Williams Ohio Valley Midstream LLC
100 Teletech Drive, Suite 2
Moundsville, WV 26041
(304) 843-4559 phone
(304) 843-3131 fax

June 10, 2016
(Via Federal Express)

Beverly McKeone
New Source Review Program Manager
Division of Air Quality
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304-2345

Subject: Application for 45CSR13 Class II Administrative Permit Update
Williams Ohio Valley Midstream LLC
MOUNDSVILLE FRACTIONATION PLANT
Marshall County, West Virginia

Dear Ms. McKeone,

Williams Ohio Valley Midstream LLC (OVM) is submitting the enclosed Application for 45CSR13 Class II Administrative Permit Update for the existing Moundsville Fractionation Plant, located at 200 Caiman Drive, west of WV-2/Lafayette Ave, approximately 2.8 miles W-SW of Moundsville in Marshall County, West Virginia.

This application for 45CSR13 Class II Administrative Permit Update has been prepared and submitted to request authorization to:

- Increase the component counts for Process and Piping Fugitives FUG (1S)

The proposed changes result in an increase in facility-wide emissions as summarized on the following page. In accordance with §45-13-2.17, the proposed changes do not meet the definition of "modification" as the emission increases are less than the specified thresholds; therefore, this application qualifies to be classified as a Class II Administrative Update.

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

EMISSIONS SUMMARY SHEET

Facility-Wide Emissions Summary [Tons per Year]			
Criteria Pollutants	**Potential Emissions (Including Fugitives)**		
	Current Permit	**Increase**	**Proposed Permit**
Nitrogen Oxides (NOX)	78.89	0.00	78.89
Carbon Monoxide (CO)	135.89	0.00	135.89
Volatile Organic Compounds (VOC)	**216.47**	**21.11**	**237.58**
Sulfur Dioxide (SO2)	0.45	0.00	0.45
Particulate Matter (PM10/2.5)	5.74	0.00	5.74
Lead (Pb)	---	---	---
Hazardous Air Pollutants (HAP)	**Potential Emissions (Including Fugitives)**		
	Current Permit	**Increase**	**Proposed Permit**
Benzene	0.21	-0.01	0.20
Ethylbenzene	0.16	-0.08	0.08
Formaldehyde (HCHO)	0.07	0.00	0.07
n-Hexane	9.40	3.74	13.14
Toluene	0.39	0.25	0.64
2,2,4-Trimethylpentane	0.32	0.10	0.42
Xylenes	1.08	0.61	1.69
Other HAP (Methanol (MeOH), etc.)	0.02	0.00	0.02
Total HAP	**11.65**	**4.61**	**16.26**
Greenhouse Gases (GHG)	**Potential Emissions (Including Fugitives)**		
	Current Permit	**Increase**	**Proposed Permit**
Carbon Dioxide (CO_2)	122,597	0	122,597
Methane (CH_4)	21	-12	9
Nitrous Oxide (N_2O)	0.6	0	0.6
CO_2 Equivalent (CO_2e)	123,304	-295	123,009

The increases in VOC and HAP emissions are due to the increased number of piping components currently in service at the facility. Some of the HAP emissions decrease due to a lower HAP content in the product streams.

Note the above emission totals do not include the emergency generator engine as it has been permitted separately under General Permit G60-C069.

Please note there is an emergency generator engine (EmGen, 6S) authorized for operation at the Moundsville facility under General Permit G60-C069 dated March 31, 2015. As the emergency generator engine is not part of this permitting action, it is not addressed in the attached permit application.

If you have any questions concerning this submittal or need additional information, please contact me at (304) 843-4559 or erika.baldauff@williams.com.

Sincerely,

Erika Baldauff
Environmental Specialist

Enclosures:

Application for NSR Construction Permit
Attachments A, B, D-K, N-P and S
Check for Application Fee

APPLICATION FOR 45CSR13
CLASS II ADMINISTRATIVE PERMIT UPDATE

For the:

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Marshall County, West Virginia

Submitted to:

WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY

Submitted by:

Williams Ohio Valley Midstream LLC
100 Teletech Drive, Suite 2
Moundsville, WV 26041

Prepared by:

EcoLogic Environmental Consultants, LLC
864 Windsor Court
Santa Barbara, CA 93111

June 2016

APPLICATION FOR 45CSR13
CLASS II ADMINISTRATIVE PERMIT UPDATE

Williams Ohio Valley Midstream LLC
MOUNDSVILLE FRACTIONATION PLANT

Marshall County, West Virginia

TABLE OF CONTENTS

APPLICATION FOR 45CSR13
CLASS II ADMINISTRATIVE PERMIT UPDATE

NTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
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** ☐ **NOT APPLICABLE**

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):*
WILLIAMS OHIO VALLEY MIDSTREAM LLC

2. Federal Employer ID No. ***(FEIN):***
27 – 0856707

3. Name of facility *(if different from above):*
MOUNDSVILLE FRACTIONATION PLANT

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
100 TELETECH DRIVE, SUITE 2
MOUNDSVILLE, WV 26041

5B. Facility's present physical address:
200 CAIMAN DRIVE
MOUNDSVILLE, WV 26041

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: **THE WILLIAMS COMPANIES, INC.**

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 PROPERTY**
– 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.):
NATURAL GAS LIQUIDS (NGL) FRACTIONATION PLANT

10. North American Industry Classification System **(NAICS)** code for the facility:
211112 – NATURAL GAS LIQUID EXTRACTION

11A. DAQ Plant ID No. (existing facilities):
051 – 00141

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (existing facilities):
R13-2892D - ISSUED 10/19/15

12A. Directions to the facility:
– 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 LAFAYETTE AVE IN MOUNDSVILLE:
A. TAKE LAFAYETTE AVE SOUTH, THEN WEST, ~2.8 MI;
B. SITE IS ON THE RIGHT AT THE FORMER OLIN FACILITY IN ROUND BOTTOM.

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

12.B. New site address (if applicable): **NA**	12C. Nearest city or town: **MOUNDSVILLE**	12D. County: **MARSHALL**
12.E. UTM Northing (KM): **4,418.11 km N Northing**	12F. UTM Easting (KM): **517.35 km Easting**	12G. UTM Zone: **17S**

13. Briefly describe the proposed change(s) at the facility:

THIS APPLICATION IS PREPARED AND SUBMITTED TO:

- **INCREASE THE PIPING COMPONENT COUNTS AND RESULTING EMISSIONS FOR PIPING AND PROCESS FUGITIVES** **FUG (1S)**

14A. Provide the date of anticipated installation or change: – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: **NA**	14B. Date of anticipated Start-Up if a permit is granted: **NA**

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). **NA**

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), 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).

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.**

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

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

- ☐ Bulk Liquid Transfer Operations
- ☒ Chemical Processes **(*)**
- ☐ Concrete Batch Plant
- ☐ Grey Iron and Steel Foundry
- ☐ General Emission Unit, specify:
- ☐ Haul Road Emissions
- ☐ Hot Mix Asphalt Plant
- ☐ Incinerator
- ☐ Indirect Heat Exchanger
- ☐ Quarry
- ☐ Solid Materials Sizing, Handling and Storage Facilities
- ☐ Storage Tanks

(*) LEAK SOURCE DATA SHEET ONLY

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

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

- ☐ Absorption Systems
- ☐ Adsorption Systems
- ☐ Afterburner
- ☐ Other Collectors, specify: **NA**
- ☐ Baghouse
- ☐ Condenser
- ☐ Electrostatic Precipitator
- ☐ Flare
- ☐ Mechanical Collector
- ☐ Wet Collecting System

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: **NA**

- ☐ Authority of Corporation or Other Business Entity
- ☐ Authority of Governmental Agency
- ☐ Authority of Partnership
- ☐ 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 (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: Paul V. Hunter *(Please use blue ink)* DATE: 06/09/2016 *(Please use blue ink)*

35B. Printed name of signee: **PAUL HUNTER**	35C. Title: **GENERAL MANAGER, OHIO RIVER SUPPLY HUB**	
35D. E-mail: **PAULV.HUNTER@WILLIAMS.COM**	36E. Phone: **(412) 787-5561**	36F. FAX: **(412) 787-6002**
36A. Printed name of contact person: **ERIKA BALDAUFF**	36B. Title: **ENVIRONMENTAL SPECIALIST**	
36C. E-mail: **ERIKA.BALDAUFF@WILLIAMS.COM**	36D. Phone: **(304) 843-4559**	36E. FAX: **(304) 843-3131**

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

Business Certificate

"6. **West Virginia Business Registration**. 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."

- **Certificate of Amendment to the Certificate of Authority**
  From: CAIMAN EASTERN MIDSTREAM, LLC
  To: WILLIAMS OHIO VALLEY MIDSTREAM LLC
  Date: May 15, 2012

- **Certificate of Authority of a Foreign Limited Liability Company**
  To: CAIMAN EASTERN MIDSTREAM, LLC
  Date: September 11, 2009

State of West Virginia

Certificate

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

the attached true and exact copy of the Articles of Amendment to the Articles of Organization of

CAIMAN EASTERN MIDSTREAM, LLC

are filed in my office, signed and verified, as required by the provisions of West Virginia Code §31B-2-204 and conform to law. Therefore, I issue this

CERTIFICATE OF AMENDMENT TO THE CERTIFICATE OF AUTHORITY

changing the name of the limited liability company to

WILLIAMS OHIO VALLEY MIDSTREAM LLC

Given under my hand and the Great Seal of the State of West Virginia on this day of May 15, 2012

Natalie E Tennant

Secretary of State

State of West Virginia

Certificate

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

CAIMAN EASTERN MIDSTREAM, LLC

Control Number: 99GIS

a limited liability company, organized under the laws of the State of Texas

has filed its "Application for Certificate of Authority" in my office according to the provisions of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a foreign limited liability company from its effective date of September 11, 2009, until a certificate of cancellation is filed with our office.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

to the limited liability company authorizing it to transact business in West Virginia

Given under my hand and the Great Seal of the State of West Virginia on this day of September 11, 2009

Natalie E. Tennant

Secretary of State

ATTACHMENT B

Location/Topographic Map

"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. Include a MAP as Attachment B."

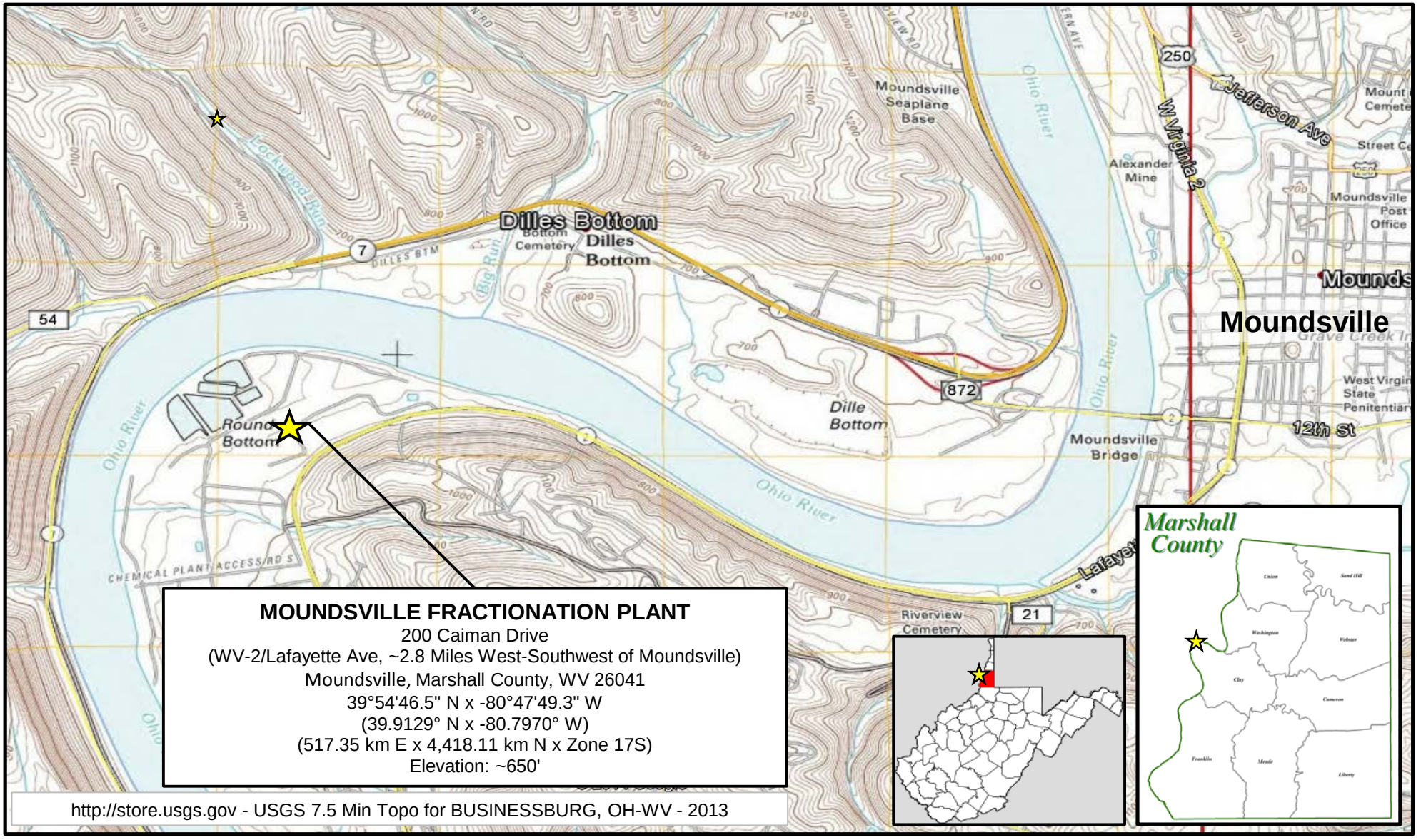
- **Address:**
  Williams Ohio Valley Midstream LLC
  Moundsville Natural Gas Liquids (NGL) Fractionation Plant
  200 Caiman Drive
  (WV-2/Lafayette Ave, ~2.8 Miles West-Southwest of Moundsville)
  Moundsville, Marshall County, WV 26041

- **Latitude and Longitude:**
  39°54'46.5" North x -80°47'49.3" West
  (39.9129° North x -80.7970° West)

- **UTM:**
  517.35 km E x 4,418.11 km N x Zone 17S

- **USGS:**
  7.5" Topographic – BUSINESSBURG, OH-WV - 2013

Attachment B - Location/Topographic Map



ATTACHMENT D

Regulatory Discussion

"18. **Regulatory Discussion**. List all Federal and State air pollution control regulations that you believe are applicable to the proposed process (if known). Discuss applicability and proposed demonstration(s) of compliance (if known). Provide this information as Attachment D."

- **Regulatory Discussion**
  - A. Applicability of New Source Review (NSR) Regulations
  - B. Applicability of Federal Regulations
  - C. Applicability of Source Aggregation
  - D. Applicability of State Regulations

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 Class II Administrative Permit Update

Attachment D
REGULATORY DISCUSSION

A. Applicability of New Source Review (NSR) Regulations

The following New Source Review (NSR) regulations are potentially applicable to natural gas liquid (NGL) fractionation plants. Applicability to the subject facility has been determined as follows:

1. Prevention of Significant Deterioration (PSD) [Not Applicable]

This rule does not apply. The facility is a "PSD Minor Source" for each regulated pollutant, as follows:

- NOx: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- CO: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- VOC: PSD Synthetic Minor Source with Controlled PTE < 250 tpy
- SO2: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy
- PM10/2.5: PSD Natural Minor Source with Pre-Controlled PTE < 250 tpy

(Note: Fugitive emissions from natural gas processing facilities are not included in the PSD Major Source Determination in accordance with 45CSR19.)

2. Non-Attainment New Source Review (NNSR) [Not Applicable]

This rule does not apply. The facility location is designated as either "Maintenance" or "Attainment/Unclassified" for all criteria pollutants except SO2. Plant-wide SO2 emissions are de minimis.

3. Major Source of Hazardous Air Pollutants (HAPs) [Not Applicable]

This rule does not apply. The facility is a "HAP Area Source", as follows:

- Each HAP: Controlled PTE < 10 tpy
- Total HAPs: Controlled PTE <25 tpy

4. Title V Operating Permit (TVOP) [Applicable]

This rule does apply. The facility is subject to Title V permit requirements because the potential to emit (PTE) carbon monoxide (CO) and volatile organic compounds (VOC) is ≥ 100 tpy (WVDEP requires fugitive emissions to be ***in***cluded at gas plants) as follows:

- NOx: TVOP Natural Minor Source with Pre-Controlled PTE < 100 tpy
- **CO: TVOP Major Source with Controlled PTE ≥ 100 tpy**
- **VOC: TVOP Major Source with Controlled PTE ≥ 100 tpy**
- SO2: TVOP Natural Minor Source with Pre-Controlled PTE < 100 tpy
- PM10/2.5: TVOP Natural Minor Source with Pre-Controlled PTE < 100 tpy
- Each HAP: TVOP Synthetic Minor Source with Controlled PTE < 10 tpy
- Total HAPs: TVOP Synthetic Minor Source with Controlled PTE < 25 tpy

This application for Moundsville Fractionation Plant is both an application for NSR permit and Title V Operating Permit revision.

B. Applicability of Federal Regulations

The following federal regulations are potentially applicable to natural gas liquid (NGL) fractionation plants. Applicability to the facility has been determined as follows:

1. NSPS A, General Provisions

40CFR§60.1-§60.19 [Applicable]

This rule does apply to all sources subject to an NSPS (unless a specific provision is excluded within the source NSPS). Requirements include notification, monitoring, and recordkeeping.

2. NSPS A, Control Devices - Flares

40CFR§60.18(b) [Applicable]

This rule does apply to the Process Flare (FL-02, 5S/5E). Requirements include:

- The pilot flame shall be present at all times when emissions may be vented to it.
- The presence of the pilot flame shall be monitored.
- The flare shall be operated with no visible emissions except for periods not to exceed a total of five minutes in any two consecutive hours.

3. NSPS Dc, Steam Generating Units

40CFR§60.40c-§60.48c [Applicable]

This rule does apply to the hot oil heaters (1-HTR and 2-HTR) because each has a maximum design heat input capacity ≥ 10 MMBtu/hr and ≤ 100 MMBtu/hr (§60.40c(a)).

Requirements include recording and maintaining records of the amount of each fuel combusted during each calendar month (§60.48c(g)(2)).

4. NSPS Kb, Volatile Organic Liquid Storage Vessels

40CFR§60.110b-§60.117b [Applicable]

This rule does apply to the two (2) 454,000 gal natural gasoline storage tanks w/ closed vent systems and a flare for emissions control. (§60.112b(a)(3))

This rule does not apply to any other storage vessel at the facility.

5. NSPS GG, Stationary Gas Turbines

40CFR§60.330-§60.335 [Not Applicable]

This rule does not apply because there is no stationary gas turbine at the facility (§60.330).

6. NSPS KKK, Leaks from Natural Gas Processing Plants

40CFR§60.630-§60.636 [Not Applicable]

This rule does not apply because plant construction commenced after 08/23/11 (§60.630).

7. NSPS LLL, Onshore Natural Gas Processing: SO2 Emissions

40CFR§60.640-§60.648 [Not Applicable]

This rule does not apply because there is no gas sweetening unit at the facility (§60.640(a)).

8. NSPS IIII, Compression Ignition Reciprocating Internal Combustion Engines

40CFR§60.4200-§60.4219 [Not Applicable]

This rule does not apply because there is no stationary compression ignition engine at the facility (§60.4200(a)).

9. NSPS JJJJ, Stationary Spark Ignition (SI) Internal Combustion Engines (ICE)

40CFR§60.4230-§60.4248 [Applicable]

This rule does apply to the Emergency Generator Engine (EmGen (6S)) permitted under General Permit G60-C069. Compliance is achieved by purchasing an EPA Certified Engine and operating the engine in accordance with the manufacturer's emission-related written instructions.

10. NSPS KKKK, Stationary Combustion Turbines

40CFR§60.4300-§60.4420 [Not Applicable]

This rule does not apply because there is no stationary combustion turbine at the facility (§60.4300).

11. NSPS OOOO, Crude Oil and Natural Gas Production

40CFR§60.5360-§60.5430 [Applicable]

This rule does apply because the facility is a natural gas processing plant (including fractionators) constructed, reconstructed, or modified after August 23, 2011. Requirements include monitoring of valves, flanges, connectors, pumps, pressure relief devices and open-ended valves or lines. The equipment leak standards are specified in §60.5400.

This rule does not apply to the two (2) 454,000 gal natural gasoline storage tanks because they are subject to and controlled in accordance with the requirements for storage vessels in 40 CFR Part 60, Subpart Kb.

12. NESHAP, Designated Source Standards

40CFR§61.01-§61.359 [Not Applicable]

This rule does not apply because the facility is not a designated facility (or source) subject to any requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAP).

13. NESHAP A, General Provisions (aka MACT)

40CFR§63.1-§63.16 [Not Applicable]

This rule does not apply because the facility is not subject to any requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) or associated Maximum Achievable Control Technology (MACT) requirements (§63.1(a)).

14. NESHAP HH, Oil and Natural Gas Production Facilities

40CFR§63.760-§63.779 [Not Applicable]

This rule does not apply because the facility is an area source of HAP emissions and does not have a triethylene glycol (TEG) dehydration unit. (§63.760(b)(2))

15. NESHAP HHH, Natural Gas Transmission and Storage Facilities

40CFR§63.1270-§63.1289 [Not Applicable]

This rule does not apply because the facility is not a natural gas transmission or storage facility transporting or storing natural gas prior to local distribution (§63.1270(a)).

16. NESHAP YYYY, Stationary Combustion Turbines

40CFR§63.6080-§63.6175 [Not Applicable]

This rule does not apply because there is no stationary gas turbine at the facility (§63.6080).

17. NESHAP ZZZZ, Stationary Reciprocating Internal Combustion Engines (RICE)

40CFR§63.6580-§63.6675 [Applicable]

This rule does apply to the Emergency Generator Engine (EmGen (6S)) permitted under General Permit G60-C069. However, because the engine is "new" or "reconstructed"; i.e., commenced construction or reconstruction on or after 06/12/06 (§63.6590(a)(2)(iii)), the only requirement is compliance with 40CFR§60.4230-§60.4248 (NSPS JJJJ) for Spark Ignition Internal Combustion Engines.

18. NESHAP DDDDD, Industrial, Commercial, and Institutional Boilers and Process Heaters – Major Sources

40CFR§63.7480 – §63.7575 [Not Applicable]

This rule does not apply to the Hot Oil Heaters (1-HTR (1E) and 2-HTR (2E)) because the facility is a not major source of HAP (§63.7485).

19. NESHAP JJJJJJ, Industrial, Commercial, and Institutional Boilers and Process Heaters – Area Sources

40CFR§63.11193 – §63.11237 [Not Applicable]

This rule does not apply because gas-fired boilers are not subject to the requirements of this subpart (§63.11195(e)). Specifically, "boiler" is defined as an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water.

20. Chemical Accident Prevention Provisions (RMP)

40CFR§68.1-§68.220 [Applicable]

This rule does apply because the facility stores more than a threshold quantity of regulated substance in a process (§68.115).

21. Compliance Assurance Monitoring (CAM)

40CFR§64.1-§64.10 [Not Applicable]

This rule does not apply to the two (2) 454,000 gal natural gasoline storage tanks w/ closed vent systems and a flare for emissions control. In accordance with §64.2(b)(1)(i), the requirements of CAM do not apply to emission limitations or standards proposed by the Administrator after November 15, 1990 pursuant to Section 111 or 112 of the Act. Although the two (2) 454,000 gallon natural gasoline storage tanks have pre-controlled emissions greater than 100 TPY and utilize a control device to achieve compliance, they are subject to NSPS Subpart Kb (an emission standard proposed pursuant to Section 111 of the Clean Air Act).

22. Mandatory Greenhouse Gases (GHG) Reporting

40CFR§98.1-§98.9 [Applicable]

This rule does apply. The facility is a supplier that is listed in Table A-5 (Subpart NN). For suppliers, the GHGs reported are the quantity that would be emitted from combustion or use of the products supplied (§98.1(a)).

C. Applicability of Source Aggregation

For New Source Review (NSR) and Title V permitting, the three-part regulatory criteria to determine whether emissions from two or more facilities should be aggregated and treated as a single source are whether the activities:

i) Belong to the same industrial grouping;
ii) Are located on one or more contiguous or adjacent properties and meets the common notion of a plant; and
iii) Are under control of the same person (or persons under common control).

i) Same Industrial Grouping

The subject facility will operate under SIC code 1321 (Natural Gas Liquids). The upstream NGL production facilities operate under the same first 2 digits of the SIC code. We do not have knowledge of any facility with a same SIC code within ½ mile of the facility. Other industrial facilities are located or will be located within ½ mile of the facility but they are unrelated to Williams or Oil and Gas and should not share the first 2 digits of our SIC code.

ii) Contiguous or Adjacent and "Plant"

The determination of whether two or more facilities are "contiguous" or "adjacent" is made on a case-by-case basis. This determination is both: a) proximity based and b) whether it meets the common sense notion of a plant. The functional interrelationship of the two or more facilities is not a relevant inquiry in determining whether the facilities are "contiguous" or "adjacent".

The OVM Moundsville Fractionation Plant processes NGLs from multiple upstream facilities located in northern West Virginia and Eastern Ohio. The nearest "company" owned supplier of NGL feedstock is the OVM Ft Beeler Gas Plant (WV) located over 3 miles from the facility, and the closest Williams owned facility is Conner Compressor Station (WV) located approximately 3.4 miles away.

iii) Common Control

Williams OVM operates under its parent company The Williams Companies, Inc. (Williams) and is the sole operator of the subject facility. The closest Williams-operated facility to the subject facility is the OVM Conner Compressor Station approximately 3.4 miles to the southeast.

Summary

The subject facility and the upstream facilites (or other operations) should not be aggregated and treated as a single source of emissions because they are not contiguous or adjacent, and do not meet the common sense definition of a plant.

D. Applicability of State Regulations

The following State regulations are potentially applicable to natural gas liquid (NGL) fractionation plants. Applicability to the facility has been determined as follows:

1. Particulate Air Pollution from Combustion of Fuel

45CSR2 [Applicable]

This rule does apply to the hot oil heaters (1-HTR (1E) and 2-HTR (2E)); limiting opacity to 10% based on a six minute block average.

Because the heat input is ≥ 10 MMBtu/hr, these units are also subject to Sections 4 (emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions.

2. Prevent and Control of Objectionable Odors

45CSR4 [Applicable]

This rule does apply and states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.

3. Control of Air Pollution from Combustion of Refuse

45CSR6 [Applicable]

This rule does apply to the flare (FL-02 (5S)) as 45CSR6 establishes emission standards for particulate matter and requirements for activities involving incineration of refuse. As the flare is required to be smokeless except for periods not to exceed a total of 5 minutes during any 2 consecutive hours, particulate matter emissions should be negligible and the flare will comply with the applicable emission standard. The facility will demonstrate compliance by maintaining records of the amount of waste gas consumed by the flare and the hours of operation. The facility will also monitor the flare pilot flame and record any malfunctions that may cause no flame to be present during facility operation.

4. **Prevent and Control Air Pollution – Sulfur Oxides**
45CSR10 [Applicable]

This rule does apply to the gas-fueled heaters w/ a Maximum Design Heat Input (MDHI) rating > 10 MMBtu/hr (1-HTR and 2-HTR) (§45-10-10.1). Requirements are specified in 45CSR10 Sections 3 (emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting).

5. **Permits for Construction, Modification, Relocation and Operation**
45CSR13 [Applicable]

This rule does apply. Williams OVM has received a 45CSR13 Permit for the subject facility.

6. **Permits for Construction and Modification of Major Stationary Sources (PSD)**
45CSR14 [Not Applicable]

The rule does not apply because the facility is not a major source subject to Prevention of Significant Deterioration (PSD) rules.

7. **Standards of Performance for New Stationary Sources (40 CFR Part 60)**
45CSR16 [Applicable]

This rule does apply to this source by reference of §40CFR60 Subparts Dc, Kb, JJJJ, and OOOO. The facility is subject to the recordkeeping, monitoring, and testing required of these Subparts.

8. **Permits for Construction and Modification (Nonattainment)**
45CSR19 [Not Applicable]

This rule does not apply. The facility location is designated as either “Maintenance” or “Attainment/Unclassified” for all criteria pollutants except SO2. Plant-wide SO2 emissions are de minimis.

9. **Regulation of Volatile Organic Compounds (VOC)**
45CSR21 [Not Applicable]

This rule does not apply because the facility is not located in Putnam County, Kanawha County, Cabell County, Wayne County, or Wood County

10. **Air Quality Management Fees Program**
45CSR22 [Applicable]

This rule does apply. It establishes a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources of air pollution.

11. Prevent and Control Emissions of Toxic Air Pollutants

45CSR27 [Not Applicable]

This rule does not apply because equipment is used in the production and distribution of petroleum products is exempt, provided that the product contains no more than 5% benzene by weight (§45-22-2.4).

12. Air Pollution Emissions Banking and Trading

45CSR28 [Not Applicable]

This rule does not apply. The facility does not choose to participate in the voluntarily statewide air pollutant emissions trading program.

13. Emission Statements for VOC and NOX

45CSR29 [Not Applicable]

This rule does not apply because facility is not located in Putnam, Kanawha, Cabell, Wayne, Wood, or Greenbrier Counties (§45-29-1).

14. Requirements for Operating Permits

45CSR30 [Applicable]

This rule does apply. The facility is subject to Title V permit requirements because the potential to emit (PTE) criteria, HAP, and GHG pollutants exceed the applicable major source thresholds as follows:

- NOx: TVOP Natural Minor Source with Pre-Controlled PTE < 100 tpy
- **CO: TVOP Major Source with Controlled PTE ≥ 100 tpy**
- **VOC: TVOP Major Source with Controlled PTE ≥ 100 tpy**
- SO2: TVOP Natural Minor Source with Pre-Controlled PTE < 100 tpy
- PM10/2.5: TVOP Natural Minor Source with Pre-Controlled PTE < 100 tpy
- Each HAP: TVOP Synthetic Minor Source with Controlled PTE < 10 tpy
- Total HAPs: TVOP Synthetic Minor Source with Controlled PTE < 25 tpy

This application for Moundsville Fractionation Plant is both an application for NSR permit and Title V Operating Permit revision.

(Note: WVDEP-DAQ requires fugitive emissions to be included in TVOP Major Source determinations at gas plants and fractionation plants.)

15. Emission Standards for Hazardous Air Pollutants (HAP)

45CSR34 [Not Applicable]

This rule does not apply to this source because the facility is not subject to NESHAP requirements in 40CFR61 of 40CFR63.

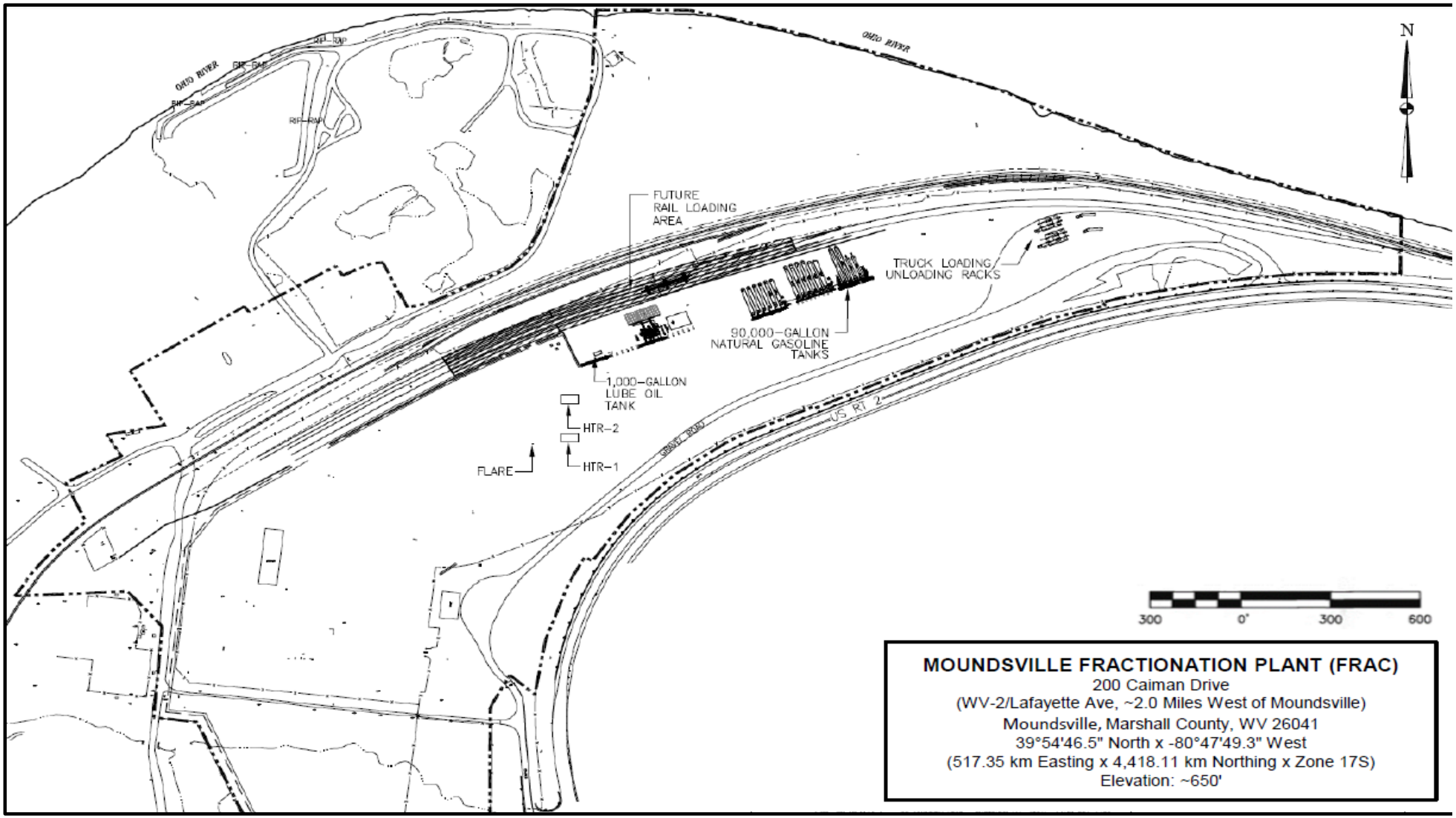
ATTACHMENT E

Plot Plan

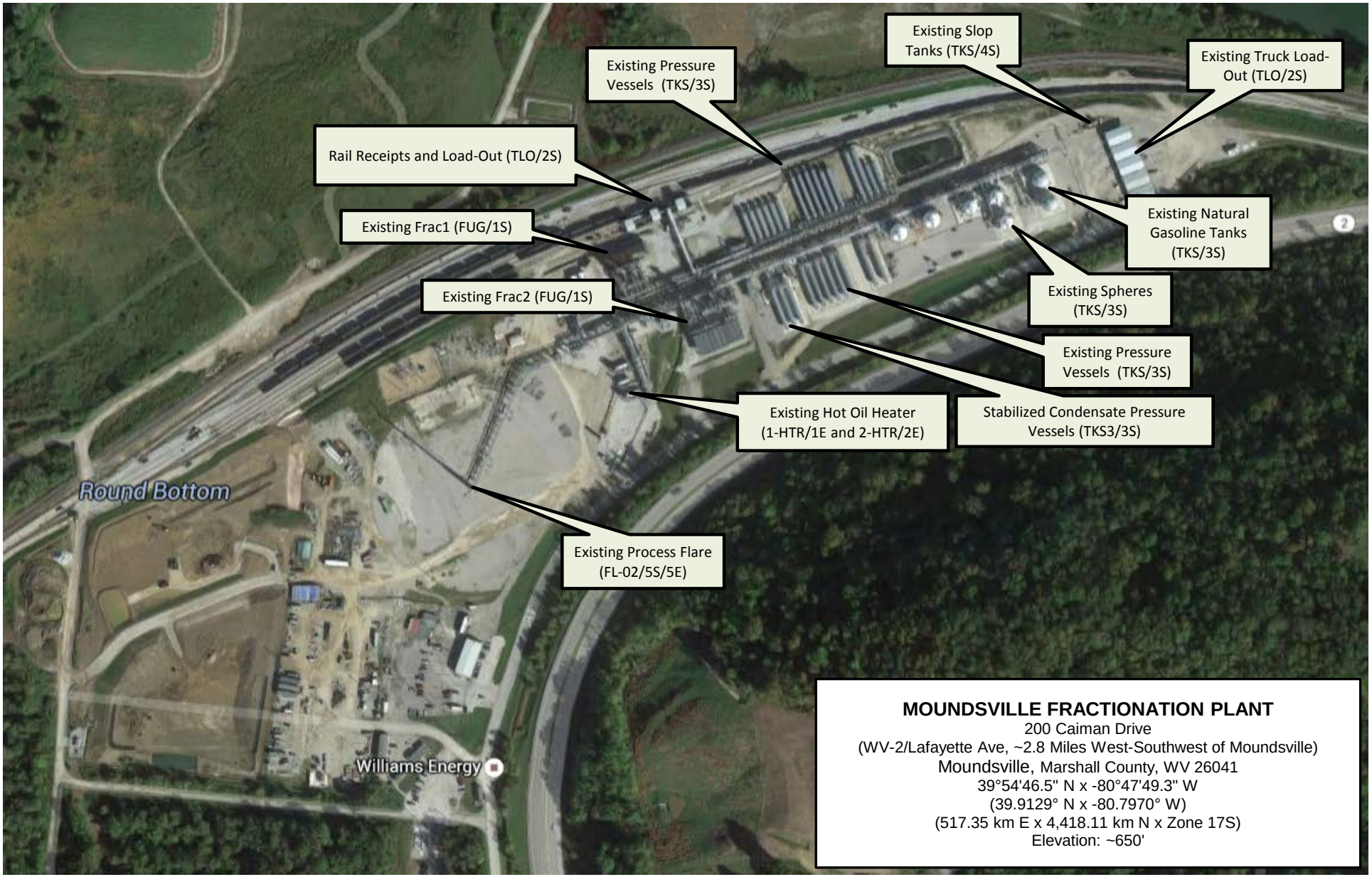
"21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E."

- **Plot Plan – Williams OVM Moundsville Fractionation Plant**
- **Aerial View – Williams OVM Moundsville Fractionation Plant**

Attachment E - Plot Plan



Attachment E' - Aerial View



MOUNDSVILLE FRACTIONATION PLANT
200 Caiman Drive
(WV-2/Lafayette Ave, ~2.8 Miles West-Southwest of Moundsville)
Moundsville, Marshall County, WV 26041
39°54'46.5" N x -80°47'49.3" W
(39.9129° N x -80.7970° W)
(517.35 km E x 4,418.11 km N x Zone 17S)
Elevation: ~650'

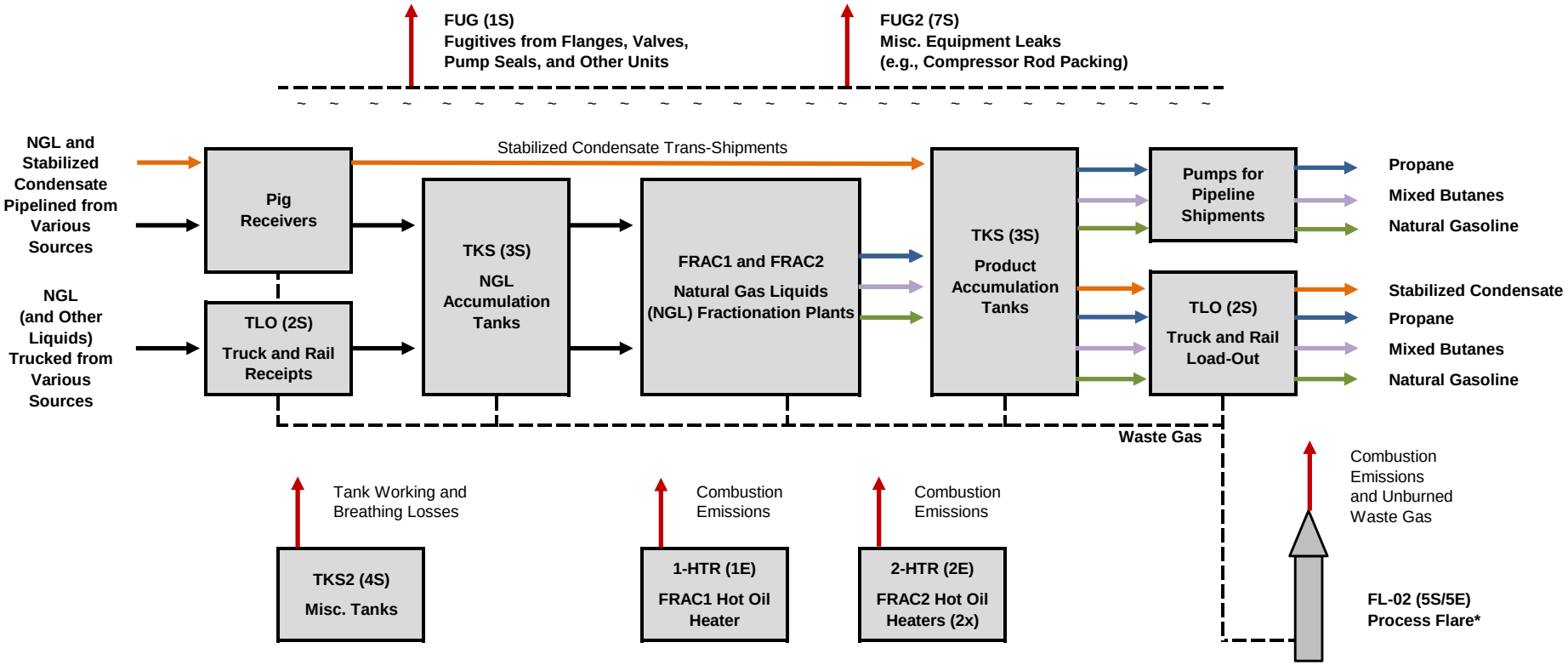
ATTACHMENT F

Detailed Process Flow Diagram

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

- **Process Flow Diagram (PFD) – Williams OVM Moundsville Fractionation Plant**

Attachment F – Process Flow Diagram (PFD)



Unit ID	DESCRIPTION
FUG (1S)	FRAC1 - Natural Gas Liquids Fractionation Plant 1 (Fugitives Only)
FUG (1S)	FRAC2 - Natural Gas Liquids Fractionation Plant 2 (Fugitives Only)
FUG (1S)	Truck Loading, Rail Loading, Condensate and Inlet Units (Fugitives Only)
TLO (2S)	Truck and Rail - Receipts and Load-Out
TKS (3S)	NGL/Stabilized Condensate/Product Accumulation Tanks
TKS2 (4S)	Misc. Tanks (Lube Oil, Slop Liquids, Diesel, Gasoline, MeOH, and Mercaptan)
1-HTR (1E)	FRAC1 Hot Oil Heater
2-HTR (2E)	FRAC2 Hot Oil Heaters (2x)
FL-02 (5S/5E)	Process Flare
FUG2 (7S)	Misc. Equipment Leaks (e.g., Compressor Rod Packing)

***Waste Gas Streams to the Process Flare:**

- Stabilized Condensate Hose Blowdown
- Product Loading/Hose Blowdown
- Natural Gasoline Tanks w/Butane Blanket
- NGL Pig Receiver Blowdowns
- Hot Oil Expansion Tanks (Fuel/Purge Gas)
- Rail Car Degassing (Natural Gasoline)
- Off-Spec Product Flaring (Inlet NGL)
- Continuous Flare Purge (Fuel/Purge Gas)
- Continuous Flare Pilot (Fuel/Purge Gas)
- Maintenance Blowdown

ATTACHMENT G

Process Description

"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). "

- **Process Description**
  A. Project Overview
  B. Fractionation Process FRAC ((FUG (1S) and FRAC2 (FUG (1S))
  C. Truck and Rail Load-Out/Receipts (TLO (2S))
  D. Pipeline Delivery Pumps (Electric Drivers)
  E. Storage Tanks (TKS (3S)
  F. Storage Tanks (TKS2 (4S))
  G. Hot Oil Heaters (1-HTR (1E) and 2-HTR (2E))
  H. Process Flare (FL-02 (5S/5E))
  I. Miscellaneous Equipment Leaks (FUG2 (7S))

Attachment G
PROCESS DESCRIPTION

Williams Ohio Valley Midstream LLC
MOUNDSVILLE FRACTIONATION PLANT
Application for 45CSR13 Class II Administrative Permit Update

A. Project Overview

Williams Ohio Valley Midstream LLC owns and operates the Moundsville Fractionation Plant located along WV Route 2, West of Moundsville, in Marshall County (See Attachment B – Site Location/Topographic Map).

