Discussion                         | <input checked="" type="checkbox"/> Attachment N: Supporting Emissions Calculations     |
| <input type="checkbox"/> Attachment E: Plot Plan                                     | <input type="checkbox"/> Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans |
| <input type="checkbox"/> Attachment F: Detailed Process Flow Diagram(s)              | <input type="checkbox"/> Attachment P: Public Notice                                    |
| <input checked="" type="checkbox"/> Attachment G: Process Description                | <input type="checkbox"/> Attachment Q: Business Confidential Claims                     |
| <input checked="" type="checkbox"/> Attachment H: Material Safety Data Sheets (MSDS) | <input checked="" type="checkbox"/> Attachment R: Authority Forms                       |
| <input type="checkbox"/> Attachment I: Emission Units Table                          | <input type="checkbox"/> Attachment S: Title V Permit Revision Information              |
| <input type="checkbox"/> Attachment J: Emission Points Data Summary Sheet            | <input type="checkbox"/> Application Fee  |

*Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.*

**FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:**

- Forward 1 copy of the application to the Title V Permitting Group and:
- For Title V Administrative Amendments:
  - NSR permit writer should notify Title V permit writer of draft permit,
- For Title V Minor Modifications:
  - Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,
  - NSR permit writer should notify Title V permit writer of draft permit.
- For Title V Significant Modifications processed in parallel with NSR Permit revision:
  - NSR permit writer should notify a Title V permit writer of draft permit,
  - Public notice should reference both 45CSR13 and Title V permits,
  - EPA has 45 day review period of a draft permit.

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



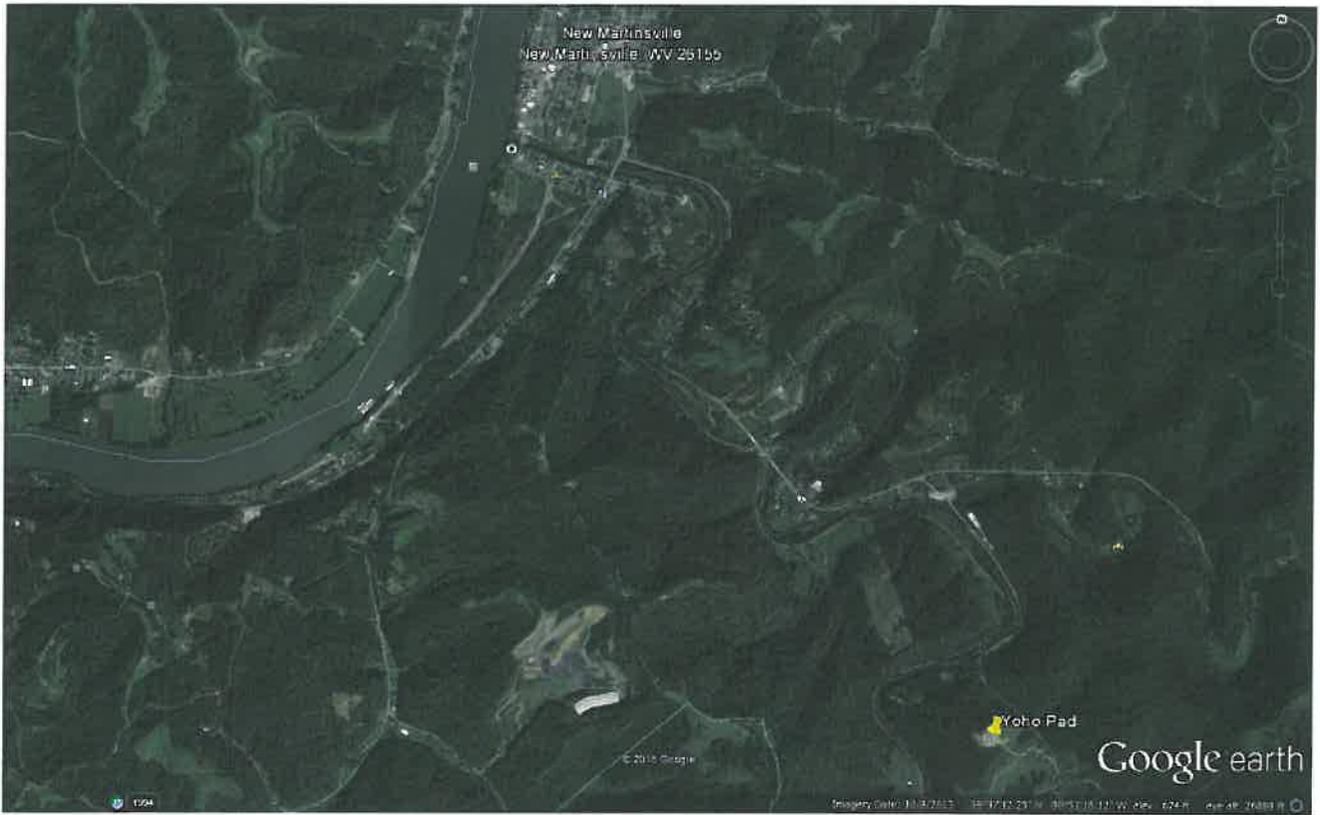
# **ATTACHMENT A**

## **AREA MAP**

### **R13 Class I Administrative Update**

**Yoho Well Pad  
New Martinsville, West Virginia**

**Tug Hill Operating  
1320 S. University, Suite 500  
Fort Worth, TX 76107**



	<p>Class I Update, Supporting Documents -- Attachment A Tug Hill Operating, LLC, Yoho Pad Wetzel County, West Virginia</p>
<p>Area Map 06/8/2016</p>	<p>Job No:116.01631.00001</p>

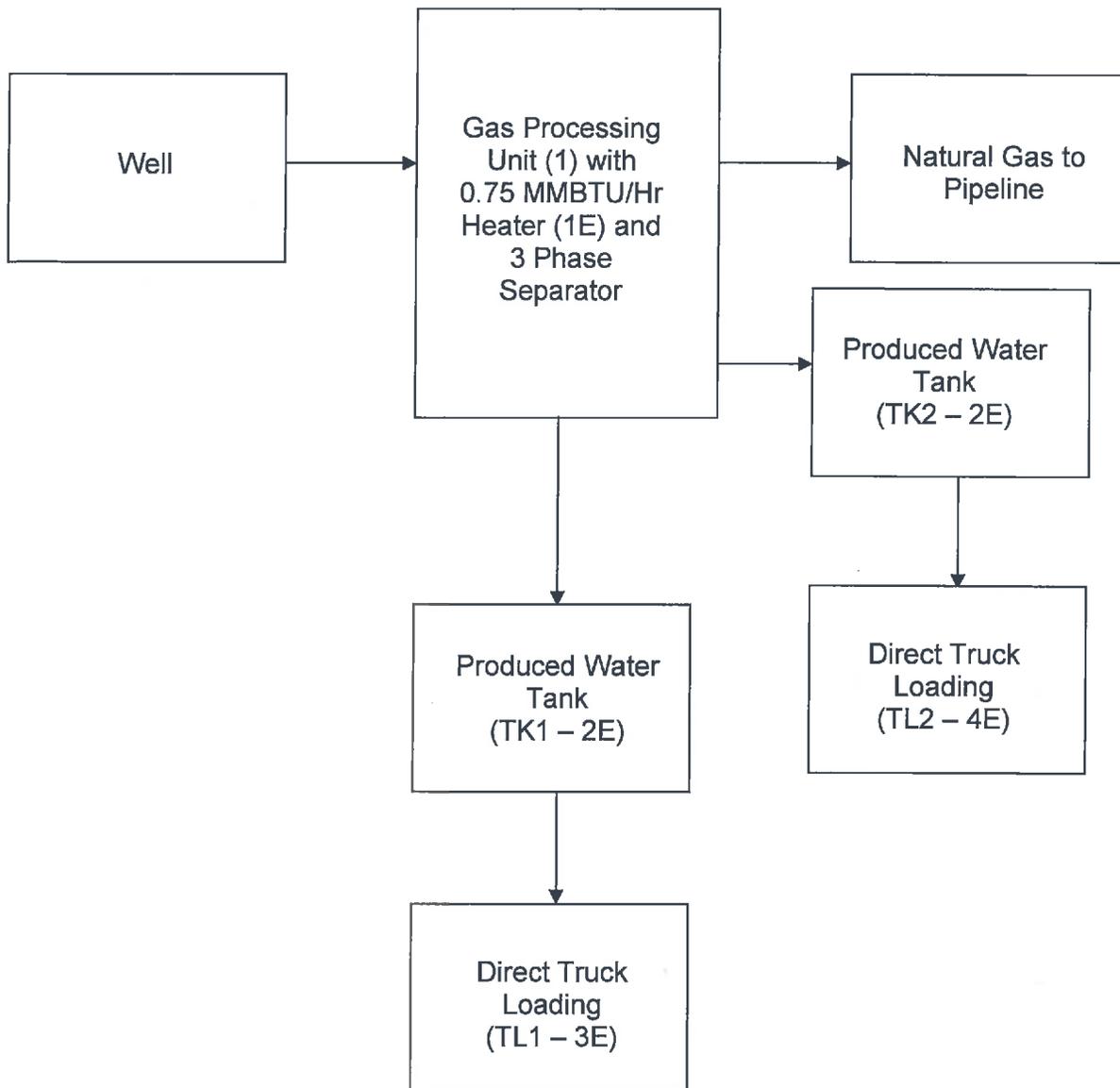
**ATTACHMENT B**

**PROCESS FLOW DIAGRAM**

**R13 Class I Administrative Update**

**Yoho Well Pad**  
**New Martinsville, West Virginia**

**Tug Hill Operating**  
1320 S. University, Suite 500  
Fort Worth, TX 76107



Process Flow Diagram  
06/08/2016

Class 1 Update, Supporting Documents – Attachment B  
Tug Hill Operating, LLC  
Yoho Pad  
Wetzel County, West Virginia

Job No: 116.01631.00001

**ATTACHMENT C**

**PROCESS DESCRIPTION**

**R13 Class I Administrative Update**

**Yoho Well Pad**  
**New Martinsville, West Virginia**

**Tug Hill Operating**  
1320 S. University, Suite 500  
Fort Worth, TX 76107

## **Process Description**

### **Background Information**

Tug Hill Operating, LLC, Inc. (Tug Hill) Took Ownership of the Yoho Well Pad in 2016. The well was placed into production by its previous owner/operator in late 2013. The well was approved to produce natural gas, condensate and produced water.

In early 2014, the West Virginia Department of Environmental Protection approved a Class I Administrative Update for the Yoho Well Pad. The approval of this permit application granted the site permission to move forward with plans to remove the two (2) temporary 500bbl condensate and produced water tanks and replaces them with two (2) 210bbl tanks. Due to the permanent nature of the storage vessels, fugitive emissions are minimized due to the use of Enardo 660 thief hatches set at 12 oz with viton gaskets and Enardo 8" 2008 emergency vents – set at 12 oz with viton gaskets.

### **Proposed**

Based upon production and testing records, no condensate has been produced at the Yoho Well Pad since 2013. With the lack of condensate production and the approval of this Permit Determination, Tug Hill proposes to remove the vapor combustor (1C). Currently, the well produces relatively small amounts of natural gas and produced water. Therefore, if the combustor is removed, the site will consist of a gas processing unit containing a 0.75 MMBtu/hr heater and two produced water tanks, 210bbl/each.

Due to the experimental nature of this well, vertical single stage producing from the Marcellus, the Yoho Well Pad has reported a relatively quick decline in production. Further, since there has been no condensate production since it first came online in late 2013 this facility's potential to emit had been substantially reduced.