This application has been prepared and submitted to request authorization to:

- Increase the component counts for Process and Piping Fugitives FUG (1S)

B. Fractionation Process (FRAC1 and FRAC2 (FUG (1S))

The facility fractionates raw Natural Gas Liquids (NGL) through a series of distillation processes (de-propanizers and de-butanizers) generating three products: propane, mixed butanes, and heavier organic liquids identified as natural gasoline.

The fractionation process is totally enclosed; the emissions are only from piping and equipment fugitives. These emissions are controlled by implementation of a site-wide, leak detection and repair (LDAR) program.

C. Truck and Rail Load-Out/Receipts (TLO (2S))

All Truck and Rail Load-Outs (including stabilized condensate) are accomplished under pressure in totally enclosed systems, resulting in no emissions to the atmosphere other than Process and Piping Fugitives (FUG (1S)), Miscellaneous Equipment Fugitives (FUG2 (7S), and Loading Hose/Cargo Tank Blowdown routed to the Process Flare (FL-02 (5S/5E)).

D. Pipeline Delivery Pumps

The facility has electrically driven pumps for shipment of product to pipelines. Operation of these pumps does not result in emissions at the facility other than fugitives accounted for at FUG (1S).

E. Storage Tanks (TKS (3S))

Incoming NGL and stabilized condensate is accumulated in horizontal pressure vessels. The three final products are accumulated in a series of pressure vessels (horizontal or spherical). The pressure vessel operations are totally enclosed and do not generate emissions during normal operations.

There are also two (2) 454,000 gallon capacity, vertical, dome roof tanks for natural gasoline accumulation. These tanks are subject to NSPS Subpart Kb regulations with emissions controlled by the Process Flare (FL-02 (5S)).

F. Storage Tanks (TKS2 (4S))

There are several miscellaneous small tanks for slop liquids, lube oil, diesel fuel, motor gasoline, and Mercaptan (odorant). All of these tanks are exempt from regulation with de-minimis (i.e., insignificant) emissions.

G. Hot Oil Heaters (1-HTR (1E) and 2-HTR (2E))

Natural gas-fueled hot oil heaters are used at the facility. The hot oil is used as a heat transfer medium in the fractionation plants.

H. Process Flare (FL-02 (5S/5E))

The process flare (FL-02 (5S/5E)) is used to combust waste gases (including: fuel/purge gas, NGL, condensate, propane, butane, and natural gasoline) released from numerous sources, including:

- Stabilized Condensate Hose Blowdown
- Product Loading/Hose Blowdown
- Natural Gasoline Tanks w/Butane Blanket
- NGL Pig Receiver Blowdowns (250 Events/year)
- Hot Oil Expansion Tanks (Fuel/Purge Gas)
- Rail Car Degassing (Propane/Butane)
- Off-Spec Product Flaring (Inlet NGL)
- Continuous Flare Purge (Fuel/Purge Gas)
- Continuous Flare Pilot (Fuel/Purge Gas)
- Maintenance Blowdown

I. Miscellaneous Equipment Leaks (FUG2 (7S))

Fugitive leaks from miscellaneous equipment is a broad category covering leaks from sealed surfaces, such as packing and gasket, resulting from the wear of mechanical joints, seals, and rotating surfaces over time. Representative emissions include a 20 bhp electric driven compressor used to off-load residual propane gas from rail cars.

ATTACHMENT H

Material Safety Data Sheets (MSDS)
(And Representative Gas Analysis)

"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."

- **INLET NATURAL GAS LIQUIDS (NGL) ANALYSIS**
- **INLET NATURAL GAS LIQUIDS (NGL) SUMMARY**
- **PROPANE/BUTANE SUMMARY**
- **NATURAL GASOLINE ANALYSIS**
- **NATURAL GASOLINE SUMMARY**
- **NATURAL GASOLINE TANK (BUTANE BLANKET) SUMMARY**
- **STABILIZED CONDENSATE ANALYSIS**
- **STABILIZED CONDENSATE SUMMARY**
- **FUEL/PURGE GAS SUMMARY**
- **WASTE GAS (AKA FLARE GAS) SUMMARY**
- **WASTE GAS – BTU ANALYSIS**
- **MATERIAL SAFETY DATA SHEETS (MSDS):**
  - Natural Gas Liquids (NGL)
  - Propane
  - Butane
  - Natural Gasoline
  - Condensate

INLET NATURAL GAS LIQUID (NGL) ANALYSIS

Williams Quality Control Facility
Extended Analysis by GPA 2186

Sample Information

	Sample Information
Sample Name	JP3 Y-Grade #7
Technician	Lab Technician
Method Name	GPA 2186
Injection Date	2014-06-30 13:19:03
Report Date	2014-06-30 13:58:32

Component Results

Component Name	Ret. Time	Peak Area	Norm Mole%	Norm Weight%	Norm Volume%
Methane	6.22	216.9	0.0763	0.0206	0.0400
Ethane	6.36	13298.4	2.3581	1.1956	1.9524
Propane	6.66	387756.8	46.0594	34.2452	39.2899
iso-Butane	7.17	76769.6	6.5815	6.4498	6.6652
n-Butane	7.55	193195.1	16.3411	16.0142	15.9495
iso-Pentane	8.85	74758.2	4.9585	6.0320	5.6191
n-Pentane	9.43	99331.1	6.4979	7.9047	7.2857
Hexanes Plus	0.00	0.0	17.1272	28.1379	23.1982
Total:			100.0000	100.0000	100.0000

C6+ Extended Fraction Compnent Summary

Pk #	Name	RT	Peak Area	Raw Mol%	Norm Mol%	C6+ Mol%	C6+ Wt%	C6+ Vol%
14	2-2-Dimethylbutane	10.42	2919.9	0.1330	0.1611	0.9405	0.8318	0.8970
15	Cyclopentane/2-3-Dimethylbutane	11.31	5838.0	0.3070	0.3718	2.1710	1.7414	1.7389
16	2-Methylpentane	11.40	34231.1	1.5570	1.8858	11.0105	9.7381	10.4340
17	3-Methylpentane	11.87	21188.4	0.9690	1.1736	6.8524	6.0605	6.3863
18	n-Hexane	12.41	58359.6	2.7380	3.3162	19.3621	17.1242	18.1929
19	2-2-Dimethylpentane	13.31	1437.3	0.0270	0.0327	0.1909	0.1963	0.2041
20	Methylcyclopentane	13.51	7662.3	0.3640	0.4409	2.5741	2.2234	2.0802
21	2-4-Dimethylpentane	13.83	364.9	0.1360	0.1647	0.9617	0.9890	1.0294
22	Benzene	14.48	862.3	0.0410	0.0497	0.2899	0.2324	0.1852
23	3-3-Dimethylpentane	14.61	892.9	0.0340	0.0412	0.2404	0.2472	0.2500
24	Cyclohexane	14.90	7477.3	0.3550	0.4300	2.5104	2.1683	1.9512
25	2-Methylhexane	15.02	17995.9	0.7410	0.8975	5.2401	5.3889	5.5603
26	2-3-Dimethylpentane	15.18	4114.2	0.1650	0.1998	1.1668	1.1999	1.2095
27	3-Methylhexane	15.42	19777.3	0.8020	0.9714	5.6715	5.8326	5.9449
28	3-Ethylpentane	15.89	2951.4	0.1110	0.1344	0.7850	0.8073	0.8097
29	2-2-4-Trimethylpentane	16.12	1857.6	0.0620	0.0751	0.4384	0.5140	0.5204
30	n-Heptane	16.50	36929.3	1.4470	1.7526	10.2327	10.5231	10.7872
31	Methylcyclohexane	17.80	20950.4	0.7910	0.9580	5.5937	5.6368	5.1352
32	2-5-Dimethylhexane	18.04	1854.8	0.0660	0.0799	0.4667	0.5471	0.5526
33	2-4-Dimethylhexane/Ethylcyclopentane	18.17	2801.2	0.1140	0.1381	0.8062	0.9452	0.9456
34	Toluene	19.38	1860.4	0.0690	0.0836	0.4879	0.4614	0.3731
35	2-methylheptane	19.56	11626.0	0.4020	0.4869	2.8428	3.3328	3.3460
36	4-methylheptane	19.64	5072.4	0.1750	0.2120	1.2375	1.4508	1.4428
37	3-methylheptane	19.82	962.0	0.0250	0.0303	0.1768	0.2073	0.2058
38	cis-1-3-Dimethylcyclohexane	20.27	5443.3	0.1850	0.2241	1.3083	1.5067	1.3789
39	n-Octane	20.95	20344.8	0.7110	0.8611	5.0279	5.8944	5.8856
41	trans-1-3-Dimethylcyclohexane	21.37	1679.9	0.0590	0.0715	0.4172	0.4805	0.4293
42	cis-1-2-Dimethylcyclohexane	22.38	3076.7	0.1090	0.1320	0.7708	0.8877	0.7817
43	Ethylcyclohexane	22.54	332.5	0.0120	0.0145	0.0849	0.0978	0.0870
44	Ethylbenzene	23.06	546.1	0.0210	0.0254	0.1485	0.1618	0.1309
45	m-Xylene/p-Xylene	23.37	12799.4	0.4600	0.5571	3.2530	3.5445	2.8766
46	o-Xylene	24.17	866.9	0.0320	0.0388	0.2263	0.2466	0.1966
47	n-Nonane	24.51	11871.7	0.3780	0.4578	2.6731	3.5186	3.4370
48	Isopropylbenzene	25.27	202.7	0.0060	0.0073	0.0424	0.0523	0.0426
49	Cyclooctane	25.53	214.8	0.0080	0.0097	0.0566	0.0652	0.0547
50	n-Propylcyclohexane	25.69	1555.9	0.0500	0.0606	0.3536	0.4581	0.4049
51	n-Propylbenzene	26.06	437.9	0.0140	0.0170	0.0990	0.1221	0.0994
52	1-3-5-Trimethylbenzene	26.44	3091.2	0.0990	0.1199	0.7001	0.8636	0.7002
54	tert-Butylcyclohexane	27.18	1593.4	0.0480	0.0581	0.3394	0.4886	0.4216
55	n-Decane	27.36	7229.4	0.1650	0.1998	1.1668	1.7038	1.6364
57	sec-Butylbenzene	27.67	1954.9	0.0570	0.0690	0.4031	0.5553	0.4521
59	n-Butylcyclohexane	28.52	1383.8	0.0400	0.0484	0.2829	0.4073	0.3574
60	n-Butylbenzene	28.92	1944.4	0.0560	0.0678	0.3960	0.5455	0.4449

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment H

INLET NATURAL GAS LIQUID (NGL) SUMMARY

Representative NGL Composition (Moundsville Inlet Y-Grade) http://www.chemindustry.com/apps/chemicals

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Nitrogen	7727-37-9	N2	28.013	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	---	---	---	---	---
Methane*	75-82-8	CH4	16.042	**0.0763**	0.000763	0.0122	0.0205	32.26
Ethane*	74-84-0	C2H6	30.069	**2.3581**	0.023581	0.7091	1.1880	1,868
Propane**	74-98-6	C3H8	44.096	**46.0594**	0.460594	20.3102	34.0279	53,521
i-Butane**	75-28-5	C4H10	58.122	**6.5815**	0.065815	3.8253	6.4090	10,080
n-Butane**	106-97-8	C4H10	58.122	**16.3411**	0.163411	9.4978	15.9127	25,028
Cyclopentane**	287-92-3	C5H10	70.100	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	**4.9585**	0.049585	3.5775	5.9938	9,427
n-Pentane**	109-66-0	C5H12	72.149	**6.4979**	0.064979	4.6882	7.8546	12,354
neo-Pentane	463-82-1	C5H12	72.149	---	---	---	---	---
Cyclohexane**	110-82-7	C6H12	84.159	**0.8709**	0.008709	0.7329	1.2280	1,931
Other Hexanes**	varies	C6H14	86.175	**3.5923**	0.035923	3.0957	5.1865	8,158
Methylcyclohexane**	varies	C7H14	98.186	**0.9580**	0.009580	0.9406	1.5759	2,479
Heptanes**	varies	C7H16	100.202	**4.1943**	0.041943	4.2028	7.0414	11,075
C8+ Heavies**	varies	C8+	130.000 est	**3.3658**	0.033658	4.3755	7.3308	11,530
Benzene***	71-43-2	C6H6	78.112	**0.0497**	0.000497	0.0388	0.0650	102
Ethylbenzene***	100-41-4	C8H10	106.165	**0.0254**	0.000254	0.0270	0.0452	71
n-Hexane***	110-54-3	C6H14	86.175	**3.3162**	0.033162	2.8577	4.7879	7,531
Toluene***	108-88-3	C7H8	92.138	**0.0836**	0.000836	0.0770	0.1291	203
2,2,4-TMP***	540-84-1	C8H18	114.229	**0.0751**	0.000751	0.0858	0.1437	226
Xylenes***	1330-20-7	C8H10	106.165	**0.5959**	0.005959	0.6326	1.0599	1,667
			Totals:	**100.00**	**1.0000**	**59.6868**	**100.00**	**157,285**
			THC:	**100.00**	**1.0000**	**59.6868**	**100.00**	**157,285**
			Total VOC:	**97.57**	**0.9757**	**58.9655**	**98.79**	**155,384**
			Total HAP:	**4.146**	**0.04146**	**3.7190**	**6.23**	**9,800**

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 ^{o}F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (150%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	---	---	---	--	--	---
Methane	75-82-8	CH4	0.076	0.021	32.26	0.12	0.03	50
Ethane	74-84-0	C2H6	2.36	1.19	1,868	3.55	1.79	2,810
VOC	Various	C3+	97.57	98.79	155,384	100.00	100.00	157,290
Benzene	71-43-2	C6H6	0.05	0.07	102	0.08	0.10	160
Ethylbenzene	110-54-3	C6H14	0.03	4.5E-02	71	0.04	0.07	110
n-Hexane	100-41-4	C8H10	3.32	4.79	7,531	4.98	7.18	11,300
Toluene	108-88-3	C7H8	0.08	0.13	203	0.13	0.20	310
2,2,4-TMP	540-84-1	C8H18	0.08	0.14	226	0.11	0.22	340
Xylenes	1330-20-7	C8H10	0.60	1.06	1,667	0.90	1.60	2,510
Total HAP:	Various	C6 thru C8	4.15	6.23	9,800	6.23	9.37	14,730

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment H

PROPANE/BUTANE SUMMARY

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Nitrogen	7727-37-9	N2	28.013	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	---	---	---	---	---
Methane*	75-82-8	CH4	16.042	---	---	---	---	---
Ethane*	74-84-0	C2H6	30.069	---	---	---	---	---
Propane**	74-98-6	C3H8	44.096	**50.0000**	0.500000	22.0478	43.1389	58,100
i-Butane**	75-28-5	C4H10	58.122	---	---	---	---	---
n-Butane**	106-97-8	C4H10	58.122	**50.0000**	0.500000	29.0611	56.8611	76,581
Cyclopentane**	287-92-3	C5H10	70.100	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	---	---	---	---	---
n-Pentane**	109-66-0	C5H12	72.149	---	---	---	---	---
neo-Pentane	463-82-1	C5H12	72.149	---	---	---	---	---
Cyclohexane**	110-82-7	C6H12	84.159	---	---	---	---	---
Other Hexanes**	varies	C6H14	86.175	---	---	---	---	---
Methylcyclohexane**	varies	C7H14	98.186	---	---	---	---	---
Heptanes**	varies	C7H16	100.202	---	---	---	---	---
C8+ Heavies**	varies	C8+	130.000 est	---	---	---	---	---
Benzene***	71-43-2	C6H6	78.112	---	---	---	---	---
Ethylbenzene***	100-41-4	C8H10	106.165	---	---	---	---	---
n-Hexane***	110-54-3	C6H14	86.175	---	---	---	---	---
Toluene***	108-88-3	C7H8	92.138	---	---	---	---	---
2,2,4-TMP***	540-84-1	C8H18	114.229	---	---	---	---	---
Xylenes***	1330-20-7	C8H10	106.165	---	---	---	---	---
			Totals:	**100.00**	**1.0000**	**51.1089**	**100.00**	**134,681**
			THC:	**100.00**	**1.0000**	**51.1089**	**100.00**	**134,681**
			Total VOC:	**100.00**	**1.0000**	**51.1089**	**100.00**	**134,681**
			Total HAP:	**0.000**	**0.00000**	**0.0000**	**0.00**	**0**

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 ^{o}F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (150%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	---	---	---	--	--	---
Methane	75-82-8	CH4	---	---	---	--	--	---
Ethane	74-84-0	C2H6	---	---	---	--	--	---
VOC	Various	C3+	100.00	100.00	134,681	100.01	100.00	134,700
Benzene	71-43-2	C6H6	---	---	---	--	--	---
Ethylbenzene	100-41-4	C8H10	---	---	---	--	--	---
n-Hexane	110-54-3	C6H14	---	---	---	--	--	---
Toluene	108-88-3	C7H8	---	---	---	--	--	---
2,2,4-TMP	540-84-1	C8H18	---	---	---	--	--	---
Xylenes	1330-20-7	C8H10	---	---	---	--	--	---
Total HAP:	Various	C6 thru C8	---	---	---	---	---	---

NATURAL GASOLINE ANALYSIS

Williams Quality Control Facility
Extended Analysis by GPA 2186

Sample Information

	Sample Information
Sample Name	Gas V-2951 020915 1245 - Ext
Corrosion	No Sample Submitted for Analysis
Vapor Pressure (calc), psia	10.99
Vapor Pressure (meas), psia	8.57
Saybolt Color	+22
Doctor's Test	Positive
Water Content, ppmw	21
Distillation, deg F	
10%	125.1
90%	513.9
FBP	619.3
Technician	Lab Technician
Method Name	Extended-Olefin Method - Diablo
Injection Date	2015-02-09 13:40:13
Report Date	2015-02-09 14:40:17

Component Results

Component Name	Ret. Time	Peak Area	Norm Mole%	Norm Weight%	Norm Volume%
Propane	6.45	5791.8	0.0192	0.0099	0.0131
iso-Butane	6.94	28550.4	0.0687	0.0469	0.0560
n-Butane	7.34	1277981.9	2.9806	2.0340	2.3418
iso-Pentane	8.67	9733985.4	18.8292	15.9503	17.1760
n-Pentane	9.30	12960134.9	24.6865	20.9121	22.2811
cis-2-butene/neo-Pentane	36.23	302673.2	0.3051	0.2010	0.2150
Hexanes Plus	0.00	0.0	53.1107	60.8458	57.9170
Total:			100.0000	100.0000	100.0000

C6+ Extended Fraction Compnent Summary

Pk #	Name	RT	Peak Area	Raw Mol%	Norm Mol%	C6+ Mol%	C6+ Wt%	C6+ Vol%
15	2-2-Dimethylbutane	10.41	351216.4	0.3360	0.5367	1.0105	0.8924	0.9636
16	Cyclopentane/2-3-Dimethylbutane	11.43	717459.1	0.7540	1.2044	2.2677	1.8164	1.8160
17	2-Methylpentane	11.55	4062640.7	3.9170	6.2567	11.7805	10.4041	11.1617
18	3-Methylpentane	12.09	2497522.5	2.3930	3.8224	7.1970	6.3561	6.7062
19	n-Hexane	46.68	12808087.5	5.8410	9.3299	17.5669	15.5142	16.5031
20	2-2-Dimethylpentane	13.73	154845.4	0.0600	0.0958	0.1805	0.1854	0.1929
21	Methylcyclopentane	13.94	901455.4	0.9080	1.4504	2.7308	2.3553	2.2064
22	2-4-Dimethylpentane	14.28	40687.6	0.2920	0.4664	0.8782	0.9018	0.9399
23	Benzene	14.96	105839.7	0.1070	0.1709	0.3218	0.2576	0.2056
24	3-3-Dimethylpentane	15.11	97715.0	0.0750	0.1198	0.2256	0.2317	0.2346
25	Cyclohexane	15.39	905612.4	0.9280	1.4823	2.7910	2.4073	2.1689
26	2-Methylhexane	15.57	2032413.5	1.6370	2.6148	4.9233	5.0558	5.2232
27	2-3-Dimethylpentane	15.72	495661.0	0.4170	0.6661	1.2541	1.2879	1.2998
28	3-Methylhexane	15.99	2301624.3	1.8080	2.8879	5.4376	5.5840	5.6986
29	3-Ethylpentane	16.48	193263.3	0.1730	0.2763	0.5203	0.5343	0.5366
30	2-2-4-Trimethylpentane	16.69	217642.7	0.1570	0.2508	0.4722	0.5528	0.5605
31	n-Heptane	17.14	4395024.5	3.7250	5.9500	11.2030	11.5043	11.8079
32	Methylcyclohexane	18.49	2323756.8	1.8950	3.0269	5.6992	5.7349	5.2311
33	2-5-Dimethylhexane	18.83	195400.7	0.1490	0.2380	0.4481	0.5246	0.5305
34	2-4-Dimethylhexane/Ethylcyclopentane	18.98	435530.3	0.3730	0.5958	1.1218	1.3133	1.3155
35	Toluene	20.42	406121.4	0.3320	0.5303	0.9985	0.9429	0.7635
36	2-methylheptane	20.73	35575.3	0.0250	0.0399	0.0752	0.0880	0.0885
37	4-methylheptane	20.96	575733.6	0.4200	0.6709	1.2632	1.4788	1.4725
38	3-methylheptane	21.17	70902.6	0.0380	0.0607	0.1143	0.1338	0.1330
39	cis-1-3-Dimethylcyclohexane	21.77	576780.9	0.4250	0.6789	1.2782	1.4699	1.3470
40	n-Octane	22.81	2507970.5	1.8340	2.9295	5.5158	6.4571	6.4555
41	trans-1-2-Dimethylcyclohexane	22.94	212164.9	0.1290	0.2061	0.3880	0.4462	0.4040
42	trans-1-3-Dimethylcyclohexane	23.32	196274.6	0.1460	0.2332	0.4391	0.5050	0.4518
43	cis-1-2-Dimethylcyclohexane	24.68	84308.6	0.0630	0.1006	0.1895	0.2179	0.1921
44	Ethylcyclohexane	24.87	639461.6	0.4680	0.7475	1.4075	1.6186	1.4422
45	Ethylbenzene	25.76	33574.5	0.0270	0.0431	0.0812	0.0883	0.0716
46	m-Xylene/p-Xylene	26.20	678225.7	0.5030	0.8035	1.5128	1.6460	1.3375
47	o-Xylene	27.42	87970.9	0.0670	0.1070	0.2015	0.2192	0.1750
48	n-Nonane	28.08	1585723.8	1.0410	1.6628	3.1308	4.1151	4.0248
49	Isopropylbenzene	29.00	181654.6	0.1230	0.1965	0.3699	0.4556	0.3712
50	Cyclooctane	29.33	236957.0	0.1800	0.2875	0.5414	0.6226	0.5230
51	n-Propylcyclohexane	29.76	401162.0	0.2690	0.4297	0.8090	1.0467	0.9262
52	n-Propylbenzene	30.35	84766.8	0.0580	0.0926	0.1744	0.2148	0.1750
53	1-3-5-Trimethylbenzene	30.89	151966.3	0.1020	0.1629	0.3068	0.3779	0.3068
54	1-2-4-Trimethylbenzene/tert-Butylbenz	32.15	203240.8	0.1320	0.2108	0.3970	0.4890	0.3922
55	tert-Butylcyclohexane	32.40	38061.6	0.0230	0.0367	0.0692	0.0995	0.0859
56	n-Decane	32.55	1064188.2	0.6280	1.0031	1.8887	2.7540	2.6483
57	iso-Butylbenzene	32.78	30695.0	0.0190	0.0303	0.0571	0.0785	0.0647
58	sec-Butylbenzene	32.87	60491.6	0.0370	0.0591	0.1113	0.1531	0.1248
59	1-2-3-Trimethylbenzene	33.41	144574.6	0.0990	0.1581	0.2977	0.3667	0.2881
60	n-Butylcyclohexane	34.14	145805.2	0.0880	0.1406	0.2647	0.3805	0.3343
61	n-Butylbenzene	34.56	47898.5	0.0290	0.0463	0.0872	0.1199	0.0979

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MOUNDSVILLE FRACTIONATION PLANT

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NATURAL GASOLINE SUMMARY

Moundsville Analysis - Sampled 09/15/2014

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Nitrogen	7727-37-9	N2	28.013	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	---	---	---	---	---
Methane*	75-82-8	CH4	16.042	---	---	---	---	---
Ethane*	74-84-0	C2H6	30.069	---	---	---	---	---
Propane**	74-98-6	C3H8	44.096	**0.0192**	0.000192	0.0085	0.0098	22
i-Butane**	75-28-5	C4H10	58.122	**0.0687**	0.000687	0.0399	0.0462	105
n-Butane**	106-97-8	C4H10	58.122	**2.9806**	0.029806	1.7324	2.0048	4,565
Cyclopentane**	287-92-3	C5H10	70.100	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	**18.8292**	0.188292	13.5851	15.7214	35,799
n-Pentane**	109-66-0	C5H12	72.149	**24.6865**	0.246865	17.8110	20.6119	46,935
neo-Pentane	463-82-1	C5H12	72.149	**0.3051**	0.003051	0.2201	0.2547	580
Cyclohexane**	110-82-7	C6H12	84.159	**2.9327**	0.029327	2.4682	2.8563	6,504
Other Hexanes**	varies	C6H14	86.175	**11.8202**	0.118202	10.1861	11.7879	26,842
Methylcyclohexane**	varies	C7H14	98.186	**3.0269**	0.030269	2.9720	3.4394	7,832
Heptanes**	varies	C7H16	100.202	**13.0771**	0.130771	13.1035	15.1641	34,530
C8+ Heavies**	varies	C8+	130.000 est	**11.0181**	0.110181	14.3236	16.5760	37,745
Benzene***	71-43-2	C6H6	78.112	**0.1709**	0.001709	0.1335	0.1545	352
Ethylbenzene***	100-41-4	C8H10	106.165	**0.0431**	0.000431	0.0458	0.0530	121
n-Hexane***	110-54-3	C6H14	86.175	**9.3299**	0.093299	8.0401	9.3044	21,187
Toluene***	108-88-3	C7H8	92.138	**0.5303**	0.005303	0.4886	0.5654	1,288
2,2,4-TMP***	540-84-1	C8H18	114.229	**0.2508**	0.002508	0.2865	0.3315	755
Xylenes***	1330-20-7	C8H10	106.165	**0.9105**	0.009105	0.9666	1.1186	2,547
			Totals:	**100.00**	**1.0000**	**86.4115**	**100.00**	**227,709**
			THC:	**100.00**	**1.0000**	**86.4115**	**100.00**	**227,709**
			Total VOC:	**100.00**	**1.0000**	**86.4115**	**100.00**	**227,709**
			Total HAP:	**11.236**	**0.11236**	**9.9611**	**11.53**	**26,249**

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 ^{o}F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (150%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	---	---	---	--	--	---
Methane	75-82-8	CH4	---	---	---	--	--	---
Ethane	74-84-0	C2H6	---	---	---	--	--	---
VOC	Various	C3+	100.00	100.00	227,709	100.00	100.00	227,710
Benzene	71-43-2	C6H6	0.17	0.15	352	0.26	0.23	530
Ethylbenzene	100-41-4	C8H10	0.04	0.05	121	0.07	0.08	190
n-Hexane	110-54-3	C6H14	9.33	9.30	21,187	14.00	13.96	31,790
Toluene	108-88-3	C7H8	0.53	0.57	1,288	0.80	0.85	1,940
2,2,4-TMP	540-84-1	C8H18	0.25	0.33	755	0.38	0.50	1,140
Xylenes	1330-20-7	C8H10	0.91	1.12	2,547	1.37	1.68	3,830
Total HAP:	Various	C6 thru C8	11.24	11.53	26,249	16.87	17.31	39,420

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment H

NATURAL GASOLINE TANKS SUMMARY

Composition of 10% Natural Gasoline Vapors and 90% Butane Vapor

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Nitrogen	7727-37-9	N2	28.013	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	---	---	---	---	---
Methane*	75-82-8	CH4	16.042	---	---	---	---	---
Ethane*	74-84-0	C2H6	30.069	---	---	---	---	---
Propane**	74-98-6	C3H8	44.096	**0.0019**	0.000019	0.0008	0.0014	2
i-Butane**	75-28-5	C4H10	58.122	**0.0069**	0.000069	0.0040	0.0066	11
n-Butane**	106-97-8	C4H10	58.122	**90.2981**	0.902981	52.4832	86.1071	138,302
Cyclopentane**	287-92-3	C5H10	70.100	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	**1.8829**	0.018829	1.3585	2.2288	3,580
n-Pentane**	109-66-0	C5H12	72.149	**2.4687**	0.024687	1.7811	2.9222	4,694
neo-Pentane	463-82-1	C5H12	72.149	**0.0305**	0.000305	0.0220	0.0361	58
Cyclohexane**	110-82-7	C6H12	84.159	**0.2933**	0.002933	0.2468	0.4049	650
Other Hexanes**	varies	C6H14	86.175	**1.1820**	0.011820	1.0186	1.6712	2,684
Methylcyclohexane**	varies	C7H14	98.186	**0.3027**	0.003027	0.2972	0.4876	783
Heptanes**	varies	C7H16	100.202	**1.3077**	0.013077	1.3104	2.1498	3,453
C8+ Heavies**	varies	C8+	130.000 est	**1.1018**	0.011018	1.4324	2.3500	3,774
Benzene***	71-43-2	C6H6	78.112	**0.0171**	0.000171	0.0133	0.0219	35
Ethylbenzene***	100-41-4	C8H10	106.165	**0.0043**	0.000043	0.0046	0.0075	12
n-Hexane***	110-54-3	C6H14	86.175	**0.9330**	0.009330	0.8040	1.3191	2,119
Toluene***	108-88-3	C7H8	92.138	**0.0530**	0.000530	0.0489	0.0802	129
2,2,4-TMP***	540-84-1	C8H18	114.229	**0.0251**	0.000251	0.0286	0.0470	75
Xylenes***	1330-20-7	C8H10	106.165	**0.0911**	0.000911	0.0967	0.1586	255
			Totals:	**100.00**	**1.0000**	**60.9511**	**100.00**	**160,617**
			THC:	**100.00**	**1.0000**	**60.9511**	**100.00**	**160,617**
			Total VOC:	**100.00**	**1.0000**	**60.9511**	**100.00**	**160,617**
			Total HAP:	**1.124**	**0.01124**	**0.9961**	**1.63**	**2,625**

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 ^{o}F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (150%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	---	---	---	--	--	---
Methane	75-82-8	CH4	---	---	---	--	--	---
Ethane	74-84-0	C2H6	---	---	---	--	--	---
VOC	Various	C3+	100.00	100.00	160,617	100.05	100.00	160,700
Benzene	71-43-2	C6H6	0.02	0.02	35	0.03	0.04	60
Ethylbenzene	100-41-4	C8H10	4.3E-03	0.01	12	0.01	0.01	20
n-Hexane	110-54-3	C6H14	0.93	1.32	2,119	1.40	1.98	3,180
Toluene	108-88-3	C7H8	0.05	0.08	129	0.08	0.12	200
2,2,4-TMP	540-84-1	C8H18	0.03	0.05	75	0.04	0.07	120
Xylenes	1330-20-7	C8H10	0.09	0.16	255	0.14	0.24	390
Total HAP:	Various	C6 thru C8	1.12	1.63	2,625	1.70	2.47	3,970

STABILIZED CONDENSATE ANALYSIS - DESIGN BASIS

Williams Quality Control Facility
Extended Analysis by GPA 2186

Sample Information

	Sample Information
Sample Name	Gas V-2951 020915 1245 - Ext
Corrosion	No Sample Submitted for Analysis
Vapor Pressure (calc), psia	10.99
Vapor Pressure (meas), psia	8.57
Saybolt Color	+22
Doctor's Test	Positive
Water Content, ppmw	21
Distillation, deg F	
10%	125.1
90%	513.9
FBP	619.3
Technician	Lab Technician
Method Name	Extended-Olefin Method - Diablo
Injection Date	2015-02-09 13:40:13
Report Date	2015-02-09 14:40:17

Component Results

Component Name	Ret. Time	Peak Area	Norm Mole%	Norm Weight%	Norm Volume%
Propane	6.45	5791.8	0.0192	0.0099	0.0131
iso-Butane	6.94	28550.4	0.0687	0.0469	0.0560
n-Butane	7.34	1277981.9	2.9806	2.0340	2.3418
iso-Pentane	8.67	9733985.4	18.8292	15.9503	17.1760
n-Pentane	9.30	12960134.9	24.6865	20.9121	22.2811
cis-2-butene/neo-Pentane	36.23	302673.2	0.3051	0.2010	0.2150
Hexanes Plus	0.00	0.0	53.1107	60.8458	57.9170
Total:			100.0000	100.0000	100.0000

C6+ Extended Fraction Compnent Summary

Pk #	Name	RT	Peak Area	Raw Mol%	Norm Mol%	C6+ Mol%	C6+ Wt%	C6+ Vol%
15	2-2-Dimethylbutane	10.41	351216.4	0.3360	0.5367	1.0105	0.8924	0.9636
16	Cyclopentane/2-3-Dimethylbutane	11.43	717459.1	0.7540	1.2044	2.2677	1.8164	1.8160
17	2-Methylpentane	11.55	4062640.7	3.9170	6.2567	11.7805	10.4041	11.1617
18	3-Methylpentane	12.09	2497522.5	2.3930	3.8224	7.1970	6.3561	6.7062
19	n-Hexane	46.68	12808087.5	5.8410	9.3299	17.5669	15.5142	16.5031
20	2-2-Dimethylpentane	13.73	154845.4	0.0600	0.0958	0.1805	0.1854	0.1929
21	Methylcyclopentane	13.94	901455.4	0.9080	1.4504	2.7308	2.3553	2.2064
22	2-4-Dimethylpentane	14.28	40687.6	0.2920	0.4664	0.8782	0.9018	0.9399
23	Benzene	14.96	105839.7	0.1070	0.1709	0.3218	0.2576	0.2056
24	3-3-Dimethylpentane	15.11	97715.0	0.0750	0.1198	0.2256	0.2317	0.2346
25	Cyclohexane	15.39	905612.4	0.9280	1.4823	2.7910	2.4073	2.1689
26	2-Methylhexane	15.57	2032413.5	1.6370	2.6148	4.9233	5.0558	5.2232
27	2-3-Dimethylpentane	15.72	495661.0	0.4170	0.6661	1.2541	1.2879	1.2998
28	3-Methylhexane	15.99	2301624.3	1.8080	2.8879	5.4376	5.5840	5.6986
29	3-Ethylpentane	16.48	193263.3	0.1730	0.2763	0.5203	0.5343	0.5366
30	2-2-4-Trimethylpentane	16.69	217642.7	0.1570	0.2508	0.4722	0.5528	0.5605
31	n-Heptane	17.14	4395024.5	3.7250	5.9500	11.2030	11.5043	11.8079
32	Methylcyclohexane	18.49	2323756.8	1.8950	3.0269	5.6992	5.7349	5.2311
33	2-5-Dimethylhexane	18.83	195400.7	0.1490	0.2380	0.4481	0.5246	0.5305
34	2-4-Dimethylhexane/Ethylcyclopentane	18.98	435530.3	0.3730	0.5958	1.1218	1.3133	1.3155
35	Toluene	20.42	406121.4	0.3320	0.5303	0.9985	0.9429	0.7635
36	2-methylheptane	20.73	35575.3	0.0250	0.0399	0.0752	0.0880	0.0885
37	4-methylheptane	20.96	575733.6	0.4200	0.6709	1.2632	1.4788	1.4725
38	3-methylheptane	21.17	70902.6	0.0380	0.0607	0.1143	0.1338	0.1330
39	cis-1-3-Dimethylcyclohexane	21.77	576780.9	0.4250	0.6789	1.2782	1.4699	1.3470
40	n-Octane	22.81	2507970.5	1.8340	2.9295	5.5158	6.4571	6.4555
41	trans-1-2-Dimethylcyclohexane	22.94	212164.9	0.1290	0.2061	0.3880	0.4462	0.4040
42	trans-1-3-Dimethylcyclohexane	23.32	196274.6	0.1460	0.2332	0.4391	0.5050	0.4518
43	cis-1-2-Dimethylcyclohexane	24.68	84308.6	0.0630	0.1006	0.1895	0.2179	0.1921
44	Ethylcyclohexane	24.87	639461.6	0.4680	0.7475	1.4075	1.6186	1.4422
45	Ethylbenzene	25.76	33574.5	0.0270	0.0431	0.0812	0.0883	0.0716
46	m-Xylene/p-Xylene	26.20	678225.7	0.5030	0.8035	1.5128	1.6460	1.3375
47	o-Xylene	27.42	87970.9	0.0670	0.1070	0.2015	0.2192	0.1750
48	n-Nonane	28.08	1585723.8	1.0410	1.6628	3.1308	4.1151	4.0248
49	Isopropylbenzene	29.00	181654.6	0.1230	0.1965	0.3699	0.4556	0.3712
50	Cyclooctane	29.33	236957.0	0.1800	0.2875	0.5414	0.6226	0.5230
51	n-Propylcyclohexane	29.76	401162.0	0.2690	0.4297	0.8090	1.0467	0.9262
52	n-Propylbenzene	30.35	84766.8	0.0580	0.0926	0.1744	0.2148	0.1750
53	1-3-5-Trimethylbenzene	30.89	151966.3	0.1020	0.1629	0.3068	0.3779	0.3068
54	1-2-4-Trimethylbenzene/tert-Butylbenz	32.15	203240.8	0.1320	0.2108	0.3970	0.4890	0.3922
55	tert-Butylcyclohexane	32.40	38061.6	0.0230	0.0367	0.0692	0.0995	0.0859
56	n-Decane	32.55	1064188.2	0.6280	1.0031	1.8887	2.7540	2.6483
57	iso-Butylbenzene	32.78	30695.0	0.0190	0.0303	0.0571	0.0785	0.0647
58	sec-Butylbenzene	32.87	60491.6	0.0370	0.0591	0.1113	0.1531	0.1248
59	1-2-3-Trimethylbenzene	33.41	144574.6	0.0990	0.1581	0.2977	0.3667	0.2881
60	n-Butylcyclohexane	34.14	145805.2	0.0880	0.1406	0.2647	0.3805	0.3343
61	n-Butylbenzene	34.56	47898.5	0.0290	0.0463	0.0872	0.1199	0.0979