**ATTACHMENT D**

**MATERIAL SAFETY DATA SHEETS (MSDS)**

**R13 Class I Administrative Update**

**Yoho Well Pad**  
**New Martinsville, West Virginia**

**Tug Hill Operating**  
1320 S. University, Suite 500  
Fort Worth, TX 76107

# SAFETY DATA SHEET

Tug Hill Operating, LLC

Date issued :  
 SDS No :  
 Date Revised :  
 Revision No :

Crude Oil  
 (West Virginia)

**\*\*\*IMPORTANT\*\*\***  
 This SDS has been prepared for Non-Sour Natural Gas Condensate at atmospheric pressure (i.e., atmospheric liquid). Refer to the following sections for important safety and response information.  
**Section 4-** First Aid Measures (for accidental exposure).  
**Section 5-** Fire Fighting Measures.  
**Section 6-** Accidental Release Measures.

## 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Crude Oil (West Virginia)  
**GENERAL USE:** Refinery Feedstock.

Tug Hill Operating, LLC  
 380 Southpointe Blvd, Suite 200  
 Canonsburg, PA 15317

**24HR. EMERGENCY TELEPHONE NUMBERS**  
 1-888-718-0605

## 2. HAZARDS IDENTIFICATION

This product has not been tested by Tug Hill Operating, LLC to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information based on the product components.

### GHS CLASSIFICATIONS

Health	Physical
H304- Aspiration Hazard, Category 1 Carcinogenicity, Category 2 H320- Eye Irritation, Category 2B H315- Skin Irritant, Category 2	H224- Extremely Flammable Liquids, Category 1

### GHS LABEL

 <b>WARNING</b> H320: Causes eye irritation. H315: Causes skin irritation.	 <b>WARNING</b> H411: Toxic to aquatic life with long lasting effects.
 <b>DANGER</b> H304: May be fatal if swallowed and enters airways. H351: Suspected of causing cancer.	 <b>DANGER</b> H224: Extremely flammable liquid and vapor.

# Crude Oil

## PRECAUTIONARY

### STATEMENT(S)

#### Prevention:

P210: Keep away from heat/sparks/open flames/hot surfaces – no smoking. P233: Keep container tightly closed.

P240: Ground/bond container and receiving equipment.

P241: Use explosion-proof electrical / ventilating / lighting / transportation devices / other equipment associated with this product.

P242: Use only non-sparking tools.

P261:

P280: Wear protective gloves/protective clothing/eye protection/face protection. P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and

#### Response:

P331: Do NOT induce vomiting.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P337+P313: If eye irritation persists: Get medical advice/attention.

P303+P361+P353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

P308+P313: IF exposed or concerned: Get medical advice/attention. P302+P352: IF ON SKIN: Wash with plenty of soap and water. P332+P313: If skin irritation occurs: Get medical advice/attention. P362: Take off contaminated clothing and wash before reuse.

P391: Collect spillage.

#### Storage:

P403+P235: Store in a well-ventilated place. Keep cool.

#### Disposal:

P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

## EMERGENCY OVERVIEW

**PHYSICAL APPEARANCE:** Dark Green to Black liquid.

**IMMEDIATE CONCERNS:** This product is a flammable liquid which may be harmful if ingested, inhaled, comes in contact with skin or eyes or is released into the environment. Please read the entire contents of Section 2 of this Safety Data Sheet (SDS) for details.

## POTENTIAL HEALTH EFFECTS

**EYES:** Eye contact with vapors may cause eye irritation, watering of eyes and reddening. Eye contact with liquid may cause irritation and pain. Prolonged contact may result in tissue damage.

**SKIN:** Skin contact may cause irritation and redness. Repeated or prolonged skin contact may cause dermatitis. Crude oil is a defatting agent and skin contact may cause dryness, itching, and cracked skin.

**INGESTION:** Ingestion of crude oil may cause a burning sensation in the mouth and stomach, nausea, vomiting, excess salivation and vomiting of blood. Ingestion of crude oil may cause tachycardia, staggering gait, dizziness, loss of consciousness and delirium, followed by chemical pneumonitis and collapse. May also cause abrupt CNS depression. Crude oil may present a potential aspiration hazard if ingested. Aspiration of even small amounts of crude oil into the lungs can result in immediate pulmonary edema (a potentially fatal accumulation of fluid in the lungs), chemical pneumonitis and hemorrhage of pulmonary tissue.

**INHALATION:** Vapors or mist from this material, at concentrations greater than the recommended exposure limits in Section 2, can cause irritation of the nose, throat, and lungs, headache, dizziness, drowsiness, loss of coordination, fatigue, nausea and labored breathing. Airborne concentrations above the recommended exposure limits are not anticipated during normal workplace activities due to the slow evaporation of this material at ambient temperatures.

**Warning:** Irritating and toxic hydrogen sulfide gas may be found in the confined vapor spaces. Greater than 15-20 ppm continuous exposure can cause mucous membrane and respiratory tract irritation. 50-500 ppm can cause headache,

## Crude Oil

nausea, and dizziness, loss of reasoning and balance, difficulty in breathing, fluid in lungs, and possible loss of consciousness. Greater than 500 ppm can cause rapid or immediate unconsciousness due to respiratory paralysis and death by suffocation unless the victim is removed from exposure and successfully resuscitated. The "rotten egg" odor of hydrogen sulfide is not a reliable indicator for warning of exposure, since olfactory fatigue (loss of smell) readily occurs, especially at concentrations above 50 ppm. At high concentrations, the victim may not even recognize the odor before becoming unconscious.

**Warning:** The burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products and inadequate oxygen levels, which may lead to suffocation, unconsciousness and death.

### SIGNS AND SYMPTOMS OF OVEREXPOSURE

**ACUTE TOXICITY:** May cause adverse health effects if ingested. May cause irritation if inhaled or absorbed through skin. Prolonged or repeated contact may defat the skin and/or cause irritation to skin and eyes. Fire will produce irritating, toxic gases. Vapors may cause dizziness or suffocation.

**CHRONIC EFFECTS:** Chronic exposure to benzene (a component of crude oil) may cause serious damage to health by all routes of exposure. Chronic oral and inhalation exposure may cause severe effects on the blood system, including damage to the bone marrow, leading to a decrease in production or changes to the cells of hemoglobin, hematocrit, red and white blood cells. Effects may occur with an exposure level as low as 10 ppm for 24 weeks. Benzene may also cause harmful changes to the immune system. Benzene is a confirmed human carcinogen. See Section 11 of this SDS for further information.

**CARCINOGENICITY:** The NTP and IARC list benzene as a "human carcinogen." IARC lists ethyl benzene as a Group 2B carcinogen. OSHA reports an 8-hour TWA of 1 ppm. See Section 11 of this SDS for more details.

**MUTAGENICITY:** May cause genetic defects. Some crude oils and crude oil fractions have been positive in mutagenicity studies.

### REPRODUCTIVE TOXICITY

**REPRODUCTIVE EFFECTS:** Not Established.

### MEDICAL CONDITIONS AGGRAVATED:

**Benzene:** Pre-existing blood system disorders, respiratory conditions, central nervous, liver, kidney, and cardio-vascular conditions may be aggravated by severe or chronic overexposure to benzene. Skin disorders may also be aggravated by exposures to benzene.

**Ethyl Benzene:** Pre-existing respiratory conditions, central nervous system, liver, kidney, and cardio-vascular conditions may be aggravated by severe or chronic overexposure to this product. Skin disorders may also be aggravated by exposures to this product.

**ROUTES OF ENTRY:** Inhalation, skin contact, eye contact, ingestion.

**TARGET ORGAN STATEMENT:** May cause damage to blood forming organs, eyes, skin, lungs, central nervous system, and respiratory system.

**SENSITIZATION:** Scientific evidence suggests that propane and butane may cause cardiac sensitization.

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## 3. COMPOSITION / INFORMATION ON INGREDIENTS

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Chemical Name	Vol. %	CAS
Chloride	<0-0.1	7782-50-5
n- Hexane	1-2	110-54-3
Naphthalene	<0- 0.1	91-20-3
m-p xylene	<0- 0.1	179601-23-1
o- xylene	<0-0.1	95-47-6
Crude Oil	85-90	8002-05-9
1,2,4 Trimethylbenzene	<0- 0.1	95-63-6

## Crude Oil

Toluene	<0- 0.1	108-88-3
Benzene	<0- 0.1	71-43-2
Ethyl Benzene	<0- 0.1	100-41-4
Total Sulfur Compounds	<0- 0.1	
Hydrogen Sulfide	<0- .01	7783-06-4

**COMMENTS:** Crude oil is a mixture of hundreds of hydrocarbon compounds and may also include components not listed. Components with percent volume prefaced with "~" are typical ranges found for crude oil.

### 4. FIRST AID MEASURES

**EYES:** Immediately flush with large amounts of water, holding eyelids open, for at least 20 minutes. Repeat if necessary. Remove contact lenses, if present and easy to do. Seek medical assistance if irritation persists.

**SKIN:** Immediately remove contaminated clothing or shoes, wipe excess from skin and flush with plenty of water for at least 15 minutes. Do not reuse clothing until thoroughly cleaned. Get medical attention.

**INGESTION:** Do not induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Slowly give 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person.

**INHALATION:** Move victim to fresh air. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult. Get medical attention.

**ANTIDOTES:** Not Established.

**ADDITIONAL INFORMATION:** Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. First Aid Responders are advised to wear personal protective equipment as found in Section 8 of this SDS.

**COMMENTS: CONTRAINDICATIONS** - Not Established.

### 5. FIRE FIGHTING MEASURES

**FLASH POINT:** <  
40°C (105°F)

**AUTOIGNITION TEMPERATURE:** 232°C (450°F)

**FLAMMABLE CLASS:** Class B.

**GENERAL HAZARD: DECOMPOSITION TEMPERATURE** - Not Established.

**EXTINGUISHING MEDIA:**

**SMALL FIRE** - Class B fire extinguisher, carbon dioxide, multipurpose dry chemical, water fog or alcohol-resistant foam.

**LARGE FIRE** - Water fog or alcohol-resistant foam.

**HAZARDOUS COMBUSTION PRODUCTS:** Any combustion, including incomplete combustion, may form carbon monoxide and carbon dioxide. Burning produces noxious and toxic fumes. Downwind personnel must be evacuated.

**OTHER CONSIDERATIONS: INAPPROPRIATE EXTINGUISHING MEDIA** - Do not use water jet.

## Crude Oil

**FIRE FIGHTING PROCEDURES: PROTECTIVE ACTIONS TO TAKE DURING FIRE FIGHTING** - Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal; do not scatter the material. Evacuate 800 meters (1/2 mile) in all directions. Persons involved in fire fighting response involving this product and its containers/packaging should refer to Section 8 of this SDS for the proper selection of exposure controls and personal protective equipment.

**FIRE FIGHTING EQUIPMENT: PRECAUTIONS FOR FIRE INVOLVING TANKS OR CAR/TRAILER LOADS** - Isolate and evacuate area for 800 meters (1/2 mile) in all directions. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Do not get water inside containers. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire.

**COMMENTS:**

**SPECIFIC HAZARDS THAT MAY ARISE FROM THE PRODUCT** - Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger. Sudden reaction and fire may result if product is mixed with an oxidizing agent.

**ADDITIONAL INFORMATION:** Reference current Emergency Response Guidebook.

## 6. ACCIDENTAL RELEASE MEASURES

**SMALL SPILL:** For emergency information and procedures to follow in the case of an accidental release, call the Emergency Telephone Number(s) listed in Section 1 of this SDS. In case of spillage, absorb with inert material and dispose of in accordance with applicable regulations. Dike far ahead of liquid spill for later disposal. Never discharge releases directly into sewers or surface waters. Remove any ignition sources and protect from ignition. Water spray may reduce vapor; but may not prevent ignition in closed spaces. A vapor suppressing foam may be used to reduce vapors. Provide sufficient ventilation in the affected area(s) and wear appropriate personal protective equipment as indicated in Section 8 of this SDS when handling spill material.

**LARGE SPILL:** Use similar response procedures as indicated under Small Spill.

**GENERAL PROCEDURES: MATERIALS & METHODS (EQUIPMENT & TECHNIQUES) FOR CONTAINMENT & CLEANUP** - Call Emergency Telephone Number(s) provided in Section 1 of this SDS. As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering.