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment H

STABILIZED CONDENSATE SUMMARY - DESIGN BASIS

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Nitrogen	7727-37-9	N2	28.013	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	---	---	---	---	---
Methane*	75-82-8	CH4	16.042	---	---	---	---	---
Ethane*	74-84-0	C2H6	30.069	---	---	---	---	---
Propane**	74-98-6	C3H8	44.096	**0.0192**	0.000192	0.0085	0.0098	22
i-Butane**	75-28-5	C4H10	58.122	**0.0687**	0.000687	0.0399	0.0462	105
n-Butane**	106-97-8	C4H10	58.122	**2.9806**	0.029806	1.7324	2.0048	4,565
Cyclopentane**	287-92-3	C5H10	70.100	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	**18.8292**	0.188292	13.5851	15.7214	35,799
n-Pentane**	109-66-0	C5H12	72.149	**24.6865**	0.246865	17.8110	20.6119	46,935
neo-Pentane***	463-82-1	C5H12	72.149	**0.3051**	0.003051	0.2201	0.2547	580
Cyclohexane**	110-82-7	C6H12	84.159	**2.9327**	0.029327	2.4682	2.8563	6,504
Other Hexanes**	varies	C6H14	86.175	**11.8202**	0.118202	10.1861	11.7879	26,842
Methylcyclohexane**	varies	C7H14	98.186	**3.0269**	0.030269	2.9720	3.4394	7,832
Heptanes**	varies	C7H16	100.202	**13.0771**	0.130771	13.1035	15.1641	34,530
C8+ Heavies**	varies	C8+	130.000 est	**11.0181**	0.110181	14.3236	16.5760	37,745
Benzene***	71-43-2	C6H6	78.112	**0.1709**	0.001709	0.1335	0.1545	352
Ethylbenzene***	100-41-4	C8H10	106.165	**0.0431**	0.000431	0.0458	0.0530	121
n-Hexane***	110-54-3	C6H14	86.175	**9.3299**	0.093299	8.0401	9.3044	21,187
Toluene***	108-88-3	C7H8	92.138	**0.5303**	0.005303	0.4886	0.5654	1,288
2,2,4-TMP***	540-84-1	C8H18	114.229	**0.2508**	0.002508	0.2865	0.3315	755
Xylenes***	1330-20-7	C8H10	106.165	**0.9105**	0.009105	0.9666	1.1186	2,547
			Totals:	**100.00**	**1.0000**	**86.4115**	**100.00**	**227,709**
			THC:	**100.00**	**1.0000**	**86.4115**	**100.00**	**227,709**
			Total VOC:	**100.00**	**1.0000**	**86.4115**	**100.00**	**227,709**
			Total HAP:	**11.236**	**0.11236**	**9.9611**	**11.53**	**26,249**

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 ^{o}F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (150%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	---	---	---	--	--	---
Methane	75-82-8	CH4	---	---	---	--	--	---
Ethane	74-84-0	C2H6	---	---	---	--	--	---
VOC	Various	C3+	100.00	100.00	227,709	100.04	100.00	227,800
Benzene	71-43-2	C6H6	0.17	0.15	351.78	0.26	0.23	530
Ethylbenzene	100-41-4	C8H10	0.04	0.05	120.58	0.07	0.08	190
n-Hexane	110-54-3	C6H14	9.33	9.30	21187.02	14.00	13.96	31,790
Toluene	108-88-3	C7H8	0.53	0.57	1287.57	0.80	0.85	1,940
2,2,4-TMP	540-84-1	C8H18	0.25	0.33	754.94	0.38	0.50	1,140
Xylenes	1330-20-7	C8H10	0.91	1.12	2547.25	1.37	1.68	3,830
Total HAP:	Various	C6 thru C8	11.24	11.53	26,249	16.87	17.31	39,420

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment H

FUEL/PURGE GAS SUMMARY

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Nitrogen	7727-37-9	N2	28.013	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	---	---	---	---	---
Methane*	75-82-8	CH4	16.042	**95.3860**	0.953822	15.3016	91.5713	40,322.46
Ethane*	74-84-0	C2H6	30.069	**4.4760**	0.044758	1.3458	8.0540	3,546.51
Propane**	74-98-6	C3H8	44.096	**0.1420**	0.001420	0.0626	0.3747	165.00
i-Butane**	75-28-5	C4H10	58.122	---	---	---	---	---
n-Butane**	106-97-8	C4H10	58.122	---	---	---	---	---
Cyclopentane**	287-92-3	C5H10	70.100	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	---	---	---	---	---
n-Pentane**	109-66-0	C5H12	72.149	---	---	---	---	---
neo-Pentane***	463-82-1	C5H12	72.149	---	---	---	---	---
Cyclohexane**	110-82-7	C6H12	84.159	---	---	---	---	---
Other Hexanes**	varies	C6H14	86.175	---	---	---	---	---
Methylcyclohexane**	varies	C7H14	98.186	---	---	---	---	---
Heptanes**	varies	C7H16	100.202	---	---	---	---	---
C8+ Heavies**	varies	C8+	130.000 est	---	---	---	---	---
Benzene***	71-43-2	C6H6	78.112	---	---	---	---	---
Ethylbenzene***	100-41-4	C8H10	106.165	---	---	---	---	---
n-Hexane***	110-54-3	C6H14	86.175	---	---	---	---	---
Toluene***	108-88-3	C7H8	92.138	---	---	---	---	---
2,2,4-TMP***	540-84-1	C8H18	114.229	---	---	---	---	---
Xylenes***	1330-20-7	C8H10	106.165	---	---	---	---	---
			Totals:	**100.00**	**1.0000**	**16.7101**	**100.00**	**44,034**
			THC:	**100.00**	**1.0000**	**16.7101**	**100.00**	**44,034**
			Total VOC:	**0.14**	**0.0014**	**0.0626**	**0.37**	**165**
			Total HAP:	**0.000**	**0.00000**	**0.0000**	**0.00**	**0**

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 ^{o}F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (150%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	---	CO2	---	---	---	--	--	---
Methane	75-82-8	CH4	95.39	91.57	40,322	100.00	100.00	42,275
Ethane	74-84-0	C2H6	4.48	8.05	3,547	6.82	12.26	5,400
VOC	Various	C3+	0.14	0.37	165	0.26	1.00	300
Benzene	71-43-2	C6H6	---	---	---	--	--	---
Ethylbenzene	110-54-3	C6H14	---	---	---	--	--	---
n-Hexane	100-41-4	C8H10	---	---	---	--	--	---
Toluene	108-88-3	C7H8	---	---	---	--	--	---
2,2,4-TMP	540-84-1	C8H18	---	---	---	--	--	---
Xylenes	1330-20-7	C8H10	---	---	---	--	--	---
Total HAP:	Various	C6 thru C8	---	---	---	--	--	---

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment H

WASTE GAS (AKA FLARE GAS) SUMMARY

Representative Waste Gas Composition

Component	CAS	Formula	Molecular Weight	Mole % (Vol %)	Mole Fraction	Weighted Sum	Weight %	lb/MMscf
Nitrogen	7727-37-9	N2	28.013	---	---	---	---	---
Hydrogen Sulfide	2148-87-8	H2S	34.086	---	---	---	---	---
Carbon Dioxide	124-38-9	CO2	44.010	---	---	---	---	---
Methane*	75-82-8	CH4	16.042	10.5142	0.105142	1.6867	2.9467	4,444.82
Ethane*	74-84-0	C2H6	30.069	1.3262	0.013262	0.3988	0.6966	1,050.81
Propane**	74-98-6	C3H8	44.096	26.2988	0.262987	11.5966	20.2590	30,558.96
i-Butane**	75-28-5	C4H10	58.122	2.3388	0.023388	1.3594	2.3748	3,582.18
n-Butane**	106-97-8	C4H10	58.122	33.9237	0.339235	19.7171	34.4454	51,957.93
Cyclopentane**	287-92-3	C5H10	70.100	---	---	---	---	---
i-Pentane**	78-78-4	C5H12	72.149	4.7626	0.047625	3.4361	6.0028	9,054.74
n-Pentane**	109-66-0	C5H12	72.149	6.2430	0.062430	4.5042	7.8688	11,869.39
neo-Pentane***	463-82-1	C5H12	72.149	0.0488	0.000488	0.0352	0.0614	92.69
Cyclohexane**	110-82-7	C6H12	84.159	0.7767	0.007767	0.6536	1.1419	1,722.42
Other Hexanes**	varies	C6H14	86.175	3.1594	0.031593	2.7226	4.7563	7,174.45
Methylcyclohexane**	varies	C7H14	98.186	0.8225	0.008225	0.8076	1.4108	2,128.14
Heptanes**	varies	C7H16	100.202	3.5731	0.035731	3.5803	6.2548	9,434.76
C8+ Heavies**	varies	C8+	130.000 est	2.9511	0.029511	3.8364	6.7021	10109.52
Benzene***	71-43-2	C6H6	78.112	0.0449	0.000449	0.0351	0.0613	92.39
Ethylbenzene***	100-41-4	C8H10	106.165	0.0159	0.000159	0.0168	0.0294	44.40
n-Hexane***	110-54-3	C6H14	86.175	2.6638	0.026638	2.2955	4.0102	6,049.04
Toluene***	108-88-3	C7H8	92.138	0.1143	0.001143	0.1053	0.1840	277.54
2,2,4-TMP (i-Octane)***	540-84-1	C8H18	114.229	0.0666	0.000666	0.0761	0.1330	200.59
Xylenes***	1330-20-7	C8H10	106.165	0.3563	0.003563	0.3782	0.6607	996.67
			Totals:	**100.00**	**1.0000**	**57.2416**	**100.00**	**150,841**
			THC:	**100.00**	**1.0000**	**57.2416**	**100.00**	**150,841**
			Total VOC:	**88.16**	**0.8816**	**55.1561**	**96.36**	**145,346**
			Total HAP:	**3.262**	**0.03262**	**2.9071**	**5.08**	**7,661**

* = Hydrocarbon (HC) ** = also Volatile Organic Compound (EPA-VOC) *** = also Hazardous Air Pollutant (EPA-HAP)

#UGC (Universal Gas Constant) = 379.482 scf/lb-mol @ 60 ^{o}F and 14.696 psia. Pound "X"/scf = M% of "X" * MW of "X" / UGC

To be conservative, the following "worst-case" values were assumed:

Component	CAS	Formula	Representative Gas Analysis			Worst-Case (100%)		
			Mole %	Wgt %	lb/MMscf	Mole %	Wgt %	lb/MMscf
Carbon Dioxide	124-38-9	CO2	---	---	---	--	--	---
Methane	75-82-8	CH4	10.51	2.95	4,445	10.64	2.98	4,500
Ethane	74-84-0	C2H6	1.33	0.70	1,051	1.39	0.73	1,100
VOC	Various	C3+	88.16	96.36	145,346	100.00	100.00	145,400
Benzene	71-43-2	C6H6	0.04	0.06	92	0.05	0.07	100
Ethylbenzene	100-41-4	C8H10	0.02	0.03	44	0.02	0.03	50
n-Hexane	110-54-3	C6H14	2.66	4.01	6,049	2.66	4.01	6,050
Toluene	108-88-3	C7H8	0.11	0.18	278	0.12	0.19	280
2,2,4-TMP (i-Octane)	540-84-1	C8H18	0.07	0.13	201	0.07	0.14	210
Xylenes	1330-20-7	C8H10	0.36	0.66	997	0.36	0.66	1,000
Total HAP:	Various	C6 thru C8	3.26	5.08	7,661	3.27	5.10	7,690

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment H

WASTE GAS - BTU ANALYSIS

Waste Gas Streams Disposed in Flare (FL-02 (5S/5E))

Gas Processors Suppliers Association (GPSA) - Engineering Data Handbook Volume II

http://www.chemindustry.com/apps/chemicals

Component	Component Btu/scf		NGL Flow: 68.1 MMscfy Flow: 7,779 scfh 35.4%		Propane/Butane Flow: 38.5 MMscfy Flow: 4,394 scfh 20.0%		Natural Gasoline Flow: 21.7 MMscfy Flow: 2,482 scfh 11.3%		Nat. Gasoline Tanks Flow: 37.8 MMscfy Flow: 4,320 scfh 19.6%		Condensate Flow: 5.3 MMscfy Flow: 600 scfh 2.7%		Fuel / Purge Gas Flow: 21.2 MMscfy Flow: 2,418 scfh 11.0%		Total Waste Gas Flow: 192.7 MMscfy Flow: 21,993 scfh 100.0%	
	LHV	HHV	Mole %	Btu/scf	Mole %	Btu/scf	Mole %	Btu/scf	Mole %	Btu/scf	Mole %	Btu/scf	Mole %	Btu/scf	Mole %	Btu/scf
Nitrogen	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hydrogen Sulfide	586.8	637.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Carbon Dioxide	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane*	909.4	1,010.0	0.0763	0.77	---	---	---	---	---	---	---	---	95.3860	963.40	10.5142	106.19
Ethane*	1,618.7	1,769.7	2.3581	41.73	---	---	---	---	---	---	---	---	4.4760	79.21	1.3262	23.47
Propane**	2,314.9	2,516.2	46.0594	1,158.95	50.0000	1,258.10	0.0192	0.48	0.00	0.05	0.0192	0.48	0.1420	3.57	26.2988	661.73
i-Butane**	3,000.4	3,252.0	6.5815	214.03	---	---	0.0687	2.23	0.01	0.22	0.0687	2.23	---	---	2.3388	76.06
n-Butane**	3,010.8	3,262.4	16.3411	533.11	50.0000	1,631.20	2.9806	97.24	90.30	2,945.88	2.9806	97.24	---	---	33.9237	1,106.73
Cyclopentane**	3,512.0	3,763.6	---	---	---	---	---	---	---	---	---	---	---	---	---	---
i-Pentane**	3,699.0	4,000.9	4.9585	198.38	---	---	18.8292	753.34	1.88	75.33	18.8292	753.34	---	---	4.7626	190.55
n-Pentane**	3,706.9	4,008.7	6.4979	260.48	---	---	24.6865	989.61	2.47	98.96	24.6865	989.61	---	---	6.2430	250.26
neo-Pentane	3,682.9	3,984.8	---	---	---	---	0.3051	12.16	0.03	1.22	0.3051	12.16	---	---	0.0488	1.94
Cyclohexane**	4,189.4	4,491.5	0.8709	39.12	---	---	2.9327	131.72	0.29	13.17	2.9327	131.72	---	---	0.7767	34.88
Other Hexanes**	4,392.4	4,744.6	3.5923	170.44	---	---	11.8202	560.82	1.18	56.08	11.8202	560.82	---	---	3.1594	149.90
Methylcyclohexane**	4,863.6	5,215.9	0.9580	49.97	---	---	3.0269	157.88	0.30	15.79	3.0269	157.88	---	---	0.8225	42.90
Heptanes**	5,090.9	5,493.5	4.1943	230.41	---	---	13.0771	718.39	1.31	71.84	13.0771	718.39	---	---	3.5731	196.29
C8+ Heavies**	5,814.8	6,254.5	3.3658	210.51	---	---	11.0181	689.13	1.10	68.91	11.0181	689.13	---	---	2.9511	184.58
Benzene***	3,590.9	3,741.9	0.0497	1.86	---	---	0.1709	6.39	0.02	0.64	0.1709	6.39	---	---	0.0449	1.68
Ethylbenzene***	4,970.4	5,222.0	0.0254	1.33	---	---	0.0431	2.25	0.00	0.23	0.0431	2.25	---	---	0.0159	0.83
n-Hexane***	4,403.8	4,756.0	3.3162	157.72	---	---	9.3299	443.73	0.93	44.37	9.3299	443.73	---	---	2.6638	126.69
Toluene***	4,273.7	4,474.9	0.0836	3.74	---	---	0.5303	23.73	0.05	2.37	0.5303	23.73	---	---	0.1143	5.12
2,2,4-TMP (i-Octane)***	5,778.9	6,248.9	0.0751	4.69	---	---	0.2508	15.67	0.03	1.57	0.2508	15.67	---	---	0.0666	4.16
Xylenes***	4,957.1	5,208.7	0.5959	31.04	---	---	0.9105	47.42	0.09	4.74	0.9105	47.42	---	---	0.3563	18.56
			100.00		100.00		100.00		100.00		100.00		100.00		100.00	
Btu/scf (HHV):			**3,308**		**2,889**		**4,652**		**3,401**		**4,652**		**1,046**		**3,183**	
LHV/HHV:			**92.3%**		**92.1%**		**92.7%**		**92.3%**		**92.7%**		**90.1%**		**92.1%**	
Btu/scf (LHV):			**3,052**		**2,662**		**4,311**		**3,140**		**4,311**		**943**		**2,930**	
MMBTU/hr (HHV):			**25.73**		**12.69**		**11.55**		**14.69**		**2.79**		**2.53**		**69.99**	
MMBTU/hr (LHV):			**23.74**		**11.70**		**10.70**		**13.57**		**2.59**		**2.28**		**64.43**	
TOTAL lb/MMscf:			**157,285**		**134,700**		**227,710**		**160,700**		**227,800**		**44,034**		**150,841**	
VOC lb/MMscf:			**157,290**		**134,700**		**227,710**		**160,700**		**227,800**		**300**		**145,400**	
HAP lb/MMscf:			**14,730**		**---**		**39,420**		**3,970**		**39,420**		**---**		**7,690**	
Btu/lb (HHV):			**21,034**		**21,450**		**20,430**		**21,166**		**20,422**		**23,759**		**21,098**	
Btu/lb (LHV):			**19,404**		**19,765**		**18,931**		**19,542**		**18,923**		**21,407**		**19,423**	

MATERIAL SAFETY DATA SHEET

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: Natural Gas Liquids

Synonyms: NGL, Y-Grade

Manufacturer Name:
Williams, Inc.
One Williams Center
Tulsa, OK 74172
USA

Emergency Telephone:
888-677-2370

Non-emergency Telephone:
800-688-7507

Intended Use: Industrial use

2 HAZARDS IDENTIFICATION

Emergency Overview
Physical State: Compressed, liquified gas
Color: Clear and colorless
Odor: Hydrocarbon

DANGER!
Gas reduces oxygen available for breathing. Prolonged or repeated contact may dry skin and cause dermatitis.
Flammable gas - may cause flash fire. Compressed gas.

Potential Health Effects

Inhalation: Suffocation (asphyxiant) hazard - if allowed to accumulate to concentrations that reduce oxygen below safe breathing levels. Due to oxygen deficiency inhalation of gas may cause dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness.

Eye Contact: Direct contact with cold gas may cause eye damage from frostbite.

Skin Contact: Prolonged or repeated contact may dry skin and cause dermatitis. Contact with cold gas might cause frostbites, in some cases with tissue damage.

Ingestion: This material is a gas under normal atmospheric conditions and ingestion is unlikely.

Target Organ(s): | Central nervous system | Eye | Skin |

Potential Physical / Chemical Effects: Inert gas and/or simple asphyxiant. Reduces oxygen available for breathing. Flammable gas - may cause flash fire. If the cylinders are heated it will cause rise in

pressure with risk of bursting. Contact with compressed gas can cause damage (frostbite) due to rapid evaporative cooling.

OSHA Regulatory Status: This product is hazardous according to OSHA 29CFR 1910.1200.

3 COMPOSITION / INFORMATION ON INGREDIENTS

General Information: The product contains:

Chemical Name	CAS-No.	Concentration*
†Heptane	142-82-5	< 30%
†Propane	74-98-6	< 15%
†Butane	106-97-8	< 15%
†2-methylbutane	78-78-4	< 15%
†Octane	111-65-9	< 10%
†Isobutane	75-28-5	< 10%
†Pentane	109-66-0	< 10%
†n-Hexane	110-54-3	< 8%
†2-Methylpentane	107-83-5	< 6%
†Decane	124-18-5	< 5%
†Nonane	111-84-2	< 5%
†3-Methylpentane	96-14-0	< 5%
†2,2-Dimethylbutane	75-83-2	< 5%
†Ethane	74-84-0	< 5%

* All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
† This chemical is hazardous according to OSHA/WHMIS criteria.

4 FIRST AID MEASURES

Inhalation: Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory tract irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation. Get medical attention if symptoms persist.

Eye Contact: If frostbite occurs, immediately flush eyes with plenty of warm water (not exceeding 105°F/41°C) for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention immediately.

Skin Contact: Immediately remove contaminated clothing and shoes and wash skin with soap and plenty of water. Get medical attention if symptoms occur. If frostbite occurs, immerse affected area in warm water (not exceeding 105°F/41°C). Keep immersed for 20 to 40 minutes. Get medical attention immediately.

Ingestion: This material is a gas under normal atmospheric conditions and ingestion is unlikely.

5 FIRE-FIGHTING MEASURES

Extinguishing Media: Use fire-extinguishing media appropriate for surrounding materials.

Unsuitable Extinguishing Media: Not applicable.

Special Fire Fighting Procedures: Evacuate area. Remove pressurized gas cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Do not extinguish a leaking gas fire unless leak can be stopped. If leak cannot be stopped and no danger to surrounding area allow the fire to burn out. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

Unusual Fire & Explosion Hazards: Flammable gas - may cause flash fire. Containers can burst violently when heated, due to excess pressure build-up. Gases may form explosive mixtures with air.

Hazardous Combustion Products: Carbon Oxides

Protective Measures: Self-contained breathing apparatus, operated in positive pressure mode and full protective clothing must be worn in case of fire.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions: If leakage cannot be stopped, evacuate area. Check oxygen content before entering the area. Avoid contact with cold gas. See Section 8 of the MSDS for Personal Protective Equipment.

Spill Cleanup Methods: Ventilate well, stop flow of gas or liquid if possible. Allow gas to evaporate. Remove sources of ignition. Beware of the explosion danger. Do not allow chemical to enter confined spaces such as sewers due to explosion risk.

7 HANDLING AND STORAGE

Handling: Open valve slowly. Control oxygen content in the workplace as described in section 8 of the MSDS. Secure that cylinders are not exposed to heat. Keep away from ignition sources such as heat/sparks/open flame - No smoking. Use non-sparking hand tools and explosion-proof electrical equipment. Avoid contact with eyes, skin, and clothing. Ground container and transfer equipment to eliminate static electric sparks.

Storage: Flammable compressed gas storage. Keep container tightly closed in a cool, well-ventilated place. Secure cylinders in an upright position at all times, close all valves when not in use. Secure cylinders from falling or being knocked over. Should be stored and transported separately from oxygen and other oxidizers. Ground container and transfer equipment to eliminate static electric sparks. Store away from incompatible materials.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

Chemical Name	Source	Type	Exposure Limits	Notes
2,2-Dimethylbutane	CA. Alberta OELs	TWA	1760 mg/m³ 500 ppm	
2,2-Dimethylbutane	CA. Alberta OELs	STEL	3500 mg/m³ 1000 ppm	
2,2-Dimethylbutane	CA. British Columbia OELs	TWA	200 ppm	
2,2-Dimethylbutane	CA. Ontario OELs	TWA	1760 mg/m³ 500 ppm	
2,2-Dimethylbutane	CA. Ontario OELs	STEL	3520 mg/m³ 1000 ppm	
2,2-Dimethylbutane	CA. Quebec OELs	TWA	1760 mg/m³ 500 ppm	
2,2-Dimethylbutane	CA. Quebec OELs	STEL	3500 mg/m³ 1000 ppm	

2,2-Dimethylbutane	MEX. OELs	TWA	1760 mg/m³ 500 ppm	
2,2-Dimethylbutane	MEX. OELs	STEL	3500 mg/m³ 1000 ppm	
2,2-Dimethylbutane	US. ACGIH TLV	STEL	1000 ppm	
2,2-Dimethylbutane	US. ACGIH TLV	TWA	500 ppm	
2,2-Dimethylbutane	US. NIOSH Guide	IDLH	-	
2-Methylpentane	CA. Alberta OELs	TWA	1760 mg/m³ 500 ppm	
2-Methylpentane	CA. Alberta OELs	STEL	3500 mg/m³ 1000 ppm	
2-Methylpentane	CA. British Columbia OELs	TWA	200 ppm	
2-Methylpentane	CA. Ontario OELs	STEL	3520 mg/m³ 1000 ppm	
2-Methylpentane	CA. Ontario OELs	TWA	1760 mg/m³ 500 ppm	
2-Methylpentane	CA. Quebec OELs	TWA	1760 mg/m³ 500 ppm	
2-Methylpentane	CA. Quebec OELs	STEL	3500 mg/m³ 1000 ppm	
2-Methylpentane	MEX. OELs	TWA	1760 mg/m³ 500 ppm	
2-Methylpentane	MEX. OELs	STEL	3500 mg/m³ 1000 ppm	
2-Methylpentane	US. ACGIH TLV	STEL	1000 ppm	
2-Methylpentane	US. ACGIH TLV	TWA	500 ppm	
2-Methylpentane	US. NIOSH Guide	IDLH	-	
2-methylbutane	CA. Alberta OELs	TWA	1770 mg/m³ 600 ppm	
2-methylbutane	CA. British Columbia OELs	TWA	600 ppm	
2-methylbutane	CA. Ontario OELs	TWA	1770 mg/m³ 600 ppm	
2-methylbutane	CA. Ontario OELs	STEL	2210 mg/m³ 750 ppm	
2-methylbutane	US. ACGIH TLV	TWA	600 ppm	
2-methylbutane	US. NIOSH Guide	IDLH	1500 ppm	
2-methylbutane	US. OSHA Z-1 PEL	TWA	2950 mg/m³ 1000 ppm	
3-Methylpentane	CA. Alberta OELs	STEL	3500 mg/m³ 1000 ppm	
3-Methylpentane	CA. Alberta OELs	TWA	1760 mg/m³ 500 ppm	
3-Methylpentane	CA. British Columbia OELs	TWA	200 ppm	
3-Methylpentane	CA. Ontario OELs	TWA	1760 mg/m³ 500 ppm	
3-Methylpentane	CA. Ontario OELs	STEL	3520 mg/m³ 1000 ppm	
3-Methylpentane	CA. Quebec OELs	STEL	3500 mg/m³ 1000 ppm	
3-Methylpentane	CA. Quebec OELs	TWA	1760 mg/m³ 500 ppm	
3-Methylpentane	MEX. OELs	STEL	3500 mg/m³ 1000 ppm	
3-Methylpentane	MEX. OELs	TWA	1760 mg/m³ 500 ppm	
3-Methylpentane	US. ACGIH TLV	TWA	500 ppm	
3-Methylpentane	US. ACGIH TLV	STEL	1000 ppm	
3-Methylpentane	US. NIOSH Guide	IDLH	-	
Butane	CA. British Columbia OELs	STEL	750 ppm	
Butane	CA. British Columbia OELs	TWA	600 ppm	
Butane	CA. Ontario OELs	TWA	1900 mg/m³ 800 ppm	
Butane	MEX. OELs	TWA	1900 mg/m³ 800 ppm	
Butane	US. NIOSH Guide	IDLH	-	
Ethane	CA. Alberta OELs	Limit value not established	-	Simple asphyxiant.
Ethane	CA. British Columbia OELs	TWA	1000 ppm	
Ethane	CA. Ontario OELs	TWA	1000 ppm	
Ethane	MEX. OELs	Limit value not	-	Simple asphyxiant.

		established		
Ethane	US. ACGIH TLV	TWA	1000 ppm	
Heptane	CA. Alberta OELs	STEL	2050 mg/m³ 500 ppm	
Heptane	CA. Alberta OELs	TWA	1640 mg/m³ 400 ppm	
Heptane	CA. British Columbia OELs	TWA	400 ppm	
Heptane	CA. British Columbia OELs	STEL	500 ppm	
Heptane	MEX. OELs	STEL	2000 mg/m³ 500 ppm	Skin
Heptane	MEX. OELs	TWA	1600 mg/m³ 400 ppm	Skin
Heptane	US. ACGIH TLV	STEL	500 ppm	
Heptane	US. ACGIH TLV	TWA	400 ppm	
Heptane	US. NIOSH Guide	IDLH	750 ppm	
Heptane	US. OSHA Z-1 PEL	TWA	2000 mg/m³ 500 ppm	
Isobutane	CA. Ontario OELs	TWA	1900 mg/m³ 800 ppm	
Isobutane	US. ACGIH TLV	TWA	1000 ppm	
Nonane	CA. Alberta OELs	TWA	1050 mg/m³ 200 ppm	
Nonane	CA. British Columbia OELs	TWA	200 ppm	
Nonane	CA. Ontario OELs	TWA	1050 mg/m³ 200 ppm	
Nonane	CA. Quebec OELs	TWA	1050 mg/m³ 200 ppm	
Nonane	MEX. OELs	STEL	1300 mg/m³ 250 ppm	
Nonane	MEX. OELs	TWA	1050 mg/m³ 200 ppm	
Nonane	US. ACGIH TLV	TWA	200 ppm	
Nonane	US. NIOSH Guide	IDLH	-	
Octane	CA. Alberta OELs	TWA	1401 mg/m³ 300 ppm	
Octane	CA. British Columbia OELs	TWA	300 ppm	
Octane	CA. Ontario OELs	STEL	1750 mg/m³ 375 ppm	
Octane	CA. Ontario OELs	TWA	1400 mg/m³ 300 ppm	
Octane	CA. Quebec OELs	TWA	1400 mg/m³ 300 ppm	
Octane	CA. Quebec OELs	STEL	1750 mg/m³ 375 ppm	
Octane	MEX. OELs	TWA	1450 mg/m³ 300 ppm	
Octane	MEX. OELs	STEL	1800 mg/m³ 375 ppm	
Octane	US. ACGIH TLV	TWA	300 ppm	
Octane	US. NIOSH Guide	IDLH	1000 ppm	
Octane	US. OSHA Z-1 PEL	TWA	2350 mg/m³ 500 ppm	
Pentane	CA. Alberta OELs	TWA	1770 mg/m³ 600 ppm	
Pentane	CA. British Columbia OELs	TWA	600 ppm	
Pentane	CA. Ontario OELs	STEL	2210 mg/m³ 750 ppm	
Pentane	CA. Ontario OELs	TWA	1770 mg/m³ 600 ppm	
Pentane	MEX. OELs	STEL	2250 mg/m³ 760 ppm	
Pentane	MEX. OELs	TWA	1800 mg/m³ 600 ppm	
Pentane	US. ACGIH TLV	TWA	600 ppm	
Pentane	US. NIOSH Guide	IDLH	1500 ppm	
Pentane	US. OSHA Z-1 PEL	TWA	2950 mg/m³ 1000 ppm	
Propane	CA. Alberta OELs	STEL	2700 mg/m³ 1500 ppm	
Propane	CA. Alberta OELs	TWA	1800 mg/m³ 1000 ppm	
Propane	CA. British Columbia OELs	TWA	1000 ppm	
Propane	CA. Ontario OELs	TWA	1000 ppm	
Propane	CA. Quebec OELs	TWA	1800 mg/m³ 1000 ppm	
Propane	MEX. OELs	Limit value	-	Simple

		not established		asphyxiant.
Propane	US. ACGIH TLV	TWA	1000 ppm	
Propane	US. NIOSH Guide	IDLH	2100 ppm	
Propane	US. OSHA Z-1 PEL	TWA	1800 mg/m³ 1000 ppm	
n-Hexane	CA. Alberta OELs	TWA	176 mg/m³ 50 ppm	Skin
n-Hexane	CA. British Columbia OELs	TWA	20 ppm	Skin
n-Hexane	CA. Ontario OELs	TWA	176 mg/m³ 50 ppm	
n-Hexane	MEX. OELs	TWA	176 mg/m³ 50 ppm	
n-Hexane	US. ACGIH TLV	TWA	50 ppm	Skin
n-Hexane	US. NIOSH Guide	IDLH	1100 ppm	
n-Hexane	US. OSHA Z-1 PEL	TWA	1800 mg/m³ 500 ppm	

Engineering Controls: Provide shower facilities near the work place. In confined spaces, make sure the area is well-ventilated and sufficient oxygen (19.5%) exists before entry. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Use explosion-proof ventilation equipment.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Use positive pressure air supplied respirator for uncontrolled releases. Follow respirator protection program requirements (OSHA 1910.134 and ANSI Z88.2) for all respirator use. Seek advice from supervisor on the company's respiratory protection standards.

Eye Protection: Risk of contact: Wear approved safety goggles.

Hand Protection: Thermally protective gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

Skin Protection: Apron and long sleeves are recommended. Risk of contact: Wear appropriate clothing to prevent freezing of skin.

Hygiene Measures: Practice good housekeeping.

Environmental Exposure Controls: Environmental manager must be informed of all major spillages.

9 PHYSICAL AND CHEMICAL PROPERTIES

Color: Clear and colorless
Odor: Hydrocarbon
Odor Threshold: No data available.
Physical State: Compressed, liquified gas
pH: Not applicable
Melting Point: No data available.
Freezing Point: No data available.
Boiling Point: -96°C (-141°F) - -170°C (-274°F)
Flash Point: <-40°C (-40°F) (Closed Cup)

Evaporation Rate: No data available.
Flammability (Solid): No data available.
Flammability Limit - Upper (%): No data available.
Flammability Limit - Lower (%): No data available.
Vapor Pressure: No data available.
Vapor Density (Air=1): 1 - 3
Specific Gravity: 0.63892
Solubility in Water: No data available.
Solubility (Other): No data available.
Partition Coefficient (n-Octanol/water): No data available.
Autoignition Temperature: No data available.
Decomposition Temperature: No data available.
Viscosity: No data available.
Percent Volatile: 100 %w
Explosive Properties: No data available

10 STABILITY AND REACTIVITY

Stability: Stable under the prescribed storage conditions.

Conditions to Avoid: Heat may cause the containers to explode.

Incompatible Materials: Strong oxidizing agents.

Hazardous Decomposition Products: No data available.

11 TOXICOLOGICAL INFORMATION

Specified Substance(s)
Acute Toxicity:

Chemical Name	Test Results
Butane	Inhalation LC50 (4 hour(s), Rat): 658 g/m³
Heptane	Inhalation LC50 (4 hour(s), Rat): 103 mg/m³

Listed Carcinogens: None.

Product Information
Acute Toxicity:
Test Results: No test data available for the product.

Other Acute: Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Gas reduces oxygen available for breathing.

Chronic Toxicity: No additional adverse health effects noted.

12 ECOLOGICAL INFORMATION

Ecotoxicity: No data available.

Mobility: Not relevant, due to the form of the product.

Persistence and Degradability: Not relevant.

Bioaccumulation Potential: Not relevant.

13 DISPOSAL CONSIDERATIONS

General Information: The packaging should be collected for reuse.

Disposal Methods: Disposal recommendations are based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

RCRA Information: D001

Container: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14 TRANSPORT INFORMATION

DOT
UN No.: UN1971
Proper Shipping Name: Natural gas, compressed
Class: 2.1
Packing Group: (N/A)
Label(s): 2.1

TDG
UN No.: UN1971
Proper Shipping Name: Natural gas, compressed
Class: 2.1
Packing Group: (N/A)

IATA
UN No.: UN1971
Proper Shipping Name: Natural gas, compressed
Class: 2.1
Packing Group: (N/A)
Label(s): Flamm. gas

IMDG
UN No.: UN1971
Proper Shipping Name: Natural gas, compressed
Class: 2.1
Packing Group: (N/A)
EmS No.: F-D, S-U

15 REGULATORY INFORMATION

Canadian Controlled Products Regulations: This product has been classified according to the hazard

criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information.

WHMIS Classification: A, B1

Mexican Dangerous Statement: This product is dangerous according to Mexican regulations.

Inventory Status

This product or all components are listed or exempt from listing on the following inventory: DSL, EINECS, TSCA

US Regulations

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Name	RQ
2-Methylpentane	100 lbs
2,2-Dimethylbutane	100 lbs
3-Methylpentane	100 lbs
Butane	100 lbs
2-methylbutane	100 lbs
Ethane	100 lbs
Heptane	100 lbs
Isobutane	100 lbs
n-Hexane	5000 lbs
Nonane	100 lbs
Octane	100 lbs
Pentane	100 lbs
Propane	100 lbs

SARA Title III

Section 302 Extremely Hazardous Substances (40 CFR 355, Appendix A): Not regulated.

Section 311/312 (40 CFR 370):

[X] Acute (Immediate) [ ] Chronic (Delayed) [X] Fire [ ] Reactive [X] Pressure Generating

Section 313 Toxic Release Inventory (40 CFR 372): Not regulated.

Chemical Name	CAS-No.	Reporting threshold for other users	Reporting threshold for manufacturing and processing
n-Hexane	110-54-3	10000 lbs	25000 lbs

For reporting purposes: the De Minimis Concentration for a toxic chemical in a mixture is 0.1% for carcinogens as defined in 29 CFR 1910.1200(d)(4) or 1% for others.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
2-methylbutane; Pentane; Ethane; Isobutane; Butane; Propane

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3): Not regulated.

Drug Enforcement Act: Not regulated.

TSCA

TSCA Section 4(a) Final Test Rules & Testing Consent Orders: 2-methylbutane; Heptane; Nonane; Pentane

TSCA Section 5(a)(2) Final Significant New Use Rules (SNURs) (40CFR 721, Subpt. E): Not regulated.

TSCA Section 5(e) PMN-Substance Consent Orders: Not regulated.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): 2-methylbutane; Heptane; Nonane; Pentane

State Regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Not regulated.

Massachusetts Right-To-Know List: 2,2-Dimethylbutane; 2-Methylpentane; 2-methylbutane; 3-Methylpentane; Butane; Ethane; Heptane; Isobutane; Nonane; Octane; Pentane; Propane; n-Hexane

Michigan Critical Materials List (Michigan Natural Resources and Environmental Protection Act (Act. 451 of 1994)): Not regulated.

Minnesota Hazardous Substances List: 2,2-Dimethylbutane; 2-Methylpentane; 2-methylbutane; 3-Methylpentane; Butane; Decane; Ethane; Heptane; Isobutane; Nonane; Octane; Pentane; Propane; n-Hexane

New Jersey Right-To-Know List: 2,2-Dimethylbutane; 2-Methylpentane; 2-methylbutane; 3-Methylpentane; Butane; Decane; Ethane; Heptane; Isobutane; Nonane; Octane; Pentane; Propane; n-Hexane

Pennsylvania Right-To-Know List: 2,2-Dimethylbutane; 2-Methylpentane; 2-methylbutane; 3-Methylpentane; Butane; Decane; Ethane; Heptane; Isobutane; Nonane; Octane; Pentane; Propane; n-Hexane

Rhode Island Right-To-Know List: 2-methylbutane; Butane; Decane; Ethane; Heptane; Nonane; Octane; Pentane; Propane; n-Hexane

16 OTHER INFORMATION

HAZARD RATINGS

	Health Hazard	Fire Hazard	Instability	Special Hazard
NFPA	1	4	0	NONE

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
NFPA Label colored diamond code: Blue - Health; Red - Flammability; Yellow - Instability; White - Special Hazards

	Health Hazard	Flammability	Physical Hazard	Personal Protection
HMIS	1	4	0	--

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
HMIS Label colored bar code: Blue - Health; Red - Flammability; Orange - Physical Hazards; White - Special

Issue Date: 11/6/2009
Supercedes Date: New
SDS No.: 1027335
Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

Product Identifier

Product Form: Mixtures

Product Name: Propane

Synonyms: Commercial Propane, LP-Gas, Liquefied Petroleum Gas, Dimethylmethane

Intended Use of the Product

Use of the Substance/Mixture: Fuel.

Name, Address, and Telephone of the Responsible Party

Company

Williams, Inc.
One Williams Center
Tulsa, OK 74172, US
T 800-688-7507
enterpriseehs@williams.com

Emergency Telephone Number

Emergency number : 800-424-9300

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

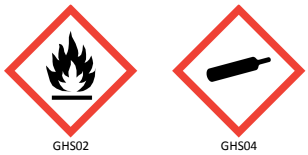
Classification (GHS-US)

Simple Asphy
Flam. Gas 1 H220
Compressed gas H280

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :



GHS02 GHS04

Signal Word (GHS-US) : Danger

Hazard Statements (GHS-US) : H220 - Extremely flammable gas
H280 - Contains gas under pressure; may explode if heated
May displace oxygen and cause rapid suffocation

Precautionary Statements (GHS-US) : P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
P403 - Store in a well-ventilated place
P410+P403 - Protect from sunlight. Store in a well-ventilated place

Other Hazards

Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre existing eye, skin, or respiratory conditions. Asphyxiant gas, can be fatal. May cause damage to the blood, central nervous system, and cardiovascular system. High concentrations of gas can cause unconciousness and death.

Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product identifier	% (w/w)	Classification (GHS-US)
Propane	(CAS No) 74-98-6	> 90	Simple Asphy Flam. Gas 1, H220

			Liquefied gas, H280
Ethane	(CAS No) 74-84-0	< 5	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280
Butane	(CAS No) 106-97-8	< 5	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280
Isobutane	(CAS No) 75-28-5	< 2.5	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). If frostbite or freezing occurs, immediately flush with plenty of lukewarm water to GENTLY warm the affected area. Do not use hot water. Do not rub affected area. Get immediate medical attention.

Inhalation: When symptoms occur: go into open air and ventilate suspected area.Remove to fresh air and keep at rest in a position comfortable for breathing.Call a POISON CENTER/doctor/physician if you feel unwell

Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes.Obtain medical attention if irritation persists.Thaw frosted parts with lukewarm water. Do not rub affected area.

Eye Contact: Rinse cautiously with water for several minutes.Remove contact lenses, if present and easy to do. Continue rinsing.Obtain medical attention if irritation persists

Ingestion: Rinse mouth.Do NOT induce vomiting.Get immediate medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: May cause frostbite on contact with the liquid. Propane is an asphyxiant. Lack of oxygen can be fatal.

Inhalation: Gas can be toxic as a simple asphyxiant by displacing oxygen from the air. Asphyxia by lack of oxygen: risk of death. May cause drowsiness or dizziness

Skin Contact: Contact with the liquid may cause cold burns/frostbite

Eye Contact: This gas is non-irritating; but direct contact with liquefied/pressurized gas or frost particles may produce severe and possibly permanent eye damage from freeze burns

Ingestion: Ingestion is not considered a potential route of exposure. Non-irritating; but solid and liquid forms of this material and pressurized gas may cause freeze burns.

Chronic Symptoms: Not available

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Foam, dry chemical, carbon dioxide, water spray, fog

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire .

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Extremely flammable gas

Explosion Hazard: May form flammable/explosive vapor-air mixture.Heating may cause an explosion.Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity: Hazardous reactions will not occur under normal conditions.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire

Firefighting Instructions: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.In case of leaking gas fire, eliminate all ignition sources if safe to do so.Use water spray or fog for cooling exposed containers. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.
Hazardous Combustion Products: Carbon oxides (CO, CO_2), hydrocarbons, sulfur oxides.
Other information: Do not allow run-off from fire fighting to enter drains or water courses

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Use special care to avoid static electric charges. Eliminate every possible source of ignition.Keep away from heat/sparks/open flames/hot surfaces - No smoking. Avoid breathing (gas, vapor, mist, spray).Use only outdoors or in a well-ventilated area. Ruptured cylinders may rocket. Do not allow product to spread into the environment.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).
Emergency Procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.
Emergency Procedures: Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment.

Methods and Material for Containment and Cleaning Up

For Containment: Notify authorities if liquid enters sewers or public waters. Use only non-sparking tools.
Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Isolate area until gas has dispersed. Use water spray to disperse vapors. For water based spills contact appropriate authorities and abide by local regulations for hydrocarbon spills into waterways. Contact competent authorities after a spill.

Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Handle empty containers with care because residual vapors are flammable.Extremely flammable gas.Do not pressurize, cut, or weld containers. .Do not puncture or incinerate container.Liquid gas can cause frost-type burns
Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures.Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work.Do no eat, drink or smoke when using this product

Conditions for Safe Storage, Including Any Incompatibilities Not available

Technical Measures: Proper grounding procedures to avoid static electricity should be followed. Comply with applicable regulations.
Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep in fireproof place. Store in a well-ventilated place. Keep container tightly closed. Keep/Store away from extremely high or low temperatures, ignition sources, direct sunlight, incompatible materials.Store in original container.
Incompatible Materials: Strong oxidizers, strong acids, strong bases, halogens, chlorine.

Specific End Use(s)

Fuel.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Butane (106-97-8)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	1900 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	800 ppm
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL STEL (ppm)	750 ppm

British Columbia	OEL TWA (ppm)	600 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
New Brunswick	OEL TWA (mg/m³)	1900 mg/m³
New Brunswick	OEL TWA (ppm)	800 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Nunavut	OEL STEL (mg/m³)	2576 mg/m³
Nunavut	OEL STEL (ppm)	1000 ppm
Nunavut	OEL TWA (mg/m³)	1901 mg/m³
Nunavut	OEL TWA (ppm)	800 ppm
Northwest Territories	OEL STEL (mg/m³)	2576 mg/m³
Northwest Territories	OEL STEL (ppm)	1000 ppm
Northwest Territories	OEL TWA (mg/m³)	1901 mg/m³
Northwest Territories	OEL TWA (ppm)	800 ppm
Ontario	OEL TWA (ppm)	800 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Québec	VEMP (mg/m³)	1900 mg/m³
Québec	VEMP (ppm)	800 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm
Yukon	OEL STEL (mg/m³)	1600 mg/m³
Yukon	OEL STEL (ppm)	750 ppm
Yukon	OEL TWA (mg/m³)	1400 mg/m³
Yukon	OEL TWA (ppm)	600 ppm

Propane (74-98-6)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m3)	1800 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	1800 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	1000 ppm
USA IDLH	US IDLH (ppm)	2100 ppm (10% LEL)
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL TWA (ppm)	1000 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	1000 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Québec	VEMP (mg/m³)	1800 mg/m³
Québec	VEMP (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

Ethane (74-84-0)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL TWA (ppm)	1000 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm

Ontario	OEL TWA (ppm)	1000 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

Isobutane (75-28-5)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	1900 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	800 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	800 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

Exposure Controls

Appropriate Engineering Controls: Gas detectors should be used when flammable gases/vapours may be released. Ensure adequate ventilation, especially in confined areas. Proper grounding procedures to avoid static electricity should be followed. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.Use explosion-proof equipment

Personal Protective Equipment: Protective goggles. Protective clothing. Respiratory protection of the dependent type. Insulated gloves.

Materials for Protective Clothing: Chemically resistant materials and fabrics. Wear fire/flame resistant/retardant clothing.

Hand Protection: Wear chemically resistant protective gloves. Insulated gloves

Eye Protection: Chemical goggles or face shield.

Skin and Body Protection: Wear appropriate protective clothing.

Respiratory Protection: Use a NIOSH-approved self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Thermal Hazard Protection: Wear suitable protective clothing.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Gas
Appearance	:	Clear,Colorless gas,Liquefied compressed gas
Odor	:	No distinct odor
Odor Threshold	:	Not available
pH	:	Not available
Relative Evaporation Rate (Air=1)	:	> 1, rapid
Melting Point	:	Not available
Freezing Point	:	Not available
Boiling Point	:	-42 (-43.6°F)
Flash Point	:	-104 °C (-155.2°F)
Auto-ignition Temperature	:	>426.7°C (>800°F)
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Extremely flammable gas
Lower Flammable Limit	:	2.1 %

Upper Flammable Limit	:	9.5 %
Vapor Pressure	:	208 mm Hg psia 37.8°C (100°F)
Relative Vapor Density at 20 °C	:	> 1 (air = 1)
Relative Density	:	0.50-0.51 15.6°C (60°F)
Specific Gravity	:	Not available
Solubility	:	Moderate
Log Pow	:	Not soluble
Log Kow	:	Not available
Viscosity, Kinematic	:	0.169 Centistokes
Viscosity, Dynamic	:	0.0742 Centistokes
Explosion Data – Sensitivity to Mechanical Impact	:	No
Explosion Data – Sensitivity to Static Discharge	:	Static Discharge could act as an ignition source

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Hazardous reactions will not occur under normal conditions.

Chemical Stability: Extremely flammable gas. Stable at standard temperature and pressure.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Direct sunlight.Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks. Incompatible materials. Avoid ignition sources.

Incompatible MaterialsStrong acids, strong bases, strong oxidizers, halogens, chlorine

Hazardous Decomposition Products: Carbon oxides (CO, CO2), hydrocarbons, sulfur oxides

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity : Not classified

LD50 and LC50 Data Not available

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Gas can be toxic as a simple asphyxiant by displacing oxygen from the air. Asphyxia by lack of oxygen: risk of death. May cause drowsiness or dizziness.

Symptoms/Injuries After Skin Contact: Contact with the liquid may cause cold burns/frostbite.

Symptoms/Injuries After Eye Contact: This gas is non-irritating; but direct contact with liquefied/pressurized gas or frost particles may produce severe and possibly permanent eye damage from freeze burns.

Symptoms/Injuries After Ingestion: Ingestion is not considered a potential route of exposure. Non-irritating; but solid and liquid forms of this material and pressurized gas may cause freeze burns.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data

Butane (106-97-8)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

Propane (74-98-6)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

Ethane (74-84-0)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

Isobutane (75-28-5)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

No additional information available

Persistence and Degradability

Propane	
Persistence and Degradability	Product is biodegradable.

Bioaccumulative Potential

Propane	
Bioaccumulative Potential	Not expected to bioaccumulate.

Butane (106-97-8)	
Log Pow	2.89

Propane (74-98-6)	
Log Pow	2.3

Ethane (74-84-0)	
Log Pow	<= 2.8

Isobutane (75-28-5)	
BCF fish 1	1.57 - 1.97
Log Pow	2.88 (at 20 °C)

Mobility in Soil Not available

Other Adverse Effects

Other adverse effects: Can cause frost damage to vegetation. Has photochemical ozone creation potential.

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

Additional Information: Handle empty containers with care because residual vapors are flammable. Empty gas cylinders should be returned to the vendor for recycling or refilling.

SECTION 14: TRANSPORT INFORMATION

In Accordance With ICAO/IATA/DOT/TDG

UN Number

UN-No.(DOT): 1075

DOT NA no.: 1075

UN Proper Shipping Name

DOT Proper Shipping Name : UN 1075 Petroleum gases, liqefied, non-odorized, 2.1
Note: For all shipping papers, on non-odorized propane, include the statement “non-odorized, or not-odorized” to the proper shipping name (PSN) per 49 CFR 172.203(3)(p)

Hazard Labels (DOT) : 2.1 - Flammable gases

DOT Special Provisions (49 CFR 172.102) : 19 - For domestic transportation only, the identification number UN1075 may be used in place of the identification number specified in column (4) of the 172.101 table. The identification number used must be consistent on package markings, shipping papers and emergency response

information.
T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter.

DOT Packaging Exceptions (49 CFR 173.xxx) : 306
DOT Packaging Non Bulk (49 CFR 173.xxx) : 304
DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

Additional Information

Emergency Response Guide (ERG) Number : 115

Transport by sea

DOT Vessel Stowage Location : E - The material may be stowed ''on deck'' or ''under deck'' on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length, but is prohibited from carriage on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 40 - Stow ''clear of living quarters''

Air transport

DOT Quantity Limitations Passenger Aircraft/Rail (49 CFR 173.27) : Forbidden
DOT Quantity Limitations Cargo Aircraft Only (49 CFR 175.75) : 150 kg

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Butane (106-97-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Propane (74-98-6)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Ethane (74-84-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Isobutane (75-28-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

Butane (106-97-8)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Hawaii - Occupational Exposure Limits - TWAs
U.S. - Maine - Chemicals of High Concern
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances

U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs

Propane (74-98-6)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Hawaii - Occupational Exposure Limits - TWAs
U.S. - Idaho - Occupational Exposure Limits - TWAs
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs

Ethane (74-84-0)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Delaware - Volatile Organic Compounds Exempt from Requirements

U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Volatile Organic Compounds Exempt From Requirements
U.S. - Minnesota - Hazardous Substance List
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Excluded Volatile Organic Compounds
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Washington - Permissible Exposure Limits - Simple Asphyxiants

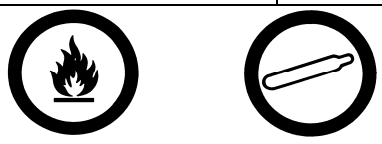
Isobutane (75-28-5)

U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Maine - Chemicals of High Concern
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Minnesota - Chemicals of High Concern
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term

Canadian Regulations

Propane

WHMIS Classification	Class B Division 1 - Flammable Gas Class A - Compressed Gas



Butane (106-97-8)

Listed on the Canadian DSL (Domestic Substances List) inventory.

Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

Propane (74-98-6)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

Ethane (74-84-0)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

Isobutane (75-28-5)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

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

SECTION 16: OTHER INFORMATION

Revision date : 01/20/2014

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200

GHS Full Text Phrases:

Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Flam. Liq. 1	Flammable liquids Category 1
Liquefied gas	Gases under pressure Liquefied gas
Simple Asphy	Simple Asphyxiant
H220	Extremely flammable gas
H224	Extremely flammable liquid and vapor
H280	Contains gas under pressure; may explode if heated
H302	Harmful if swallowed
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

Party Responsible for the Preparation of This Document

Williams, Inc.
One Williams Center
Tulsa, OK 74172, US
800-688-7507

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

North America GHS US 2012 & WHMIS

Butane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision Date: 04/18/2014 Version: 1.0

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

Product Identifier

Product Form: Mixture

Product Name: Butane

Synonyms: Butyl Hydride

Intended Use of the Product

Use of the Substance/Mixture: Fuel.

Name, Address, and Telephone of the Responsible Party

Company

Williams, Inc.
One Williams Center
Tulsa, OK 74172, US
T 800-688-7507
enterpriseehs@williams.com

Emergency Telephone Number

Emergency number : 800-424-9300

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

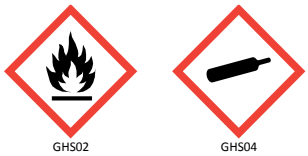
Classification (GHS-US)

Simple Asphy
Flam. Gas 1 H220
Compressed gas H280

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :



GHS02 GHS04

Signal Word (GHS-US) : Danger

Hazard Statements (GHS-US) : H220 - Extremely flammable gas
H280 - Contains gas under pressure; may explode if heated
May displace oxygen and cause rapid suffocation

Precautionary Statements (GHS-US) : P210 - Keep away from heat, sparks, open flames, hot surfaces. - No smoking.
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 - Eliminate all ignition sources if safe to do so.
P403 - Store in a well-ventilated place.
P410+P403 - Protect from sunlight. Store in a well-ventilated place.

Other Hazards

Other Hazards Not Contributing to the Classification: No additional information available

Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product identifier	% (w/w)	Classification (GHS-US)
Butane	(CAS No) 106-97-8	> 95	Simple Asphy Flam. Gas 1, H220 Liquefied gas, H280
Isobutane	(CAS No) 75-28-5	< 4	Simple Asphy

			Flam. Gas 1, H220 Liquefied gas, H280

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible). If frostbite or freezing occurs, immediately flush with plenty of lukewarm water to GENTLY warm the affected area. Do not use hot water. Do not rub affected area. Get immediate medical attention.

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER/doctor/physician if you feel unwell

Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes.Obtain medical attention if irritation persists.Thaw frosted parts with lukewarm water. Do not rub affected area.

Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.Obtain medical attention if irritation persists

Ingestion: Rinse mouth. Do NOT induce vomiting. Get immediate medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: May cause frostbite on contact with the liquid. Butane is an asphyxiant. Lack of oxygen can be fatal.

Inhalation: Gas can be toxic as a simple asphyxiant by displacing oxygen from the air.Asphyxia by lack of oxygen: risk of death. May cause drowsiness or dizziness

Skin Contact: Contact with the liquid may cause cold burns/frostbite

Eye Contact: This gas is non-irritating; but direct contact with liquefied/pressurized gas or frost particles may produce severe and possibly permanent eye damage from freeze burns

Ingestion: Ingestion is not considered a potential route of exposure. Non-irritating; but solid and liquid forms of this material and pressurized gas may cause freeze burns.

Chronic Symptoms: Not available

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Foam, dry chemical, carbon dioxide, water spray, fog

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Extremely flammable gas

Explosion Hazard: May form flammable/explosive vapor-air mixture. Heating may cause an explosion. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity: Hazardous reactions will not occur under normal conditions.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire

Firefighting Instructions: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leaking gas fire, eliminate all ignition sources if safe to do so. Use water spray or fog for cooling exposed containers. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Carbon oxides (CO, CO_2). Hydrocarbons.

Other information: Do not allow run-off from fire fighting to enter drains or water courses

Reference to Other Sections
Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Use special care to avoid static electric charges.Eliminate every possible source of ignition.Keep away from heat, sparks, open flames, hot surfaces - No smoking. Avoid breathing (gas, vapors, mist, spray).Use only outdoors or in a well-ventilated area. Ruptured cylinders may rocket. Do not allow product to spread into the environment

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment

Methods and Material for Containment and Cleaning Up

For Containment: Notify authorities if liquid enters sewers or public waters. Use only non-sparking tools.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Isolate area until gas has dispersed. Stop leak if possible to do so without risk. Use water spray to disperse vapors. For water based spills contact appropriate authorities and abide by local regulations for hydrocarbon spills into waterways. Contact competent authorities after a spill.

Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Handle empty containers with care because residual vapors are flammable. Extremely flammable gas. Do not pressurize, cut, or weld containers. Do not puncture or incinerate container. Liquid gas can cause frost-type burns.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do no eat, drink or smoke when using this product.

Conditions for Safe Storage, Including Any Incompatibilities Not available

Technical Measures: Proper grounding procedures to avoid static electricity should be followed. Comply with applicable regulations.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep in fireproof place.Store in a well-ventilated place. Keep container tightly closed.Keep/Store away from extremely high or low temperatures, ignition sources, direct sunlight, incompatible materials.Store in original container.

Incompatible Materials: Strong acids, strong bases, strong oxidizers, chlorine, halogenated compounds.

Specific End Use(s)

Fuel.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Isobutane (75-28-5)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	1900 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	800 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	800 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm

Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

Butane (106-97-8)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m3)	1900 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	800 ppm
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL STEL (ppm)	750 ppm
British Columbia	OEL TWA (ppm)	600 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
New Brunswick	OEL TWA (mg/m³)	1900 mg/m³
New Brunswick	OEL TWA (ppm)	800 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Nunavut	OEL STEL (mg/m³)	2576 mg/m³
Nunavut	OEL STEL (ppm)	1000 ppm
Nunavut	OEL TWA (mg/m³)	1901 mg/m³
Nunavut	OEL TWA (ppm)	800 ppm
Northwest Territories	OEL STEL (mg/m³)	2576 mg/m³
Northwest Territories	OEL STEL (ppm)	1000 ppm
Northwest Territories	OEL TWA (mg/m³)	1901 mg/m³
Northwest Territories	OEL TWA (ppm)	800 ppm
Ontario	OEL TWA (ppm)	800 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Québec	VEMP (mg/m³)	1900 mg/m³
Québec	VEMP (ppm)	800 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm
Yukon	OEL STEL (mg/m³)	1600 mg/m³
Yukon	OEL STEL (ppm)	750 ppm
Yukon	OEL TWA (mg/m³)	1400 mg/m³
Yukon	OEL TWA (ppm)	600 ppm

Exposure Controls

Appropriate Engineering Controls: Gas detectors should be used when flammable gases/vapours may be released. Ensure adequate ventilation, especially in confined areas. Proper grounding procedures to avoid static electricity should be followed. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use explosion-proof equipment

Personal Protective Equipment: Protective goggles. Protective clothing. Respiratory protection of the dependent type. Insulated gloves

Materials for Protective Clothing: Chemically resistant materials and fabrics.Wear fire/flame resistant/retardant clothing.

Hand Protection: Wear chemically resistant protective gloves.Insulated gloves.

Eye Protection: Chemical goggles or face shield.

Skin and Body Protection: Wear suitable protective clothing.

Respiratory Protection: Use a NIOSH-approved self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Thermal Hazard Protection: Wear suitable protective clothing.
Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State	:	Gas
Appearance	:	Clear, colorless gas
Odor	:	Unpleasant
Odor Threshold	:	Not available
pH	:	Not available
Relative Evaporation Rate (butylacetate=1)	:	> 1
Melting Point	:	Not available
Freezing Point	:	Not available
Boiling Point	:	-1°C (30.2°F)
Flash Point	:	-73 °C (-99.4°F)
Auto-ignition Temperature	:	399 °C (750.2°F)
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Extremely flammable gas
Lower Flammable Limit	:	1.9 %
Upper Flammable Limit	:	8.5 %
Vapor Pressure	:	2670 mm Hg 37.8°C (100°F)
Vapor Density	:	2 (air = 1)
Relative Density	:	0.58 @15.6°C (60°F)
Specific Gravity	:	Not available
Solubility	:	Negligible
Log Pow	:	Not available
Log Kow	:	Not available
Viscosity, Kinematic	:	Not available
Viscosity, Dynamic	:	Not available
Explosion Data – Sensitivity to Mechanical Impact	:	Not expected to present an explosion hazard due to mechanical impact.
Explosion Data – Sensitivity to Static Discharge	:	Static discharge could act as an ignition source.

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Hazardous reactions will not occur under normal conditions.
Chemical Stability: Extremely flammable gas. Stable at standard temperature and pressure.
Possibility of Hazardous Reactions: Hazardous polymerization will not occur.
Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks. Incompatible materials. Avoid ignition sources.
Incompatible Materials: Strong acids, strong bases, strong oxidizers, halogenated compounds, chlorine.
Hazardous Decomposition Products: Carbon oxides (CO, CO2), hydrocarbons, sulfur oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity : Not classified
LD50 and LC50 Data Not available
Skin Corrosion/Irritation: Not classified
Serious Eye Damage/Irritation: Not classified
Respiratory or Skin Sensitization: Not classified
Germ Cell Mutagenicity: Not classified
Teratogenicity: Not available
Carcinogenicity: Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified
Reproductive Toxicity: Not classified
Specific Target Organ Toxicity (Single Exposure): Not classified
Aspiration Hazard: Not classified
Symptoms/Injuries After Inhalation: Gas can be toxic as a simple asphyxiant by displacing oxygen from the air. Asphyxia by lack of oxygen: risk of death. May cause drowsiness or dizziness.
Symptoms/Injuries After Skin Contact: Contact with the liquid may cause cold burns/frostbite.
Symptoms/Injuries After Eye Contact: This gas is non-irritating; but direct contact with liquefied/pressurized gas or frost particles may produce severe and possibly permanent eye damage from freeze burns.
Symptoms/Injuries After Ingestion: Ingestion is not considered a potential route of exposure. Non-irritating; but solid and liquid forms of this material and pressurized gas may cause freeze burns.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data

Isobutane (75-28-5)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

Butane (106-97-8)	
LC50 Inhalation Rat (mg/l)	658 mg/l (Exposure time: 4 h)

Ethyl mercaptan (75-08-1)	
LD50 Oral Rat	517 mg/kg
LD50 Dermal Rat	> 2000 mg/kg
LC50 Inhalation Rat (ppm)	4299 ppm (Exposure time: 4 h)

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

No additional information available

Persistence and Degradability

Butane	
Persistence and Degradability	Product is biodegradeable

Bioaccumulative Potential

Butane	
Bioaccumulative Potential	Not expected to bioaccumulate.

Isobutane (75-28-5)	
BCF fish 1	1.57 - 1.97
Log Pow	2.88 (at 20 °C)

Butane (106-97-8)	
Log Pow	2.89

Mobility in Soil Not available

Other Adverse Effects

Other adverse effects: Can cause frost damage to vegetation. Has photochemical ozone creation potential.
Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.
Additional Information: Handle empty containers with care because residual vapors are flammable. Empty gas cylinders should be returned to the vendor for recycling or refilling.

SECTION 14: TRANSPORT INFORMATION

In Accordance With ICAO/IATA/IMDG/DOT

14.1. UN Number

UN-No.(DOT) : 1075

DOT NA no. UN1075, Butane, 2.1

14.2. UN Proper Shipping Name

DOT Proper Shipping Name : Petroleum gases, liquefied or Liquefied petroleum gas

Department of Transportation (DOT) Hazard Classes : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115

Hazard Labels (DOT) : 2.1 - Flammable gas

DOT Special Provisions (49 CFR 172.102) : T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter.

DOT Packaging Exceptions (49 CFR 173.xxx) : 306

DOT Packaging Non Bulk (49 CFR 173.xxx) : 304

DOT Packaging Bulk (49 CFR 173.xxx) : 314;315

14.3. Additional Information

Emergency Response Guide (ERG) Number : 115

Other information : No supplementary information available.

Transport by Sea

DOT Vessel Stowage Location : E - The material may be stowed ''on deck'' or ''under deck'' on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length, but is prohibited from carriage on passenger vessels in which the limiting number of passengers is exceeded.

DOT Vessel Stowage Other : 40 - Stow ''clear of living quarters''

Air Transport

DOT Quantity Limitations Passenger Aircraft/Rail (49 CFR 173.27) : Forbidden

DOT Quantity Limitations Cargo Aircraft Only (49 CFR 175.75) : 150 kg

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Butane	
SARA Section 311/312 Hazard Classes	Fire hazard Immediate (acute) health hazard Sudden release of pressure hazard

Isobutane (75-28-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Butane (106-97-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

US State Regulations

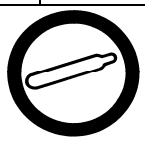
Isobutane (75-28-5)
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities

U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Maine - Chemicals of High Concern
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Minnesota - Chemicals of High Concern
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term

Butane (106-97-8)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Hawaii - Occupational Exposure Limits - TWAs
U.S. - Maine - Chemicals of High Concern
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs

Canadian Regulations

Butane	
WHMIS Classification	Class B Division 1 - Flammable Gas Class A - Compressed Gas
 	

Isobutane (75-28-5)	
Listed on the Canadian DSL (Domestic Substances List) inventory.	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

Butane (106-97-8)	
Listed on the Canadian DSL (Domestic Substances List) inventory. Listed on the Canadian Ingredient Disclosure List	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

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

SECTION 16: OTHER INFORMATION

Revision date : 04/18/2014

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200

GHS Full Text Phrases:

Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Acute 1	Hazardous to the aquatic environment - Acute Hazard Category 1
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Flam. Liq. 1	Flammable liquids Category 1
Liquefied gas	Gases under pressure Liquefied gas
Simple Asphy	Simple Asphyxiant
H220	Extremely flammable gas
H224	Extremely flammable liquid and vapor
H280	Contains gas under pressure; may explode if heated
H302	Harmful if swallowed
H400	Very toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects

Party Responsible for the Preparation of This Document

Williams, Inc.
One Williams Center
Tulsa, OK 74172, US
800-688-7507

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product

North America GHS US 2012 & WHMIS

Natural Gasoline

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations

Revision Date: 11/03/2014 Version: 1.0

SECTION 1: IDENTIFICATION

Product Identifier

Product Form: Mixture

Product Name: Natural Gasoline

Intended Use of the Product

Use of the Substance/Mixture: For professional use only.

Name, Address, and Telephone of the Responsible Party

Company

Williams, Inc.
One Williams Center
Tulsa, OK 74172, US
T 800-688-7507
employeesafetycoe@williams.com

Emergency Telephone Number

Emergency Number : 800-424-9300

SECTION 2: HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

Classification (GHS-US)

Flam. Liq. 1 H224
Skin Irrit. 2 H315
Eye Irrit. 2B H320
Muta. 1B H340
Carc. 1A H350
Repr. 2 H361
STOT SE 3 H336
STOT RE 2 H373
Asp. Tox. 1 H304

Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :

GHS02 GHS07 GHS08

Signal Word (GHS-US) : Danger

Hazard Statements (GHS-US) : H224 - Extremely flammable liquid and vapor.
H304 - May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H320 - Causes eye irritation.
H336 - May cause drowsiness or dizziness.
H340 - May cause genetic defects.
H350 - May cause cancer.
H361 - Suspected of damaging fertility or the unborn child.
H373 - May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements (GHS-US) : 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.
P240 - Ground/bond container and receiving equipment.
P241 - Use explosion-proof electrical, ventilating, and lighting equipment.
P242 - Use only non-sparking tools.

P243 - Take precautionary measures against static discharge.
P260 - Do not breathe vapors, mist, spray.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P280 - Wear eye protection, protective gloves, protective clothing, face protection, respiratory protection.
P301+P310 - If swallowed: Immediately call a poison center/doctor.
P302+P352 - If on skin: Wash with plenty of water.
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - IF INHALED: Remove person to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P312 - Call a poison center/doctor if you feel unwell.
P314 - Get medical advice/attention if you feel unwell.
P321 - Specific treatment (see section 4).
P331 - Do NOT induce vomiting.
P332+P313 - If skin irritation occurs: Get medical advice/attention.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P362 - Take off contaminated clothing and wash before reuse.
P370+P378 - In case of fire: Use asppropriate media to extinguish.
P391 - Collect spillage.
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P403+P235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 - Dispose of contents/container in accordance with local, regional, national, territorial, provincial, and international regulations.

Other Hazards

Other Hazards Not Contributing to the Classification:

Hazardous to the aquatic environment- Acute Hazard Category 2.
Hazardous to the aquatic environment- Long-term Hazard Category 2.
H401 - Toxic to aquatic life
H411- Toxic to aquatic life with long lasting effects.

Contains Sulfur, may release small amounts of hydrogen sulfide. Hydrogen sulfide is a highly flammable, explosive gas under certain conditions, is a toxic gas, and may be fatal. Gas can accumulate in the headspace of closed containers, use caution when opening sealed containers. Heating the product or containers can cause thermal decomposition of the product and release hydrogen sulfide. Flammable vapors can accumulate in head space of closed systems. Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions.

Unknown Acute Toxicity (GHS-US) Not available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Mixture

Name	Product Identifier	% (w/w)	Classification (GHS-US)
Gasoline, natural	(CAS No) 8006-61-9	100	Flam. Liq. 1, H224 Skin Irrit. 2, H315 Muta. 1B, H340 Carc. 1B, H350 Repr. 2, H361 STOT SE 3, H336 Asp. Tox. 1, H304

			Aquatic Acute 2, H401 Aquatic Chronic 2, H411
Contains	**Product Identifier**	**% (w/w)**	**Classification (GHS-US)**
Pentane	(CAS No) 109-66-0	15 - 40	Flam. Liq. 1, H224 Eye Irrit. 2B, H320 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Acute 2, H401 Aquatic Chronic 2, H411
Isopentane	(CAS No) 78-78-4	15 - 40	Flam. Liq. 1, H224 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Acute 2, H401 Aquatic Chronic 2, H411
Butane	(CAS No) 106-97-8	0.5 - 1, 1 - 2	Simple Asphy, H380 Flam. Gas 1, H220 Liquefied gas, H280
Hexane	(CAS No) 110-54-3	1 - 5	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361 STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Acute 2, H401 Aquatic Chronic 2, H411
Methylcyclopentane	(CAS No) 96-37-7	0.5 - 1.5	Flam. Liq. 2, H225 Skin Irrit. 2, H315 STOT SE 3, H335 Asp. Tox. 1, H304 Aquatic Chronic 2, H411
Xylenes (o-, m-, p- isomers)	(CAS No) 1330-20-7	0.1 - 1	Flam. Liq. 3, H226 Acute Tox. 4 (Dermal), H312 Acute Tox. 4 (Inhalation:vapour), H332 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Acute 2, H401 Aquatic Chronic 2, H411
Toluene	(CAS No) 108-88-3	0.1 - 1	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361 STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Acute 2, H401 Aquatic Chronic 3, H412
Benzene	(CAS No) 71-43-2	0.1 - 1	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2A, H319 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372

			Asp. Tox. 1, H304 Aquatic Acute 2, H401 Aquatic Chronic 2, H411
Isobutane	(CAS No) 75-28-5	0.1 - 1	Simple Asphy, H380 Flam. Gas 1, H220 Liquefied gas, H280
Ethane	(CAS No) 74-84-0	< 0.01	Simple Asphy, H380 Flam. Gas 1, H220 Liquefied gas, H280

Multiple WHMIS Ranges have been utilized due to varying composition

Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

Description of First Aid Measures

General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

Inhalation: When symptoms occur: go into open air and ventilate suspected area. Remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER/doctor/physician if you feel unwell.

Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation persists.

Eye Contact: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation persists.

Ingestion: Rinse mouth. Do NOT induce vomiting. Get immediate medical attention.

Most Important Symptoms and Effects Both Acute and Delayed

General: May cause cancer. May cause genetic defects. Suspected of damaging fertility. Suspected of damaging the unborn child. Causes skin irritation. Vapors may cause drowsiness and dizziness. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis.

Inhalation: May cause drowsiness or dizziness. Vapors are heavier than air and may cause asphyxia by reduction of the oxygen content.

Skin Contact: Causes skin irritation.

Eye Contact: Causes eye irritation.

Ingestion: Aspiration into the lungs can cause severe pulmonary edema/hemorrhage. May cause nausea, vomiting, and diarrhea.

Chronic Symptoms: May cause cancer. May cause genetic defects.

Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention. Suspected of damaging fertility. Suspected of damaging the unborn child.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Foam, dry chemical, carbon dioxide, water spray, fog.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

Special Hazards Arising From the Substance or Mixture

Fire Hazard: Extremely flammable liquid and vapor.

Explosion Hazard: May form flammable/explosive vapor-air mixture. Heating may cause an explosion. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Reactivity: Reacts with (strong) oxidizers: (increased) risk of fire. Stable at ambient temperature and under normal conditions of use.

Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Hazardous Combustion Products: Carbon oxides (CO, CO_2). Hydrocarbons. Contains Sulfur, may release small amounts of hydrogen sulfide. Hydrogen sulfide is a highly flammable, explosive gas under certain conditions, is a toxic gas, and may be fatal. Gas can accumulate in the headspace of closed containers, use caution when opening sealed containers. Heating the product or containers can cause thermal decomposition of the product and release hydrogen sulfide. Upon thermal decomposition releases sulfur dioxide (SO_2) a toxic and irritating gas.

Other Information: Do not allow run-off from fire fighting to enter drains or water courses.

Reference to Other Sections

Refer to section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Use special care to avoid static electric charges. Eliminate every possible source of ignition. Keep away from heat/sparks/open flames/hot surfaces - No smoking. Avoid breathing (vapors, mist, spray). Use only outdoors or in a well-ventilated area. Avoid all contact with skin, eyes, or clothing. Do not allow product to spread into the environment.

For Non-Emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

For Emergency Personnel

Protective Equipment: Equip cleanup crew with proper protection.

Emergency Procedures: Ventilate area.

Environmental Precautions

Prevent entry to sewers and public waters. Avoid release to the environment.

Methods and Material for Containment and Cleaning Up

For Containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Use water spray to disperse vapors. For water based spills contact appropriate authorities and abide by local regulations for hydrocarbon spills into waterways. Use only non-sparking tools. Contact competent authorities after a spill.

Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

Precautions for Safe Handling

Additional Hazards When Processed: Handle empty containers with care because residual vapors are flammable. Do not pressurize, cut, or weld containers. Do not puncture or incinerate container. Contains Sulfur, may release small amounts of hydrogen sulfide. Hydrogen sulfide is a highly flammable, explosive gas under certain conditions, is a toxic gas, and may be fatal. Gas can accumulate in the headspace of closed containers, use caution when opening sealed containers. Heating the product or containers can cause thermal decomposition of the product and release hydrogen sulfide. Combustion will produce sulfur dioxide another toxic and irritating gas.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do no eat, drink or smoke when using this product.

Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Proper grounding procedures to avoid static electricity should be followed. Comply with applicable regulations.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep in fireproof place. Store in a well-ventilated place. Keep container tightly closed. Store away from incompatible materials.

Incompatible Materials: Strong acids, strong bases, strong oxidizer, halogenated compounds, alkalis.

Storage Area: Store in a well-ventilated place. Store locked up.

Specific End Use(s)

For professional use only.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

For substances listed in section 3 that are not listed here, there are no established Exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), NIOSH (REL), OSHA (PEL), Canadian provincial governments, or the Mexican government

Butane (106-97-8)		
Mexico	OEL TWA (mg/m³)	1900 mg/m³
Mexico	OEL TWA (ppm)	800 ppm
USA ACGIH	ACGIH STEL (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m³)	1900 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	800 ppm
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL STEL (ppm)	750 ppm
British Columbia	OEL TWA (ppm)	600 ppm
Manitoba	OEL STEL (ppm)	1000 ppm
New Brunswick	OEL TWA (mg/m³)	1900 mg/m³
New Brunswick	OEL TWA (ppm)	800 ppm
Newfoundland & Labrador	OEL STEL (ppm)	1000 ppm
Nova Scotia	OEL STEL (ppm)	1000 ppm
Nunavut	OEL STEL (mg/m³)	2576 mg/m³
Nunavut	OEL STEL (ppm)	1000 ppm
Nunavut	OEL TWA (mg/m³)	1901 mg/m³
Nunavut	OEL TWA (ppm)	800 ppm
Northwest Territories	OEL STEL (mg/m³)	2576 mg/m³
Northwest Territories	OEL STEL (ppm)	1000 ppm
Northwest Territories	OEL TWA (mg/m³)	1901 mg/m³
Northwest Territories	OEL TWA (ppm)	800 ppm
Ontario	OEL TWA (ppm)	800 ppm
Prince Edward Island	OEL STEL (ppm)	1000 ppm
Québec	VEMP (mg/m³)	1900 mg/m³
Québec	VEMP (ppm)	800 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm
Yukon	OEL STEL (mg/m³)	1600 mg/m³
Yukon	OEL STEL (ppm)	750 ppm
Yukon	OEL TWA (mg/m³)	1400 mg/m³
Yukon	OEL TWA (ppm)	600 ppm

Isobutane (75-28-5)		
USA ACGIH	ACGIH STEL (ppm)	1000 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m³)	1900 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	800 ppm
Manitoba	OEL STEL (ppm)	1000 ppm
Newfoundland & Labrador	OEL STEL (ppm)	1000 ppm
Nova Scotia	OEL STEL (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	800 ppm
Prince Edward Island	OEL STEL (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

Pentane (109-66-0)		
Mexico	OEL TWA (mg/m³)	1800 mg/m³
Mexico	OEL TWA (ppm)	600 ppm
Mexico	OEL STEL (mg/m³)	2250 mg/m³
Mexico	OEL STEL (ppm)	760 ppm
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
USA OSHA	OSHA PEL (TWA) (mg/m³)	2950 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	1000 ppm

USA NIOSH	NIOSH REL (TWA) (mg/m³)	350 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	120 ppm
USA NIOSH	NIOSH REL (ceiling) (mg/m³)	1800 mg/m³
USA NIOSH	NIOSH REL (ceiling) (ppm)	610 ppm
USA IDLH	US IDLH (ppm)	1500 ppm (10% LEL)
Alberta	OEL TWA (mg/m³)	1770 mg/m³
Alberta	OEL TWA (ppm)	600 ppm
British Columbia	OEL TWA (ppm)	600 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
New Brunswick	OEL STEL (mg/m³)	2210 mg/m³
New Brunswick	OEL STEL (ppm)	750 ppm
New Brunswick	OEL TWA (mg/m³)	1770 mg/m³
New Brunswick	OEL TWA (ppm)	600 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Nunavut	OEL STEL (mg/m³)	2213 mg/m³
Nunavut	OEL STEL (ppm)	750 ppm
Nunavut	OEL TWA (mg/m³)	1771 mg/m³
Nunavut	OEL TWA (ppm)	600 ppm
Northwest Territories	OEL STEL (mg/m³)	2213 mg/m³
Northwest Territories	OEL STEL (ppm)	750 ppm
Northwest Territories	OEL TWA (mg/m³)	1771 mg/m³
Northwest Territories	OEL TWA (ppm)	600 ppm
Ontario	OEL TWA (ppm)	600 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Québec	VEMP (mg/m³)	350 mg/m³
Québec	VEMP (ppm)	120 ppm
Saskatchewan	OEL STEL (ppm)	750 ppm
Saskatchewan	OEL TWA (ppm)	600 ppm
Yukon	OEL STEL (mg/m³)	2250 mg/m³
Yukon	OEL STEL (ppm)	750 ppm
Yukon	OEL TWA (mg/m³)	1800 mg/m³
Yukon	OEL TWA (ppm)	600 ppm

Isopentane (78-78-4)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
Alberta	OEL TWA (mg/m³)	1770 mg/m³
Alberta	OEL TWA (ppm)	600 ppm
British Columbia	OEL TWA (ppm)	600 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	600 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	750 ppm
Saskatchewan	OEL TWA (ppm)	600 ppm

Benzene (71-43-2)		
Mexico	OEL TWA (mg/m³)	3.2 mg/m³
Mexico	OEL TWA (ppm)	1 ppm
Mexico	OEL STEL (mg/m³)	16 mg/m³
Mexico	OEL STEL (ppm)	5 ppm
USA ACGIH	ACGIH TWA (ppm)	0.5 ppm

USA ACGIH	ACGIH STEL (ppm)	2.5 ppm
USA OSHA	OSHA PEL (TWA) (ppm)	10 ppm 1 ppm
USA OSHA	OSHA PEL (STEL) (ppm)	5 ppm (see 29 CFR 1910.1028)
USA OSHA	OSHA PEL (Ceiling) (ppm)	25 ppm
USA NIOSH	NIOSH REL (TWA) (ppm)	0.1 ppm
USA NIOSH	NIOSH REL (STEL) (ppm)	1 ppm
USA IDLH	US IDLH (ppm)	500 ppm
Alberta	OEL STEL (mg/m³)	8 mg/m³
Alberta	OEL STEL (ppm)	2.5 ppm
Alberta	OEL TWA (mg/m³)	1.6 mg/m³
Alberta	OEL TWA (ppm)	0.5 ppm
British Columbia	OEL STEL (ppm)	2.5 ppm
British Columbia	OEL TWA (ppm)	0.5 ppm
Manitoba	OEL STEL (ppm)	2.5 ppm
Manitoba	OEL TWA (ppm)	0.5 ppm
New Brunswick	OEL STEL (mg/m³)	8 mg/m³
New Brunswick	OEL STEL (ppm)	2.5 ppm
New Brunswick	OEL TWA (mg/m³)	1.6 mg/m³
New Brunswick	OEL TWA (ppm)	0.5 ppm
Newfoundland & Labrador	OEL STEL (ppm)	2.5 ppm
Newfoundland & Labrador	OEL TWA (ppm)	0.5 ppm
Nova Scotia	OEL STEL (ppm)	2.5 ppm
Nova Scotia	OEL TWA (ppm)	0.5 ppm
Nunavut	OEL STEL (mg/m³)	80 mg/m³
Nunavut	OEL STEL (ppm)	25 ppm
Nunavut	OEL TWA (mg/m³)	32 mg/m³
Nunavut	OEL TWA (ppm)	10 ppm
Northwest Territories	OEL STEL (mg/m³)	80 mg/m³
Northwest Territories	OEL STEL (ppm)	25 ppm
Northwest Territories	OEL TWA (mg/m³)	32 mg/m³
Northwest Territories	OEL TWA (ppm)	10 ppm
Ontario	OEL STEL (ppm)	2.5 ppm (applies to workplaces to which the designated substance regulation does not apply)
Ontario	OEL TWA (ppm)	0.5 ppm (applies to workplaces to which the designated substances regulation does not apply)
Prince Edward Island	OEL STEL (ppm)	2.5 ppm
Prince Edward Island	OEL TWA (ppm)	0.5 ppm
Québec	VECD (mg/m³)	15.5 mg/m³
Québec	VECD (ppm)	5 ppm
Québec	VEMP (mg/m³)	3 mg/m³
Québec	VEMP (ppm)	1 ppm
Yukon	OEL Ceiling (mg/m³)	32 mg/m³
Yukon	OEL Ceiling (ppm)	10 ppm
Yukon	OEL TWA (mg/m³)	32 mg/m³

Hexane (110-54-3)		
Mexico	OEL TWA (mg/m³)	176 mg/m³
Mexico	OEL TWA (ppm)	50 ppm
USA ACGIH	ACGIH TWA (ppm)	50 ppm
USA OSHA	OSHA PEL (TWA) (mg/m³)	1800 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	500 ppm