**RELEASE NOTES: ENVIRONMENTAL PRECAUTIONS** - Avoid contact of spilled material with soil and prevent runoff entering surface waterways. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**SPECIAL PROTECTIVE EQUIPMENT: EMERGENCY & NON-EMERGENCY RESPONDERS** - Refer to Section 8 of this SDS for appropriate exposure controls and personal protective equipment (PPE).

**COMMENTS: INAPPROPRIATE CONTAINMENT & CLEANUP TECHNIQUES** - Not Established.

## 7. HANDLING AND STORAGE

**GENERAL PROCEDURES:** Handle in accordance with good industrial hygiene and safety practices. These practices include but are not limited to avoiding unnecessary exposure and prompt removal of material from eyes, skin and clothing. If needed, take first aid actions as indicated in Section 4 of this SDS.

**HANDLING:** Use only with adequate ventilation. Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8 of this SDS. Vent slowly to the atmosphere when opening. Avoid all contact with skin and eyes. Avoid breathing product dust or vapors. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not reuse container. Remove contaminated clothing immediately. Wash with soap and water after working with this product.

**STORAGE:** Keep in airtight container away from all heat sources. Store in a segregated and approved area. Store in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Keep container in a well-ventilated area. Store away from incompatible materials. Store in the original container or an approved alternative made from compatible material. Do not store in unlabeled containers. Treat empty containers in a similar fashion as residual product may exist. Use appropriate containment to avoid environmental contamination.

**STORAGE TEMPERATURE:** Store in a room with ambient temperature.

**STORAGE PRESSURE:** Containers should be stored in room with ambient pressure.

## Crude Oil

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### EXPOSURE GUIDELINES

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)			
		Exposure Limits	
		OSHA PEL	ACGIH TLV
Chemical Name		ppm	ppm
Naphthalene	TWA	10	10
	STEL	N/E	15
m-p Xylene	TWA	100	100
	STEL	N/E	150
o-xylene	TWA	100	100
	STEL	N/E	150
1,2,4 Trimethylbenzene	TWA	N/E	25
	STEL	N/E	N/E
Hydrogen Sulfide	TWA	N/E	1
	STEL	20	5
Toluene	TWA	200	20
	STEL	300	N/E
Benzene	TWA	0.1	0.5
	STEL	1	2.5
Ethyl Benzene	TWA	100	N/E
	STEL	N/E	N/E
n-Hexane	TWA	500	50
	STEL	N/E	N/E

**ENGINEERING CONTROLS:** Provide sufficient ventilation to control exposure levels below airborne exposure limits. Use local mechanical exhaust ventilation at sources of air contamination such as open process equipment. Consult current NFPA Standard 91 and ACGIH manual on Industrial Ventilation for design of exhaust system. Have eye baths available at locations where there is potential for eye contact. Provide a safety shower at locations where skin contact can occur.

#### PERSONAL PROTECTIVE EQUIPMENT

**EYES AND FACE:** Employees should be provided with and required to use splash-proof safety goggles and full face splash shields where there is any possibility of product coming in contact with eyes. Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of contact lenses. Ensure that eye wash station is operable and nearby.

**SKIN: GLOVES AND BOOTS -** Any appropriate fire retardant and impervious gloves and boots including nitrile rubber or neoprene rubber.

**RESPIRATORY:** Avoid breathing mist, and/or vapor. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Consult respirator manufacturer to determine appropriate type of equipment for given application. The respirator use limitations specified by NIOSH/MSHA and the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR 1910.134.

**WORK HYGIENIC PRACTICES:** Consider the potential hazards of this material, applicable exposure limits, job activities, environmental working conditions, and other substances in the workplace when designing engineering controls and selecting personal protective equipment (PPE). The user should read and understand all manufacturer instructions and limitations supplied with the personal protection equipment before use.

## Crude Oil

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### 9. PHYSICAL AND CHEMICAL PROPERTIES

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**ODOR:** Hydrocarbon.

**APPEARANCE:** Dark Green to Black liquid

**pH:** Not Established.

**BOILING POINT:** (20°F) to (40°F) 760 mmHg

**FREEZING POINT:** Not Established.

**MELTING POINT:** Not Established.

**FLASH POINT:** < 38°C (100°F)

**SOLUBILITY IN WATER:** Not Established.

**SPECIFIC GRAVITY:** 0.80

**Notes:** H<sub>2</sub>O = 1 at 60°F

**MOLECULAR WEIGHT:** 152

**COEFF. OIL/WATER:** Not Established.

**ODOR THRESHOLD:** Not Established.

**EVAPORATION RATE:** Not Established.

**%VOLITALES BY VOLUME:** 20-100%

**VAPOR DENSITY (Air=1):** 1.0-3.0

**VAPOR PRESSURE:** Not Established.

**COMMENTS: FLAMMABILITY** - Refer to Section 2 and Section 5 of this SDS for classification and flammability characteristics.

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### 10. STABILITY AND REACTIVITY

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**STABLE:** Yes

**HAZARDOUS POLYMERIZATION:** No

**STABILITY:** This product is anticipated to be stable under normal ambient storage and handling conditions of temperature and pressure.

**POLYMERIZATION:** This product is not anticipated to cause hazardous reactions or polymerizations under normal ambient storage and handling conditions of temperature and pressure.

**CONDITIONS TO AVOID:** Avoid contact with high temperatures, open flames, sparks, welding, smoking and other ignition sources.

**HAZARDOUS DECOMPOSITION PRODUCTS:** This product may produce carbon monoxide, carbon dioxide, aromatics, and other hydrocarbons during decomposition.

**INCOMPATIBLE MATERIALS:** Strong oxidizing agents.

# Crude Oil

## 11. TOXICOLOGICAL INFORMATION

### ACUTE

Chemical Name	ORAL LD <sub>50</sub> (rat)	DERMAL LD <sub>50</sub> (rabbit)	INHALATION LC <sub>50</sub> (rat)
Naphthalene	490 mg/kg	2001 mg/kg	170 ppm (4 hours)
m-p xylene	5000 mg/kg	12400 mg/kg	4550 ppm (4 hours)
o xylene	Not Established.	Not Established.	Not Established.
1,2,3 Trimethylbenzene	5000 mg/kg	Not Established.	18000mg/m <sup>3</sup> (4 hours)
n-Hexane	25 g/kg	Not Established.	48000 ppm (4 hours)
Hydrogen Sulfide	Not Established.	Not Established.	700 mg/m <sup>3</sup> (4 hours)
Toluene	636 mg/kg	14100 ug/kg	49 g/m <sup>3</sup> (4 hours)
Benzene	930 mg/kg	< 9400 ug/kg	10000 ppm (7 hours)
Ethyl Benzene	<= 3500 mg/kg	<= 3500 mg/kg	<= 55000 mg/m <sup>3</sup>

**NOTES: TOXICITY & HEALTH EFFECTS** - Refer to Section 2 of this SDS for additional hazards identification.

**EYE EFFECTS:** May cause moderate to severe eye irritation.

**SKIN EFFECTS:** Prolonged or repeated contact may result in mild irritation. May be absorbed through skin with toxic effects.

**CHRONIC: TOXICITY & HEALTH EFFECTS** - Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation. This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia.

### CARCINOGENICITY

Chemical Name	NTP Status	IARC Status	OSHA Status
Toluene		3	
Benzene	1	1	Carcinogen.
Ethyl Benzene		2B	

**Notes: Benzene** - Caused cancer (leukemia), damage to the blood-producing system and serious blood disorders from prolonged, high exposure based on human epidemiology studies. Caused genetic effects and effects on the immune system in laboratory animal and some human studies. Caused toxicity to the fetus in laboratory animal studies.

**Ethylbenzene** - Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

**n-Hexane** - Prolonged and/or repeated exposures to n-Hexane can cause progressive and potentially irreversible damage to the peripheral nervous system. Simultaneous exposure to methyl ethyl ketone (MEK) or methyl isobutyl ketone (MIBK) and n-Hexane can potentiate the risk of adverse effects from n-Hexane on the peripheral nervous system. n-Hexane has been shown to cause testicular damage at high doses in male rats. The relevance of this effect for humans is unknown.

**REPEATED DOSE EFFECTS: TARGET ORGANS** - Repeated exposure may cause damage to organs such as liver, kidneys, blood and nervous system and skin, depending on routes of exposure.

**SENSITIZATION:** Scientific evidence suggests that propane and butane may cause cardiac sensitization.

## Crude Oil

**NEUROTOXICITY:** Not Established.

**GENETIC EFFECTS:** Not Established.

**REPRODUCTIVE EFFECTS:** Not Established.

**TERATOGENIC EFFECTS:** Not Established.

**MUTAGENICITY:** May cause genetic defects. Some crude oils and crude oil fractions have been positive in mutagenicity studies.

**GENERAL COMMENTS:**

**INTERACTIVE EFFECTS -** Not Established.

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## 12. ECOLOGICAL INFORMATION

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### ENVIRONMENTAL DATA:

**MOBILITY IN SOIL POTENTIAL -** Not established for this mixture, however this mixture contains volatile constituents. Partly evaporates from water or soil surfaces, but significant proportion will remain after one day. If the product enters the soil, one or more constituents will or may be mobile and may contaminate groundwater.

**ECOTOXICOLOGICAL INFORMATION:** This product has no known ecotoxicological effects.

**TERRESTRIAL/MICROORGANISM TOXICITY -**

**ACUTE:** Ecological data does not exist for this mixture.

**CHRONIC:** Ecological data does not exist for this mixture.

**BIOACCUMULATION/ACCUMULATION:** Has the potential to bioaccumulate.

**AQUATIC TOXICITY (ACUTE):** This product is expected to be harmful to aquatic life.

**Notes: (CHRONIC) -** May cause long lasting harmful effects to aquatic life.

### CHEMICAL FATE INFORMATION:

**PERSISTENCE & DEGRADABILITY -** Major constituents are inherently biodegradable, but contains components that may persist in the environment. The volatile constituents will oxidize rapidly by photochemical reactions in air.

**GENERAL COMMENTS:** Any other adverse environmental effects, such as environmental fate (exposure), ozone depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and global warming potential are indicated in this section if data exists. Otherwise, this data has not been established.

**COMMENTS:** Data from laboratory studies and from scientific literature is noted in this section if available. Otherwise, data has not been established.

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## 13. DISPOSAL CONSIDERATIONS

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**DISPOSAL METHOD:** The generator of a waste is responsible to determine if the material disposed of meets federal, state, or local criteria to be defined as a hazardous waste and dispose of accordance with applicable Federal, state and local regulations.

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## 14. TRANSPORT INFORMATION

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### DOT (DEPARTMENT OF TRANSPORTATION)

**PROPER SHIPPING NAME:** Petroleum crude oil.

**PRIMARY HAZARD CLASS/DIVISION:** 3

**UN/NA NUMBER:** 1267

**PACKING GROUP:** II

**NAERG:** 128

### VESSEL (IMO/IMDG)

**SHIPPING NAME:** Petroleum crude oil.

**UN/NA NUMBER:** 1267

**PRIMARY HAZARD CLASS/DIVISION:** 3

**PACKING GROUP:** II

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## 15. REGULATORY INFORMATION

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### SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

**311/312 HAZARD CATEGORIES:** Fire hazard. Immediate (acute) health hazard. Delayed (chronic) health hazard.

**FIRE:** Yes **PRESSURE GENERATING:** No **REACTIVITY:** No **ACUTE:** Yes **CHRONIC:** Yes

**EPCRA SECTION 313 SUPPLIER NOTIFICATION**

## Crude Oil

Chemical Name	Wt.%	CAS
n-Hexane	1-2	110-54-3
Benzene	<0- 0.1	71-43-2

### CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

Chemical Name	Wt.%	CERCLA RQ
n-Hexane	1-2	5,000
Toluene	<0- 0.1	1,000
Benzene	<0- 0.1	10
Ethyl Benzene	<0- 0.1	1,000

### TSCA (TOXIC SUBSTANCE CONTROL ACT)

Naphthalene	91-20-3
m-p- Xylene	179601-23-1
n-Hexane	110-54-3
1,2,4- Trimethylbenzene	95-63-6
Propane	74-98-6
2-methylpentane	107-83-5
Toluene	108-88-3
Benzene	71-43-2
Ethyl Benzene	100-41-4

### OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

**29 CFR1910.119—PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS:** Benzene is subject to the requirements of CFR 29 1910.1028, the OSHA Benzene Standard. The Action Level for Benzene is 0.5 ppm as an 8-hour, time-weighted average under this regulation. Benzene is not listed in Appendix A as a highly hazardous chemical, per 29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals. Under this regulation, however, any process that involves a flammable liquid on-site, in one location, in quantities of 10,000 lbs (4,553 kg) or greater is covered under this regulation unless it is used as a fuel.

### U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product contains constituent listed on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

### RCRA INFORMATION

This product may be recycled. If disposed, this product is considered ignitable hazardous waste. Consult federal, state, and local waste regulations to determine appropriate disposal options.

### CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

### CERCLA SECTION 103 and SARA Section 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substance contains a "petroleum exclusion" clause that exempts crude oil, refined oil, and unrefined petroleum products, and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

### SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES

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

## Crude Oil

### SARA SECTION 311/312- HAZARD CATEGORIES

Acute Health Immediate	Chronic Health Delayed	Fire X	Sudden Release of Pressure —	Reactive —
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This material is subject to the reporting requirements of Section 311-312 of the Emergency Planning and Community Right to Know Act (EPCRA) if stored at quantities in excess of 10,000 pounds at any one time.

### SARA SECTION 313- SUPPLIER NOTIFICATION

This product contains the following toxic substances subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372. See Section 2 for composition, CAS numbers, and exposure limit information for these substances:

- Benzene
- Ethylbenzene
- N-Hexane
- Toluene
- 1,2,4- Trimethylbenzene
- Xylene (mixed isomers)

You may be required to report releases of chemicals listed in 40 CFR 372.28. However, Polycyclic Aromatic Compounds (PACs) are coincidentally manufactured from the combustion of various fuel oils and other petroleum products. Under SARA Section 313, the de minimis exemption has been eliminated for PACs and other listed persistent bio-accumulative and toxic chemicals (PBTs). Refer to EPA guidance for additional reporting information.

### EPA NOTIFICATION (OIL SPILLS)

If there is a discharge of more than 1,000-gallons of oil into or upon navigable waters of the United States, or if it is the second spill event of 42 gallons or more of oil into the water within a twelve (12) month period, a written report must be submitted to the Regional Administrator of the SPA within sixty days of the event.

### CANADIAN REGULATORY INFORMATION (WHMIS)

Class B (Flammable and combustible Material, Division 2 (Flammable Liquid))

### OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

**29 CFR 1910.119—PROCESS SAFETY MANAGEMENT OF HIGHLY HAZARDOUS CHEMICALS:** Benzene is subject to the requirements of CFR 29 1910.1028, the OSHA Benzene Standard. The Action Level for Benzene is 0.5 ppm as an 8-hour, time-weighted average under this regulation. Benzene is not listed in Appendix A as a highly hazardous chemical, per 29 CFR 1910.119: Process Safety Management of Highly Hazardous Chemicals. Under this regulation, however, any process that involves a flammable liquid on-site, in one location, in quantities of 10,000 lbs (4,553 kg) or greater is covered under this regulation unless it is used as a fuel.

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## 16. OTHER INFORMATION

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### PREPARED BY:

### REVISION SUMMARY:

#### NATIONAL FIRE PROTECTION ASSOCIATION®HAZARD RATING

HEALTH: 2-Hazardous  
FIRE: 3-Below 100°F (flashpoint)  
REACTIVITY: 0- Stable

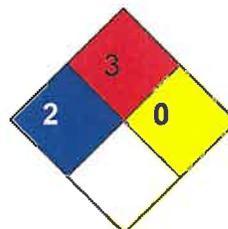
#### HAZARDOUS MATERIAL IDENTIFICATION SYSTEM®HAZARD RATING

HEALTH: 2\*- Moderate Hazard (\*Chronic)  
FIRE: 3- Serious Hazard  
PHYSICAL: 0- Minimal Hazard

#### HMIS RATING

HEALTH	2
FLAMMABILITY	3
PHYSICAL HAZARD	0
PERSONAL PROTECTION	H

#### NFPA CODES



HMIS RATINGS NOTES: Please refer to Section 8 of this SDS for recommended personal protective equipment.

## Crude Oil

### ADDITIONAL MSDS INFORMATION:

#### KEY / LEGEND

ACGIH - American Conference of Governmental Industrial Hygienists  
ADR - Agreement on Dangerous Goods by Road  
CAA - Clean Air Act  
CAS - Chemical Abstracts Service Registry Number  
CDG - Carriage of Dangerous Goods By Road and Rail Manual  
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act  
CFR - Code of Federal Regulations  
EINECS - European Inventory of Existing Chemical Substances Registry Number  
ERG - Emergency Response Guidebook  
EPCRA - Emergency Planning and Community Right-to-Know Act  
GHS - Globally Harmonized System of Classification and Labeling of Chemicals  
IARC - International Agency for Research on Cancer  
IATA - International Air Transport Association  
ICAO - International Civil Aviation Organization  
IMDG - International Maritime Dangerous Goods Code  
IMO - International Maritime Organization  
N/E - Not Established  
NTP - National Toxicology Program  
OSHA - Occupational Safety and Health Administration  
PEL - Permissible Exposure Limit  
PPE - Personal Protective Equipment  
RCRA - Resource Conservation and Recovery Act  
RID - Regulations Concerning the International Transport of Dangerous Goods by Rail  
RQ - Reportable Quantities  
SARA - Superfund Amendments and Reauthorization Act of 1986  
SDS - Safety Data Sheet  
TCC - Tag Closed Cup  
TDG - Transportation of Dangerous Goods  
TLV - Threshold Limit Value  
TSCA - Toxic Substance Control Act  
UNNA - United Nations / North American Number  
UNECE - United Nations Economic Commission for Europe  
US DOT - United States Department of Transportation  
US EPA - United States Environmental Protection Agency  
Vol. - Volume  
WHMIS - Workplace Hazardous Materials Information System

**GENERAL STATEMENTS:** Other information not included anywhere else in this SDS is included in this section if, in fact, such data exists.

**MANUFACTURER DISCLAIMER:** This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability or completeness. NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION HEREIN PROVIDED. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement

**Crude Oil**

# SAFETY DATA SHEET

TUG HILL OPERATING, LLC

Date Issued :  
SDS No :  
Date Revised :  
Revision No : 1

**Non-Sour Natural Gas**  
(West Virginia)

**\*\*\*IMPORTANT\*\*\***  
This SDS has been prepared for Non-Sour Natural Gas. Refer to the following sections for important safety and response information.  
**Section 4-** First Aid Measures (for accidental exposure).  
**Section 5-** Fire Fighting Measures.  
**Section 6-** Accidental Release Measures.

## 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Non-Sour Natural Gas  
**GENERAL USE:** Refinery Feedstock.  
**Common Name and Synonyms:**

Tug Hill Operating, LLC  
380 Southpointe Blvd, Suite 200  
Canonsburg, PA 15317

**24HR. EMERGENCY TELEPHONE NUMBERS**  
1-888-718-0605

## 2. HAZARDS IDENTIFICATION

This product has not been tested by Gastar Exploration Ltd. to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information based on the product components.

### GHS CLASSIFICATIONS

Health	Physical
Carcinogenicity, Category 1 Hazard Not Otherwise Classified, Simple Asphyxiant	Gases Under Pressure, Liquefied gas Flammable Gases, Category 1

### GHS LABEL

<p style="text-align: center;"><b>WARNING</b></p> <p>H000: May displace oxygen and cause rapid suffocation.</p>	<div style="text-align: center;">   <b>DANGER</b>                      H220: Extremely flammable gas.                 </div>
<div style="text-align: center;">   <b>WARNING</b>                      H280: Contains gas under pressure; may explode if heated.                 </div>	<div style="text-align: center;">   <b>DANGER</b>                      H350: May cause cancer.                 </div>

### PRECAUTIONARY

#### STATEMENT(S) Prevention:

P210: Keep away from heat/sparks/open flames/hot surfaces – no smoking.

## Sweet Natural Gas

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood. P281: Use personal protective equipment as required.

### Response:

P377: Leaking gas fire: Do not extinguish unless leak can be stopped safely. P381: Eliminate all ignition sources if safe to do so.

P308+P313: IF exposed or concerned: Get medical advice/attention.

### Storage:

P403: Store in a well-ventilated place.

P410+P403: Protect from sunlight. Store in a well-ventilated place

### Disposal:

P501: Dispose of contents/container in accordance with local/regional/national regulations.

## EMERGENCY OVERVIEW

### PHYSICAL APPEARANCE:

**IMMEDIATE CONCERNS: HAZARD DESCRIPTION / WARNING INFORMATION SUMMARY** - This material is a flammable gas. This product is toxic; inhalation of this material may cause severe injury or death. Please read entire contents of Section

2 of this Safety Data Sheet (SDS) for details.

### POTENTIAL HEALTH EFFECTS

**EYES:** This product is unlikely to cause eye irritation.

**SKIN:** This product is unlikely to cause skin irritation or injury.

**INGESTION:** This product is a compressed gas; hence oral exposure and resulting acute toxicity are unlikely.

**INHALATION:** This product is a simple asphyxiant. Excessive exposure may cause central nervous system effects such as dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure and death.

### SIGNS AND SYMPTOMS OF OVEREXPOSURE

**CARCINOGENICITY:** No component of this product present at levels greater than or equal to 0.1% is identified as a probable, possible, or confirmed carcinogen by IARC, NTP, OSHA or ACGIH.

**MUTAGENICITY:** Not Established.

### REPRODUCTIVE TOXICITY

**REPRODUCTIVE EFFECTS:** Not Established.

**TERATOGENIC EFFECTS:** Not Established.

**MEDICAL CONDITIONS AGGRAVATED:** Persons with pre-existing central nervous system disorders should refrain from contact with this material.

**ROUTES OF ENTRY:** Inhalation, skin contact, eye contact.

**TARGET ORGAN STATEMENT:** May cause damage to lungs and central nervous system.

**SENSITIZATION:** Not Established.

**COMMENTS: OTHER HAZARDS** - Not Established.

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## 3. COMPOSITION / INFORMATION ON INGREDIENTS

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Chemical Name	Vol. %	CAS
Methane	70 - 94	74-82-8
Ethane	5 - 10	74-84-0
Propane	1 - 4	74-98-6
i-Butane	0.5 - 3	75-28-5
n-Butane	0.5 - 2	106-97-8
Carbon Dioxide	0.5 - 10	124-38-9
Nitrogen	0.5 - 10	7727-37-9

## Sweet Natural Gas

Benzene	may contain	71-43-2
Hydrogen Sulfide	may contain	7783-06-4

**COMMENTS:** This may not be a complete list of components. Compositions given are typical values, not specifications.

### 4. FIRST AID MEASURES

**EYES:** Immediately flush eyes with plenty of water. Get medical attention, if irritation persists.

**SKIN:** Wash with soap and water. Get medical attention if irritation develops or persists. **INGESTION:** This is not considered a major potential route of exposure.

**INHALATION:** Move victim to fresh air. Call 911, emergency medical service, or Emergency Phone Numbers(s) provided in Section 1 of this SDS. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult.

**ANTIDOTES:** Not Established.

**NOTES TO PHYSICIAN: CLINICAL TESTING & MEDICAL MONITORING FOR DELAYED EFFECTS** - Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed. Provide general supportive measures and treat symptomatically.