USA NIOSH	NIOSH REL (TWA) (mg/m³)	180 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	50 ppm
USA IDLH	US IDLH (ppm)	1100 ppm (10% LEL)
Alberta	OEL TWA (mg/m³)	176 mg/m³
Alberta	OEL TWA (ppm)	50 ppm
British Columbia	OEL TWA (ppm)	20 ppm
Manitoba	OEL TWA (ppm)	50 ppm
New Brunswick	OEL TWA (mg/m³)	176 mg/m³
New Brunswick	OEL TWA (ppm)	50 ppm
Newfoundland & Labrador	OEL TWA (ppm)	50 ppm
Nova Scotia	OEL TWA (ppm)	50 ppm
Nunavut	OEL STEL (mg/m³)	440 mg/m³
Nunavut	OEL STEL (ppm)	125 ppm
Nunavut	OEL TWA (mg/m³)	352 mg/m³
Nunavut	OEL TWA (ppm)	100 ppm
Northwest Territories	OEL STEL (mg/m³)	440 mg/m³
Northwest Territories	OEL STEL (ppm)	125 ppm
Northwest Territories	OEL TWA (mg/m³)	352 mg/m³
Northwest Territories	OEL TWA (ppm)	100 ppm
Ontario	OEL TWA (ppm)	50 ppm
Prince Edward Island	OEL TWA (ppm)	50 ppm
Québec	VEMP (mg/m³)	176 mg/m³
Québec	VEMP (ppm)	50 ppm
Saskatchewan	OEL STEL (ppm)	62.5 ppm
Saskatchewan	OEL TWA (ppm)	50 ppm
Yukon	OEL STEL (mg/m³)	450 mg/m³
Yukon	OEL STEL (ppm)	125 ppm
Yukon	OEL TWA (mg/m³)	360 mg/m³
Yukon	OEL TWA (ppm)	100 ppm

Ethane (74-84-0)		
USA ACGIH	ACGIH TWA (ppm)	1000 ppm
Alberta	OEL TWA (ppm)	1000 ppm
British Columbia	OEL TWA (ppm)	1000 ppm
Manitoba	OEL TWA (ppm)	1000 ppm
Newfoundland & Labrador	OEL TWA (ppm)	1000 ppm
Nova Scotia	OEL TWA (ppm)	1000 ppm
Ontario	OEL TWA (ppm)	1000 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

Gasoline, natural (8006-61-9)		
Québec	VECD (mg/m³)	1480 mg/m³
Québec	VECD (ppm)	500 ppm
Québec	VEMP (mg/m³)	890 mg/m³
Québec	VEMP (ppm)	300 ppm

Xylenes (o-, m-, p- isomers) (1330-20-7)		
Mexico	OEL TWA (mg/m³)	435 mg/m³
Mexico	OEL TWA (ppm)	100 ppm
Mexico	OEL STEL (mg/m³)	655 mg/m³
Mexico	OEL STEL (ppm)	150 ppm

USA ACGIH	ACGIH TWA (ppm)	100 ppm
USA ACGIH	ACGIH STEL (ppm)	150 ppm
USA OSHA	OSHA PEL (TWA) (mg/m³)	435 mg/m³
USA OSHA	OSHA PEL (TWA) (ppm)	100 ppm
Alberta	OEL STEL (mg/m³)	651 mg/m³
Alberta	OEL STEL (ppm)	150 ppm
Alberta	OEL TWA (mg/m³)	434 mg/m³
Alberta	OEL TWA (ppm)	100 ppm
British Columbia	OEL STEL (ppm)	150 ppm
British Columbia	OEL TWA (ppm)	100 ppm
Manitoba	OEL STEL (ppm)	150 ppm
Manitoba	OEL TWA (ppm)	100 ppm
New Brunswick	OEL STEL (mg/m³)	651 mg/m³
New Brunswick	OEL STEL (ppm)	150 ppm
New Brunswick	OEL TWA (mg/m³)	434 mg/m³
New Brunswick	OEL TWA (ppm)	100 ppm
Newfoundland & Labrador	OEL STEL (ppm)	150 ppm
Newfoundland & Labrador	OEL TWA (ppm)	100 ppm
Nova Scotia	OEL STEL (ppm)	150 ppm
Nova Scotia	OEL TWA (ppm)	100 ppm
Nunavut	OEL STEL (mg/m³)	652 mg/m³
Nunavut	OEL STEL (ppm)	150 ppm
Nunavut	OEL TWA (mg/m³)	434 mg/m³
Nunavut	OEL TWA (ppm)	100 ppm
Northwest Territories	OEL STEL (mg/m³)	652 mg/m³
Northwest Territories	OEL STEL (ppm)	150 ppm
Northwest Territories	OEL TWA (mg/m³)	434 mg/m³
Northwest Territories	OEL TWA (ppm)	100 ppm
Ontario	OEL STEL (ppm)	150 ppm
Ontario	OEL TWA (ppm)	100 ppm
Prince Edward Island	OEL STEL (ppm)	150 ppm
Prince Edward Island	OEL TWA (ppm)	100 ppm
Québec	VECD (mg/m³)	651 mg/m³
Québec	VECD (ppm)	150 ppm
Québec	VEMP (mg/m³)	434 mg/m³
Québec	VEMP (ppm)	100 ppm
Saskatchewan	OEL STEL (ppm)	150 ppm
Saskatchewan	OEL TWA (ppm)	100 ppm
Yukon	OEL STEL (mg/m³)	650 mg/m³
Yukon	OEL STEL (ppm)	150 ppm
Yukon	OEL TWA (mg/m³)	435 mg/m³
Yukon	OEL TWA (ppm)	100 ppm

Toluene (108-88-3)		
Mexico	OEL TWA (mg/m³)	188 mg/m³
Mexico	OEL TWA (ppm)	50 ppm
USA ACGIH	ACGIH TWA (ppm)	20 ppm
USA OSHA	OSHA PEL (TWA) (ppm)	200 ppm
USA OSHA	OSHA PEL (Ceiling) (ppm)	300 ppm
USA NIOSH	NIOSH REL (TWA) (mg/m³)	375 mg/m³
USA NIOSH	NIOSH REL (TWA) (ppm)	100 ppm
USA NIOSH	NIOSH REL (STEL) (mg/m³)	560 mg/m³

USA NIOSH	NIOSH REL (STEL) (ppm)	150 ppm
USA IDLH	US IDLH (ppm)	500 ppm
Alberta	OEL TWA (mg/m³)	188 mg/m³
Alberta	OEL TWA (ppm)	50 ppm
British Columbia	OEL TWA (ppm)	20 ppm
Manitoba	OEL TWA (ppm)	20 ppm
New Brunswick	OEL TWA (mg/m³)	188 mg/m³
New Brunswick	OEL TWA (ppm)	50 ppm
Newfoundland & Labrador	OEL TWA (ppm)	20 ppm
Nova Scotia	OEL TWA (ppm)	20 ppm
Nunavut	OEL STEL (mg/m³)	560 mg/m³
Nunavut	OEL STEL (ppm)	150 ppm
Nunavut	OEL TWA (mg/m³)	375 mg/m³
Nunavut	OEL TWA (ppm)	100 ppm
Northwest Territories	OEL STEL (mg/m³)	560 mg/m³
Northwest Territories	OEL STEL (ppm)	150 ppm
Northwest Territories	OEL TWA (mg/m³)	375 mg/m³
Northwest Territories	OEL TWA (ppm)	100 ppm
Ontario	OEL TWA (ppm)	20 ppm
Prince Edward Island	OEL TWA (ppm)	20 ppm
Québec	VEMP (mg/m³)	188 mg/m³
Québec	VEMP (ppm)	50 ppm
Saskatchewan	OEL STEL (ppm)	60 ppm
Saskatchewan	OEL TWA (ppm)	50 ppm
Yukon	OEL STEL (mg/m³)	560 mg/m³
Yukon	OEL STEL (ppm)	150 ppm
Yukon	OEL TWA (mg/m³)	375 mg/m³
Yukon	OEL TWA (ppm)	100 ppm

Exposure Controls

Appropriate Engineering Controls: Gas detectors should be used when flammable gases/vapors may be released. Ensure adequate ventilation, especially in confined areas. Proper grounding procedures to avoid static electricity should be followed. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use explosion-proof equipment. Ensure all national/local regulations are observed.

Personal Protective Equipment: Protective goggles. Protective clothing. Respiratory protection of the dependent type. Gloves.

Materials for Protective Clothing: Chemically resistant materials and fabrics. Wear fire/flame resistant/retardant clothing.

Hand Protection: Wear chemically resistant protective gloves. Insulated gloves.

Eye Protection: Chemical goggles or face shield.

Skin and Body Protection: Not available

Respiratory Protection: Use a NIOSH-approved respirator or self-contained breathing apparatus whenever exposure may exceed established Occupational Exposure Limits.

Thermal Hazard Protection: Wear suitable protective clothing.

Other Information: When using, do not eat, drink or smoke.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Information on Basic Physical and Chemical Properties

Physical State : Liquid

Appearance : <0.5 ASTM

Odor : Odorless

Odor Threshold	:	Not available
pH	:	Not available
Evaporation Rate	:	Not available
Melting Point	:	< -51.1°C (-59.98 °F)
Freezing Point	:	< -51.1°C (-59.98 °F)
Boiling Point	:	28.9 - 37.8°C (84 - 100°F)
Flash Point	:	-8.89 °C (16.00 °F)
Auto-ignition Temperature	:	247 °C (476.60 °F)
Decomposition Temperature	:	Not available
Flammability (solid, gas)	:	Extremely flammable liquid
Lower Flammable Limit	:	1.2 %
Upper Flammable Limit	:	7.0 %
Vapor Pressure	:	10-15 psia @ 37.8°C (100°F)
Relative Vapor Density at 20 °C	:	2.5 - 3
Relative Density	:	0.6 - 0.7
Specific Gravity	:	0.6508
Solubility	:	Slightly soluble.
Partition Coefficient: N-octanol/water	:	Not available
Viscosity	:	Not available
Viscosity, Kinematic	:	0.3122 Centistokes
Viscosity, Dynamic	:	0.1893 Centipoise
Explosion Data – Sensitivity to Mechanical Impact	:	Not expected to present an explosion hazard due to mechanical impact.
Explosion Data – Sensitivity to Static Discharge	:	Static discharge could act as an ignition source.

SECTION 10: STABILITY AND REACTIVITY

Reactivity: Reacts with (strong) oxidizers: (increased) risk of fire. Stable at ambient temperature and under normal conditions of use.

Chemical Stability: Extremely flammable liquid and vapor.

Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Open flame. Overheating. Heat. Sparks. Incompatible materials. Avoid ignition sources.

Incompatible Materials: strong acids, strong bases, strong oxidizers, halogenated compounds, may react violently with alkalis.

Hazardous Decomposition Products: Carbon oxides (CO, CO_2), hydrocarbons, organic materials. Contains Sulfur, may release small amounts of hydrogen sulfide. Hydrogen sulfide is a highly flammable, explosive gas under certain conditions, is a toxic gas, and may be fatal. Gas can accumulate in the headspace of closed containers, use caution when opening sealed containers. Heating the product or containers can cause thermal decomposition of the product and release hydrogen sulfide. Upon thermal decomposition releases sulfur dioxide (SO_2) a toxic and irritating gas.

SECTION 11: TOXICOLOGICAL INFORMATION

Information on Toxicological Effects - Product

Acute Toxicity: Not classified

LD50 and LC50 Data: Not available

Skin Corrosion/Irritation: Causes skin irritation.

Serious Eye Damage/Irritation: Causes eye irritation.

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: May cause genetic defects.

Teratogenicity: Not available

Carcinogenicity: May cause cancer.

Specific Target Organ Toxicity (Repeated Exposure): May cause damage to organs through prolonged or repeated exposure.

Reproductive Toxicity: Suspected of damaging fertility or the unborn child.

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

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

Symptoms/Injuries After Inhalation: May cause drowsiness or dizziness. Vapors are heavier than air and may cause asphyxia by reduction of the oxygen content.

Symptoms/Injuries After Skin Contact: Causes skin irritation.

Symptoms/Injuries After Eye Contact: Causes eye irritation

Symptoms/Injuries After Ingestion: Aspiration into the lungs can cause severe pulmonary edema/hemorrhage. May cause nausea, vomiting, and diarrhea.

Information on Toxicological Effects - Ingredient(s)

LD50 and LC50 Data:

Butane (106-97-8)	
LC50 Inhalation Rat	30957 mg/m³ (Exposure time: 4 h)

Isobutane (75-28-5)	
LC50 Inhalation Rat	658 mg/l/4h

Pentane (109-66-0)	
LD50 Dermal Rabbit	3000 mg/kg
LC50 Inhalation Rat	364 g/m³ (Exposure time: 4 h)

Benzene (71-43-2)	
LD50 Oral Rat	3306 mg/kg
LD50 Dermal Rabbit	> 8200 mg/kg
LC50 Inhalation Rat	44.66 mg/l/4h

Hexane (110-54-3)	
LD50 Dermal Rabbit	3000 mg/kg
LC50 Inhalation Rat	48000 ppm/4h

Ethane (74-84-0)	
LC50 Inhalation Rat	658 mg/l/4h

Gasoline, natural (8006-61-9)	
LC50 Inhalation Rat	300 g/m³ (Exposure time: 5 min)

Xylenes (o-, m-, p- isomers) (1330-20-7)	
LD50 Oral Rat	3500 mg/kg
LD50 Dermal Rabbit	> 1700 mg/kg
LC50 Inhalation Rat	47635 mg/l/4h (Exposure time: 4 h)
LC50 Inhalation Rat	6247 ppm/4h (species: Sprague-Dawley)

Toluene (108-88-3)	
LD50 Oral Rat	5580 mg/kg
LD50 Dermal Rabbit	12000 mg/kg

Benzene (71-43-2)	
IARC Group	1
National Toxicity Program (NTP) Status	Evidence of Carcinogenicity, Known Human Carcinogens.

Xylenes (o-, m-, p- isomers) (1330-20-7)	
IARC Group	3

SECTION 12: ECOLOGICAL INFORMATION

Toxicity

Ecology - General: Toxic to aquatic life with long lasting effects.

Pentane (109-66-0)	
LC50 Fish 1	9.87 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss)
EC50 Daphnia 1	9.74 mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC 50 Fish 2	11.59 mg/l (Exposure time: 96 h - Species: Pimephales promelas)

Isopentane (78-78-4)	
EC50 Daphnia 1	2.3 mg/l (Exposure time: 48 h - Species: Daphnia magna)

Benzene (71-43-2)	
LC50 Fish 1	10.7 - 14.7 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
EC50 Daphnia 1	8.76 - 15.6 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
LC 50 Fish 2	5.3 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])
EC50 Daphnia 2	10 mg/l (Exposure time: 48 h - Species: Daphnia magna)

Hexane (110-54-3)	
LC50 Fish 1	2.1 - 2.98 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])

Gasoline, natural (8006-61-9)	
LC50 Fish 1	56 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss)

Xylenes (o-, m-, p- isomers) (1330-20-7)	
LC50 Fish 1	3.3 mg/l
EC50 Daphnia 1	3.82 mg/l (Exposure time: 48 h - Species: water flea)
LC 50 Fish 2	2.661 (2.661 - 4.093) mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static])

Toluene (108-88-3)	
LC50 Fish 1	15.22 - 19.05 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
EC50 Daphnia 1	5.46 - 9.83 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
LC 50 Fish 2	12.6 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static])
EC50 Daphnia 2	11.5 mg/l (Exposure time: 48 h - Species: Daphnia magna)
NOEC chronic crustacea	0.74 mg/l (Ceriodaphnia dubia)

Persistence and Degradability

Natural Gasoline	
Persistence and Degradability	May cause long-term adverse effects in the environment.

Bioaccumulative Potential

Natural Gasoline	
Bioaccumulative Potential	Not established.

Butane (106-97-8)	
Log Pow	2.89

Isobutane (75-28-5)	
BCF Fish 1	1.57 - 1.97
Log Pow	2.88 (at 20 °C)

Pentane (109-66-0)	
Log Pow	3.39

Isopentane (78-78-4)	
Log Pow	3.2 - 3.3

Benzene (71-43-2)	
BCF Fish 1	3.5 - 4.4
Log Pow	1.83

Ethane (74-84-0)	
Log Pow	<= 2.8

Gasoline, natural (8006-61-9)	
Log Pow	2.1 - 6.0

Xylenes (o-, m-, p- isomers) (1330-20-7)	
BCF Fish 1	0.6 (0.6 - 15)
Log Pow	2.77 - 3.15

Mobility in Soil

Natural Gasoline	
Ecology - Soil	Hydrocarbon film may develop and spread on the surface of water. Some low weight components will become volatile, while others will adsorb to sediment particles. Both of these scenarios represent hazards to the aquatic ecosystem.

Other Adverse Effects

Other Information: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, provincial, territorial and international regulations.

Additional Information: Handle empty containers with care because residual vapors are flammable. Empty gas cylinders should be returned to the vendor for recycling or refilling.

SECTION 14: TRANSPORT INFORMATION

In Accordance With ICAO/IATA/DOT/TDG

14.1. UN Number

UN-No.(DOT) : 1268

DOT NA no. : UN1268

14.2. UN Proper Shipping Name

Proper Shipping Name (DOT) : Petroleum products, n.o.s

Department of Transportation (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120

Hazard Classes

Hazard Labels (DOT) : 3 - Flammable liquid

Packing Group (DOT) : I - Great Danger

DOT Special Provisions (49 CFR 172.102) : 144 - If transported as a residue in an underground storage tank (UST), as defined in 40 CFR 280.12, that has been cleaned and purged or rendered inert according to the American Petroleum Institute (API) Standard 1604 (IBR, see 171.7 of this subchapter), then the tank and this material are not subject to any other requirements of this subchapter. However, sediments remaining in the tank that meet the definition for a hazardous material are subject to the applicable regulations of this subchapter.
T11 - 6 178.274(d)(2) Normal..... 178.275(d)(3)
TP1 - The maximum degree of filling must not exceed the degree of filling determined by the following: Degree of filling = 97 / (1 + a (tr - tf)) Where: tr is the maximum mean bulk temperature during transport, and tf is the temperature in degrees celsius of the liquid during filling.
TP8 - A portable tank having a minimum test pressure of 1.5 bar (150 kPa) may be used when the flash point of the hazardous material transported is greater than 0 C (32 F).

DOT Packaging Exceptions (49 CFR 173.xxx) : 150

DOT Packaging Non Bulk (49 CFR 173.xxx) : 201

DOT Packaging Bulk (49 CFR 173.xxx) : 243

14.3. Additional Information

Emergency Response Guide (ERG) Number : 128

Transport by Sea

DOT Vessel Stowage Location : E - The material may be stowed ''on deck'' or ''under deck'' on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length, but is prohibited from carriage on passenger vessels in which the limiting number of passengers is exceeded.

Air Transport

DOT Quantity Limitations Passenger Aircraft/Rail (49 CFR 173.27) : 1 L

DOT Quantity Limitations Cargo Aircraft Only (49 CFR 175.75) : 30 L

SECTION 15: REGULATORY INFORMATION

US Federal Regulations

Natural Gasoline	
SARA Section 311/312 Hazard Classes	Fire hazard Immediate (acute) health hazard Delayed (chronic) health hazard

Butane (106-97-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Isobutane (75-28-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Pentane (109-66-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
EPA TSCA Regulatory Flag	T - T - indicates a substance that is the subject of a Section 4 test rule under TSCA.

Isopentane (78-78-4)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Benzene (71-43-2)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313	
RQ (Reportable Quantity, Section 304 of EPA's List of Lists):	10 lb
SARA Section 313 - Emission Reporting	0.1 %

Hexane (110-54-3)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313	
SARA Section 313 - Emission Reporting	1.0 %

Ethane (74-84-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Methylcyclopentane (96-37-7)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Gasoline, natural (8006-61-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Xylenes (o-, m-, p- isomers) (1330-20-7)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313	
RQ (Reportable Quantity, Section 304 of EPA's List of Lists):	100 lb
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard Fire hazard Immediate (acute) health hazard

SARA Section 313 - Emission Reporting	1.0 %

Toluene (108-88-3)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313	
RQ (Reportable Quantity, Section 304 of EPA's List of Lists):	1000 lb
SARA Section 313 - Emission Reporting	1.0 %

US State Regulations

Benzene (71-43-2)	
U.S. - California - Proposition 65 - Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer.
U.S. - California - Proposition 65 - Developmental Toxicity	WARNING: This product contains chemicals known to the State of California to cause birth defects.
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	WARNING: This product contains chemicals known to the State of California to cause (Male) reproductive harm.

Toluene (108-88-3)	
U.S. - California - Proposition 65 - Developmental Toxicity	WARNING: This product contains chemicals known to the State of California to cause birth defects.
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	WARNING: This product contains chemicals known to the State of California to cause (Female) reproductive harm.

Butane (106-97-8)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Maine - Chemicals of High Concern
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Oregon - Permissible Exposure Limits - TWAs
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs

Isobutane (75-28-5)
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Maine - Chemicals of High Concern
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - Minnesota - Chemicals of High Concern
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term

Pentane (109-66-0)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
U.S. - Idaho - Occupational Exposure Limits - TWAs
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - Michigan - Occupational Exposure Limits - STELs
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - STELs
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Oregon - Permissible Exposure Limits - TWAs
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Tennessee - Occupational Exposure Limits - STELs
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - Effects Screening Levels - Long Term

U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Vermont - Permissible Exposure Limits - STELs
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs

Isopentane (78-78-4)

U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term

Benzene (71-43-2)

U.S. - California - Priority Toxic Pollutants - Human Health Criteria
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)
U.S. - California - SCAQMD - Toxic Air Contaminants - Carcinogens
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Acute
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic
U.S. - California - SDAPCD - Toxic Air Contaminants - Carcinogenic Impacts Must Be Calculated
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)
U.S. - Colorado - Groundwater Quality Standards
U.S. - Colorado - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues
U.S. - Colorado - Hazardous Wastes - Maximum Concentration for the Toxicity Characteristics
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Level Goals (MCLGs)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Levels (MCLs)
U.S. - Connecticut - Carcinogenic Substances
U.S. - Connecticut - Drinking Water Quality Standards - Maximum Contaminant Levels
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Connecticut - Volatile Substances
U.S. - Connecticut - Water Quality Standards - Consumption of Organisms Only
U.S. - Connecticut - Water Quality Standards - Consumption of Water and Organisms
U.S. - Connecticut - Water Quality Standards - Health Designations
U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Florida - Drinking Water Standards - Volatile Organic Contaminants - Maximum Contaminant Levels (MCLs)
U.S. - Georgia - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Idaho - Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - Idaho - Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
U.S. - Idaho - Occupational Exposure Limits - Acceptable Maximum Peak Above the Ceiling Concentration for an 8-Hour Shift
U.S. - Idaho - Occupational Exposure Limits - Ceilings

U.S. - Idaho - Occupational Exposure Limits - TWAs
U.S. - Illinois - Toxic Air Contaminant Carcinogens
U.S. - Illinois - Toxic Air Contaminants
U.S. - Louisiana - Reportable Quantity List for Pollutants
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Maine - Chemicals of High Concern
U.S. - Maryland - Surface Water Quality Standards - Consumption of Organisms Only
U.S. - Maryland - Surface Water Quality Standards - Consumption of Water and Organisms
U.S. - Massachusetts - Allowable Ambient Limits (AALs)
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)
U.S. - Massachusetts - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Threshold Effects Exposure Limits (TELs)
U.S. - Massachusetts - Toxics Use Reduction Act
U.S. - Michigan - Occupational Exposure Limits - Ceilings
U.S. - Michigan - Occupational Exposure Limits - Skin Designations
U.S. - Michigan - Occupational Exposure Limits - STELs
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Michigan - Polluting Materials List
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Groundwater Health Risk Limits
U.S. - Minnesota - Hazardous Substance List
U.S. - Missouri - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Nebraska - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Nebraska - Maximum Concentration of Contaminants for the Toxicity Characteristic
U.S. - New Hampshire - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Prohibited Volatile Organic Compounds
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual
U.S. - New Jersey - Control and Prohibition of Air Pollution by Toxic Substances
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Primary Drinking Water Standards - Maximum Contaminant Levels - MCLs
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)
U.S. - New Mexico - Water Quality - Standards for Ground Water of 10,000 mg/L TDS Concentration or Less
U.S. - New York - Occupational Exposure Limits - Ceilings
U.S. - New York - Occupational Exposure Limits - Skin Designations
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - New York - Priority Chemical Avoidance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - North Carolina - Control of Toxic Air Pollutants
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 1-Hour
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - North Dakota - Air Pollutants - Unit Risk Factors
U.S. - North Dakota - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues
U.S. - North Dakota - Hazardous Wastes - Maximum Concentration for the Toxicity Characteristic

U.S. - North Dakota - Water Quality Standards - Human Health Value for Class III
U.S. - North Dakota - Water Quality Standards - Human Health Value for Classes I, IA, II
U.S. - Oregon - Permissible Exposure Limits - Ceilings
U.S. - Oregon - Permissible Exposure Limits - STELs
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups
U.S. - Pennsylvania - Drinking Water - Maximum Contaminant Levels (MCLs)
RTK - U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
RTK - U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 1-Hour
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 24-Hour
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - Annual
U.S. - Rhode Island - Water Quality Standards - Acute Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Carcinogens
U.S. - Rhode Island - Water Quality Standards - Chronic Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Aquatic Organisms Only
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Water and Aquatic Organisms
U.S. - South Carolina - Maximum Contaminant Levels (MCLs)
U.S. - South Carolina - Toxic Air Pollutants - Maximum Allowable Concentrations
U.S. - South Carolina - Toxic Air Pollutants - Pollutant Categories
U.S. - Tennessee - Occupational Exposure Limits - Ceilings
U.S. - Tennessee - Occupational Exposure Limits - STELs
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - City of Austin - Aerosol Paint and Glue Restrictions
U.S. - Texas - Drinking Water Standards - Maximum Contaminant Levels (MCLs)
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Utah - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Vermont - Hazardous Waste - Hazardous Constituents
U.S. - Vermont - Hazardous Waste - Maximum Contaminant Concentration for Toxicity
U.S. - Vermont - Permissible Exposure Limits - Ceilings
U.S. - Vermont - Permissible Exposure Limits - STELs
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Virginia - Water Quality Standards - Known or Suspected Carcinogens
U.S. - Virginia - Water Quality Standards - Public Water Supply Effluent Limits
U.S. - Virginia - Water Quality Standards - Surface Waters Not Used for the Public Water Supply Effluent Limits
U.S. - Washington - Dangerous Waste - Dangerous Waste Constituents List
U.S. - Washington - Dangerous Waste - Discarded Chemical Products List
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs
U.S. - West Virginia - Air Quality - Toxic Air Pollutant Emission Limits
U.S. - West Virginia - Water Quality - Groundwater Standards - Ceiling Concentrations
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

Hexane (110-54-3)

U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Connecticut - Volatile Substances

U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
U.S. - Idaho - Occupational Exposure Limits - TWAs
U.S. - Illinois - Toxic Air Contaminants
U.S. - Louisiana - Reportable Quantity List for Pollutants
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Toxics Use Reduction Act
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Michigan - Polluting Materials List
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Groundwater Health Risk Limits
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - North Carolina - Control of Toxic Air Pollutants
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - Annual
U.S. - South Carolina - Toxic Air Pollutants - Maximum Allowable Concentrations
U.S. - South Carolina - Toxic Air Pollutants - Pollutant Categories
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - City of Austin - Aerosol Paint and Glue Restrictions
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

Ethane (74-84-0)

U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)

U.S. - Delaware - Accidental Release Prevention Regulations - Sufficient Quantities
U.S. - Delaware - Accidental Release Prevention Regulations - Threshold Quantities
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Delaware - Volatile Organic Compounds Exempt from Requirements
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Volatile Organic Compounds Exempt From Requirements
U.S. - Minnesota - Hazardous Substance List
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Excluded Volatile Organic Compounds
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - TCPA - Extraordinarily Hazardous Substances (EHS)
U.S. - Ohio - Accidental Release Prevention - Threshold Quantities
U.S. - Oregon - Permissible Exposure Limits - TWAs
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Washington - Permissible Exposure Limits - Simple Asphyxiants

Methylcyclopentane (96-37-7)

U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term

Gasoline, natural (8006-61-9)

U.S. - Minnesota - Chemicals of High Concern
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups

Xylenes (o-, m-, p- isomers) (1330-20-7)

U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Acute
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)
U.S. - Colorado - Groundwater Quality Standards
U.S. - Colorado - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Level Goals (MCLGs)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Levels (MCLs)
U.S. - Connecticut - Drinking Water Quality Standards - Maximum Contaminant Levels
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Florida - Drinking Water Standards - Volatile Organic Contaminants - Maximum Contaminant Levels (MCLs)
U.S. - Georgia - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations

U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
U.S. - Idaho - Occupational Exposure Limits - TWAs
U.S. - Illinois - Toxic Air Contaminants
U.S. - Louisiana - Reportable Quantity List for Pollutants
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Massachusetts - Allowable Ambient Limits (AALs)
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)
U.S. - Massachusetts - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Threshold Effects Exposure Limits (TELs)
U.S. - Massachusetts - Toxics Use Reduction Act
U.S. - Michigan - Occupational Exposure Limits - STELs
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Michigan - Polluting Materials List
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Groundwater Health Risk Limits
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - STELs
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - Missouri - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Nebraska - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Primary Drinking Water Standards - Maximum Contaminant Levels - MCLs
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)
U.S. - New Mexico - Water Quality - Standards for Ground Water of 10,000 mg/L TDS Concentration or Less
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - North Carolina - Control of Toxic Air Pollutants
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 1-Hour
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - North Dakota - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues
U.S. - North Dakota - Water Quality Standards - Human Health Value for Classes I, IA, II
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups
U.S. - Pennsylvania - Drinking Water - Maximum Contaminant Levels (MCLs)
RTK - U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 1-Hour
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 24-Hour
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - Annual
U.S. - Rhode Island - Water Quality Standards - Acute Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Chronic Freshwater Aquatic Life Criteria

U.S. - South Carolina - Maximum Contaminant Levels (MCLs)
U.S. - South Carolina - Toxic Air Pollutants - Maximum Allowable Concentrations
U.S. - South Carolina - Toxic Air Pollutants - Pollutant Categories
U.S. - Tennessee - Occupational Exposure Limits - STELs
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - City of Austin - Aerosol Paint and Glue Restrictions
U.S. - Texas - Drinking Water Standards - Maximum Contaminant Levels (MCLs)
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Utah - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Washington - Dangerous Waste - Discarded Chemical Products List
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs
U.S. - West Virginia - Water Quality - Groundwater Standards - Ceiling Concentrations
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

Toluene (108-88-3)

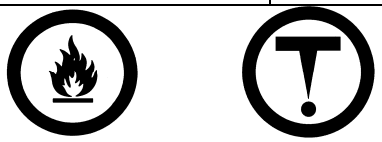
U.S. - California - Priority Toxic Pollutants - Human Health Criteria
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Acute
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)
U.S. - Colorado - Groundwater Quality Standards
U.S. - Colorado - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Level Goals (MCLGs)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Levels (MCLs)
U.S. - Connecticut - Drinking Water Quality Standards - Maximum Contaminant Levels
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Connecticut - Volatile Substances
U.S. - Connecticut - Water Quality Standards - Consumption of Organisms Only
U.S. - Connecticut - Water Quality Standards - Consumption of Water and Organisms
U.S. - Connecticut - Water Quality Standards - Health Designations
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Florida - Drinking Water Standards - Volatile Organic Contaminants - Maximum Contaminant Levels (MCLs)
U.S. - Florida - Essential Chemicals List
U.S. - Georgia - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
U.S. - Idaho - Occupational Exposure Limits - Acceptable Maximum Peak Above the Ceiling Concentration for an 8-Hour Shift
U.S. - Idaho - Occupational Exposure Limits - Ceilings
U.S. - Idaho - Occupational Exposure Limits - TWAs
U.S. - Illinois - Toxic Air Contaminants
U.S. - Louisiana - Reportable Quantity List for Pollutants
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Maine - Chemicals of High Concern
U.S. - Maryland - Surface Water Quality Standards - Consumption of Organisms Only
U.S. - Maryland - Surface Water Quality Standards - Consumption of Water and Organisms
U.S. - Massachusetts - Allowable Ambient Limits (AALs)
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)
U.S. - Massachusetts - Drinking Water - Maximum Contaminant Levels (MCLs)

U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
RTK - U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Threshold Effects Exposure Limits (TELs)
U.S. - Massachusetts - Toxics Use Reduction Act
U.S. - Michigan - Occupational Exposure Limits - STELs
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Michigan - Polluting Materials List
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Groundwater Health Risk Limits
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - STELs
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - Missouri - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Nebraska - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Primary Drinking Water Standards - Maximum Contaminant Levels - MCLs
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Special Health Hazards Substances List
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)
U.S. - New Mexico - Water Quality - Standards for Ground Water of 10,000 mg/L TDS Concentration or Less
U.S. - New York - Occupational Exposure Limits - Ceilings
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - North Carolina - Control of Toxic Air Pollutants
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - North Dakota - Hazardous Wastes - Discarded Chemical Products, Off-Specification Species, Container and Spill Residues
U.S. - North Dakota - Water Quality Standards - Human Health Value for Class III
U.S. - North Dakota - Water Quality Standards - Human Health Value for Classes I, IA, II
U.S. - Oregon - Permissible Exposure Limits - Ceilings
U.S. - Oregon - Permissible Exposure Limits - STELs
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups
U.S. - Pennsylvania - Drinking Water - Maximum Contaminant Levels (MCLs)
RTK - U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
RTK - U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 1-Hour
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - Annual
U.S. - Rhode Island - Water Quality Standards - Acute Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Chronic Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Aquatic Organisms Only
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Water and Aquatic Organisms
U.S. - South Carolina - Maximum Contaminant Levels (MCLs)
U.S. - South Carolina - Toxic Air Pollutants - Maximum Allowable Concentrations
U.S. - South Carolina - Toxic Air Pollutants - Pollutant Categories
U.S. - Tennessee - Occupational Exposure Limits - STELs

U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - City of Austin - Aerosol Paint and Glue Restrictions
U.S. - Texas - Drinking Water Standards - Maximum Contaminant Levels (MCLs)
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Utah - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Vermont - Hazardous Waste - Hazardous Constituents
U.S. - Vermont - Permissible Exposure Limits - STELs
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Virginia - Water Quality Standards - Public Water Supply Effluent Limits
U.S. - Virginia - Water Quality Standards - Surface Waters Not Used for the Public Water Supply Effluent Limits
U.S. - Washington - Dangerous Waste - Dangerous Waste Constituents List
U.S. - Washington - Dangerous Waste - Discarded Chemical Products List
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs
U.S. - West Virginia - Water Quality - Groundwater Standards - Ceiling Concentrations
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

Canadian Regulations

Natural Gasoline	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects



Butane (106-97-8)	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

Isobutane (75-28-5)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

Pentane (109-66-0)	
Listed on the Canadian DSL (Domestic Substances List)	
Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class B Division 2 - Flammable Liquid

Isopentane (78-78-4)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 2 - Flammable Liquid

Benzene (71-43-2)
Listed on the Canadian DSL (Domestic Substances List)
Listed on the Canadian IDL (Ingredient Disclosure List)

IDL Concentration 0.1 %	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Hexane (110-54-3)	
Listed on the Canadian DSL (Domestic Substances List) Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Ethane (74-84-0)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class A - Compressed Gas Class B Division 1 - Flammable Gas

Methylcyclopentane (96-37-7)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Gasoline, natural (8006-61-9)	
Listed on the Canadian DSL (Domestic Substances List) Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Xylenes (o-, m-, p- isomers) (1330-20-7)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Toluene (108-88-3)	
Listed on the Canadian DSL (Domestic Substances List) Listed on the Canadian IDL (Ingredient Disclosure List)	
IDL Concentration 1 %	
WHMIS Classification	Class B Division 2 - Flammable Liquid Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects Class D Division 1 Subdivision B - Toxic material causing immediate and serious toxic effects

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

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision Date : 11/03/2014

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 4 (Dermal)	Acute toxicity (dermal) Category 4
Acute Tox. 4 (Inhalation:vapour)	Acute toxicity (inhalation:vapour) Category 4
Aquatic Acute 2	Hazardous to the aquatic environment - Acute Hazard Category 2

Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Asp. Tox. 1	Aspiration hazard Category 1
Carc. 1A	Carcinogenicity Category 1A
Carc. 1B	Carcinogenicity Category 1B
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Eye Irrit. 2B	Serious eye damage/eye irritation Category 2B
Flam. Gas 1	Flammable gases Category 1
Flam. Liq. 1	Flammable liquids Category 1
Flam. Liq. 2	Flammable liquids Category 2
Flam. Liq. 3	Flammable liquids Category 3
Liquefied gas	Gases under pressure Liquefied gas
Muta. 1B	Germ cell mutagenicity Category 1B
Repr. 2	Reproductive toxicity Category 2
Simple Asphy	Simple Asphyxiant
Skin Irrit. 2	Skin corrosion/irritation Category 2
STOT RE 1	Specific target organ toxicity (repeated exposure) Category 1
STOT RE 2	Specific target organ toxicity (repeated exposure) Category 2
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H220	Extremely flammable gas
H224	Extremely flammable liquid and vapor
H225	Highly flammable liquid and vapor
H226	Flammable liquid and vapor
H280	Contains gas under pressure; may explode if heated
H304	May be fatal if swallowed and enters airways
H312	Harmful in contact with skin
H315	Causes skin irritation
H319	Causes serious eye irritation
H320	Causes eye irritation
H332	Harmful if inhaled
H335	May cause respiratory irritation
H336	May cause drowsiness or dizziness
H340	May cause genetic defects
H350	May cause cancer
H361	Suspected of damaging fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H401	Toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects

Party Responsible for the Preparation of This Document

Williams, Inc.
One Williams Center
Tulsa, OK 74172, US
800-688-7507

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

North America GHS US 2012 & WHMIS 2

MATERIAL SAFETY DATA SHEET

1 PRODUCT AND COMPANY IDENTIFICATION

Product Name: Natural Gas Condensate

Synonyms: Condensate, Gas Condensate, Distillate, Pipeline Drip, Natural gasoline, Casinghead gasoline, Straight-run gasoline, Isoparaffin mixture, and Drip gas

Manufacturer Name:
Williams, Inc.
One Williams Center
Tulsa, OK 74172
USA

Emergency Telephone:
888-677-2370

Non-emergency Telephone:
800-688-7507

Intended Use: Industrial use

2 HAZARDS IDENTIFICATION

Emergency Overview
Physical State: Liquid
Color: Colorless to brownish-black
Odor: Petroleum

DANGER!
Harmful if inhaled or absorbed through skin. Harmful if swallowed - may enter lungs if swallowed or vomited. Causes skin and eye irritation. High vapor concentrations may cause drowsiness and irritation of the eyes or respiratory tract.
Extremely flammable liquid and vapor - vapor may cause flash fire.

Potential Health Effects

Inhalation: Harmful if inhaled. May cause central nervous system effects.

Eye Contact: Causes eye irritation. High vapor concentrations may cause irritation.

Skin Contact: Harmful if absorbed through skin. Causes skin irritation.

Ingestion: Harmful if swallowed - may enter lungs if swallowed or vomited.

Chronic Health Effects: Long-term exposure to condensate vapor has caused kidney and liver cancer in laboratory animals. Case reports of chronic condensate abuse (such as sniffing) and chronic misuse as a solvent or as a cleaning agent have shown a range of nervous system effects, sudden deaths from heart attacks, blood effects and leukemia. These effects are not expected to occur at exposure levels encountered in the distribution and use of condensate as a motor fuel. Prolonged and repeated exposure to benzene may

cause serious injury to blood forming organs and is associated with anemia and to the later development of acute myelogenous leukemia (AML).

Target Organ(s): | Central nervous system | Eye | Kidney | Liver | Skin | Blood and/or blood-forming organs |

OSHA Regulatory Status: This product is hazardous according to OSHA 29CFR 1910.1200.

3 COMPOSITION / INFORMATION ON INGREDIENTS

General Information: Condensate is a complex mixture of volatile hydrocarbons, primarily in the C3 to C8 range. The composition varies depending on the natural gas source and processing, but typically includes some concentration of benzene.

Chemical Name	CAS-No.	Concentration*
†Natural gas condensates (petroleum)	68919-39-1	97.9 - 99.6%
†Benzene	71-43-2	0.4 - 2.1%

* All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
† This chemical is hazardous according to OSHA/WHMIS criteria.

4 FIRST AID MEASURES

Inhalation: Move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Eye Contact: Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.

Skin Contact: Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.

Ingestion: Call a physician or poison control center immediately. DO NOT induce vomiting. if victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head lower than the hips to help prevent aspiration.

5 FIRE-FIGHTING MEASURES

Extinguishing Media: Extinguish with foam, carbon dioxide, dry powder or water fog.

Unsuitable Extinguishing Media: Not applicable.

Special Fire Fighting Procedures: Self-contained breathing apparatus and full protective clothing should be worn when fighting chemical fires. Use water spray to keep fire-exposed containers cool.

Unusual Fire & Explosion Hazards: Material will float and may ignite on surface of water. Vapors may travel considerable distance to a source of ignition and flash back. Vapors may cause a flash fire or ignite explosively.

Hazardous Combustion Products: Carbon Oxides

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear protective clothing as described in Section 8 of this safety data sheet.

Spill Cleanup Methods: Eliminate all ignition sources. Small Liquid Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Large Spillages: Use water spray to disperse vapors and flush spill area. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.

7 HANDLING AND STORAGE

Handling: Do not breathe mist or vapor. Do not get in eyes, on skin, on clothing. Do not taste or swallow. Use only with adequate ventilation. Wash thoroughly after handling.