### 5. FIRE FIGHTING MEASURES

**FLASH POINT:** -188 °C (-306.4°F) **Notes:** Based on methane. .

**AUTOIGNITION TEMPERATURE:** 482°C (900°F) to 649°C (1200°F)

**GENERAL HAZARD: DECOMPOSITION TEMPERATURE** - Not Established.

**EXTINGUISHING MEDIA:**

**SMALL FIRE** - Class B fire extinguisher, carbon dioxide, multipurpose dry chemical, water fog or alcohol-resistant foam.

**LARGE FIRE** - Water fog or alcohol-resistant foam.

**HAZARDOUS COMBUSTION PRODUCTS:** Any combustion, including incomplete combustion, may form carbon monoxide and carbon dioxide. Burning produces noxious and toxic fumes. Downwind personnel must be evacuated.

**OTHER CONSIDERATIONS: INAPPROPRIATE EXTINGUISHING MEDIA** - Do not use water jet.

**FIRE EXPLOSION: HIGHLY FLAMMABLE.** Will be easily ignited by heat, sparks or flames. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated.

**COMMENTS:**

**SPECIFIC HAZARDS THAT MAY ARISE FROM THE PRODUCT** - Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.

## Sweet Natural Gas

### 6. ACCIDENTAL RELEASE MEASURES

**SMALL SPILL:** For emergency information and procedures to follow in the case of an accidental release, call the Emergency Telephone Number(s) listed in Section 1 of this SDS. Remove any ignition sources and protect from ignition. Water spray may reduce vapor but may not prevent ignition in closed spaces. A vapor suppressing foam may be used to reduce vapors. Provide sufficient ventilation in the affected area(s) and wear appropriate personal protective equipment as indicated in Section 8 of this SDS when handling spill material. Isolate the area until gas has dispersed. Never discharge releases directly into sewers or surface waters.

**LARGE SPILL:** Use similar response procedures as indicated under Small Spill.

### 7. HANDLING AND STORAGE

**GENERAL PROCEDURES:** Handle in accordance with good industrial hygiene and safety practices. These practices include but are not limited to avoiding unnecessary exposure and prompt removal of material from eyes, skin and clothing. If needed, take first aid actions as indicated in Section 4 of this SDS.

**HANDLING:** Use only with adequate ventilation. Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8 of this SDS. Vent slowly to the atmosphere when opening. Avoid all contact with skin and eyes. Avoid breathing product dust or vapors. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not reuse container. Remove contaminated clothing immediately. Wash with soap and water after working with this product.

**STORAGE:** Keep in airtight container away from all heat sources. Store in a segregated and approved area. Store in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Keep container in a well-ventilated area. Ground all containers during transfer. Store away from incompatible materials. Cylinders should be separated from oxygen cylinders or other oxidizers by a minimum distance of 20 feet, or by a barrier of non-combustible material at least 5 feet high having a fire resistance rating of at least 1/2 hour. Store in the original container or an approved alternative made from compatible material. Do not store in unlabeled containers. Treat empty containers in a similar fashion as residual product may exist. Use appropriate containment to avoid environmental contamination.

**STORAGE TEMPERATURE:** Store containers in a room with ambient temperature.

**STORAGE PRESSURE:** Containers should be stored in room with ambient pressure.

**SHELF LIFE:**

**HOW TO MAINTAIN THE INTEGRITY OF THE SUBSTANCE BY USE OF STABILIZERS OR ANTIOXIDANTS** - Not Established.

**ELECTROSTATIC ACCUMULATION HAZARD:** To minimize the hazard of static electricity during transfer operations, bonding and grounding may be necessary, but may not by themselves be sufficient. For more information, refer to OSHA Standard 29 CFR 1910.106; National Fire Protection Standard (NFPA) 77 - "Recommended Practice on Static Electricity"; and/or the American Petroleum Institute (API) Recommended Practice 2003 - "Protection Against Ignitions Arising Out of Static, Lighting and Stray Currents."

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

#### EXPOSURE GUIDELINES

OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)					
		EXPOSURE LIMITS			
		OSHA PEL		ACGIH TLV	
Chemical Name		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Ethane	TWA	N/E	N/E	1000	N/E
	STEL	N/E	N/E	N/E	N/E
Propane	TWA	1000	1800	1000	N/E
	STEL	N/E	N/E	N/E	N/E
i-Butane	TWA	N/E	N/E	1000	N/E
	STEL	N/E	N/E	N/E	N/E
	TWA	N/E	N/E	1000	N/E

## Sweet Natural Gas

n-Butane	STEL	N/E	N/E	N/E	N/E
Carbon Dioxide	TWA	5000	9000	5000	9000
	STEL	N/E	N/E	30000	54000

**ENGINEERING CONTROLS:** Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

### PERSONAL PROTECTIVE EQUIPMENT

**EYES AND FACE:** Employees should be provided with and required to use splash-proof safety goggles and splash shields where there is any possibility of product coming in contact with eyes. Ensure that eye wash station is operable and nearby.

**SKIN: GLOVES AND BOOTS -** Any impervious gloves and boots including butyl rubber, nitrile rubber or neoprene rubber.

**RESPIRATORY:** Depending on airborne concentration a full-face supplied air respirator is recommended, because air purifying respirators cannot provide adequate protection.

**PROTECTIVE CLOTHING:** Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn. Cotton clothing is recommended.

**WORK HYGIENIC PRACTICES:** Consider the potential hazards of this material, applicable exposure limits, job activities, environmental working conditions, and other substances in the workplace when designing engineering controls and selecting personal protective equipment (PPE). The user should read and understand all manufacturer instructions and limitations supplied with the personal protection equipment before use.

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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**ODOR:** Generally odorless (if no H<sub>2</sub>S is present and no mercaptan added for odor).

**APPEARANCE:** Colorless gas.

**pH:** Not Applicable.

**PERCENT VOLATILE:** 100

**VAPOR PRESSURE:** Not Established.

**VAPOR DENSITY:** 0.6 to 0.8 (Air = 1)

**BOILING POINT:** -161 °C (-258 °F)

**Notes:** Based on methane.

**FREEZING POINT:** Not Applicable.

**MELTING POINT:** Not Applicable.

**FLASH POINT:** -188 °C (-306.4 °F)

**Notes:** Based on methane.

**AUTO IGNITION TEMP:** Not Established.

**DECOMPOSITION TEMP:** Not Established.

**EVAPORATION RATE:** Not Established.

**DENSITY:** Not Established.

**SPECIFIC GRAVITY:** Not Established.

**VISCOSITY:** Not Applicable.

**SOLUBILITY:** Not Established.

**COEFF. OIL/WATER:** Not Established.

**ODOR THRESHOLD:** Not Established.

**COMMENTS: FLAMMABILITY -** Refer to Section 2 and Section 5 of this SDS for classification and flammability characteristics.

## Sweet Natural Gas

### 10. STABILITY AND REACTIVITY

**STABLE:** Yes

**HAZARDOUS POLYMERIZATION:** No

**STABILITY:** This product is anticipated to be stable under normal ambient storage and handling conditions of temperature and pressure.

**POLYMERIZATION:** This product is not anticipated to cause hazardous reactions or polymerizations under normal ambient storage and handling conditions of temperature and pressure.

**CONDITIONS TO AVOID:** Avoid contact with incompatible materials. Avoid exposure to excess heat, sparks, open flame, or other potential ignition sources. Prevent vapor accumulation.

**HAZARDOUS DECOMPOSITION PRODUCTS:** Products of thermal decomposition include carbon oxides and nitrogen oxides.

**INCOMPATIBLE MATERIALS:** Strong oxidizing agents, liquid oxygen, mineral acids and metal catalysts.

### 11. TOXICOLOGICAL INFORMATION

#### ACUTE

Chemical Name	ORAL LD <sub>50</sub> (rat)	DERMAL LD <sub>50</sub> (rabbit)	INHALATION LC <sub>50</sub> (rat)
Ethane	Not Established.	Not Established.	> 800000 ppm (15 min)
Propane	Not Established.	Not Established.	658 mg/L (4 hours)
i-Butane	Not Established.	Not Established.	658 mg/L (4 hours)
n-Butane	Not Established.	Not Established.	658 g/m <sup>3</sup>
Carbon Dioxide	Not Established.	Not Established.	30000 to 50000 ppm (30 min)
Benzene	930 mg/kg	> 9400 ug/kg	10000 ppm (7 hours)
Hydrogen Sulfide	Not Established.	Not Established.	444 ppm

**NOTES: ACUTE TOXICITY & HEALTH EFFECTS** - This product is a simple asphyxiant; higher concentrations may cause dizziness. Refer to Section 2 of this SDS for additional hazards identification.

**EYE EFFECTS:** Not expected to cause prolonged or significant eye irritation.

**SKIN EFFECTS:** Not expected to cause prolonged or significant skin irritation.

**CHRONIC: TOXICITY & HEALTH EFFECTS** - This product is not expected to be toxic. Refer to Section 2 of this SDS for additional hazards identification.

#### CARCINOGENICITY

Chemical Name	NTP Status	IARC Status	OSHA Status
Benzene	1	1	Carcinogen.

**Notes:** No component of this product at levels greater than 0.1% is identified as a carcinogen by ACGIH, the International Agency for Research on Cancer (ARC), the U.S. National Toxicology Program (NTP) or the U.S. Occupational Safety and Health Act (OSHA).

**SENSITIZATION:** Not Established.

**NEUROTOXICITY:** Not Established.

**GENETIC EFFECTS:** Not Established.

**REPRODUCTIVE EFFECTS:** Not Established.

## Sweet Natural Gas

**TARGET ORGANS:** Contact may cause damage to the lungs and central nervous system.

**TERATOGENIC EFFECTS:** Not Established.

**MUTAGENICITY:** Not Established.

**SYNERGISTIC MATERIALS:** Not Established.

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### 12. ECOLOGICAL INFORMATION

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**ENVIRONMENTAL DATA: MOBILITY IN SOIL POTENTIAL** - Not Established.

**ECOTOXICOLOGICAL INFORMATION: TERRESTRIAL/MICROORGANISM TOXICITY** -

**ACUTE:** Ecological data does not exist for this mixture.

**CHRONIC:** Ecological data does not exist for this mixture.

**BIOACCUMULATION/ACCUMULATION:** Ecological data does not exist for this mixture.

**AQUATIC TOXICITY (ACUTE):** Ecological data does not exist for this mixture.

**Notes: (CHRONIC)** - Ecological data does not exist for this mixture.

**CHEMICAL FATE INFORMATION: PERSISTENCE & DEGRADABILITY** - Not Established.

**GENERAL COMMENTS:** Any other adverse environmental effects, such as environmental fate (exposure), ozone depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and global warming potential are indicated in this section if data exists. Otherwise, this data has not been established.

**COMMENTS:** Data from laboratory studies and from scientific literature is noted in this section if available. Otherwise, data has not been established.

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### 13. DISPOSAL CONSIDERATIONS

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**DISPOSAL METHOD:** It is recommended that this product, in any form, be incinerated in a suitable combustion chamber for disposal. Empty containers should be disposed of in a similar fashion due to presence of product residue. Follow applicable Federal, state, and local regulations.

**PRODUCT DISPOSAL:** Persons conducting disposal of this product and its containers/packaging should refer to Section 8 of this SDS for the proper selection of exposure controls and personal protective equipment.

**EMPTY CONTAINER:** Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death.

**GENERAL COMMENTS: PHYSICAL & CHEMICAL PROPERTIES THAT MAY AFFECT DISPOSAL OPTIONS** - Not Established.

**COMMENTS:** Dispose of material in accordance with national, state, regional, and local regulations. Never discharge directly into sewers or surface waters. Consult with environmental regulatory agencies for guidance on acceptable disposal practices for the product, in any form, and its containers/packaging.

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### 14. TRANSPORT INFORMATION

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**DOT (DEPARTMENT OF TRANSPORTATION)**

**PROPER SHIPPING NAME:** Compressed gas, flammable, n.o.s.

**PRIMARY HAZARD CLASS/DIVISION:** 2.1

**UN/NA NUMBER:** 1954

**NAERG:** 115

**LABEL:** 2.1: Flammable Gas

**MARINE POLLUTANT #1:** Not Listed.

# Sweet Natural Gas

## 15. REGULATORY INFORMATION

### UNITED STATES

#### SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES: Fire Hazard. Immediate (Acute) Health Hazard.

FIRE: Yes PRESSURE GENERATING: No REACTIVITY: No ACUTE: Yes CHRONIC: Yes

#### CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

Chemical Name	Wt. %	CERCLA RQ
Benzene	may contain	10
Hydrogen Sulfide	may contain	100

### TSCA (TOXIC SUBSTANCE CONTROL ACT)

Chemical Name	CAS
Methane	74-82-8
Ethane	74-84-0
Propane	74-98-6
i-Butane	75-28-5
n-Butane	106-97-8
Carbon Dioxide	124-38-9
Nitrogen	7727-37-9

### CLEAN AIR ACT

Chemical Name	Vol. %	CAS
Ethane	5 - 10	74-84-0
Propane	1 - 4	74-98-6
i-Butane	0.5 - 3	75-28-5
n-Butane	0.5 - 2	106-97-8

## Sweet Natural Gas

### 16. OTHER INFORMATION

**RELEVANT R-PHRASES:**R61: May cause harm to the unborn child.

R26: Very toxic by inhalation.

R48/23: Toxic : danger of serious damage to health by prolonged exposure through inhalation.

R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R12: Extremely flammable.

R45: May cause cancer.

R46: May cause heritable genetic damage.

R11: Highly flammable.

R36/38: Irritating to eyes and skin.

R65: Harmful: may cause lung damage if swallowed.

#### PREPARED BY:

#### REVISION SUMMARY:

#### NATIONAL FIRE PROTECTION ASSOCIATION®HAZARD RATING

HEALTH: 1-Hazard No greater than Ordinary Material

FIRE: 4-Will Not Burn

REACTIVITY: 0- Stable

#### HAZARDOUS MATERIAL IDENTIFICATION SYSTEM®HAZARD RATING

HEALTH: 0- Minimal Hazard

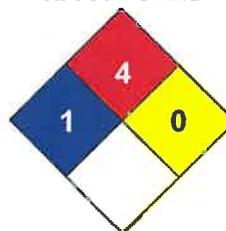
FIRE: 0- Minimal Hazard

PHYSICAL: 0- Minimal Hazard

#### HMIS RATING

HEALTH	1
FLAMMABILITY	4
PHYSICAL HAZARD	0
PERSONAL PROTECTION	H

#### NFPA CODES



**HMIS RATINGS NOTES:** Please refer to Section 8 of this SDS for recommended personal protective equipment.

#### DATA SOURCES:

##### REFERENCES

ACGIH. 2012 Guide to Occupational Exposure Values. Cincinnati, OH. Signature Publications, 2012.

Forsberg, K.; Mansdorf, S.Z. Quick Selection Guide to Chemical Protective Clothing. Fifth Edition. Hoboken, NJ. John Wiley & Sons, 2007.

Lide, D.R. CRC Handbook of Chemistry and Physics. 88th Edition. Boca Raton, FL. CRC Press, 2008.

UNECE. Globally Harmonized System of Classification and labelling of Chemicals (GHS). Third Revised Edition. New York and Geneva. United Nations, 2009.

US DOT; Pipeline and Hazardous Materials Safety Administration. 2008 Emergency Response Guidebook. Neenah, WI. J.J. Keller & Associates, Inc. 2008.

US EPA. Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) and Section 112(r) of the Clean Air Act. [Available] Online: <http://www.epa.gov/ceppo/pubs/title3.pdf>. Retrieved 02/02/2011.

#### ADDITIONAL MSDS INFORMATION:

##### KEY / LEGEND

ACGIH - American Conference of Governmental Industrial Hygienists

ADR - Agreement on Dangerous Goods by Road

CAA - Clean Air Act

CAS - Chemical Abstracts Service Registry Number

CDG - Carriage of Dangerous Goods By Road and Rail Manual

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CFR - Code of Federal Regulations

## Sweet Natural Gas

EINECS - European Inventory of Existing Chemical Substances Registry Number  
ERG - Emergency Response Guidebook  
EPCRA - Emergency Planning and Community Right-to-Know Act  
GHS - Globally Harmonized System of Classification and Labelling of Chemicals  
IARC - International Agency for Research on Cancer  
IATA - International Air Transport Association  
ICAO - International Civil Aviation Organization  
IMDG - International Maritime Dangerous Goods Code  
IMO - International Maritime Organization  
N/E - Not Established  
NTP - National Toxicology Program  
OSHA - Occupational Safety and Health Administration  
PEL - Permissible Exposure Limit  
PPE - Personal Protective Equipment  
RCRA - Resource Conservation and Recovery Act  
RID - Regulations Concerning the International Transport of Dangerous Goods by Rail  
RQ - Reportable Quantities  
SARA - Superfund Amendments and Reauthorization Act of 1986  
SDS - Safety Data Sheet  
TCC - Tag Closed Cup  
TDG - Transportation of Dangerous Goods  
TLV - Threshold Limit Value  
TSCA - Toxic Substance Control Act  
UN/NA - United Nations / North American Number  
UNECE - United Nations Economic Commission for Europe  
US DOT - United States Department of Transportation  
US EPA - United States Environmental Protection Agency  
Vol. - Volume  
WHMIS - Workplace Hazardous Materials Information System

**GENERAL STATEMENTS:** Other information not included anywhere else in this SDS is included in this section if, in fact, such data exists.

**MANUFACTURER DISCLAIMER:** This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability or completeness. NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION HEREIN PROVIDED. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

## Sweet Natural Gas

# SAFETY DATA SHEET

Tug Hill Operating, LLC

Date Issued:  
SDS NO:  
Date Revised:  
Revision No:

Non-Sour Natural Gas Condensate (Atmospheric Liquid)  
(West Virginia)

**\*\*\*IMPORTANT\*\*\***

This SDS has been prepared for Non-Sour Natural Gas Condensate at atmospheric pressure (i.e., atmospheric liquid). Refer to the following sections for important safety and response information.

**Section 4-** First Aid Measures (for accidental exposure).

**Section 5-** Fire Fighting Measures.

**Section 6-** Accidental Release Measures.

## 1. PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME:** Non-Sour Natural Gas Condensate (Atmospheric Liquid)

**GENERAL USE:** Condensate extracted from natural gas well production.

**Common Name and Synonyms:** Gas Liquid, Condensate Liquids, Drip Gas, Natural Gas Condensate

Tug Hill Operating, LLC  
380 Southpointe Blvd, Suite 200  
Canonsburg, PA 15317

**24HR. EMERGENCY TELEPHONE NUMBERS**  
1-888-718-0605

## 2. HAZARDS IDENTIFICATION

This product has not been tested by Gastar Exploration Ltd. to determine its specific health hazards. Therefore, the information provided in this section includes health hazard information based on the product components.

### GHS CLASSIFICATIONS

Health	Physical
H319 – Eye damage/irritation – Category 2 H315 – Skin corrosion/irritation – Category 2 H304 – Aspiration Hazard – Category 1 H331 – Acute toxicity, Inhalation – Category 3 H336 – Specific target organ toxicity (single exposure) – Category 3 H350 – Carcinogenicity – Category 1B H412 – Harmful to aquatic life, chronic toxicity – Category 3	H224 – Extremely flammable liquid and vapor – Category 1

### GHS LABEL



WARNING

H320: Causes eye irritation.  
H315: Causes skin irritation.



DANGER

H350: May cause cancer.

## Non-Sour Natural Gas Condensate (Atmospheric Liquid)



**WARNING**

H224 Extremely flammable liquid and vapor



**DANGER**

H331 Toxic if inhaled

### PRECAUTIONARY STATEMENT(S)

#### Prevention:

- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P210: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
- P233: Keep container tightly closed.
- P235: Keep cool.
- P240: Ground/bond container and receiving equipment.
- P241: Use with explosion-proof equipment.
- P242: Use only non-sparking tools.
- P243: Take precautionary measures against static discharge.
- P261: Avoid breathing dust/fume/gas/mist/vapours/spray.
  
- P264: Wash thoroughly after handling.
- P271: Use only outdoors or in a well-ventilated area.
- P273: Avoid release to the environment.
- P280: Wear protective gloves / protective clothing / eye protection / face protection.

#### Response:

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. (P304+P340)  
If experiencing respiratory symptoms: Immediately call a POISON CENTER or doctor/physician. (P342+310)

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. (P302+P310)

Call a POISON CENTER or doctor/physician. (P311)

Do NOT induce vomiting. (P331)

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.  
Continue rinsing. (P305+P351+338)

: If eye irritation persists: Get medical advice/attention. (P337+P313)

IF ON SKIN: Remove/Take off immediately all contaminated clothing. (P302+P361)

Wash with plenty of soap and water. (P352)

If skin irritation or a rash occurs: Get medical advice/attention. (P333+P313)

IF ON CLOTHING: Take off contaminated clothing and wash before reuse. (P306+P362)

IF exposed or concerned: Call a POISON CENTER or doctor/physician if you feel unwell. (P308+P312)

In case of fire: Use dry chemical, carbon dioxide, or foam for extinction. (P370+P378)

Collect spillage. (P391)\*

Store in a well-ventilated place. Keep container tightly closed. Keep cool. (P403+P233+235)

Store locked up. (P405)

## Non-Sour Natural Gas Condensate (Atmospheric Liquid)

IF exposed or concerned: Call a POISON CENTER or doctor/physician if you feel unwell. (P308+3312)

### Disposal:

Dispose of contents/container in accordance with local/regional/national regulations. (P501)

### EMERGENCY OVERVIEW

**PHYSICAL APPEARANCE:** Clear liquid.

**IMMEDIATE CONCERNS: HAZARD DESCRIPTION / WARNING INFORMATION SUMMARY** – This product is a highly flammable liquid which may be harmful if ingested, inhaled, comes in contact with skin or eyes, or is released into the environment. Please read entire contents of Section 2 of this Safety Data Sheet (SDS) for details.

### POTENTIAL HEALTH EFFECTS

**EYES:** Eye contact with vapors may cause eye irritation, watering of eyes and reddening. Eye contact with liquid may cause irritation and pain. Prolonged contact may result in tissue damage.

**SKIN:** Skin contact may cause skin irritation and redness. Repeated or prolonged skin contact may cause dermatitis.

**INGESTION:** Ingestion may cause irritation to the gastrointestinal tract with nausea and diarrhea. May be harmful if swallowed in large quantities.

**INHALATION:** Breathing the mist and vapors may be irritating to the respiratory tract.

### SIGNS AND SYMPTOMS OF OVEREXPOSURE

**CHRONIC EFFECTS:** Skin, eye, and respiratory tract irritation. Gastrointestinal and vascular effects and death may occur at high concentrations. May cause nervous system effects, such as headache, nausea and drowsiness.

**CARCINOGENICITY:** Condensate contains Category 2 constituents (Benzene).

**MUTAGENICITY:** Not Established.

### REPRODUCTIVE TOXICITY

**REPRODUCTIVE EFFECTS:** Not Established.

**TERATOGENIC EFFECTS:** Not Established.

**MEDICAL CONDITIONS AGGRAVATED: Benzene** – Pre-existing blood system disorders, respiratory conditions, central nervous, liver, kidney, and cardio-vascular conditions may be aggravated by severe or chronic overexposure to benzene. Skin disorders may also be aggravated by exposures to benzene.

**ROUTES OF ENTRY:** Inhalation, skin contact, eye contact, ingestion.

**TARGET ORGAN STATEMENT:** May cause damage to eyes, skin and respiratory system.

**CANCER STATEMENT:** This product may cause cancer. Refer to Section 11 of this SDS for details.

**SENSITIZATION:** Not Established.

**COMMENTS: ADDITIONAL MEDICAL AND TOXICOLOGICAL INFORMATION:** Natural gas condensate and some of its fractions have been shown to cause skin irritation, damage and even cancers when applied directly and repeatedly to skin. When laboratory animals inhale oil vapors at high concentration or ingest in repeated doses, various tumors have developed.