Storage: Keep away from heat, sparks and open flame. Keep container tightly closed and in a well-ventilated place. Comply with all national, state, and local codes pertaining to the storage, handling, dispensing, and disposal of flammable liquids. Keep away from food, drink and animal feed. Store away from incompatible materials.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

Chemical Name	Source	Type	Exposure Limits	Notes
Benzene	CA. Alberta OELs	STEL	16 mg/m³ 5 ppm	Skin
Benzene	CA. Alberta OELs	TWA	3.2 mg/m³ 1 ppm	Skin
Benzene	CA. British Columbia OELs	TWA	0.5 ppm	Skin
Benzene	CA. British Columbia OELs	STEL	2.5 ppm	Skin
Benzene	CA. Ontario OELs	STEL	2.5 ppm	
Benzene	CA. Ontario OELs	TWA	0.5 ppm	
Benzene	CA. Quebec OELs	TWA	3 mg/m³ 1 ppm	
Benzene	CA. Quebec OELs	STEL	15.5 mg/m³ 5 ppm	
Benzene	MEX. OELs	STEL	16 mg/m³ 5 ppm	
Benzene	MEX. OELs	TWA	3.2 mg/m³ 1 ppm	
Benzene	US. ACGIH TLV	STEL	2.5 ppm	Skin
Benzene	US. ACGIH TLV	TWA	0.5 ppm	Skin
Benzene	US. NIOSH Guide	IDLH	500 ppm	
Benzene	US. OSHA Spec. Reg.	OSHA Action level	0.5 ppm	
Benzene	US. OSHA Spec. Reg.	STEL	5 ppm	
Benzene	US. OSHA Spec. Reg.	TWA	1 ppm	
Benzene	US. OSHA Z-2 PEL	TWA	10 ppm	
Benzene	US. OSHA Z-2 PEL	Maximum concentration	50 ppm	
Benzene	US. OSHA Z-2 PEL	Ceiling	25 ppm	

Engineering Controls: Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits.

If exposure limits have not been established, maintain airborne levels to an acceptable level.

Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.

Eye Protection: Wear safety glasses with side shields (or goggles). Wear a full-face respirator, if needed.

Hand Protection: Wear chemical-resistant gloves. Contact glove manufacturer for specific information.

Skin Protection: Wear appropriate chemical resistant clothing to prevent any possibility of skin contact.

Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

Environmental Exposure Controls: Environmental manager must be informed of all major spillages.

9 PHYSICAL AND CHEMICAL PROPERTIES

Color: Colorless to brownish-black
Odor: Petroleum
Odor Threshold: No data available.
Physical State: Liquid
pH: Not applicable
Melting Point: No data available.
Freezing Point: No data available.
Boiling Point: 45°C (113°F) - 404°C (759°F)
Flash Point: <-18°C (0°F) (Approximate)
Evaporation Rate: >100 [vs. n-Butyl Acetate = 1]
Flammability (Solid): No data available.
Flammability Limit - Upper (%): 10 (Approximate)
Flammability Limit - Lower (%): 1 (Approximate)
Vapor Pressure: 51 mmHg - 857 mmHg @100°F [Reid]
Vapor Density (Air=1): > 1
Specific Gravity: 0.766 - 0.87
Solubility in Water: Negligible
Solubility (Other): No data available.
Partition Coefficient (n-Octanol/water): No data available.
Autoignition Temperature: No data available.
Decomposition Temperature: No data available.
Viscosity: < 1 cst @38°C
Percent Volatile: 100 %vol
Explosive Properties: No data available

10 STABILITY AND REACTIVITY

Stability: Stable under the prescribed storage conditions.

Conditions to Avoid: Keep away from heat, sparks and open flame. Prevent buildup of vapors or gases to explosive concentrations.

Incompatible Materials: Strong oxidizing agents.

Hazardous Decomposition Products: No data available.

11 TOXICOLOGICAL INFORMATION

Specified Substance(s)
Acute Toxicity:
Test Results:

Chemical Name	Test Results
Natural gas condensates (petroleum)	Dermal LD50 (Rabbit): > 3750 mg/kg
Natural gas condensates (petroleum)	Inhalation LC50 (Rat): > 5.2 mg/l
Natural gas condensates (petroleum)	Oral LD50 (Rat): > 5000 mg/kg

Chronic Toxicity: Contains benzene. Human epidemiology studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-producing system and serious blood disorders, including leukemia. Animal tests suggest that prolonged and/or repeated overexposure to benzene may damage the embryo/fetus. The relevance of these animal studies to humans has not been fully established.

Listed Carcinogens:

Chemical Name	IARC	NTP	OSHA	ACGIH
Benzene	1	Listed	Listed	A1

IARC: 1 = Carcinogenic to Humans; 2A = Probably Carcinogenic to Humans; 2B = Possibly Carcinogenic to Humans; 3 = Not classifiable as to carcinogenicity to humans; 4 = Probably not carcinogenic to humans; Not listed = Not evaluated by IARC.
ACGIH: A1 = Confirmed Human Carcinogen; A2 = Suspected Human Carcinogen; A3 = Confirmed Animal Carcinogen; A4 = Not classifiable as a human carcinogen; A5 = Not suspected to be a human carcinogen; Not listed = Not evaluated by ACGIH.

Product Information
Acute Toxicity:
Test Results: No test data available for the product.

Other Acute: Harmful if inhaled or absorbed through skin. Harmful if swallowed - may enter lungs if swallowed or vomited. Causes severe skin and eye irritation. High vapor concentrations may cause drowsiness and irritation of the eyes or respiratory tract.

Chronic Toxicity: Long-term exposure to gasoline vapor has caused kidney and liver cancer in laboratory animals. Case reports of chronic gasoline abuse (such as sniffing) and chronic misuse as a solvent or as a cleaning agent have shown a range of nervous system effects, sudden deaths from heart attacks, blood effects and leukemia. These effects are not expected to occur at exposure levels encountered in the distribution and use of gasoline as a motor fuel.

12 ECOLOGICAL INFORMATION

Ecotoxicity: There are no data on the ecotoxicity of this product.

Mobility: No data available.

Persistence and Degradability: No data available.

Bioaccumulation Potential: No data available.

13 DISPOSAL CONSIDERATIONS

General Information: Dispose of waste and residues in accordance with local authority requirements.

Disposal Methods: No specific disposal method required.

Container: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14 TRANSPORT INFORMATION

DOT
UN No.: UN1993
Proper Shipping Name: Flammable liquids, n.o.s. (Natural gas condensates)
Class: 3
Packing Group: II
Label(s): 3

TDG
UN No.: UN1993
Proper Shipping Name: Flammable liquid, n.o.s. (Natural gas condensates)
Class: 3
Packing Group: II

IATA
UN No.: UN1993
Proper Shipping Name: Flammable liquid, n.o.s. (Natural gas condensates)
Class: 3
Packing Group: II
Label(s): 3

IMDG
UN No.: UN1993
Proper Shipping Name: Flammable liquid, n.o.s. (Natural gas condensates)
Class: 3
Packing Group: II
EmS No.: F-E, S-E

15 REGULATORY INFORMATION

Canadian Controlled Products Regulations: This product has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information.

WHMIS Classification: B2, D2A, D2B

Mexican Dangerous Statement: This product is dangerous according to Mexican regulations.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-.1052):

Chemical Name	CAS-No.
Benzene	71-43-2

Inventory Status

This product or all components are listed or exempt from listing on the following inventory: TSCA

US Regulations

CERCLA Hazardous Substance List (40 CFR 302.4):

Chemical Name	RQ
Benzene	10 lbs

SARA Title III

Section 302 Extremely Hazardous Substances (40 CFR 355, Appendix A): Not regulated.

Section 311/312 (40 CFR 370):

[X] Acute (Immediate) [X] Chronic (Delayed) [X] Fire [ ] Reactive [ ] Pressure Generating

Section 313 Toxic Release Inventory (40 CFR 372):

Chemical Name	CAS-No.	Reporting threshold for other users	Reporting threshold for manufacturing and processing
Benzene	71-43-2	10000 lbs	25000 lbs

For reporting purposes: the De Minimis Concentration for a toxic chemical in a mixture is 0.1% for carcinogens as defined in 29 CFR 1910.1200(d)(4) or 1% for others.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130):
Not regulated.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3): Benzene

Drug Enforcement Act: Not regulated.

TSCA

TSCA Section 4(a) Final Test Rules & Testing Consent Orders: Not regulated.

TSCA Section 5(a)(2) Final Significant New Use Rules (SNURs) (40CFR 721, Subpt. E): Not regulated.

TSCA Section 5(e) PMN-Substance Consent Orders: Not regulated.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): Not regulated.

State Regulations

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Benzene

Massachusetts Right-To-Know List: Benzene

Michigan Critical Materials List (Michigan Natural Resources and Environmental Protection Act (Act. 451 of 1994)): Benzene

Minnesota Hazardous Substances List: Benzene

New Jersey Right-To-Know List: Benzene

Pennsylvania Right-To-Know List: Benzene

Rhode Island Right-To-Know List: Benzene

16 OTHER INFORMATION

HAZARD RATINGS

	Health Hazard	Fire Hazard	Instability	Special Hazard
NFPA	2	4	0	NONE

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
NFPA Label colored diamond code: Blue - Health; Red - Flammability; Yellow - Instability; White - Special Hazards

	Health Hazard	Flammability	Physical Hazard	Personal Protection
HMIS	2*	4	0	--

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe *- Chronic Health Effect
HMIS Label colored bar code: Blue - Health; Red - Flammability; Orange - Physical Hazards; White - Special

Issue Date: 31-Mar-2009
Supercedes Date: 28-Jul-1999
SDS No.: 1023419
Disclaimer: This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

ATTACHMENT I

Emission Units Table

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

- **Emissions Unit Table**

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment N

EMISSION UNITS TABLE

(Include all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status.)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
1S	**FUG**	**Fractionation Plant 1 (Fugitives Only)**	**2011**	**12,500 bpd (ave)**	**Modified**	**LDAR**
		Fractionation Plant 2 (Fugitives Only)	**2013**	**30,000 bpd (ave)**		
		Truck Loadout (Fugitives Only)	**2011/2016**	**---**		
		Rail Loadout (Fugitives Only)	**2011/2016**	**---**		
		Condensate Unit (Fugitives Only)	**2014**	**---**		
		Inlet Unit (Fugitives Only)	**2011/2013**	**---**		
2S	TLO	Truck/Rail Load-Out	2011/2013	58,200 bpd (ave)	Existing	FL-02 (5E)
3S	TKS	Stabilized Condensate Tanks	2014	3 tanks @ 90,000 gals ea	Existing	Pressure Vessels (Insignificant Emissions)
		NGL Accumulation Tanks	2011	6 tanks @ 61,400 gals ea	Existing	
			2013	6 tanks @ 90,000 gals ea	Existing	
		Propane Accumulation Tanks	2011	4 tanks @ 90,000 gals ea	Existing	
			2011	2 tanks @ 114,000 gals ea	Existing	
			2013	1 tank @ 90,000 gals	Existing	
			2013	2 tanks @ 420,000 gals ea	Existing	
		Butane Accumulation Tanks	2011	2 tanks @ 140,000 gals ea	Existing	
			2013	3 tanks @ 210,000 gals ea	Existing	
		Natural Gasoline Accumulation Tanks	2011	2 tanks @ 60,000 gals ea	Existing	
			2011	1 tank @ 90,000 gals	Existing	
			2013	2 tanks @ 454,000 gals ea	Existing	FL-02 (5S/5E)
4S	TKS2	Slop Liquid Tanks	2012	2 tanks @ 8,240 gals ea	Existing	None
		Diesel Fuel Tank	2012	1 tank @ 520 gals	Existing	
		Gasoline Tank	2012	1 tank @ 520 gals	Existing	
		Methanol (MeOH) Tank	2012	1 tank @ 300 gals	Existing	
		Mercaptan (Odorant) (PressureVessels)	2012	2 tanks @ 1,000 gals ea	Existing	Pressure Vessels
			2013	1 tank @ 3,000 gals	Existing	
1-HTR	1E	Fractionation Plant 1 - Hot Oil Heater-1	2011	45.54 MMBtu/hr	Existing	None
2-HTR	2E	Fractionation Plant 2 - Hot Oil Heater-2A	2013	2 Htrs @ 89.85 MMBtu/hr ea	Existing	None
5S	FL-02 (5E)	Process Flare	2013	28,000 lb/hr	Existing	None
7S	FUG2	Miscellaneous Equipment Leaks	2011	---	Existing	None

[1] For Emission Units (or Sources) use the following numbering system: 1S, 2S, 3S, ... or other appropriate designation.

[2] For Emission Points use the following numbering system: 1E, 2E, 3E, ... or other appropriate designation.

[3] New, modification, removal, etc.

[4] For Control Devices use the following numbering system: 1C, 2C, 3C, ... or other appropriate designation.

Note: The emergency generator engine (EmGen (6S)) is permitted seperately under General Permit G60-C069.

ATTACHMENT J

Emission Points Data Summary Sheet

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

- **Table 1 – Emissions Data**
  - Miscellaneous Tanks (TKS (4S))
  - Frac1 - Hot Oil Heater (1-HTR (1E))
  - Frac2 - Hot Oil Heaters (2x) (2-HTR (2E))
  - New Process Flare (FL-02 (5S/5E))
  - FACILITY WIDE SUMMARY (Including Fugitives)
- **Table 2 – Release Parameter Data**

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment J

EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
		Misc Tanks (TKS2 (4S)) (Slop Oil, Diesel Fuel, Gasoline, Methanol)						NOX	---	---	---	---	Gas	---	
								CO	---	---	---	---	Gas	---	
								VOC	693.86	3,039.12	0.09	0.40	Gas	AP-42	
								SO2	---	---	---	---	Gas	AP-42	
								PM10/2.5	---	---	---	---	Solid/Gas	AP-42	
								Benzene	---	---	---	---	Gas	AP-42	
								Ethylbenzene	---	---	---	---	Gas	AP-42	
								HCHO	---	---	---	---	Gas	AP-42	
								n-Hexane	9.15	40.09	0.02	0.10	Gas	AP-42	
								Toluene	---	---	---	---	Gas	AP-42	
TKS2 (4S)	Upward Vertical	TKS2 (4S)	TKS2 (4S)	na	na	C	8,760	2,2,4-TMP	---	---	---	---	Gas	AP-42	
								Xylenes	---	---	---	---	Gas	AP-42	
								Other HAP	3.3E-03	0.01	3.3E-03	0.01	Gas	AP-42	
								Total HAP	11.34	49.67	0.03	0.11	Gas	AP-42	
								CO	---	---	---	---	Gas	EPA	
								CH4	---	---	---	---	Gas	EPA	
								N2O	---	---	---	---	Gas	EPA	
								CO2e	---	---	---	---	Gas	EPA	

Continued …

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment J

EMISSION POINTS DATA SUMMARY SHEET - Continued

Table 1: Emissions Data - Continued

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
								NOX	4.46	19.56	4.46	19.56	Gas	AP-42	
	Frac1 - Hot Oil Heater (1-HTR (1E))							CO	3.75	16.43	3.75	16.43	Gas	AP-42	
								VOC	0.25	1.08	0.25	1.08	Gas	AP-42	
								SO2	0.03	0.12	0.03	0.12	Gas	AP-42	
								PM10/2.5	0.34	1.49	0.34	1.49	Solid/Gas	AP-42	
								Benzene	9.4E-05	4.1E-04	9.4E-05	4.1E-04	Gas	AP-42	
								Ethylbenzene	---	---	---	---	Gas	AP-42	
								HCHO	3.3E-03	0.01	3.3E-03	0.01	Gas	AP-42	
								n-Hexane	0.08	0.35	0.08	0.35	Gas	AP-42	
								Toluene	1.5E-04	6.6E-04	1.5E-04	6.6E-04	Gas	AP-42	
1-HTR (1E)	Upward Vertical	1-HTR (1E)	1-HTR (1E)	na	na	C	8,760	2,2,4-TMP	---	---	---	---	Gas	AP-42	
								Xylenes	---	---	---	---	Gas	AP-42	
								Other HAP	8.5E-05	3.7E-04	8.5E-05	3.7E-04	Gas	AP-42	
								Total HAP	0.08	0.37	0.08	0.37	Gas	AP-42	
								CO	5,327	23,333	5,327	23,333	Gas	EPA	
								CH4	0.10	0.44	0.10	0.44	Gas	EPA	
								N2O	0.01	0.04	0.01	0.04	Gas	EPA	
								CO2e	5,333	23,357	5,333	23,357	Gas	EPA	

Continued …

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment J

EMISSION POINTS DATA SUMMARY SHEET - Continued

Table 1: Emissions Data - Continued

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
								NOX	6.47	28.34	6.47	17.03	Gas	Vendor	
	Frac2 - Hot Oil Heaters (2x) (2-HTR (2E)) (TOTAL BOTH UNITS)							CO	13.30	58.24	13.30	35.00	Gas	Vendor	
								VOC	0.72	3.15	0.72	1.89	Gas	Vendor	
								SO2	0.11	0.46	0.11	0.28	Gas	AP-42	
								PM10/2.5	1.34	5.86	1.34	3.52	Solid/Gas	AP-42	
								Benzene	3.7E-04	1.6E-03	3.7E-04	9.7E-04	Gas	AP-42	
								Ethylbenzene	---	---	---	---	Gas	AP-42	
								HCHO	0.01	0.06	0.01	0.03	Gas	AP-42	
								n-Hexane	0.32	1.39	0.32	0.83	Gas	AP-42	
								Toluene	6.0E-04	2.6E-03	6.0E-04	1.6E-03	Gas	AP-42	
2-HTR (2E) (Qty: 2)	Upward Vertical	2-HTR (2E) (Qty: 2)	2-HTR (2E) (Qty: 2)	na	na	C	8,760	2,2,4-TMP	---	---	---	---	Gas	AP-42	
								Xylenes	---	---	---	---	Gas	AP-42	
								Other HAP	1.3E-03	5.9E-03	1.3E-03	3.5E-03	Gas	AP-42	
								Total HAP	0.33	1.46	0.33	0.88	Gas	AP-42	
								CO	20,959	91,803	20,959	55,173	Gas	EPA	
								CH4	0.40	1.74	0.40	1.04	Gas	EPA	
								N2O	0.04	0.17	0.04	0.10	Gas	EPA	
								CO2e	20,981	91,898	20,981	55,231	Gas	EPA	

Continued …

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment J

EMISSION POINTS DATA SUMMARY SHEET - Continued

Table 1: Emissions Data - Continued

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
	New Process Flare (FL-02 (5S/5E))							NOX	---	---	85.56	42.31	Gas	TCEQ	
								CO	---	---	170.81	84.46	Gas	TCEQ	
								VOC	28,000	14,006	280.00	140.06	Gas	MB	
								SO2	---	---	0.12	0.06	Gas	AP-42	
								PM10/2.5	---	---	1.48	0.73	Solid/Gas	AP-42	
								Benzene	18.56	9.63	0.19	0.10	Gas	MB	
								Ethylbenzene	9.28	4.82	0.09	0.05	Gas	MB	
								HCHO	---	---	0.05	0.02	Gas	MB	
								n-Hexane	1,123	583	11.23	5.83	Gas	MB	
								Toluene	51.98	26.97	0.52	0.27	Gas	MB	
FL-02 (5S/5E)	Flare	FL-02 (5S/5E)	FL-02 (5S/5E)	na	na	C	8,760	2,2,4-TMP	38.98	20.23	0.39	0.20	Gas	MB	
								Xylenes	185.63	96.33	1.86	0.96	Gas	MB	
								Other HAP	1.3E-04	5.7E-04	1.2E-03	5.7E-04	Gas	MB	
								Total HAP	1,427	741	14.32	7.43	Gas	MB	
								CO	---	---	89,168	44,090	Gas	EPA	
								CH4	835	433	8.35	4.33	Gas	EPA	
								N2O	---	---	0.82	0.45	Gas	EPA	
								CO2e	20,883	10,837	89,621	44,333	Gas	EPA	

Continued …

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment J

EMISSION POINTS DATA SUMMARY SHEET - Continued

Table 1: Emissions Data - Continued

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(Chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] *(ppmv or mg/m^3)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
								NOX	10.93	47.89	96.49	78.89	Gas		
	FACILITY -WIDE SUMMARY (Including Fugitives (FUG (1S) and FUG2 (7S))							CO	17.05	74.67	187.86	135.89	Gas		
								VOC	28,752	17,284	305.65	237.58	Gas		
								SO2	0.13	0.58	0.25	0.45	Gas		
								PM10/2.5	1.68	7.35	3.16	5.74	Solid/Gas		
								Benzene	18.61	9.85	0.21	0.20	Gas		
								Ethylbenzene	9.30	4.89	0.10	0.08	Gas		
								HCHO	0.02	0.07	0.06	0.07	Gas		
								n-Hexane	1,136	637.51	13.03	13.14	Gas		
								Toluene	52.16	27.76	0.60	0.64	Gas		
								2,2,4-TMP	39.09	20.69	0.44	0.42	Gas		
								Xylenes	185.98	97.88	2.02	1.69	Gas		
								Other HAP	4.9E-03	0.02	0.01	0.02	Gas		
								Total HAP	1,443	808.24	16.47	16.26	Gas		
								CO2	26,287	115,135	115,455	122,597	Gas		
								CH4	837.86	444.63	9.66	9.36	Gas		
								N2O	0.05	0.22	0.87	0.60	Gas		
								CO2e	47,248	126,316	115,955	123,009	Gas		

Continued …

Notes: 1 - Emissions from the emergency generator engine (6S) are not included in the above totals as it is permitted separately under Permit G60-C069 and does not affect regulatory applicability of the current application.

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment J

EMISSION POINTS DATA SUMMARY SHEET - Continued

Criteria Pollutants	
Pollutant	**CAS**
NO2	10102-44-0
CO	630-08-0
VOC	na
Propane	74-98-6
i-Butane	75-28-5
n-Butane	106-97-8
SO2	7446-09-5
PM10/2.5	na

Hazardous Air Pollutants (HAPs)	
Pollutant	**CAS**
Benzene	71-43-2
Ethylbenzene	100-41-4
Formadehyde	50-00-0
n-Hexane	110-54-3
Toluene	108-88-3
2,2,4-TMP	540-84-1
Xylenes	1330-20-7
Other HAP	na
Total HAP	na

Greenhouse Gas (GHG) Pollutants	
Pollutant	**CAS**
CO2	124-38-9
CH4	74-82-8
N2O	10024-97-2
CO2e	na

Table 1: Notes

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

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

2 Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

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

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

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

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

7 Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO2, use units of ppmv (See 45CSR10).

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment J

EMISSION POINTS DATA SUMMARY SHEET - Continued

Table 2: Release Parameter Data

Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (oF)	Volumetric Flow[1] (acfm) (A*t operating conditions)*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height[2] *(Release height of emissions above ground level)*	Northing	Easting
1-HTR	**2.00**	**900**	**33,000 (est.)**	**175**	**650**	**30.5**	**4,418.1**	**517.4**
2-HTR	**6.00**	**448**	**34,773**	**20.5**	**650**	**30**	**4,418.1**	**517.4**
	6.00	**448**	**34,773**	**20.5**	**650**	**30**	**4,418.1**	**517.4**
FL-02 (5E)	**1.25**	**1,832**	**12,967**	**175.4 (est.)**	**650**	**190**	**4,418.1**	**517.4**

[1] Give at operating conditions. Include inerts.
2 Release height of emissions above ground level.

ATTACHMENT K

Fugitive Emissions Data Summary Sheet

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

- **Application Forms Checklist – Fugitive Emissions**
- **Fugitive Emissions Summary**
- **Description of Fugitive Emissions**

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS

1.) Will there be haul road activities?

☐ Yes ☑ No

☐ If Yes, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.

2.) Will there be Storage Piles?

☐ Yes ☑ No

☐ If Yes, then complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.

3.) Will there be Liquid Loading/Unloading Operations?

☐ Yes ☑ **No** **(Totally Enclosed - Included in Equipment Leaks, below)**

☐ If Yes, then complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.

4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation?

☐ Yes ☑ No

☐ If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET.

5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)?

☑ **Yes** ☐ No

☑ **If Yes, then complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.**

6.) Will there be General Clean-up VOC Operations?

☐ Yes ☑ No

☐ If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET.

7.) Will there be any other activities that generate fugitive emissions?

☐ Yes ☑ No

☐ If Yes, then complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.

If you answered “NO” to all of the items above, it is not necessary to complete the following table, “Fugitive Emissions Summary.”

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.
Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions.

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants Chemical Name/CAS[1]	Maximum Potential Pre-Controlled Emissions[2]		Maximum Potential Controlled Emissions[3]		Est. Method Used[4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Paved Haul Roads	na	---	---	---	---	---
Unpaved Haul Roads	na	---	---	---	---	---
Storage Pile Emissions	na	---	---	---	---	---
Loading/Unloading Operations	**na**	**(Totally Enclosed - Included in Equipment Leaks, below)**				
Wastewater Treatment	na	---	---	---	---	---
Equipment Leaks (FUG (1S) and FUG2 (7S))	**VOC**	**56.68**	**234.65**	**24.60**	**94.15**	**O - AP-42**
	Benzene	**0.05**	**0.21**	**0.02**	**0.10**	**MB**
	E-Benzene	**0.02**	**0.08**	**0.01**	**0.04**	**MB**
	n-Hexane	**2.94**	**12.89**	**1.38**	**6.03**	**MB**
	Toluene	**0.18**	**0.79**	**0.08**	**0.37**	**MB**
	2,2,4-TMP	**0.11**	**0.46**	**0.05**	**0.22**	**MB**
	Xylenes	**0.35**	**1.55**	**0.17**	**0.73**	**MB**
	Other HAP	**negligible**	**negligible**	**negligible**	**negligible**	**MB**
	Total HAP	**3.65**	**15.98**	**1.71**	**7.48**	**MB**
	CO	**---**	**---**	**---**	**---**	**---**
	CH4	**2.05**	**8.97**	**0.81**	**3.54**	**O - GWP**
	N2O	**---**	**---**	**---**	**---**	**---**
	CO2e	**51**	**224**	**20**	**88**	**O - GWP**
General Clean-up VOC Emissions	na	---	---	---	---	---
Other	na	---	---	---	---	---

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases, etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in min (e.g. 5 lb VOC/20 min batch).

[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in min (e.g. 5 lb VOC/20 min batch).

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

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment K

DESCRIPTION OF FUGITIVE EMISSIONS

Soure Category	Pollutant	Number of Source Components[1]	Number of Components Monitored by Frequency[2]	Average Time to Repair (Days)[3]	Estimated Annual Emission Rate (lb/yr)[4]
Pumps[5]	Light Liquid VOC[6,7]	47	40 CFR 60 Subpart OOOO	≤ 15	3,681
	Heavy Liquid VOC[8]	---	---	---	---
	Non-VOC[9]	---	---	---	---
Valves[10]	Gas VOC	1,157	40 CFR 60 Subpart OOOO	≤ 15	11,499
	Light Liquid VOC	4,258	40 CFR 60 Subpart OOOO	≤ 15	32,893
	Heavy Liquid VOC	---	---	---	---
	Non-VOC	---	---	---	---
Safety Relief Valves[11]	Gas VOC	---	---	---	---
	Light Liquid VOC	---	---	---	---
	Non-VOC	---	---	---	---
Open Ended Lines[12]	Gas VOC	---	---	---	---
	Light Liquid VOC	---	---	---	---
	Non-VOC	---	---	---	---
Sampling Connections[13]	Gas VOC	---	---	---	---
	Light Liquid VOC	---	---	---	---
	Non-VOC	---	---	---	---
Compressors	Gas VOC	---	---	---	---
	Non-VOC	---	---	---	---
Flanges	Gas VOC	1,199	40 CFR 60 Subpart OOOO	≤ 15	7,751
	Light Liquid VOC	4,094	40 CFR 60 Subpart OOOO	≤ 15	8,698
	Non-VOC	---	---	---	---
Connectors	Gas VOC	1,572	40 CFR 60 Subpart OOOO	≤ 15	3,617
	Light Liquid VOC	15,971	40 CFR 60 Subpart OOOO	≤ 15	43,397
	Non-VOC	---	---	---	---
Other*	Gas VOC	353	40 CFR 60 Subpart OOOO	≤ 15	56,307
	Light Liquid VOC	86	40 CFR 60 Subpart OOOO	≤ 15	12,427
	Non-VOC	---	---	---	---
				TOTAL (lb/yr)	**180,271**
				TOTAL (tpy)	**90.14**

*Other components include compressor seals, relief valves, diaphragms, drains, meters, etc.

Does NOT Include FUG2
Miscellaneous Equipment Leaks

Attachment K
DESCRIPTION OF FUGITIVE EMISSIONS - Continued

Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.

2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in visual or soap-bubble leak detection ppm. Do not include monitoring by methods. "M/Q(M)/Q/SA/A/0" means the time period between inspections as follows:
Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/other (specify time period)

If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category valves, gas service: 0/50/0/75/0/50 (bimonthly).

3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.

4. Note the method used: MB - material balance; EPA - emission factors established by EPA (cite document used);
EE - engineering estimate; 0 - other method, such as in-house emission factor (specify).

5. Do not include in the equipment count seal-less pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)

6. Volatile organic compounds (VOC) means the term as defined in 40 CFR. 51.100 (s).

7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C, then the fluid is defined as a light liquid.

8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°c. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20°C. then the fluid is defined as a heavy liquid.

9. LIST CO, H2S, mineral acids, NO, SO, etc. DO NOT LIST H, H2O, N, O, and Noble Gases.

10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.

11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.

12. Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.

13. Do not include closed-purge sampling connections.

ATTACHMENT N

Supporting Emissions Calculations

"30. Provide all **Supporting Emissions Calculations** as Attachment N."

- **Emission Summary Spreadsheets**
  - Criteria Pollutants - Controlled Emissions Summary
  - Hazardous Air Pollutants - Controlled Emissions Summary
  - Greenhouse Gas (GHG) - Emissions Summary
  - Pre-Controlled Emissions Summary
- **Unit-Specific Emission Spreadsheets**
  - Fractionation Plant 1 - Process and Piping Fugitive Emissions (FUG (1S))
  - Fractionation Plant 2 - Process and Piping Fugitive Emissions (FUG (1S))
  - Truck Loading - Process and Piping Fugitive Emissions (FUG (1S))
  - Rail Loading - Process and Piping Fugitive Emissions (FUG (1S))
  - Condensate Unit - Process and Piping Fugitive Emissions (FUG (1S))
  - Inlet Unit - Process and Piping Fugitive Emissions (FUG (1S))
  - Facility-Wide - Process and Piping Fugitive Emissions (FUG (1S))
  - FRAC1 - Hot Oil Heater - 45.54 MMBtu/hr (1-HTR (1E))
  - FRAC2 - Hot Oil Heaters - 89.85 MMBtu/hr (Each) (2-HTR (2E))
  - Modified - Process Flare - 620 MMBtu/hr (FL-02 (5S/5E))
  - NEW - Miscellaneous Equipment Fugitive Leaks (FUG2 (7S))
- **AP-42 and GHG Emission Factors**

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment N

Criteria Pollutants - Controlled Emissions Summary

Unit ID	Point ID	Description	Capacity	NOX		CO		VOC		SO2		PM10/2.5		CO2e	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S	**FUG**	**Fractionation Plant 1 (Fugitives Only)**	**12,500 bpd (ave)**	**---**	**---**	**---**	**---**	**20.58**	**90.14**	**---**	**---**	**---**	**---**	**20**	**88**
		Fractionation Plant 2 (Fugitives Only)	**30,000 bpd (ave)**												
		Truck Loadout (Fugitives Only)	**---**												
		Rail Loadout (Fugitives Only)	**---**												
		Condensate Unit (Fugitives Only)	**---**												
		Inlet Unit (Fugitives Only)	**---**												
2S	TLO	Truck/Rail Load-Out	58,200 bpd (ave)	No Emissions Except as Included in Fugitives (1S) and Blowdown/Purge (5S)											
3S	TKS	Stabilized Condensate - Pressure Vessels (3x)	270,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
		NGL - Pressure Vessels (12x)	908,400 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
		Propane - Pressure Vessels (9x)	1,518,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
		Butane - Pressure Vessels (5x)	910,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
		Natural Gasoline - Tanks and Vessels (5x)	1,118,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S)) and Tank Losses to Flare (FL-02 (5S/5E))											
4S	TKS2	Slop Liquids (2x)	16,480 gals (total)	---	---	---	---	0.01	0.05	---	---	---	---	---	---
		Diesel Fuel	520 gals	---	---	---	---	3.7E-03	0.02	---	---	---	---	---	---
		Gasoline	520 gals	---	---	---	---	0.07	0.32	---	---	---	---	---	---
		Methanol (MeOH)	300 gals	---	---	---	---	3.3E-03	0.01	---	---	---	---	---	---
		Mercaptan (Odorant) (3x) (Pressure Vessels)	5,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
1-HTR	1E	Fractionation Plant 1 - Hot Oil Heater-1	45.54 MMBtu/hr	4.46	19.56	3.75	16.43	0.25	1.08	0.03	0.12	0.34	1.49	5,333	23,357
2-HTR	2E	Fractionation Plant 2 - Hot Oil Heater-2A	89.85 MMBtu/hr	3.23	17.03	6.65	35.00	0.36	1.89	0.05	0.28	0.67	3.52	10,491	55,231
		Fractionation Plant 2 - Hot Oil Heater-2B	89.85 MMBtu/hr	3.23		6.65		0.36		0.05		0.67		10,491	
5S	FL-02 (5E)	Process Flare	620 MMBtu/hr	85.56	42.31	170.81	84.46	280.00	140.06	0.12	0.06	1.48	0.73	89,621	44,333
7S	FUG2	Misc Equipment Leaks	---	---	---	---	---	4.02	4.02	---	---	---	---	0.00	0.00
		TOTAL PTE (w/ Fugitives):		**96.49**	**78.89**	**187.86**	**135.89**	**305.65**	**237.58**	**0.25**	**0.45**	**3.16**	**5.74**	**115,955**	**123,009**
		WVDEP-DAQ Exemption:		**6 lb/hr *AND* 10 tpy**		**6 lb/hr AND 10 tpy**		**6 lb/hr AND 10 tpy**		6 lb/hr AND 10 tpy		6 lb/hr AND 10 tpy		**---**	
		TVOP Threshold:			100.00		**100.00**		**100.00**		100.00		100.00		**100,000**
		TOTAL PTE (w/o Fugitives):		**96.49**	**78.89**	**187.86**	**135.89**	**281.05**	**143.43**	**0.25**	**0.45**	**3.16**	**5.74**	**115,935**	**122,920**
		PSD Threshold:			250.00		250.00		250.00		250.00		250.00		na

Notes: 1 - The TLO (2S) thru-put includes Frac1, Frac2, and 6,000 bbl/day Stabilized Condensate, all with a **20.0%** **margin**

2 - Emissions estimates are based on operation at 100% of rated capacity for 8,760 hr/yr; except:

a. The 2-HTR (2E) long-term (tpy) emissions are based on **927.53 MMscf/yr (Total)**

b. The FL-02 (5S/5E) long-term (tpy) emissions are based on **192.66 MMscf/yr**

c. The FUG2 (7S) long-term (tpy) emissions are based on **2,000 hr/yr**

3 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5

4 - CO2e is aggregated Greenhouse Gas (GHG), comprised of carbon dioxide (CO2), methane (CH4) and nitrous oxide (N2O), as adjusted for Global Warming Potential (GWP)

5 - PSD Major Source applicability does not count fugitives since the fractionation facility is not one of 28 named sources (Table 1 in 45 CSR 19).

6 - For Title V Major Source applicability, West Virginia 45 CSR 30 requires that natural gas processing plants, including fractionation plants, to include fugitives.

7 - Emissions from the emergency generator engine (6S) are not included in the above totals as it is permitted separately under Permit G60-C069 and does not affect regulatory applicability of the current application.

Hazardous Air Pollutants (HAP) - Controlled Emissions Summary

Unit ID	Point ID	Description	Benzene		Ethylbenzene		HCHO		n-Hexane		Toluene		2,2,4-TMP		Xylenes		Other HAP		Total HAP	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S	**FUG**	**Fractionation Plant 1 (Fugitives Only)**	**0.02**	**0.10**	**0.01**	**0.04**	**---**	**---**	**1.38**	**6.03**	**0.08**	**0.37**	**0.05**	**0.22**	**0.17**	**0.73**	**---**	**---**	**1.71**	**7.48**
		Fractionation Plant 2 (Fugitives Only)																		
		Truck Loadout (Fugitives Only)																		
		Rail Loadout (Fugitives Only)																		
		Condensate Unit (Fugitives Only)																		
		Inlet Unit (Fugitives Only)																		
2S	TLO	Truck/Rail Load-Out	No Emissions Except as Included in Fugitives (1S) and Blowdown/Purge (5S)																	
3S	TKS	Stabilized Condensate - Pressure Vessels (3x)	No Emissions Except as Included in Fugitives (FUG (1S))																	
		NGL - Pressure Vessels (12x)	No Emissions Except as Included in Fugitives (FUG (1S))																	
		Propane - Pressure Vessels (9x)	No Emissions Except as Included in Fugitives (FUG (1S))																	
		Butane - Pressure Vessels (5x)	No Emissions Except as Included in Fugitives (FUG (1S))																	
		Natural Gasoline - Tanks and Vessels (5x)	No Emissions Except as Included in Fugitives (FUG (1S)) and Tank Losses to Flare (FL-02 (5S/5E))																	
4S	TKS2	Slop Liquids (2x)	---	---	---	---	---	---	2.6E-03	0.01	---	---	---	---	---	---	---	---	2.6E-03	0.01
		Diesel Fuel	---	---	---	---	---	---	9.1E-04	4.0E-03	---	---	---	---	---	---	---	---	9.1E-04	4.0E-03
		Gasoline	---	---	---	---	---	---	0.02	0.08	---	---	---	---	---	---	---	---	0.02	0.08
		Methanol (MeOH)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3.3E-03	0.01	3.3E-03	0.01
		Mercaptan (Odorant) (3x) (Pressure Vessels)	No Emissions Except as Included in Fugitives (FUG (1S))																	
1-HTR	1E	Fractionation Plant 1 - Hot Oil Heater-1	9.4E-05	4.1E-04	---	---	3.3E-03	0.01	0.08	0.35	1.5E-04	6.6E-04	---	---	---	---	8.5E-05	3.7E-04	0.08	0.37
2-HTR	2E	Fractionation Plant 2 - Hot Oil Heater-2A	1.8E-04	9.7E-04	---	---	0.01	0.03	0.16	0.83	3.0E-04	1.6E-03	---	---	---	---	6.7E-04	3.5E-03	0.17	0.88
		Fractionation Plant 2 - Hot Oil Heater-2B	1.8E-04		---		0.01		0.16		3.0E-04		---		---		6.7E-04		0.17	
5S	FL-02 (5E)	Process Flare	0.19	0.10	0.09	0.05	0.05	0.02	11.23	5.83	0.52	0.27	0.39	0.20	1.86	0.96	1.2E-03	5.7E-04	14.32	7.43
7S	FUG2	Misc Equipment Leaks	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
		TOTAL PTE (w/ Fugitives):	**0.21**	**0.20**	**0.10**	**0.08**	**0.06**	**0.07**	**13.03**	**13.14**	**0.60**	**0.64**	**0.44**	**0.42**	**2.02**	**1.69**	**0.01**	**0.02**	**16.47**	**16.26**
		WVDEP-DAQ Exemption:	**2 lb/hr OR 0.5 tpy**		**2 lb/hr OR 5 tpy**		**2 lb/hr OR 0.5 tpy**		**2 lb/hr OR 5 tpy**		**2 lb/hr OR 5 tpy**		**2 lb/hr OR 5 tpy**		**2 lb/hr OR 5 tpy**		**2 lb/hr OR 5 tpy**		**2 lb/hr OR 5 tpy**	
		TVOP Threshold:		10		10		10		10		10		10		10		10		25

Notes: 1 - HCHO is formaldehyde; Other HAP includes, but not limited to, acetaldehyde, acrolein, and methanol (MeOH).

2 - Emissions from the emergency generator engine (6S) are not included in the above totals as it is permitted separately under Permit G60-C069 and does not affect regulatory applicability of the current application.

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment N

Greenhouse Gas (GHG) - Emissions Summary

Unit ID	Point ID	Description	Site Rating	Operating Hours	Heat Input (HHV)	CO2 GWP: 1	CO2e	CH4 GWP: 25	CO2e	N2O GWP: 298	CO2e	TOTAL CO2e	
				hr/yr	MMBtu/hr	tpy	tpy	tpy	tpy	tpy	tpy	lb/hr	tpy
1S	**FUG**	**Fractionation Plant 1 (Fugitives Only)**	**12,500 bpd (ave)**	**8,760**	**---**	**---**	**---**	**4**	**88**	**---**	**---**	**20**	**88**
		Fractionation Plant 2 (Fugitives Only)	**30,000 bpd (ave)**										
		Truck Loadout (Fugitives Only)	**---**										
		Rail Loadout (Fugitives Only)	**---**										
		Condensate Unit (Fugitives Only)	**---**										
		Inlet Unit (Fugitives Only)	**---**										
2S	TLO	Truck/Rail Load-Out	58,200 bpd (ave)	8,760	---	No Emissions Except as Included in Fugitives (1S) and Blowdown/Purge (5S)							
3S	TKS	Stabilized Condensate - Pressure Vessels (3x)	270,000 gals (total)	8,760	---	No Emissions Except as Included in Fugitives (FUG (1S))							
		NGL - Pressure Vessels (12x)	908,400 gals (total)	8,760	---	No Emissions Except as Included in Fugitives (FUG (1S))							
		Propane - Pressure Vessels (9x)	1,518,000 gals (total)	8,760	---	No Emissions Except as Included in Fugitives (FUG (1S))							
		Butane - Pressure Vessels (5x)	910,000 gals (total)	8,760	---	No Emissions Except as Included in Fugitives (FUG (1S))							
		Natural Gasoline - Tanks and Vessels (5x)	1,118,000 gals (total)	8,760	---	No Emissions Except as Included in Fugitives (FUG (1S)) and Tank Losses to Flare (FL-02 (5S/5E))							
4S	TKS2	Slop Liquids (2x)	16,480 gals (total)	8,760	---	---	---	---	---	---	---	---	---
		Diesel Fuel	520 gals	8,760	---	---	---	---	---	---	---	---	---
		Gasoline	520 gals	8,760	---	---	---	---	---	---	---	---	---
		Methanol (MeOH)	300 gals	8,760	---	---	---	---	---	---	---	---	---
		Mercaptan (Odorant) (3x) (Pressure Vessels)	5,000 gals (total)	8,760	---	No Emissions Except as Included in Fugitives (FUG (1S))							
1-HTR	1E	Fractionation Plant 1 - Hot Oil Heater-1	45.54 MMBtu/hr	8,760	45.54	23,333	23,333	0.44	11	0.04	13	5,333	23,357
2-HTR	2E	Fractionation Plant 2 - Hot Oil Heater-2A	89.85 MMBtu/hr	8,760	108.00	55,173	55,173	1.04	26	0.1	31	12,610	55,231
		Fractionation Plant 2 - Hot Oil Heater-2B	89.85 MMBtu/hr										
5S	FL-02 (5E)	Process Flare	620.00 MMBtu/hr	8,760	69.99	44,090	44,090	4.33	108	0.5	134	10,122	44,333
7S	FUG2	Misc Equipment Leaks	---	8,760	---	---	---	---	---	---	---	---	---

TOTAL PTE:	**122,597**		**9**		**0.6**			**123,009**
TVOP Threshold:	na		na		na			**100,000**
PSD Threshold: (	na	**- OR -**	na	**- OR -**	na	**)**	**- AND -**	na

On June 23, 2014, the U.S. Supreme Court said that EPA may not treat greenhouse gases as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit.

Notes: 1 - Emissions from the emergency generator engine (6S) are not included in the above totals as it is permitted separately under Permit G60-C069 and does not affect regulatory applicability of the current application.

Pre-Controlled Emissions Summary

Unit ID	Point ID	Description	Site Rating	NOX		CO		VOC		n-Hexane		Total HAP		CO2e	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1S	**FUG**	**Fractionation Plant 1 (Fugitives Only)**	**12,500 bpd (ave)**	**---**	**---**	**---**	**---**	**52.66**	**230.63**	**2.94**	**12.89**	**3.65**	**15.98**	**51**	**224**
		Fractionation Plant 2 (Fugitives Only)	**30,000 bpd (ave)**												
		Truck Loadout (Fugitives Only)	**---**												
		Rail Loadout (Fugitives Only)	**---**												
		Condensate Unit (Fugitives Only)	**---**												
		Inlet Unit (Fugitives Only)	**---**												
2S	TLO	Truck/Rail Load-Out	58,200 bpd (ave)	No Emissions Except as included in Fugitives (1S) and Blowdown/Purge (5S)											
3S	TKS	Stabilized Condensate - Pressure Vessels (3x)	270,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
		NGL - Pressure Vessels (12x)	908,400 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
		Propane - Pressure Vessels (9x)	1,518,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
		Butane - Pressure Vessels (5x)	910,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
		Natural Gasoline - Tanks and Vessels (5x)	1,118,000 gals (total)	---	---	---	---	693.86	3,039.12	9.15	40.09	11.34	49.67	---	---
4S	TKS2	Slop Liquids (2x)	16,480 gals (total)	---	---	---	---	0.01	0.05	2.6E-03	0.01	2.6E-03	0.01	---	---
		Diesel Fuel	520 gals	---	---	---	---	3.7E-03	0.02	9.1E-04	4.0E-03	9.1E-04	4.0E-03	---	---
		Gasoline	520 gals	---	---	---	---	0.07	0.32	0.02	0.08	0.02	0.08	---	---
		Methanol (MeOH)	300 gals	---	---	---	---	3.3E-03	0.01	---	---	3.3E-03	0.01	---	---
		Mercaptan (Odorant) (3x) (Pressure Vessels)	5,000 gals (total)	No Emissions Except as Included in Fugitives (FUG (1S))											
1-HTR	1E	Fractionation Plant 1 - Hot Oil Heater-1	45.54 MMBtu/hr	4.46	19.56	3.75	16.43	0.25	1.08	0.03	0.12	0.08	0.37	5,333	23,357
2-HTR	2E	Fractionation Plant 2 - Hot Oil Heater-2A	89.85 MMBtu/hr	3.23	17.03	6.65	35.00	0.36	1.89	0.05	0.28	0.17	0.88	10,491	55,231
		Fractionation Plant 2 - Hot Oil Heater-2B	89.85 MMBtu/hr	3.23		6.65		0.36		0.05		0.17		10,491	
5S	FL-02 (5E)	Process Flare	---	---	---	---	---	28,000	14,006	1,123	583	1,427	741	20,883	10,837
7S	FUG2	Misc Equipment Leaks	---	---	---	---	---	4.02	4.02	---	---	---	---	---	---
		TOTAL PTE:		**10.93**	**36.58**	**17.05**	**51.43**	**28,752**	**17,283**	**1,135**	**636**	**1,443**	**808**	**47,248**	**89,649**

Notes: 1 - Emissions from the emergency generator engine (6S) are not included in the above totals as it is permitted separately under Permit G60-C069 and does not affect regulatory applicability of the current application.

The Pre-Control Natural Gasoline Tank Emissions
are estimated as follows:

	4,320.00	Total Flow scf/hr (ave)
x	160,616.63	lb VOC/MMscf
x	2,118.70	lb n-Hexane /MMscf
x	2,624.91	lb total HAP/MMscf
=	693.86	lb VOC/hr Pre-Controlled
=	9.15	lb n-Hexane/hr Pre-Controlled
=	11.34	lb total HAP/hr Pre-Controlled
=	3,039.12	ton VOC/yr Pre-Controlled
=	40.09	ton n-Hexane/yr Pre-Controlled
=	49.67	ton total HAP/yr Pre-Controlled

Fractionation Plant 1 (Frac1 (1S)) - Process Piping Fugitive Emissions

FRAC1 (Fugitives (1S))		Vapor Service				Light Liquid Service			GRAND TOTAL
		NGL	C3 and C4	Fuel Gas	Sub-Total	NGL	C3 and C4	Sub-Total	
Valves	count	23	182	70	275	47	369	416	691
Emission Factor[1]	kg/hr/unit		4.5E-03		---		2.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.23	1.80	0.70	2.73	0.26	2.03	2.29	5.02
LDAR Credit[2]	Control%		87%		---		84%	---	---
TOC Emissions	Controlled - lb/hr	0.03	0.23	0.09	0.35	0.04	0.32	0.37	0.72
Pump Seals	count					4	13	18	18
Emission Factor[1]	kg/hr/unit						1.3E-02	---	---
TOC Emissions	Pre-Control - lb/hr			---		0.13	0.38	0.50	0.50
LDAR Credit[2]	Control%						69%	---	---
TOC Emissions	Controlled - lb/hr					0.04	0.12	0.16	0.16
Others	count	41	66	11	118	0	0	0	118
Emission Factor[1]	kg/hr/unit		8.8E-03		---		7.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.79	1.28	0.21	2.28	0.00	0.00	0.00	2.28
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.79	1.28	0.21	2.28	0.00	0.00	0.00	2.28
Connectors	count	44	339	88	471	790	6,293	7,083	7,554
Emission Factor[1]	kg/hr/unit		2.0E-04		---		2.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.02	0.15	0.04	0.21	0.37	2.91	3.28	3.49
LDAR Credit[2]	Control%		33%		---		33%	---	---
TOC Emissions	Controlled - lb/hr	0.01	0.10	0.03	0.14	0.24	1.95	2.20	2.34
Flanges	count	24	215	86	325	881	367	1,249	1,573
Emission Factor[1]	kg/hr/unit		3.9E-04		---		1.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.02	0.18	0.07	0.28	0.21	0.09	0.30	0.58
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.02	0.18	0.07	0.28	0.21	0.09	0.30	0.58
VOC	Weight %	100.00%	100.00%	1.00%	---	100.00%	100.00%	---	---
	Pre-Control - lb/hr	1.06	3.41	1.0E-02	4.48	0.97	5.41	6.38	10.86
	Pre-Control - tpy	4.64	14.96	0.04	19.64	4.23	23.70	27.94	47.58
	Controlled - lb/hr	0.85	1.80	4.0E-03	2.66	0.54	2.48	3.02	5.68
	Controlled - tpy	**3.74**	**7.88**	**0.02**	**11.63**	**2.36**	**10.88**	**13.24**	**24.87**
Benzene	Weight %	0.23%		---	---	0.23%		---	---
	Pre-Control - lb/hr	2.5E-03		---	2.5E-03	2.2E-03		2.2E-03	4.7E-03
	Pre-Control - tpy	0.01	---	---	0.01	0.01	---	0.01	0.02
	Controlled - lb/hr	2.0E-03		---	2.0E-03	1.3E-03		1.3E-03	3.2E-03
	Controlled - tpy	**0.01**		**---**	**0.01**	**0.01**		**0.01**	**0.01**
Toluene	Weight %	0.85%		---	---	0.85%		---	---
	Pre-Control - lb/hr	9.0E-03		---	9.0E-03	8.2E-03		8.2E-03	1.7E-02
	Pre-Control - tpy	0.04	---	---	0.04	0.04	---	0.04	0.08
	Controlled - lb/hr	7.3E-03		---	7.3E-03	4.6E-03		4.6E-03	1.2E-02
	Controlled - tpy	**0.03**		**---**	**0.03**	**0.02**		**0.02**	**0.05**
Ethylbenzene	Weight %	0.08%		---	---	0.08%		---	---
	Pre-Control - lb/hr	8.8E-04		---	8.8E-04	8.1E-04		8.1E-04	1.7E-03
	Pre-Control - tpy	0.00	---	---	0.00	0.00	---	0.00	0.01
	Controlled - lb/hr	7.1E-04		---	7.1E-04	4.5E-04		4.5E-04	1.2E-03
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.00**		**0.00**	**0.01**
Xylenes	Weight %	1.68%		---	---	1.68%		---	---
	Pre-Control - lb/hr	1.8E-02		---	1.8E-02	1.6E-02		1.6E-02	3.4E-02
	Pre-Control - tpy	0.08	---	---	0.08	0.07	---	0.07	0.15
	Controlled - lb/hr	1.4E-02		---	1.4E-02	9.1E-03		9.1E-03	2.3E-02
	Controlled - tpy	**0.06**		**---**	**0.06**	**0.04**		**0.04**	**0.10**
2,2,4-Trimethylpentane	Weight %	0.50%		---	---	0.50%		---	---
	Pre-Control - lb/hr	5.3E-03		---	5.3E-03	4.8E-03		4.8E-03	1.0E-02
	Pre-Control - tpy	0.02	---	---	0.02	0.02	---	0.02	0.04
	Controlled - lb/hr	4.3E-03		---	4.3E-03	2.7E-03		2.7E-03	7.0E-03
	Controlled - tpy	**0.02**		**---**	**0.02**	**0.01**		**0.01**	**0.03**
n-Hexane	Weight %	13.96%		---	---	13.96%		---	---
	Pre-Control - lb/hr	0.15		---	0.15	0.13		0.13	0.28
	Pre-Control - tpy	0.65	---	---	0.65	0.59	---	0.59	1.24
	Controlled - lb/hr	0.12		---	0.12	0.08		0.08	0.19
	Controlled - tpy	**0.52**		**---**	**0.52**	**0.33**		**0.33**	**0.85**
Total HAP	Weight %	17.31%		---	---	17.31%		---	---
	Pre-Control - lb/hr	0.18		---	0.18	0.17		0.17	0.35
	Pre-Control - tpy	0.80	---	---	0.80	0.73	---	0.73	1.54
	Controlled - lb/hr	0.15		---	0.15	0.09		0.09	0.24
	Controlled - tpy	**0.65**		**---**	**0.65**	**0.41**		**0.41**	**1.06**
Methane (CH4)	Weight %			100.00%	---				---
	Pre-Control - lb/hr			1.02	1.02				1.02
	Pre-Control - tpy	---	---	4.49	4.49	---	---	---	4.49
	Controlled - lb/hr			0.40	0.40				0.40
	Controlled - tpy			**1.77**	**1.77**				**1.77**
								CO2e:	**44.23**

1. Table 2-4; Oil and Gas Production Operations Average Emission Factors (kg/hr/source) from *Protocol for Equipment Leak Emission Estimates* , EPA-453/R-95-017, November 1995

2. Table 4.2-2; *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks . Volume II: Chapter 4* , November 1996

Fractionation Plant 2 (Frac2 (1S)) - Process Piping Fugitive Emissions

FRAC2 (Fugitives (1S))		Vapor Service				Light Liquid Service			GRAND TOTAL
		NGL	C3 and C4	Fuel Gas	Sub-Total	NGL	C3 and C4	Sub-Total	
Valves	count	19	43	70	132	650	1,891	2,541	2,673
Emission Factor[1]	kg/hr/unit		4.5E-03		---		2.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.19	0.43	0.70	1.31	3.58	10.42	14.00	15.31
LDAR Credit[2]	Control%		87%		---		84%	---	---
TOC Emissions	Controlled - lb/hr	0.02	0.06	0.09	0.17	0.57	1.67	2.24	2.41
Pump Seals	count					8	18	25	25
Emission Factor[1]	kg/hr/unit						1.3E-02	---	---
TOC Emissions	Pre-Control - lb/hr			---		0.22	0.50	0.73	0.73
LDAR Credit[2]	Control%						69%	---	---
TOC Emissions	Controlled - lb/hr					0.07	0.16	0.22	0.22
Others	count	48	36	11	96	10	19	29	124
Emission Factor[1]	kg/hr/unit		8.8E-03		---		7.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.94	0.70	0.21	1.86	0.16	0.31	0.47	2.33
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.94	0.70	0.21	1.86	0.16	0.31	0.47	2.33
Connectors	count	4	32	88	124	5,646	1,549	7,195	7,319
Emission Factor[1]	kg/hr/unit		2.0E-04		---		2.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	1.9E-03	0.01	0.04	0.05	2.61	0.72	3.33	3.39
LDAR Credit[2]	Control%		33%		---		33%	---	---
TOC Emissions	Controlled - lb/hr	1.3E-03	0.01	0.03	0.04	1.75	0.48	2.23	2.27
Flanges	count	29	48	86	163	446	1,361	1,806	1,969
Emission Factor[1]	kg/hr/unit		3.9E-04		---		1.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.02	0.04	0.07	0.14	0.11	0.33	0.44	0.58
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.02	0.04	0.07	0.14	0.11	0.33	0.44	0.58
VOC	Weight %	100.00%	100.00%	1.00%	---	100.00%	100.00%	---	---
	Pre-Control - lb/hr	1.15	1.19	1.0E-02	2.35	6.69	12.28	18.97	21.32
	Pre-Control - tpy	5.04	5.19	0.04	10.28	29.30	53.80	83.10	93.38
	Controlled - lb/hr	0.99	0.81	4.0E-03	1.80	2.66	2.94	5.61	7.41
	Controlled - tpy	**4.33**	**3.55**	**0.02**	**7.90**	**11.67**	**12.89**	**24.56**	**32.46**
Benzene	Weight %	0.23%		---	---	0.23%		---	---
	Pre-Control - lb/hr	2.7E-03		---	2.7E-03	0.02		0.02	0.02
	Pre-Control - tpy	0.01	---	---	0.01	0.07	---	0.07	0.08
	Controlled - lb/hr	2.3E-03		---	2.3E-03	0.01		0.01	0.01
	Controlled - tpy	**0.01**		**---**	**0.01**	**0.03**		**0.03**	**0.04**
Toluene	Weight %	0.85%		---	---	0.85%		---	---
	Pre-Control - lb/hr	9.8E-03		---	9.8E-03	5.7E-02		5.7E-02	6.7E-02
	Pre-Control - tpy	0.04	---	---	0.04	0.25	---	0.25	0.29
	Controlled - lb/hr	8.4E-03		---	8.4E-03	2.3E-02		2.3E-02	3.1E-02
	Controlled - tpy	**0.04**		**---**	**0.04**	**0.10**		**0.10**	**0.14**
Ethylbenzene	Weight %	0.08%		---	---	0.08%		---	---
	Pre-Control - lb/hr	9.6E-04		---	9.6E-04	5.6E-03		5.6E-03	6.5E-03
	Pre-Control - tpy	0.00	---	---	0.00	0.02	---	0.02	0.03
	Controlled - lb/hr	8.3E-04		---	8.3E-04	2.2E-03		2.2E-03	3.0E-03
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.01**		**0.01**	**0.01**
Xylenes	Weight %	1.68%		---	---	1.68%		---	---
	Pre-Control - lb/hr	1.9E-02		---	1.9E-02	1.1E-01		1.1E-01	1.3E-01
	Pre-Control - tpy	0.08	---	---	0.08	0.49	---	0.49	0.58
	Controlled - lb/hr	1.7E-02		---	1.7E-02	4.5E-02		4.5E-02	6.1E-02
	Controlled - tpy	**0.07**		**---**	**0.07**	**0.20**		**0.20**	**0.27**
2,2,4-Trimethylpentane	Weight %	0.50%		---	---	0.50%		---	---
	Pre-Control - lb/hr	5.8E-03		---	5.8E-03	3.3E-02		3.3E-02	3.9E-02
	Pre-Control - tpy	0.03	---	---	0.03	0.15	---	0.15	0.17
	Controlled - lb/hr	5.0E-03		---	5.0E-03	1.3E-02		1.3E-02	1.8E-02
	Controlled - tpy	**0.02**		**---**	**0.02**	**0.06**		**0.06**	**0.08**
n-Hexane	Weight %	13.96%		---	---	13.96%		---	---
	Pre-Control - lb/hr	0.16		---	0.16	0.93		0.93	1.09
	Pre-Control - tpy	0.70	---	---	0.70	4.09	---	4.09	4.79
	Controlled - lb/hr	0.14		---	0.14	0.37		0.37	0.51
	Controlled - tpy	**0.60**		**---**	**0.60**	**1.63**		**1.63**	**2.23**
Total HAP	Weight %	17.31%		---	---	17.31%		---	---
	Pre-Control - lb/hr	0.20		---	0.20	1.16		1.16	1.36
	Pre-Control - tpy	0.87	---	---	0.87	5.07	---	5.07	5.95
	Controlled - lb/hr	0.17		---	0.17	0.46		0.46	0.63
	Controlled - tpy	**0.75**		**---**	**0.75**	**2.02**		**2.02**	**2.77**
Methane (CH4)	Weight %			100.00%	---				---
	Pre-Control - lb/hr			1.02	1.02				1.02
	Pre-Control - tpy	---	---	4.49	4.49	---	---	---	4.49
	Controlled - lb/hr			0.40	0.40				0.40
	Controlled - tpy			**1.77**	**1.77**				**1.77**
								CO2e:	**44.23**

1. Table 2-4; Oil and Gas Production Operations Average Emission Factors (kg/hr/source) from *Protocol for Equipment Leak Emission Estimates* , EPA-453/R-95-017, November 1995

2. Table 4.2-2; *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks . Volume II: Chapter 4* , November 1996

Truck Loading (1S) - Process Piping Fugitive Emissions

Truck Loading (Fugitives (1S))		Vapor Service				Light Liquid Service			GRAND TOTAL
		NGL	C3 and C4	Fuel Gas	Sub-Total	NGL	C3 and C4	Sub-Total	
Valves	count	19	67	0	86	209	572	781	867
Emission Factor[1]	kg/hr/unit		4.5E-03		---		2.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.19	0.67	0.00	0.85	1.15	3.15	4.30	5.16
LDAR Credit[2]	Control%		87%		---		84%	---	---
TOC Emissions	Controlled - lb/hr	0.02	0.09	0.00	0.11	0.18	0.50	0.69	0.80
Pump Seals	count					0	0	0	0
Emission Factor[1]	kg/hr/unit						1.3E-02	---	---
TOC Emissions	Pre-Control - lb/hr			---		0.00	0.00	0.00	0.00
LDAR Credit[2]	Control%						69%	---	---
TOC Emissions	Controlled - lb/hr					0.00	0.00	0.00	0.00
Others	count	0	0	0	0	10	29	39	39
Emission Factor[1]	kg/hr/unit		8.8E-03		---		7.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.00	0.00	0.00	0.00	0.16	0.47	0.64	0.64
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.00	0.00	0.00	0.00	0.16	0.47	0.64	0.64
Connectors	count	143	238	0	381	618	338	956	1,337
Emission Factor[1]	kg/hr/unit		2.0E-04		---		2.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.06	0.10	0.0E+00	0.17	0.29	0.16	0.44	0.61
LDAR Credit[2]	Control%		33%		---		33%	---	---
TOC Emissions	Controlled - lb/hr	0.04	0.07	0.00	0.11	0.19	0.10	0.30	0.41
Flanges	count	37	151	0	188	328	255	583	771
Emission Factor[1]	kg/hr/unit		3.9E-04		---		1.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.03	0.13	0.00	0.16	0.08	0.06	0.14	0.30
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.03	0.13	0.00	0.16	0.08	0.06	0.14	0.30
VOC	Weight %	100.00%	100.00%	1.00%	---	100.00%	100.00%	---	---
	Pre-Control - lb/hr	0.28	0.90	0.0E+00	1.18	1.68	3.84	5.52	6.71
	Pre-Control - tpy	1.23	3.94	0.00	5.17	7.36	16.84	24.20	29.37
	Controlled - lb/hr	0.10	0.29	0.0E+00	0.38	0.62	1.14	1.76	2.15
	Controlled - tpy	**0.43**	**1.25**	**0.00**	**1.69**	**2.71**	**5.01**	**7.72**	**9.41**
Benzene	Weight %	0.23%		---	---	0.23%		---	---
	Pre-Control - lb/hr	6.5E-04		---	0.00	3.9E-03		3.9E-03	4.6E-03
	Pre-Control - tpy	2.9E-03	---	---	0.00	0.02	---	0.02	0.02
	Controlled - lb/hr	2.3E-04		---	0.00	1.4E-03		1.4E-03	1.7E-03
	Controlled - tpy	**1.0E-03**		**---**	**0.00**	**0.01**		**0.01**	**0.01**
Toluene	Weight %	0.85%		---	---	0.85%		---	---
	Pre-Control - lb/hr	2.4E-03		---	2.4E-03	1.4E-02		1.4E-02	1.7E-02
	Pre-Control - tpy	0.01	---	---	0.01	0.06	---	0.06	0.07
	Controlled - lb/hr	8.4E-04		---	8.4E-04	5.3E-03		5.3E-03	6.1E-03
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.02**		**0.02**	**0.03**
Ethylbenzene	Weight %	0.08%		---	---	0.08%		---	---
	Pre-Control - lb/hr	2.3E-04		---	2.3E-04	1.4E-03		1.4E-03	1.6E-03
	Pre-Control - tpy	0.00	---	---	0.00	0.01	---	0.01	0.01
	Controlled - lb/hr	8.2E-05		---	8.2E-05	5.2E-04		5.2E-04	6.0E-04
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.00**		**0.00**	**0.00**
Xylenes	Weight %	1.68%		---	---	1.68%		---	---
	Pre-Control - lb/hr	4.7E-03		---	4.7E-03	2.8E-02		2.8E-02	3.3E-02
	Pre-Control - tpy	0.02	---	---	0.02	0.12	---	0.12	0.14
	Controlled - lb/hr	1.7E-03		---	1.7E-03	1.0E-02		1.0E-02	1.2E-02
	Controlled - tpy	**0.01**		**---**	**0.01**	**0.05**		**0.05**	**0.05**
2,2,4-Trimethylpentane	Weight %	0.50%		---	---	0.50%		---	---
	Pre-Control - lb/hr	1.4E-03		---	1.4E-03	8.4E-03		8.4E-03	9.8E-03
	Pre-Control - tpy	0.01	---	---	0.01	0.04	---	0.04	0.04
	Controlled - lb/hr	4.9E-04		---	4.9E-04	3.1E-03		3.1E-03	3.6E-03
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.01**		**0.01**	**0.02**
n-Hexane	Weight %	13.96%		---	---	13.96%		---	---
	Pre-Control - lb/hr	0.04		---	0.04	0.23		0.23	0.27
	Pre-Control - tpy	0.17	---	---	0.17	1.03	---	1.03	1.20
	Controlled - lb/hr	0.01		---	0.01	0.09		0.09	0.10
	Controlled - tpy	**0.06**		**---**	**0.06**	**0.38**		**0.38**	**0.44**
Total HAP	Weight %	17.31%		---	---	17.31%		---	---
	Pre-Control - lb/hr	0.05		---	0.05	0.29		0.29	0.34
	Pre-Control - tpy	0.21	---	---	0.21	1.27	---	1.27	1.49
	Controlled - lb/hr	0.02		---	0.02	0.11		0.11	0.12
	Controlled - tpy	**0.07**		**---**	**0.07**	**0.47**		**0.47**	**0.54**
Methane (CH4)	Weight %			100.00%	---				---
	Pre-Control - lb/hr			0.00	0.00				0.00
	Pre-Control - tpy	---	---	0.00	0.00	---	---	---	0.00
	Controlled - lb/hr			0.00	0.00				0.00
	Controlled - tpy			**0.00**	**0.00**				**0.00**
								CO2e:	**0.00**

1. Table 2-4; Oil and Gas Production Operations Average Emission Factors (kg/hr/source) from *Protocol for Equipment Leak Emission Estimates* , EPA-453/R-95-017, November 1995

2. Table 4.2-2; *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks . Volume II: Chapter 4* , November 1996

Rail Loading (1S) - Process Piping Fugitive Emissions

Rail Loading (Fugitives (1S))		Vapor Service				Light Liquid Service			GRAND TOTAL
		NGL	C3 and C4	Fuel Gas	Sub-Total	NGL	C3 and C4	Sub-Total	
Valves	count	54	175	0	229	50	367	417	646
Emission Factor[1]	kg/hr/unit		4.5E-03		---		2.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.53	1.74	0.00	2.27	0.27	2.02	2.30	4.57
LDAR Credit[2]	Control%		87%		---		84%	---	---
TOC Emissions	Controlled - lb/hr	0.07	0.23	0.00	0.30	0.04	0.32	0.37	0.66
Pump Seals	count					0	0	0	0
Emission Factor[1]	kg/hr/unit						1.3E-02	---	---
TOC Emissions	Pre-Control - lb/hr			---		0.00	0.00	0.00	0.00
LDAR Credit[2]	Control%						69%	---	---
TOC Emissions	Controlled - lb/hr					0.00	0.00	0.00	0.00
Others	count	63	2	0	65	1	18	19	84
Emission Factor[1]	kg/hr/unit		8.8E-03		---		7.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	1.22	0.04	0.00	1.26	0.02	0.29	0.31	1.57
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	1.22	0.04	0.00	1.26	0.02	0.29	0.31	1.57
Connectors	count	58	95	0	153	261	329	590	743
Emission Factor[1]	kg/hr/unit		2.0E-04		---		2.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.03	0.04	0.00	0.07	0.12	0.15	0.27	0.34
LDAR Credit[2]	Control%		33%		---		33%	---	---
TOC Emissions	Controlled - lb/hr	0.02	0.03	0.00	0.05	0.08	0.10	0.18	0.23
Flanges	count	53	221	0	274	162	168	330	604
Emission Factor[1]	kg/hr/unit		3.9E-04		---		1.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.05	0.19	0.00	0.24	0.04	0.04	0.08	0.32
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.05	0.19	0.00	0.24	0.04	0.04	0.08	0.32
VOC	Weight %	100.00%	100.00%	1.00%	---	100.00%	100.00%	---	---
	Pre-Control - lb/hr	1.82	2.01	0.0E+00	3.83	0.45	2.51	2.96	6.79
	Pre-Control - tpy	7.98	8.80	0.00	16.78	1.98	10.99	12.96	29.75
	Controlled - lb/hr	1.35	0.49	0.0E+00	1.83	0.18	0.76	0.94	2.77
	Controlled - tpy	**5.91**	**2.13**	**0.00**	**8.04**	**0.80**	**3.32**	**4.12**	**12.15**
Benzene	Weight %	0.23%		---	---	0.23%		---	---
	Pre-Control - lb/hr	4.2E-03		---	4.2E-03	1.0E-03		1.0E-03	0.01
	Pre-Control - tpy	0.02	---	---	0.02	4.6E-03	---	4.6E-03	0.02
	Controlled - lb/hr	3.1E-03		---	3.1E-03	4.2E-04		4.2E-04	3.6E-03
	Controlled - tpy	**0.01**		**---**	**0.01**	**1.9E-03**		**1.9E-03**	**0.02**
Toluene	Weight %	0.85%		---	---	0.85%		---	---
	Pre-Control - lb/hr	1.6E-02		---	1.6E-02	3.8E-03		3.8E-03	1.9E-02
	Pre-Control - tpy	0.07	---	---	0.07	0.02	---	0.02	0.08
	Controlled - lb/hr	1.1E-02		---	1.1E-02	1.5E-03		1.5E-03	1.3E-02
	Controlled - tpy	**0.05**		**---**	**0.05**	**0.01**		**0.01**	**0.06**
Ethylbenzene	Weight %	0.08%		---	---	0.08%		---	---
	Pre-Control - lb/hr	1.5E-03		---	1.5E-03	3.8E-04		3.8E-04	1.9E-03
	Pre-Control - tpy	0.01	---	---	0.01	0.00	---	0.00	0.01
	Controlled - lb/hr	1.1E-03		---	1.1E-03	1.5E-04		1.5E-04	1.3E-03
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.00**		**0.00**	**0.01**
Xylenes	Weight %	1.68%		---	---	1.68%		---	---
	Pre-Control - lb/hr	3.1E-02		---	3.1E-02	7.6E-03		7.6E-03	3.8E-02
	Pre-Control - tpy	0.13	---	---	0.13	0.03	---	0.03	0.17
	Controlled - lb/hr	2.3E-02		---	2.3E-02	3.1E-03		3.1E-03	2.6E-02
	Controlled - tpy	**0.10**		**---**	**0.10**	**0.01**		**0.01**	**0.11**
2,2,4-Trimethylpentane	Weight %	0.50%		---	---	0.50%		---	---
	Pre-Control - lb/hr	9.1E-03		---	9.1E-03	2.3E-03		2.3E-03	1.1E-02
	Pre-Control - tpy	0.04	---	---	0.04	0.01	---	0.01	0.05
	Controlled - lb/hr	6.8E-03		---	6.8E-03	9.1E-04		9.1E-04	7.7E-03
	Controlled - tpy	**0.03**		**---**	**0.03**	**0.00**		**0.00**	**0.03**
n-Hexane	Weight %	13.96%		---	---	13.96%		---	---
	Pre-Control - lb/hr	0.25		---	0.25	0.06		0.06	0.32
	Pre-Control - tpy	1.11	---	---	1.11	0.28	---	0.28	1.39
	Controlled - lb/hr	0.19		---	0.19	0.03		0.03	0.21
	Controlled - tpy	**0.82**		**---**	**0.82**	**0.11**		**0.11**	**0.94**
Total HAP	Weight %	17.31%		---	---	17.31%		---	---
	Pre-Control - lb/hr	0.32		---	0.32	0.08		0.08	0.39
	Pre-Control - tpy	1.38	---	---	1.38	0.34	---	0.34	1.72
	Controlled - lb/hr	0.23		---	0.23	0.03		0.03	0.26
	Controlled - tpy	**1.02**		**---**	**1.02**	**0.14**		**0.14**	**1.16**
Methane (CH4)	Weight %			100.00%	---				---
	Pre-Control - lb/hr			0.00	0.00				0.00
	Pre-Control - tpy	---	---	0.00	0.00	---	---	---	0.00
	Controlled - lb/hr			0.00	0.00				0.00
	Controlled - tpy			**0.00**	**0.00**				**0.00**
								CO2e:	**0.00**

1. Table 2-4; Oil and Gas Production Operations Average Emission Factors (kg/hr/source) from *Protocol for Equipment Leak Emission Estimates* , EPA-453/R-95-017, November 1995

2. Table 4.2-2; *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks . Volume II: Chapter 4* , November 1996

Condensate Process Unit (1S) - Process Piping Fugitive Emissions

Condensate Unit (Fugitives (1S))		Vapor Service				Light Liquid Service			GRAND TOTAL
		NGL	C3 and C4	Fuel Gas	Sub-Total	NGL	C3 and C4	Sub-Total	
Valves	count	380	0	0	380	101	0	101	481
Emission Factor[1]	kg/hr/unit		4.5E-03		---		2.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	3.76	0.00	0.00	3.76	0.56	0.00	0.56	4.32
LDAR Credit[2]	Control%		87%		---		84%	---	---
TOC Emissions	Controlled - lb/hr	0.49	0.00	0.00	0.49	0.09	0.00	0.09	0.58
Pump Seals	count					4	0	4	4
Emission Factor[1]	kg/hr/unit						1.3E-02	---	---
TOC Emissions	Pre-Control - lb/hr			---		0.13	0.00	0.13	0.13
LDAR Credit[2]	Control%						69%	---	---
TOC Emissions	Controlled - lb/hr					0.04	0.00	0.04	0.04
Others	count	75	0	0	75	0	0	0	75
Emission Factor[1]	kg/hr/unit		8.8E-03		---		7.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	1.45	0.00	0.00	1.45	0.00	0.00	0.00	1.45
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	1.45	0.00	0.00	1.45	0.00	0.00	0.00	1.45
Connectors	count	437	0	0	437	107	0	107	543
Emission Factor[1]	kg/hr/unit		2.0E-04		---		2.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.19	0.00	0.00	0.19	0.05	0.00	0.05	0.24
LDAR Credit[2]	Control%		33%		---		33%	---	---
TOC Emissions	Controlled - lb/hr	0.13	0.00	0.00	0.13	0.03	0.00	0.03	0.16
Flanges	count	244	0	0	244	86	0	86	330
Emission Factor[1]	kg/hr/unit		3.9E-04		---		1.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.21	0.00	0.00	0.21	0.02	0.00	0.02	0.23
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.21	0.00	0.00	0.21	0.02	0.00	0.02	0.23
VOC	Weight %	100.00%	100.00%	1.00%	---	100.00%	100.00%	---	---
	Pre-Control - lb/hr	5.62	0.00	0.0E+00	5.62	0.75	0.00	0.75	6.37
	Pre-Control - tpy	24.61	0.00	0.00	24.61	3.30	0.00	3.30	27.91
	Controlled - lb/hr	2.28	0.00	0.0E+00	2.28	0.18	0.00	0.18	2.46
	Controlled - tpy	**9.98**	**0.00**	**0.00**	**9.98**	**0.80**	**0.00**	**0.80**	**10.78**
Benzene	Weight %	0.23%		---	---	0.23%		---	---
	Pre-Control - lb/hr	0.01		---	0.01	1.8E-03		1.8E-03	0.01
	Pre-Control - tpy	0.06	---	---	0.06	0.01	---	0.01	0.06
	Controlled - lb/hr	0.01		---	0.01	4.2E-04		4.2E-04	0.01
	Controlled - tpy	**0.02**		**---**	**0.02**	**1.9E-03**		**1.9E-03**	**0.03**
Toluene	Weight %	0.85%		---	---	0.85%		---	---
	Pre-Control - lb/hr	4.8E-02		---	4.8E-02	6.4E-03		6.4E-03	5.4E-02
	Pre-Control - tpy	0.21	---	---	0.21	0.03	---	0.03	0.24
	Controlled - lb/hr	1.9E-02		---	1.9E-02	1.6E-03		1.6E-03	2.1E-02
	Controlled - tpy	**0.09**		**---**	**0.09**	**0.01**		**0.01**	**0.09**
Ethylbenzene	Weight %	0.08%		---	---	0.08%		---	---
	Pre-Control - lb/hr	4.7E-03		---	4.7E-03	6.3E-04		6.3E-04	5.3E-03
	Pre-Control - tpy	0.02	---	---	0.02	0.00	---	0.00	0.02
	Controlled - lb/hr	1.9E-03		---	1.9E-03	1.5E-04		1.5E-04	2.1E-03
	Controlled - tpy	**0.01**		**---**	**0.01**	**0.00**		**0.00**	**0.01**
Xylenes	Weight %	1.68%		---	---	1.68%		---	---
	Pre-Control - lb/hr	9.5E-02		---	9.5E-02	1.3E-02		1.3E-02	1.1E-01
	Pre-Control - tpy	0.41	---	---	0.41	0.06	---	0.06	0.47
	Controlled - lb/hr	3.8E-02		---	3.8E-02	3.1E-03		3.1E-03	4.1E-02
	Controlled - tpy	**0.17**		**---**	**0.17**	**0.01**		**0.01**	**0.18**
2,2,4-Trimethylpentane	Weight %	0.50%		---	---	0.50%		---	---
	Pre-Control - lb/hr	2.8E-02		---	2.8E-02	3.8E-03		3.8E-03	3.2E-02
	Pre-Control - tpy	0.12	---	---	0.12	0.02	---	0.02	0.14
	Controlled - lb/hr	1.1E-02		---	1.1E-02	9.1E-04		9.1E-04	1.2E-02
	Controlled - tpy	**0.05**		**---**	**0.05**	**0.00**		**0.00**	**0.05**
n-Hexane	Weight %	13.96%		---	---	13.96%		---	---
	Pre-Control - lb/hr	0.78		---	0.78	0.11		0.11	0.89
	Pre-Control - tpy	3.44	---	---	3.44	0.46	---	0.46	3.90
	Controlled - lb/hr	0.32		---	0.32	0.03		0.03	0.34
	Controlled - tpy	**1.39**		**---**	**1.39**	**0.11**		**0.11**	**1.51**
Total HAP	Weight %	17.31%		---	---	17.31%		---	---
	Pre-Control - lb/hr	0.97		---	0.97	0.13		0.13	1.10
	Pre-Control - tpy	4.26	---	---	4.26	0.57	---	0.57	4.83
	Controlled - lb/hr	0.39		---	0.39	0.03		0.03	0.43
	Controlled - tpy	**1.73**		**---**	**1.73**	**0.14**		**0.14**	**1.87**
Methane (CH4)	Weight %			100.00%	---				---
	Pre-Control - lb/hr			0.00	0.00				0.00
	Pre-Control - tpy	---	---	0.00	0.00	---	---	---	0.00
	Controlled - lb/hr			0.00	0.00				0.00
	Controlled - tpy			**0.00**	**0.00**				**0.00**
								CO2e:	**0.00**

1. Table 2-4; Oil and Gas Production Operations Average Emission Factors (kg/hr/source) from *Protocol for Equipment Leak Emission Estimates* , EPA-453/R-95-017, November 1995

2. Table 4.2-2; *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks . Volume II: Chapter 4* , November 1996

Inlet Process Unit (1S) - Process Piping Fugitive Emissions

Inlet Unit (Fugitives (1S))		Vapor Service				Light Liquid Service			GRAND TOTAL
		NGL	C3 and C4	Fuel Gas	Sub-Total	NGL	C3 and C4	Sub-Total	
Valves	count	56	0	0	56	2	0	2	58
Emission Factor[1]	kg/hr/unit		4.5E-03		---		2.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.56	0.00	0.00	0.56	0.01	0.00	0.01	0.57
LDAR Credit[2]	Control%		87%		---		84%	---	---
TOC Emissions	Controlled - lb/hr	0.07	0.00	0.00	0.07	0.00	0.00	0.00	0.07
Pump Seals	count					0	0	0	0
Emission Factor[1]	kg/hr/unit						1.3E-02	---	---
TOC Emissions	Pre-Control - lb/hr			---		0.00	0.00	0.00	0.00
LDAR Credit[2]	Control%						69%	---	---
TOC Emissions	Controlled - lb/hr					0.00	0.00	0.00	0.00
Others	count	0	0	0	0	0	0	0	0
Emission Factor[1]	kg/hr/unit		8.8E-03		---		7.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Connectors	count	7	0	0	7	41	0	41	47
Emission Factor[1]	kg/hr/unit		2.0E-04		---		2.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	2.9E-03	0.00	0.00	2.9E-03	0.02	0.00	0.02	0.02
LDAR Credit[2]	Control%		33%		---		33%	---	---
TOC Emissions	Controlled - lb/hr	1.9E-03	0.00	0.00	1.9E-03	0.01	0.00	0.01	0.01
Flanges	count	6	0	0	6	41	0	41	46
Emission Factor[1]	kg/hr/unit		3.9E-04		---		1.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01
VOC	Weight %	100.00%	100.00%	1.00%	---	100.00%	100.00%	---	---
	Pre-Control - lb/hr	0.56	0.00	0.0E+00	0.56	0.04	0.00	0.04	0.61
	Pre-Control - tpy	2.47	0.00	0.00	2.47	0.18	0.00	0.18	2.65
	Controlled - lb/hr	0.08	0.00	0.0E+00	0.08	0.02	0.00	0.02	0.10
	Controlled - tpy	**0.35**	**0.00**	**0.00**	**0.35**	**0.11**	**0.00**	**0.11**	**0.45**
Benzene	Weight %	0.23%		---	---	0.23%		---	---
	Pre-Control - lb/hr	1.3E-03		---	1.3E-03	9.5E-05		9.5E-05	1.4E-03
	Pre-Control - tpy	0.01	---	---	0.01	4.2E-04	---	4.2E-04	0.01
	Controlled - lb/hr	1.8E-04		---	1.8E-04	5.7E-05		5.7E-05	2.4E-04
	Controlled - tpy	**0.00**		**---**	**8.1E-04**	**2.5E-04**		**2.5E-04**	**1.1E-03**
Toluene	Weight %	0.85%		---	---	0.85%		---	---
	Pre-Control - lb/hr	4.8E-03		---	4.8E-03	3.5E-04		3.5E-04	5.2E-03
	Pre-Control - tpy	0.02	---	---	0.02	0.00	---	0.00	0.02
	Controlled - lb/hr	6.7E-04		---	6.7E-04	2.1E-04		2.1E-04	8.8E-04
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.00**		**0.00**	**0.00**
Ethylbenzene	Weight %	0.08%		---	---	0.08%		---	---
	Pre-Control - lb/hr	4.7E-04		---	4.7E-04	3.4E-05		3.4E-05	5.0E-04
	Pre-Control - tpy	0.00	---	---	0.00	0.00	---	0.00	0.00
	Controlled - lb/hr	6.6E-05		---	6.6E-05	2.0E-05		2.0E-05	8.6E-05
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.00**		**0.00**	**0.00**
Xylenes	Weight %	1.68%		---	---	1.68%		---	---
	Pre-Control - lb/hr	9.5E-03		---	9.5E-03	6.9E-04		6.9E-04	1.0E-02
	Pre-Control - tpy	0.04	---	---	0.04	0.00	---	0.00	0.04
	Controlled - lb/hr	1.3E-03		---	1.3E-03	4.1E-04		4.1E-04	1.7E-03
	Controlled - tpy	**0.01**		**---**	**0.01**	**0.00**		**0.00**	**0.01**
2,2,4-Trimethylpentane	Weight %	0.50%		---	---	0.50%		---	---
	Pre-Control - lb/hr	2.8E-03		---	2.8E-03	2.0E-04		2.0E-04	3.0E-03
	Pre-Control - tpy	0.01	---	---	0.01	0.00	---	0.00	0.01
	Controlled - lb/hr	4.0E-04		---	4.0E-04	1.2E-04		1.2E-04	5.2E-04
	Controlled - tpy	**0.00**		**---**	**0.00**	**0.00**		**0.00**	**0.00**
n-Hexane	Weight %	13.96%		---	---	13.96%		---	---
	Pre-Control - lb/hr	0.08		---	0.08	0.01		0.01	0.08
	Pre-Control - tpy	0.34	---	---	0.34	0.02	---	0.02	0.37
	Controlled - lb/hr	0.01		---	0.01	0.00		0.00	0.01
	Controlled - tpy	**0.05**		**---**	**0.05**	**0.01**		**0.01**	**0.06**
Total HAP	Weight %	17.31%		---	---	17.31%		---	---
	Pre-Control - lb/hr	0.10		---	0.10	0.01		0.01	0.10
	Pre-Control - tpy	0.43	---	---	0.43	0.03	---	0.03	0.46
	Controlled - lb/hr	0.01		---	0.01	4.2E-03		4.2E-03	0.02
	Controlled - tpy	**0.06**		**---**	**0.06**	**0.02**		**0.02**	**0.08**
Methane (CH4)	Weight %			100.00%	---				---
	Pre-Control - lb/hr			0.00	0.00				0.00
	Pre-Control - tpy	---	---	0.00	0.00	---	---	---	0.00
	Controlled - lb/hr			0.00	0.00				0.00
	Controlled - tpy			**0.00**	**0.00**				**0.00**
								CO2e:	**0.00**