This product contains benzene, which can cause degeneration in blood forming bone marrow leading to anemia which may further degrade to leukemia, a type of cancer (see 29 CFR 1910.1028 of standard). Benzene is recognized as a human carcinogen by OSHA, NTP, ACGIH, and IARC.

## Non-Sour Natural Gas Condensate (Atmospheric Liquid)

### 3. COMPOSITION / INFORMATION ON INGREDIENTS

Compositions given are typical values, not specifications. Compositions provided may vary with geographic location, geologic formation, temperature and pressure and actual values could be higher or lower than the ranges provided.

Chemical Name	Non-Sour Atmospheric Condensate Liquid WT % (All Vary)	CAS
Water	<1.0 – 5.0	7732-18-5
Nitrogen	0.0 – 0.015	7727-37-9
Carbon Dioxide	0.0 – 0.04	124-38-9
Benzene	<0.10 – 0.70	71-43-2
Ethyl benzene	<1.0 – 3.0	100-41-4
Toluene	<1.0 – 5.0	108-88-3
Xylenes	<1.0 – 5.0	1330-20-7
Methane	<1.0 – 5.0	74-82-8
Ethane	<1.0 – 8.0	74-84-0
Propane	1.0 – 10.0	74-98-6
Isobutane	1.0 – 3.0	75-28-5
n-Butane	2.0 – 9.0	106-97-8
2,2-Dimethylpropane	0.0 – 0.20	463-82-1
Isopentane	2.0 – 5.0	78-78-4
n-Pentane	2.0 – 7.0	109-66-0
2,2-Dimethylbutane	0.10 – 0.40	75-83-2
Cyclopentane	0.000	287-92-3
2,3-Dimethylbutane	0.30 – 0.70	79-29-8
2-Methylpentane	1.0 – 4.0	107-83-5
3-Methylpentane	1.0 – 3.0	96-14-0
n-Hexane	2.0 – 5.0	110-54-3
Heptanes Plus	45.0 – 80.0	Mixture
Hydrogen Sulfide	<1.0	7783-06-4

**COMMENTS:** Some components of this material such as benzene, toluene and xylene have been shown to produce fetal toxicity and/or reduce female or male reproductive capacity in laboratory animals.

## Non-Sour Natural Gas Condensate (Atmospheric Liquid)

### 4. FIRST AID MEASURES

**EYES:** Immediately flush with large amounts of water, holding eyelids open, for at least 20 minutes. Repeat if necessary. Remove contact lenses, if present and easy to do. If pain or redness persists, seek medical attention. If eye is exposed to hot liquid, cover eyes with cloth and seek medical attention immediately.

**SKIN:** In case of hot liquid exposure, do not remove clothing or treat, wash only unburned area and seek medical attention immediately.

**INGESTION:** Do not induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Have exposed individual rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person. Obtain medical assistance immediately and treat as directed by a medical professional.

**INHALATION:** Move victim to fresh air. Call 911, emergency medical service, or Emergency Phone Number(s) provided in Section 1 of this SDS. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth methods if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult.

**ANTIDOTES:** Not Established.

**NOTES TO PHYSICIAN:** No specific treatment. Treat symptomatically. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

**CLINICAL TESTING & MEDICAL MONITORING FOR DELAYED EFFECTS** – Not Established.

**COMMENTS: CONTRAINDICATIONS** – Not Established.

### 5. FIRE FIGHTING MEASURES

**FLASH POINT:** This material is capable of flashing at temperatures of 22°C (72°F) or lower.

**\*\*\*\*IMPORTANT:** *This material is highly flammable. When separator condensate liquid under pressure encounters normal atmospheric pressures, each 42-gallon barrel equivalent of condensate is capable of flashing over 92 pounds of volatile vapors to the atmosphere in a relatively short amount of time\*\*\*\**

**AUTOIGNITION TEMPERATURE:** Not Established.

**EXTINGUISHING MEDIA:**

**SMALL FIRE** – Class B fire extinguisher, carbon dioxide, multipurpose dry chemical, water fog or alcohol-resistant foam.

**LARGE FIRE** – Water fog or alcohol-resistant foam.

**COMMENTS:**

**SPECIFIC HAZARDS THAT MAY ARISE FROM THE PRODUCT** - Vapors are flammable and some constituents may be heavier than air. Vapors may travel through the air as well as across the ground and reach remote ignition sources causing a flashback fire danger. Sudden reaction and fire may result if product is mixed with an oxidizing agent.

**FIRE EXPLOSION:** This product is extremely flammable. Hydrocarbon vapors that are released are a potential fire hazard. The condensate as well as its related vapors can easily be ignited by heat, sparks or flames. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Some vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Many liquids are lighter than water. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated.

**SENSITIVE TO STATIC DISCHARGE:** Not Established.

**SENSITIVITY TO IMPACT:** Not Established.

## Non-Sour Natural Gas Condensate (Atmospheric Liquid)

### 6. ACCIDENTAL RELEASE MEASURES

**SMALL SPILL:** For emergency information and procedures to follow in the case of an accidental release, call the Emergency Telephone Number(s) listed in Section 1 of this SDS. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). As an immediate precautionary measure, isolate spill or leak area 50 meters (160 feet) in all directions. Evacuate building and all affected areas. Keep unauthorized personnel away. Do not touch or walk through spilled material. Stay upwind. Keep out of low areas. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. Dike far ahead of liquid for later disposal. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Use clean non-sparking tools to collect absorbed material. Water spray may reduce vapor; but may not prevent ignition in closed spaces. A vapor suppressing foam may be used to reduce vapors. Provide sufficient ventilation in the affected area(s) and wear appropriate personal protective equipment as indicated in Section 8 when handling spill material. This material has been reported to behave when spilled in water in a manner that it partitions and the lighter ends volatilize off and the heavier ends can sink.

**LARGE SPILL:** Use similar response procedures as indicated under Small Spill. Consider initial downwind evacuation for at least 100 meters (330 feet). Large releases may require the notification of local emergency response agencies. Wear self-contained breathing apparatus if conditions or air monitoring warrants.

### 7. HANDLING AND STORAGE

**GENERAL PROCEDURES:** Handle in accordance with good industrial hygiene and safety practices. These practices include but are not limited to avoiding unnecessary exposure and prompt removal of material from eyes, skin and clothing. Wash exposed skin and clothing frequently. If needed, take first aid actions as indicated in Section 4 of this SDS.

**HANDLING:** Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8. Vent slowly to the atmosphere when opening. Avoid all contact with skin and eyes. Avoid breathing product dust or vapors. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Remove contaminated clothing immediately. Wash with soap and water after working with this product.

**STORAGE:** Keep in airtight container away from all heat sources. Store the container in a segregated and approved area. Store in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Keep container in a well-ventilated area. Ground all containers during transfer. Store containers away from incompatible materials. Store in the original container or an approved alternative made from compatible material. Do not store in unlabeled containers. Treat empty containers in a similar fashion as residual product may exist. Use appropriate containment to avoid environmental contamination.

**STORAGE TEMPERATURE:** Store containers of product in a cool (between 50°F or below), well ventilated location.

**STORAGE PRESSURE:** Store in a room with ambient atmospheric pressure.

**ELECTROSTATIC ACCUMULATION HAZARD:** Not Established.

### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)			
		EXPOSURE LIMITS	
		OSHA PEL	ACGIH TLV
Chemical Name		ppm	ppm
Benzene	TWA	1	0.5
	STEL	5	2.5
Toluene	TWA	200	20
	STEL	300	N/E
Ethyl benzene	TWA	100	20

## Non-Sour Natural Gas Condensate (Atmospheric Liquid)

	STEL	125	N/E
m-p Xylene	TWA	100	100
	STEL	150	150
o- Xylene	TWA	100	100
	STEL	150	150
Hexane	TWA	50	50
	STEL	N/E	N/E
Hydrogen Sulfide	TWA	N/E	1
	STEL	20	5
Propane	TWA	1000	N/E
	STEL	N/E	N/E
n-Pentane	TWA	1000	1000
	STEL	N/E	N/E
<p><b>Note:</b> OSHA has also assigned H<sub>2</sub>S a STEL value of 50 ppm for a 10-minute peak that may be reached only once per 8-hour shift. In the event no Federal OSHA PEL exists for a constituent, California/OSHA PELs have been substituted, as appropriate.</p>			

### EXPOSURE GUIDELINES

**ENGINEERING CONTROLS:** Provide adequate general and local ventilation to maintain airborne chemical concentrations below applicable exposure limits, to prevent accumulation of flammable vapors and formation of explosive atmospheres, and to prevent formation of oxygen deficient atmospheres, especially in confined spaces. This product may release gases or vapors that can displace oxygen in enclosed areas.

### PERSONAL PROTECTIVE EQUIPMENT

**EYES AND FACE:** Employees should be provided with and required to use splash-proof safety goggles and full face splash shields where there is any possibility of product coming in contact with eyes. Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of contact lenses. Ensure that eye wash station is operable and nearby.

**SKIN:** Consider wearing long-sleeve, FRC, otherwise normal working clothes should be worn. Wash contaminated clothing prior to reuse. If gloves are required for job operations involving this product, wear nitrile rubber or polyvinylalcohol (PVAL) gloves.

**RESPIRATORY:** Respiratory protection is normally not required except in emergencies or when conditions cause excessive airborne levels of mists or vapors. Select NIOSH-approved organic vapor air-purifying respirator, SCBA or air-supplied respirator where there may be potential for overexposure.

**PROTECTIVE CLOTHING:** Long sleeve shirt and long pants or coveralls; Consider wearing long-sleeve, FRC, . Consider wearing butyl rubber apron or outerwear where splashing may occur. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

**WORK HYGIENIC PRACTICES:** Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove contaminated clothing and launder before reuse. Shower after work using plenty of soap and water.

**OTHER USE PRECAUTIONS: FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR DEATH CONDITIONS** - A self-contained breathing apparatus with full face piece operated in a pressure-demand or other positive pressure mode is recommended for firefighting or other immediately dangerous to life and death conditions. Supplied-air respirator with full face piece and operated in pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode may also be used.

**COMMENTS: EXPOSURE LIMITS & SOURCES** - Refer to Section 16 Table 1 for additional exposure limits and sources for this product or its components, whichever applies.

## Non-Sour Natural Gas Condensate (Atmospheric Liquid)

### 9. PHYSICAL AND CHEMICAL PROPERTIES

**ODOR:** Hydrocarbon.

**APPEARANCE:** Clear Liquid

**pH:** 5.5 to 8.0

**VAPOR PRESSURE:** Not Established.

**VAPOR DENSITY:** > 1.0 (Air = 1)

**BOILING POINT:** Varies widely depending on hydrocarbon content.

**FREEZING POINT:** < 0°C (32°F)

**POUR POINT:** Not Established.

**FLASH POINT:** 22°C (72°F) May flash at lower temperatures..

**SOLUBILITY IN WATER:** Not Established.

**EVAPORATION RATE:** Not Established.

**SPECIFIC GRAVITY:** < 1.0 at 0°C (32°F)

**VISCOSITY:** Not Established.

**COEFF. OIL/WATER:** Not Established.

**ODOR THRESHOLD:** Not Established.

**RELATIVE DENSITY:** Not Established.

**DECOMPOSITION TEMP:** Not Established.

**AUTO-IGNITION TEMP:** Not Established.

### 10. STABILITY AND REACTIVITY

**STABLE:** Yes

**HAZARDOUS POLYMERIZATION:** No

**STABILITY: CHEMICAL STABILITY** - This product is anticipated to be stable under normal ambient storage and handling conditions of temperature and pressure.

**POLYMERIZATION:** This product is not anticipated to cause hazardous reactions or polymerizations under normal ambient storage and handling conditions of temperature and pressure.

**CONDITIONS TO AVOID:** Avoid contact with incompatible materials such as heat, open flame, other sources of ignition, and oxidizing materials such as chlorine and concentrated nitric acid.

**HAZARDOUS DECOMPOSITION PRODUCTS:** This product may produce carbon monoxide and carbon dioxide during decomposition.

### 11. TOXICOLOGICAL

#### INFORMATION ACUTE

Chemical Name	ORAL LD <sub>50</sub> (rat)	DERMAL LD <sub>50</sub> (rabbit)	INHALATION LC <sub>50</sub> (rat)
Xylene	5000 mg/kg	12400 mg/kg	4550 ppm (4 hours)
Hexane	25 g/kg	Not Established.	48000 ppm (4 hours)
Crude Oil	< 5000 mg/kg	> 2000 mg/kg	Not Established
Toluene	636 mg/kg	14100 ug/kg	49 g/m <sup>3</sup> (4 hours)

## Non-Sour Natural Gas Condensate (Atmospheric Liquid)

Benzene	930 mg/kg	< 9400 ug/kg	10000 ppm (7 hours)
Ethyl benzene	<= 3500 mg/kg	<= 3500 mg/kg	<= 55000 mg/m <sup>3</sup>
Hydrogen Sulfide	Not Established	Not Established.	700 mg/m <sup>3</sup> (4 hours)

**EYE EFFECTS:** May cause moderate to severe eye irritation.

**SKIN EFFECTS:** May cause mild skin irritation. Prolonged or repeated contact may result in mild irritation. May be absorbed through skin with toxic effects.

**CHRONIC:** This product contains benzene, which can cause degeneration in blood forming bone marrow leading to anemia, which may further degrade to leukemia, a type of cancer. Chronic exposure affects the hematopoietic system causing blood disorders including anemia and pancytopenia.

### CARCINOGENICITY

Chemical Name	NTP Status	IARC Status	OSHA Status
Crude Oil		3	
Benzene	1	1	Carcinogen.

**SENSITIZATION:** This product is not expected to be a skin sensitizer.

**NEUROTOXICITY:** Not Established.

**GENETIC EFFECTS:** Not Established.

**REPRODUCTIVE EFFECTS:** Not Established.

**TERATOGENIC EFFECTS:** Not Established.

**MUTAGENICITY:** Not Established.

## 12. ECOLOGICAL INFORMATION

**ENVIRONMENTAL DATA: MOBILITY IN SOIL POTENTIAL -** Not Established.

**BIOACCUMULATION/ACCUMULATION:** Not Established.

**DISTRIBUTION:** Do not discharge into or allow runoff to flow into sewers and natural waterways. Contain spill material and dike for proper disposal.

**AQUATIC TOXICITY (ACUTE):** This product is not expected to be acutely harmful to aquatic life.

**CHEMICAL FATE INFORMATION: PERSISTENCE & DEGRADABILITY -** Not Established.

**GENERAL COMMENTS:** Any other adverse environmental effects, such as environmental fate (exposure), ozone depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and global warming potential are indicated in this section if data exists. Otherwise, this data has not been established.

## 13. DISPOSAL CONSIDERATIONS

**DISPOSAL METHOD:** Properly characterize the material and to manage it in accordance with applicable Federal, state and local regulations.

## 14. TRANSPORT INFORMATION

**DOT (DEPARTMENT OF TRANSPORTATION)**

**PROPER SHIPPING NAME:** Flammable liquid, n.o.s.

**PRIMARY HAZARD CLASS/DIVISION:** 3

**UN/NA NUMBER:** 1993

**PACKING GROUP:** II

**NAERG:** 128

# Non-Sour Natural Gas Condensate (Atmospheric Liquid)

## 15. REGULATORY

### INFORMATION UNITED

#### STATES

#### SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES: Fire hazard. Immediate (acute) health hazard. Delayed (chronic) health hazard.

FIRE: Yes PRESSURE GENERATING: No REACTIVITY: No ACUTE: Yes CHRONIC: Yes

#### EPCRA SECTION 313 SUPPLIER NOTIFICATION

Chemical Name	Vol. %	CAS
Benzene	<0-1.0	71-43-2

#### CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

Chemical Name	Vol. %	CERCLA RQ
Benzene	<0-1.0	10
Hydrogen Sulfide	<0-1.0	100

#### TSCA (TOXIC SUBSTANCE CONTROL ACT)

Chemical Name	CAS
Crude Oil	8002-05-9
Benzene	71-43-2
Hydrogen Sulfide	7783-06-4

#### CLEAN AIR ACT

Chemical Name	Vol. %	CAS
Hydrogen Sulfide	<0-1.0	7783-06-4

## 16. OTHER INFORMATION

#### RELEVANT R-PHRASES:

R36/37/38: Irritating to eyes, respiratory system and skin.

R45: May cause cancer.

R46: May cause heritable genetic damage.

R11: Highly flammable.

R36/38: Irritating to eyes and skin.

R65: Harmful: may cause lung damage if swallowed.

R12: Extremely flammable.

R26: Very toxic by inhalation.

R50: Very toxic to aquatic organisms.

#### PREPARED BY:

#### REVISION SUMMARY:

#### NATIONAL FIRE PROTECTION ASSOCIATION®HAZARD RATING

HEALTH: 2-Hazardous

FIRE: 3-Below 100°F (flashpoint)

REACTIVITY: 0- Stable

#### HAZARDOUS MATERIAL IDENTIFICATION SYSTEM®HAZARD RATING

HEALTH: 2\*- Moderate Hazard (\*Chronic)

FIRE: 3- Serious Hazard

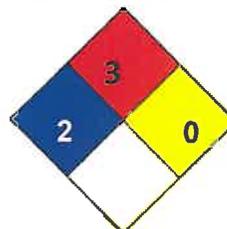
## Non-Sour Natural Gas Condensate (Atmospheric Liquid)

PHYSICAL: 0- Minimal Hazard

### HMIS RATING

HEALTH	2
FLAMMABILITY	3
PHYSICAL HAZARD	0
PERSONAL PROTECTION	G

### NFPA CODES



### DATA SOURCES: REFERENCES

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- Lide, D.R. CRC Handbook of Chemistry and Physics. 88th Edition. Boca Raton, FL. CRC Press, 2008.
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- US DOT; Pipeline and Hazardous Materials Safety Administration. 2008 Emergency Response Guidebook. Neenah, WI. J.J. Keller & Associates, Inc. 2008.
- US EPA. Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) and Section 112(r) of the Clean Air Act. [Available] Online: <http://www.epa.gov/ceppo/pubs/title3.pdf>. Retrieved 02/02/2011.

### ADDITIONAL MSDS

#### INFORMATION: KEY / LEGEND

- ACGIH - American Conference of Governmental Industrial Hygienists
- ADR - Agreement on Dangerous Goods by Road
- CAA - Clean Air Act
- CAS - Chemical Abstracts Service Registry Number
- CDG - Carriage of Dangerous Goods By Road and Rail Manual
- GERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
- CFR - Code of Federal Regulations
- EINECS - European Inventory of Existing Chemical Substances Registry Number
- ERG - Emergency Response Guidebook
- EPCRA - Emergency Planning and Community Right-to-Know Act
- GHS - Globally Harmonized System of Classification and Labeling of Chemicals
- IARC - International Agency for Research on Cancer
- IATA - International Air Transport Association
- ICAO - International Civil Aviation Organization
- IMDG - International Maritime Dangerous Goods Code
- IMO - International Maritime Organization
- N/E - Not Established
- NTP - National Toxicology Program
- OSHA - Occupational Safety and Health Administration
- PEL - Permissible Exposure Limit
- PPE - Personal Protective Equipment
- RCRA - Resource Conservation and Recovery Act
- RID - Regulations Concerning the International Transport of Dangerous Goods by Rail
- RQ - Reportable Quantities
- SARA - Superfund Amendments and Reauthorization Act of 1986
- SDS - Safety Data Sheet
- TCC - Tag Closed Cup
- TDG - Transportation of Dangerous Goods
- TLV - Threshold Limit Value
- TSCA - Toxic Substance Control Act
- UNNA - United Nations / North American Number
- UNECE - United Nations Economic Commission for Europe

**ATTACHMENT E**

**SUPPORTING CALCULATIONS**

**R13 Class I Administrative Update**

**Yoho Well Pad**  
**New Martinsville, West Virginia**

**Tug Hill Operating**  
1320 S. University, Suite 500  
Fort Worth, TX 76107

Table 1. Annual Potential To Emit (PTE) Summary  
Tug Hill Operating, LLC - Yoho Pad

**Criteria Pollutants**

Current PTE without Fugitive Emissions

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e *	HAPs
Total Emissions (ton/yr)	0.37	0.19	0.12	0.200	0.30	0.25	21.96	1131.96	0.46
Total Emissions (lb/day)	149.76	44.64	5.04	0.48	7.20	6.00	527.04	6202.52	18.79
Total Emissions (lb/hr)	6.240	1.860	0.210	0.020	0.30	0.3	21.960	258.44	0.78

\*CO2e total is in Metric Tons/Yr.

**Criteria Pollutants**

Proposed PTE without Fugitive Emissions

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e *	HAPs
Line Heaters + GPUs	0.024	0.024	0.024	0.0019	0.32	0.27	0.02	383.98	0.00609
Tanks							0.12		
Fugitive Leaks							1.50		
Total Emissions (ton/yr)	0.00	0.02	0.02	0.024	0.32	0.27	0.13	383.98	0.01
Total Emissions (lb/day)	0.00	0.13	0.13	0.13	1.76	1.48	0.73	2104.00	0.03
Total Emissions (lb/hr)	0.00	0.01	0.01	0.01	0.07	0.06	0.03	87.67	0.00

\*CO2e total is in Metric Tons/Yr.

Proposed Difference in Emissions

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e *	Total HAPs
Total Emissions (ton/yr)	-0.370	-0.166	-0.096	-0.176	0.022	0.021	-21.826	-747.979	-0.455
Total Emissions (lb/hr)	-6.240	-1.854	-0.204	-0.014	-0.226	-0.188	-21.929	-170.772	-0.782

**ATTACHMENT F**

**AUTHORITY OF CORPORATION (ATTACHMENT R)**

**R13 Class I Administrative Update**

**Yoho Well Pad  
New Martinsville, West Virginia**

**Tug Hill Operating  
1320 S. University, Suite 500  
Fort Worth, TX 76107**

**Attachment R**  
**AUTHORITY OF CORPORATION**  
**OR OTHER BUSINESS ENTITY (DOMESTIC OR FOREIGN)**

TO: The West Virginia Department of Environmental Protection,  
Division of Air Quality

DATE: \_\_\_\_\_, \_\_\_\_\_

ATTN.: Director

Corporation's / other business entity's Federal Employer I.D. Number \_\_\_\_\_

The undersigned hereby files with the West Virginia Department of Environmental Protection, Division of Air Quality, a permit application and hereby certifies that the said name is a trade name which is used in the conduct of an incorporated business or other business entity.

Further, the corporation or the business entity certifies as follows:

(1) \_\_\_\_\_ (is/are) the authorized representative(s) and in that capacity may represent the interest of the corporation or the business entity and may obligate and legally bind the corporation or the business entity.

(2) The corporation or the business entity is authorized to do business in the State of West Virginia.

(3) If the corporation or the business entity changes its authorized representative(s), the corporation or the business entity shall notify the Director of the West Virginia Department of Environmental Protection, Division of Air Quality, immediately upon such change.

\_\_\_\_\_  
President or Other Authorized Officer  
(Vice President, Secretary, Treasurer or other  
official in charge of a principal business function of  
the corporation or the business entity)

(If not the President, then the corporation or the business entity must submit certified minutes or bylaws stating legal authority of other authorized officer to bind the corporation or the business entity).

\_\_\_\_\_  
Secretary

\_\_\_\_\_  
Name of Corporation or business entity