1. Table 2-4; Oil and Gas Production Operations Average Emission Factors (kg/hr/source) from *Protocol for Equipment Leak Emission Estimates* , EPA-453/R-95-017, November 1995

2. Table 4.2-2; *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks . Volume II: Chapter 4* , November 1996

Process Piping Fugitive Emissions - Entire Facility

Entire Plant		Vapor Service				Light Liquid Service			GRAND TOTAL
		NGL	C3 and C4	Fuel Gas	Sub-Total	NGL	C3 and C4	Sub-Total	
Valves	count	550	466	141	1,157	1,059	3,199	4,258	5,415
Emission Factor[1]	kg/hr/unit		4.5E-03		---		2.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	5.46	4.63	1.40	11.48	5.84	17.63	23.47	34.95
LDAR Credit[2]	Control%		87%		---		84%	---	---
TOC Emissions	Controlled - lb/hr	0.71	0.60	0.18	1.49	0.93	2.82	3.75	5.25
Pump Seals	count					17	31	47	47
Emission Factor[1]	kg/hr/unit						1.3E-02	---	---
TOC Emissions	Pre-Control - lb/hr			---		0.47	0.88	1.36	1.36
LDAR Credit[2]	Control%						69%	---	---
TOC Emissions	Controlled - lb/hr					0.15	0.27	0.42	0.42
Others	count	227	105	22	353	21	65	86	439
Emission Factor[1]	kg/hr/unit		8.8E-03		---		7.5E-03	---	---
TOC Emissions	Pre-Control - lb/hr	4.40	2.03	0.43	6.85	0.35	1.07	1.42	8.27
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	4.40	2.03	0.43	6.85	0.35	1.07	1.42	8.27
Connectors	count	693	703	176	1,572	7,462	8,509	15,971	17,543
Emission Factor[1]	kg/hr/unit		2.0E-04		---		2.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.31	0.31	0.08	0.69	3.45	3.94	7.39	8.09
LDAR Credit[2]	Control%		33%		---		33%	---	---
TOC Emissions	Controlled - lb/hr	0.20	0.21	0.05	0.46	2.31	2.64	4.95	5.42
Flanges	count	393	635	172	1,199	1,943	2,152	4,094	5,293
Emission Factor[1]	kg/hr/unit		3.9E-04		---		1.1E-04	---	---
TOC Emissions	Pre-Control - lb/hr	0.34	0.55	0.15	1.03	0.47	0.52	0.99	2.02
LDAR Credit[2]	Control%		0%		---		0%	---	---
TOC Emissions	Controlled - lb/hr	0.34	0.55	0.15	1.03	0.47	0.52	0.99	2.02
VOC	Weight %	100.00%	100.00%	1.00%	---	100.00%	100.00%	---	---
	Pre-Control - lb/hr	10.50	7.51	2.0E-02	18.03	10.58	24.05	34.63	52.66
	Pre-Control - tpy	45.97	32.89	0.09	78.95	46.35	105.33	151.68	230.63
	Controlled - lb/hr	5.65	3.38	8.1E-03	9.04	4.21	7.33	11.54	20.58
	Controlled - tpy	**24.74**	**14.81**	**0.04**	**39.59**	**18.45**	**32.10**	**50.55**	**90.14**
Benzene	Weight %				---			---	---
	Pre-Control - lb/hr	0.02		0.0E+00	0.98	0.02		0.02	0.05
	Pre-Control - tpy	0.11	---	0.00	4.31	0.11	---	0.11	0.21
	Controlled - lb/hr	0.01		0.0E+00	0.40	0.01		0.01	0.02
	Controlled - tpy	**0.06**		**0.0E+00**	**1.76**	**0.04**		**0.04**	**0.10**
Toluene	Weight %				---			---	---
	Pre-Control - lb/hr	0.09		0.0E+00	0.04	0.09		0.09	0.18
	Pre-Control - tpy	0.39	---	0.00	0.18	0.39	---	0.39	0.79
	Controlled - lb/hr	0.05		0.0E+00	0.03	0.04		0.04	0.08
	Controlled - tpy	**0.21**		**0.0E+00**	**0.13**	**0.16**		**0.16**	**0.37**
Ethylbenzene	Weight %				---			---	---
	Pre-Control - lb/hr	0.01		0.0E+00	0.00	0.01		0.01	0.02
	Pre-Control - tpy	0.04	---	0.00	0.02	0.04	---	0.04	0.08
	Controlled - lb/hr	0.00		0.0E+00	0.00	0.00		0.00	0.01
	Controlled - tpy	**0.02**		**0.0E+00**	**0.01**	**0.02**		**0.02**	**0.04**
Xylenes	Weight %				---			---	---
	Pre-Control - lb/hr	0.18		0.0E+00	0.08	0.18		0.18	0.35
	Pre-Control - tpy	0.77	---	0.00	0.36	0.78	---	0.78	1.55
	Controlled - lb/hr	0.09		0.0E+00	0.06	0.07		0.07	0.17
	Controlled - tpy	**0.42**		**0.0E+00**	**0.25**	**0.31**		**0.31**	**0.73**
2,2,4-Trimethylpentane	Weight %				---			---	---
	Pre-Control - lb/hr	0.05		0.0E+00	0.02	0.05		0.05	0.11
	Pre-Control - tpy	0.23	---	0.00	0.11	0.23	---	0.23	0.46
	Controlled - lb/hr	0.03		0.0E+00	0.02	0.02		0.02	0.05
	Controlled - tpy	**0.12**		**0.0E+00**	**0.07**	**0.09**		**0.09**	**0.22**
n-Hexane	Weight %				---			---	---
	Pre-Control - lb/hr	1.47		0.0E+00	0.68	1.48		1.48	2.94
	Pre-Control - tpy	6.42	---	0.00	2.98	6.47	---	6.47	12.89
	Controlled - lb/hr	0.79		0.0E+00	0.47	0.59		0.59	1.38
	Controlled - tpy	**3.45**		**0.0E+00**	**2.06**	**2.58**		**2.58**	**6.03**
Total HAP	Weight %				---			---	---
	Pre-Control - lb/hr	1.82		0.0E+00	1.82	1.83		1.83	3.65
	Pre-Control - tpy	7.96	---	0.00	7.96	8.02	---	8.02	15.98
	Controlled - lb/hr	0.98		0.0E+00	0.98	0.73		0.73	1.71
	Controlled - tpy	**4.28**		**0.0E+00**	**4.28**	**3.19**		**3.19**	**7.48**
Methane (CH4)	Weight %			100.00%	---				---
	Pre-Control - lb/hr			2.05	2.05				2.05
	Pre-Control - tpy	---	---	8.97	8.97	---	---	---	8.97
	Controlled - lb/hr			0.81	0.81				0.81
	Controlled - tpy			**3.54**	**3.54**				**3.54**
								CO2e:	**88.47**

1. Table 2-4; Oil and Gas Production Operations Average Emission Factors (kg/hr/source) from *Protocol for Equipment Leak Emission Estimates*, EPA-453/R-95-017, November 1995

2. Table 4.2-2; *Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks. Volume II: Chapter 4*, November 1996

FRAC1 - Hot Oil Heater - 45.54 MMBtu/hr (1-HTR (1E))

Unit ID (Point ID)	Description	Reference	Pollutant	Emission Factor		Pre-Controlled Emissions		Control Efficiency	Controlled Emissions	
				lb/MMscf	lb/MMBtu	lb/hr	tpy	%	lb/hr	tpy
1-HTR (1E)	**FRAC1 - Hot Oil Heater**	EPA AP-42 Table 1.4-1	NOX	100.00	0.098	4.46	19.56	na	**4.46**	**19.56**
		EPA AP-42 Table 1.4-1	CO	84.00	0.082	3.75	16.43	na	**3.75**	**16.43**
		EPA AP-42 Table 1.4-2	VOC	5.50	5.4E-03	0.25	1.08	na	**0.25**	**1.08**
		EPA AP-42 Table 1.4-2	SO2	0.60	5.9E-04	0.03	0.12	na	**0.03**	**0.12**
		EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	0.34	1.49	na	**0.34**	**1.49**
		EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	9.4E-05	4.1E-04	na	**9.4E-05**	**4.1E-04**
	45.54 MMBtu/hr (HHV)	EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	**---**	**---**
		EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	3.3E-03	0.01	na	**3.3E-03**	**0.01**
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	0.08	0.35	na	**0.08**	**0.35**
	8,760 hr/yr	EPA AP-42 Table 1.4-3	Toluene	3.4E-03	3.33E-06	1.5E-04	6.6E-04	na	**1.5E-04**	**6.6E-04**
		EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	---	**---**	**---**
	44,647 scf/hr	EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	**---**	**---**
	391.11 MMscf/yr	EPA AP-42 Table 1.4-3/4	Other HAP	1.9E-03	1.86E-06	8.5E-05	3.7E-04	na	**8.5E-05**	**3.7E-04**
		SUM	Total HAP	1.88	1.85E-03	0.08	0.37	na	**0.08**	**0.37**
	920 Btu/scf (LHV)	40CFR98 - Table C-1	CO2	119,317	117	5,327	23,333	na	**5,327**	**23,333**
	1,020 Btu/scf (HHV)	40CFR98 - Table C-2	CH4	2.25	2.2E-03	0.10	0.44	na	**0.10**	**0.44**
		40CFR98 - Table C-2	N2O	0.22	2.2E-04	0.01	0.04	na	**0.01**	**0.04**
		40CFR98 - Table A-1	CO2e	119,440	117	5,333	23,357	---	**5,333**	**23,357**

Notes: 1 - The fuel heating value will vary, 920 Btu/scf (LHV) is at the low end of the range and results in a high (conservative) fuel consumption estimate.

2 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.

FRAC2 - Hot Oil Heaters - 89.85 MMBtu/hr (Each) (2-HTR (2E))

Unit ID (Point ID)	Description	Reference	Pollutant	Emission Factor		Pre-Controlled Emissions		Control Efficiency	Controlled Emissions	
				lb/MMscf	lb/MMBtu	lb/hr (Each)	tpy (Total)	%	lb/hr (Each)	tpy (Total)
2-HTR (2E) (Qty: 2)	**FRAC2 - Hot Oil Heater-2a** **FRAC2 - Hot Oil Heater-2b**	Vendor Data	NOX	36.72	0.036	3.23	28.34	na	**3.23**	**17.03**
		Vendor Data	CO	75.48	0.074	6.65	58.24	na	**6.65**	**35.00**
		Vendor Data	VOC	4.08	0.004	0.36	3.15	na	**0.36**	**1.89**
		EPA AP-42 Table 1.4-2	SO2	0.60	5.9E-04	0.05	0.46	na	**0.05**	**0.28**
	89.85 MMBtu/hr (Max - Each)	EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	0.67	5.86	na	**0.67**	**3.52**
	54.00 MMBtu/hr (Ave - Each)	EPA AP-42 Table 1.4-3	Benzene	2.1E-03	2.06E-06	1.8E-04	1.6E-03	na	**1.8E-04**	**9.7E-04**
	108.00 MMBtu/hr (Ave - Total)	EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	**---**	**---**
	(HHV)	EPA AP-42 Table 1.4-3	HCHO	0.08	7.35E-05	6.6E-03	0.06	na	**0.01**	**0.03**
		EPA AP-42 Table 1.4-3	n-Hexane	1.80	1.76E-03	0.16	1.39	na	**0.16**	**0.83**
	8,760 hr/yr	EPA AP-42 Table 1.4-3	Toluene	3.4E-03	3.33E-06	3.0E-04	2.6E-03	na	**3.0E-04**	**1.6E-03**
		EPA AP-42 Table 1.4-3	2,2,4-TMP	---	---	---	---	---	**---**	**---**
	88,088 scf/hr (Each)	EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	**---**	**---**
	927.53 MMscf/yr (Total)	EPA AP-42 Table 1.4-3/4	Other HAP	0.01	7.44E-06	6.7E-04	5.9E-03	na	**6.7E-04**	**3.5E-03**
		SUM	Total HAP	1.89	1.85E-03	0.17	1.46	na	**0.17**	**0.88**
	920 Btu/scf (LHV)	40CFR98 - Table C-1	CO2	118,969	117	10,480	91,803	na	**10,480**	**55,173**
	1,020 Btu/scf (HHV)	40CFR98 - Table C-2	CH4	2.25	2.2E-03	0.20	1.74	na	**0.20**	**1.04**
		40CFR98 - Table C-2	N2O	0.22	2.2E-04	0.02	0.17	na	**0.02**	**0.10**
		40CFR98 - Table A-1	CO2e	119,092	117	10,491	91,898	---	**10,491**	**55,231**

Notes:
1 - The pre-controlled emissions are based-on operating at coapcity for 8,760 hr/yr.
2 - The long term (tpy) controlled emissions are based on each heater operating an average of: **60.10%** capacity.
3 - The short-term (lb/hr) emissions are the sum of both heaters operating simultaneously at 100% capacity.
4 - The fuel heating value will vary, 920 Btu/scf (LHV) is at the low end of the range and results in a high (conservative) fuel consumption estimate.
5 - PM10/2.5 is filterable and condensable particulate matter; including PM10 and PM2.5.

Process Flare - 620 MMBtu/hr (FL-02 (5S/5E))

Unit ID (Point ID)	Description	Reference	Pollutant	Emission Factor		Pre-Controlled Emissions		Control Efficiency	Controlled Emissions	
				lb/MMscf	lb/MMBtu	lb/hr	tpy	%	lb/hr	tpy
	8,760 hr/yr (Total)	TCEQ	NOX	439.19	0.1380	---	---	---	**85.56**	**42.31**
	28,000 lb/hr (Max)	TCEQ	CO	876.78	0.2755	---	---	---	**170.81**	**84.46**
	192.66 MMscf/yr (Total)	Mass Balance	VOC	na - Mass Balance		28,000.00	14,006.17	99.0%	**280.00**	**140.06**
	3,183 Btu/scf (ave)	EPA AP-42 Table 1.4-2	SO2	0.60	1.9E-04	---	---	---	**0.12**	**0.06**
	69.99 MMBtu/hr (ave)	EPA AP-42 Table 1.4-2	PM10/2.5	7.60	2.4E-03	---	---	---	**1.48**	**0.73**
Flare	613,133 MMBtu/yr (Total)	Mass Balance	Benzene	na - Mass Balance		18.56	9.63	99.0%	**0.19**	**0.10**
FL-02	**8,760 hr/yr (Continuous)**	Mass Balance	Ethylbenzene	na - Mass Balance		9.28	4.82	99.0%	**0.09**	**0.05**
(5S/5E)	21,884 scf/hr (Continuous)	EPA AP-42 Table 1.4-3	HCHO	0.23	7.35E-05	---	---	---	**0.05**	**0.02**
	191.71 MMscf/yr (Continuous)	Mass Balance	n-Hexane	na - Mass Balance		1,123.03	582.79	99.0%	**11.23**	**5.83**
620	3,182 Btu/scf (Continuous)	Mass Balance	Toluene	na - Mass Balance		51.98	26.97	99.0%	**0.52**	**0.27**
MMBtu/hr	69.63 MMBtu/hr (Continuous)	EPA AP-42 Table 1.4-3	2,2,4-TMP	na - Mass Balance		38.98	20.23	99.0%	**0.39**	**0.20**
Capacity	609,983 MMBtu/yr (Continuous)	Mass Balance	Xylenes	na - Mass Balance		185.63	96.33	99.0%	**1.86**	**0.96**
	24 hr/yr (Maintenance)	EPA AP-42 Table 1.4-3	Other HAP	5.9E-03	1.86E-06	1.3E-04	5.7E-04	---	**1.2E-03**	**5.7E-04**
	39,667 scf/hr (Maintenance)	Mass Balance	Total HAP	Sum		1,427.46	740.77	99.0%	**14.32**	**7.43**
	0.95 MMscf/yr (Maintenance)	EPA GHG Emission Factors	CO2	457,617	144	---	---	---	**89,168**	**44,090**
	3,308 Btu/scf (Maintenance)	Mass Balance	CH4	na - Mass Balance		835.31	433.48	99.0%	**8.35**	**4.33**
	131.23 MMBtu/hr (Maintenance)	EPA GHG Emission Factors	N2O	4	1.3E-03	---	---	---	**0.82**	**0.45**
	3,149 MMBtu/yr (Maintenance)	40CFR98 - Table A-1	CO2e	---	---	20,883	10,837	---	**89,621**	**44,333**

Notes: 1 - Smokeless Design Capacity = 28,000 lb/hr 21,098 Btu/lb (HHV) 591 MMBtu/hr 5% Margin **620 MMBtu/hr (HHV)** 150,841 lb/MMscf

2 - The Total Waste Gas to Flare is estimated as follows:

Description		Heat Value (HHV)	Hourly Flow Rate (ave)	Hourly Heat Input (HHV)	Annual Flow Rate	Annual Heat Input (HHV)
Stabilized Condensate Hose Blowdown		4,652 Btu/scf	600 scf/hr (ave)	2.79 MMBtu/hr (ave)	5.26 MMscf/yr	24,452 MMBtu/yr
Product Loading/Hose Blowdown		3,477 Btu/scf	5,735 scf/hr (ave)	19.94 MMBtu/hr (ave)	50.23 MMscf/yr	174,661 MMBtu/yr
Natural Gasoline Tanks w/Butane Blanket		3,401 Btu/scf	4,320 scf/hr (ave)	14.69 MMBtu/hr (ave)	37.84 MMscf/yr	128,719 MMBtu/yr
NGL Pig Receiver Blowdowns (250 Events/year)		3,308 Btu/scf	250 scf/hr (ave)	0.827 MMBtu/hr (ave)	2.19 MMscf/yr	7,245 MMBtu/yr
Hot Oil Expansion Tanks (Fuel/Purge Gas)		1,046 Btu/scf	231 scf/hr (ave)	0.24 MMBtu/hr (ave)	2.02 MMscf/yr	2,117 MMBtu/yr
Rail Car Degassing (50% C3/C4 + 50% Nat. Gasoline)		3,771 Btu/scf	1,142 scf/hr (ave)	4.30 MMBtu/hr (ave)	10.00 MMscf/yr	37,708 MMBtu/yr
Off-Spec Product Flaring (Inlet NGL)		3,308 Btu/scf	7,420 scf/hr (ave)	24.55 MMBtu/hr (ave)	65.00 MMscf/yr	215,039 MMBtu/yr
Continuous Flare Purge (Fuel/Purge Gas)		1,046 Btu/scf	1,962 scf/hr (ave)	2.05 MMBtu/hr (ave)	17.19 MMscf/yr	17,981 MMBtu/yr
Continuous Flare Pilot (Fuel/Purge Gas)		1,046 Btu/scf	225 scf/hr (ave)	0.24 MMBtu/hr (ave)	1.97 MMscf/yr	2,062 MMBtu/yr
TOTAL CONTINUOUS FLOW		3,182 Btu/scf	21,884 scf/hr (ave)	69.63 MMBtu/hr (ave)	191.71 MMscf/yr	609,983 MMBtu/yr
MAINTENANCE BLOWDOWN	24 hr/yr	3,308 Btu/scf	39,667 scf/hr (max)	131.23 MMBtu/hr (max)	0.95 MMscf/yr	3,149 MMBtu/yr
GRAND TOTAL FLOW TO FLARE		**3,183 Btu/scf**	**21,993 scf/hr (ave)** **3,317 lb/hr (ave)**	**69.99 MMBtu/hr (ave)**	**192.66 MMscf/yr**	**613,133 MMBtu/yr**

3 - The **PRE-CONTROLLED** Waste gas composition is estimated as follows (see Attachment H - WASTE GAS (AKA FLARE GAS) SUMMARY:

			Max Instantaneous Flow Rate		**Annual Average Flow Rate**	
CO2	-- Weight %	--- lb/MMscf		--- lb/hr CO2		--- tpy CO2
Methane	2.98 Weight %	4,500 lb/MMscf		835.31 lb/hr Methane		433.48 tpy Methane
Ethane	0.73 Weight %	1,100 lb/MMscf		204.19 lb/hr Ethane		105.96 tpy Ethane
VOC	100.00 Weight %	145,400 lb/MMscf		28,000.00 lb/hr VOC		14,006.17 tpy VOC
Benzene	0.07 Weight %	100 lb/MMscf		18.56 lb/hr Benzene		9.63 tpy Benzene
E-Benzene	0.03 Weight %	50 lb/MMscf		9.28 lb/hr E-Benzene		4.82 tpy E-Benzene
n-Hexane	4.01 Weight %	6,050 lb/MMscf	**28,000 lb/hr (max)**	1,123.03 lb/hr n-Hexane	**192.66 MMscf/yr**	582.79 tpy n-Hexane
Toluene	0.19 Weight %	280 lb/MMscf		51.98 lb/hr Toluene		26.97 tpy Toluene
2,2,4-TMP	0.14 Weight %	210 lb/MMscf		38.98 lb/hr 2,2,4-TMP		20.23 tpy 2,2,4-TMP
Xylenes	0.66 Weight %	1,000 lb/MMscf		185.63 lb/hr Xylenes		96.33 tpy Xylenes
Total HAP	5.10 Weight %	7,690 lb/MMscf		1,427.46 lb/hr Total HAP		740.77 tpy Total HAP

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for Class II Administrative Permit Update

Attachment N

Miscellaneous Equipment Fugitives (FUG2 (7S))

Unit Description	Unit No.	Cumulative Total Fugitive Leak Rate			VOC (Propane) 116,500 lb/MMscf		n-Hexane 0 lb/MMscf		BTEX, TMP (ea) 0 lb/MMscf		Total HAP 0 lb/MMscf		CH4 0 lb/MMscf		CO2e GWP: 25 lb/MMscf	
		scf/hr	hr/yr	MMscf/yr	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Miscellaneous Equipment	FUG2	34.50	2,000	0.07	4.02	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Notes: 1 - Fugitive leaks from miscellaneous equipment is a broad category covering leaks from sealed surfaces, such as packing and gaskets, resulting from the wear of mechanical joints, seals, and rotating surfaces over time.

2 - Emissions include a 20 bhp electric driven compressor used to off-load propane gas from rail cars.

Potentially Applicable

AP-42 and GHG EMISSION FACTORS

(Preferentially use test data or vendor data where available)

	Pollutant	GAS-FIRED ENGINES			GAS-FIRED TURBINES		
		AP-42 Table 3.2-1; 3.2-2; 3.2-3 07/00			AP-42 Table 3.1-1; 3.1-2a; 3.1-3 04/00		
		2SLB lb/MMBtu	4SLB lb/MMBtu	4SRB lb/MMBtu	Uncontrolled lb/MMBtu	Water Injection lb/MMBtu	Lean Pre-Mix# lb/MMBtu
CRITERIA	NOX (≥ 90% Load)	3.17E+00	4.08E+00	2.21E+00	3.20E-01	1.30E-01	9.90E-02
	CO (≥ 90% Load)	3.86E-01	3.17E-01	3.72E+00	8.20E-02	3.00E-02	1.50E-02
	THC (TOC)	1.64E+00	1.47E+00	3.58E-01	1.10E-02	1.10E-02	1.10E-02
	NMHC (THC-CH4)	1.90E-01	2.20E-01	1.28E-01	2.40E-03	2.40E-03	2.40E-03
	NMNEHC (NMHC-C2H6)	1.19E-01	1.15E-01	5.76E-02	2.10E-03	2.10E-03	2.10E-03
	VOC	1.20E-01	1.18E-01	2.96E-02	2.10E-03	2.10E-03	2.10E-03
	SO2*** (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	5.88E-04	5.88E-04	5.88E-04
	PM10/2.5 (Filter+Cond)	4.83E-02	9.99E-03	1.94E-02	6.60E-03	6.60E-03	6.60E-03
HAPs	Benzene	1.94E-03	4.40E-04	1.58E-03	1.20E-05	1.20E-05	9.10E-07
	Ethylbenzene	1.08E-04	3.97E-05	2.48E-05	3.20E-05	3.20E-05	3.20E-05
	Formaldehyde (HCHO)	5.52E-02	5.28E-02	2.05E-02	7.10E-04	7.10E-04	2.00E-05
	n-Hexane	4.45E-04	1.11E-03	---	---	---	---
	Toluene	9.63E-04	4.08E-04	5.58E-04	1.30E-04	1.30E-04	1.30E-04
	2,2,4-Trimethylpentane	8.46E-04	2.50E-04	---	---	---	---
	Xylenes	2.68E-04	1.84E-04	1.95E-04	6.40E-05	6.40E-05	6.40E-05
	Other HAPs	1.96E-02	1.69E-02	9.42E-03	1.06E-04	1.06E-04	1.06E-04
GHG	CO2**** (GWP=1)	*1.17E+02*	*1.17E+02*	*1.17E+02*	*1.17E+02*	*1.17E+02*	*1.17E+02*
	CH4 (GWP=25)	1.45E+00	1.25E+00	2.30E-01	8.60E-03	8.60E-03	8.60E-03
	N2O (GWP=298)	*2.20E-04*	*2.20E-04*	*2.20E-04*	3.00E-03	3.00E-03	3.00E-03
	CO2e	1.53E+02	1.48E+02	1.23E+02	1.18E+02	1.18E+02	1.18E+02

(#Lean Pre-Mix - aka: Dry Low Emissions (DLE or DLN) and SoLoNOx)

	Pollutant	GAS-FIRED EXTERNAL COMBUSTION			FLARES	DIESEL ENGINES
		AP-42 Table 1.4-1; 1.4-2; 1.4-3 (<100 MMBtu/hr) 07/98			13.5-1 01/95	3.3-1; 3.3-2 10/96
		Uncontrolled lb/MMBtu	LoNOx Burners lb/MMBtu	Flue Gas Recirc lb/MMBtu	(Combustion) lb/MMBtu	Uncontrolled lb/MMBtu
CRITERIA	NOX	9.80E-02	4.90E-02	3.14E-02	6.80E-02	4.41E+00
	CO	8.24E-02	8.24E-02	8.24E-02	3.70E-01	9.50E-01
	THC (TOC)	1.08E-02	1.08E-02	1.08E-02	1.40E-01	3.60E-01
	NMHC (THC-CH4)	8.53E-03	8.53E-03	8.53E-03	*1.38E-01*	3.53E-01
	NMNEHC (NMHC-C2H6)	5.49E-03	5.49E-03	5.49E-03	*5.49E-03*	3.50E-01
	VOC	5.39E-03	5.39E-03	5.39E-03	*5.39E-03*	3.60E-01
	SO2 (2,000 gr-S/MMscf)	5.88E-04	5.88E-04	5.88E-04	*5.88E-04*	2.90E-01
	PM10/2.5 (Filter+Condense)	7.45E-03	7.45E-03	7.45E-03	*7.45E-03*	3.10E-01
HAPs	Benzene	2.06E-06	2.06E-06	2.06E-06	*2.06E-06*	9.33E-04
	Ethylbenzene	---	---	---	---	---
	HCHO (Formaldehyde)	7.35E-05	7.35E-05	7.35E-05	*7.35E-05*	1.18E-03
	n-Hexane	1.76E-03	1.76E-03	1.76E-03	*1.76E-03*	---
	Toluene	3.33E-06	3.33E-06	3.33E-06	*3.33E-06*	4.09E-04
	2,2,4-Trimethylpentane	---	---	---	---	---
	Xylenes	---	---	---	---	2.85E-04
	Other HAPs	1.86E-06	1.86E-06	1.86E-06	*1.86E-06*	1.05E-03
GHG	CO2 (GWP=1)	1.18E+02	1.18E+02	1.18E+02	*1.18E+02*	1.64E+02
	CH4 (GWP=25)	2.25E-03	2.25E-03	2.25E-03	*2.25E-03*	*6.61E-03*
	N2O (GWP=298)	2.16E-03	6.27E-04	6.27E-04	*2.16E-03*	*1.32E-03*
	CO2e	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.65E+02

40 CFR 98 - DEFAULT EMISSION FACTORS				
Fuel Type	Table C-1 to Subpart C of Part 98		Table C-2 to Subpart C of Part 98	
	Default HHV	Carbon Dioxide lb CO2/MMBtu	Methane lb CH4/MMBtu	Nitrous Oxide lb N2O/MMBtu
Fuel Oil No. 2 (Diesel)	0.138 MMBtu/gal	1.61E+02	6.61E-03	1.32E-03
Natural Gas	1,026 Btu/scf	1.17E+02	2.20E-03	2.20E-04

Global Warming Potential (100 Yr) (GWP)		
Table A-1 to Subpart A of Part 98		
CO2	CH4*	N2O#
1	25	298

#Revised by EPA on 11/29/13

Conversion Factors

http://www.onlineconversion.com/

1.0 lb	=	453.5924 g
1.0 kg	=	2.2046 lb
1.0 hp	=	2,544.4332 Btu/hr
1.0 hp	=	745.6999 Watt
1.0 kW	=	3,412.1416 Btu/hr
1.0 kW-hr	=	1.3400 hp-hr
1.0 cf	=	7.4805 gal
1.0 gal H2O	=	8.3378 lb
1.0 cf H2O	=	62.3711 lb
1.0 m	=	3.2808 ft
1.0 km	=	0.6214 mi
1.0 acre	=	43,560.1742 ft2
1.0 ^{o}F	=	(^{o}C*9/5)+32
1.0 ^{o}R	=	^{o}F+459.67
1.0%	=	10,000 ppm
Std Temperature	=	60.0 oF
Std Pressure	=	14.696 psia
UGC (stp)	=	379.4820 cf/lb-mol

*Converted Ext Comb Emission Factors to lb/MMBtu by dividing lb/MMscf by AP-42 default high heating value of 1,020 Btu/scf.

**Converted GHG Emission Factors to lb/MMBtu by multiplying kg/MMBtu by 2.2046 lb/kg.

***Assumes 100% conversion of fuel sulfur to SO2 (2,000 gr/MMscf).

****Assumes 99.5% conversion of fuel carbon to CO2 for natural gas.

ATTACHMENT O

Monitoring/Recordkeeping/Reporting/Testing Plans

"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."

Williams OVM does NOT propose any changes to the monitoring, recordkeeping, reporting, and testing plans as provided in the current permit (R13-2892D). However, Williams OVM does request that the emission unit descriptions and limitations be modified, as indicated on the following pages.

1.0. Emission Units

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Control Device
1S	n/a	Fractionation Plant 1 (Fugitives Only)	2011	12,500 BPD	**LDAR**
		Fractionation Plant 2 (Fugitives Only)	2013	30,000 BPD	
		Truck Loading (Fugitives Only)	**2011/2016**	**n/a**	
		Rail Loading (Fugitives Only)	**2011/2016**	**n/a**	
		Condensate Unit (Fugitives Only)	**2014**	**n/a**	
		Inlet Unit (Fugitives Only)	**2011/2013**	**n/a**	
2S	TLO	Product Loading/Unloading	2011/2013	58,200 BPD	FL-02
3S	n/a	Stabilized Condensate Tanks	2014	3 tanks @ 90,000 gallons	Pressure Vessels
		NGL Accumulation Tanks	2011	6 tanks @ 61,400 gallons	Pressure Vessels
			2013	6 tanks @ 90,000 gallons	
		Propane Accumulation Tanks	2011	2 tanks @ 114,000 gallons	Pressure Vessels
				4 tanks @ 90,000 gallons	
			2013	2 tanks @ 420,000 gallons	
				1 tank @ 90,000 gallons	
		Butane Accumulation Tanks	2011	2 tanks @ 140,000 gallons	Pressure Vessels
			2013	3 tanks @ 210,000 gallons	
		Natural Gasoline Accumulation Tanks	2011/2013	2 tanks @ 60,000 gallons	Pressure Vessels
				1 tank @ 90,000 gallons	
			2013	2 tanks @ 454,000 gallons	FL-02
1-HTR	1E	Hot Oil Heater	2011	45.54 MMBTU/hr	None
2-HTR	2E	Hot Oil Heaters (2)	2013	89.85 MMBTU/hr (each)	None
5S	5E	Flare Pilot Light	2013	0.24 MMBTU/hr	None
		Flare Waste Gas Combustion		28,000 lb/hr	
7S	n/a	Miscellaneous Equipment Leaks	2011	n/a	n/a

1.1. Control Devices No Change

2.0. General Conditions No Change

3.0. Facility-Wide Requirements No Change

4.0. Source-Specific Requirements No Change

5.0. Source-Specific Requirements (Hot Oil Heater (1E), Hot Oil Heaters (2E)) No Change

6.0. Source-Specific Requirements (Flare Control Device (FL-02), 5S) No Change

7.0. Source-Specific Requirements (40CFR60 Subpart OOOO Requirements, Product Loading Area, Gas Processing Plants Fugitives

7.1. Limitations and Standards

7.1.1. No Change

7.1.2. The Product Loading Area (2S) at the Fractionation Processing Plant shall be operated in accordance with the plans and specifications filed in Permit Application **R13-2892E**. The rail and truck loading area will route all vapors to the flare for combustion.

7.1.3. Fugitive emissions of VOCs from equipment leaks at the facility, as calculated from emissions factors taken from Table 2-4 of EPA-453/R-95-017 - "Protocol for Equipment Leak Emission Estimates," shall not exceed **90.14 TPY**. Continuing compliance with this limit shall be determined by the following: The permittee shall not exceed the number and type of components (valves, pump seals, connectors, etc.) in gas/vapor or light liquid (as applicable) listed in Attachment N of Permit Application **R13-2892E**.

7.1.4. - 7.1.6. No Change

7.2. - 7.5. No Change

8.0. - 8.5. No Change

ATTACHMENT P
Public Notice

"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."

- Legal Advertisement (as shown) will be placed in a newspaper of general circulation in the area where the source is located (See 45CSR§13-8.3 through 45CSR§13-8.5).

- An Affidavit of Publication shall be submitted immediately upon receipt.

Attachment P

LEGAL ADVERTISEMENT

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Williams Ohio Valley Midstream LLC (OVM) has applied to the West Virginia Department of Environmental Protection, Division of Air Quality (WV-DAQ), for a 45CSR13 Class II Administrative Permit Update for the existing Moundsville Fractionation Plant.

The plant is located at 200 Caiman Drive, west of WV-2/Lafayette Ave, approximately 2.8 miles W-SW of Moundsville, in Marshall County, West Virginia.

The latitude and longitude coordinates are 39.9129° North x -80.7970° West, respectively

The applicant estimates the increase in potential to discharge regulated air pollutants will be:

21.11	tons of volatile organic compounds (VOC) per year
(0.01)	tons of benzene per year
(0.08)	tons of ethylbenzene per year
3.74	tons of n-hexane per year
0.25	tons of toluene per year
0.10	tons of 2,2,4-trimethylpentane per year
0.61	tons of xylenes per year
4.61	tons of total hazardous air pollutants (HAP) per year
(295)	tons of carbon dioxide equivalent (CO2e) per year

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

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

Dated this the _____ day of _____ 20____.

By: Williams Ohio Valley Midstream LLC
Mr. Paul Hunter
General Manager, Ohio River Supply Hub
Park Place Corporate Center 2
2000 Commerce Drive
Pittsburgh, PA 15275

ATTACHMENT S

Title V Permit Revision Information

It is requested the Moundsville Fractionation Plant Title V permit is updated to include the proposed changes to process piping fugitive component counts and emissions. These changes will be reflected in 45CSR13 Permit R13-2892E to be issued by WVDEP.

Attachment S

Title V Permit Revision Information

1. New Applicable Requirements Summary	
Mark all applicable requirements associated with the changes involved with this permit revision:	
☐ SIP	☐ FIP
☒ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☐ NESHAP (45CSR15)	☐ Nonattainment NSR (45CSR19)
☒ Section 111 NSPS (Subpart(s)___OOOO_____)	☐ Section 112(d) MACT standards (Subpart(s)_____)
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ Compliance Assurance Monitoring (40CFR64) [(1)]
☐ NO_x Budget Trading Program Non-EGUs (45CSR1)	☐ NO_x Budget Trading Program EGUs (45CSR26)
[(1)] If this box is checked, please include **Compliance Assurance Monitoring (CAM) Form(s)** for each Pollutants Specific Emission Unit (PSEU) (See Attachment H to Title V Application). If this box is not checked, please explain why **Compliance Assurance Monitoring** is not applicable:	

2. Non Applicability Determinations

List all requirements, which the source has determined not applicable to this permit revision and for which a permit shield is requested. The listing shall also include the rule citation and a rationale for the determination.

NEW SOURCE PERFORMANCE STANDARDS (NSPS)

NSPS D - No boiler greater than 250 MMBtu/hr (40CFR60.40(a)(1))
NSPS Da - No boiler greater than 250 MMBtu/hr (40CFR60.40a(a)(1))
NSPS Db - No boiler greater than 100 MMBtu/hr (40CFR60.40b(a))
NSPS K - No tank constructed prior to 05/19/78 (40CFR 60.110(a))
NSPS Ka - No tank constructed prior to 07/23/84 (40CFR60.110a(a))
NSPS GG - No stationary gas turbine (40CFR60.330(a))
NSPS LLL - No sweetening units on site (40CFR60.640(a))
NSPS IIII - No stationary compression ignition engine (§60.4200(a))
NSPS JJJJ - No stationary spark ignition engine (§60.4230(a))
NSPS KKKK - No stationary combustion turbine (§60.4300(a))

NATIONAL EMISSION STANDARDS FOR HAZAROUS AIR POLLUTANTS (NESHAP)

NESHAP HH - An area source with no triethylene glycol (TEG) dehydration unit (§63.760(b)(2))
NESHAP HHH - No natural gas transmission or storage prior to local distribution (§63.1270(a))
NESHAP YYYY - No stationary gas turbine (§63.6080(a))
NESHAP ZZZZ - No stationary reciprocating internal combustion engine.
NESHAP DDDDD - Not a major source of HAP (§63.7485(a))
NESHAP JJJJJJ - Only gas-fired boilers present at facility (§63.11195(e))

COMPLIANCE ASSURANCE MONITORING (CAM)

In accordance with §64.2(b)(1)(i), the requirements of CAM do not apply to emission limitations or standards proposed by the Administrator after November 15, 1990 pursuant to Section 111 or 112 of the Act. Although the two (2) 454,000 gallon natural gasoline storage tanks have pre-controlled emissions greater than 100 TPY and utilize a control device to achieve compliance, they are subject to NSPS Subpart Kb (an emission standard proposed pursuant to Section 111 of the Clean Air Act).

WEST VIRGINIA AIR QUALITY REGULATIONS

45CSR14 - Permits for Major Sources - Not a Major Source as defined in §45-14-2.43.
45CSR19 - Permits for Major Sources - Does not cause or contribute to nonattainment as per §45-19-3.2.
45CSR21 - Control of VOCs - Not located in Putnam, Kanawha, Cabell, Wayne, or Wood County
45CSR27 - No surface coating or similar equipment utilizing a toxic air pollutant as a solvent or for other purposes.
45CSR28 - Voluntary Emission Trading Program - Applicant chooses not to participate
45CSR29 - Not in Putnam, Kanawha, Cabell, Wayne, or Wood County

☐ **Permit Shield Requested** *(not applicable to Minor Modifications)*

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

3. Suggested Title V Draft Permit Language

Are there any changes involved with this Title V Permit revision outside of the scope of the NSR Permit revision? ☐ Yes ☒ No If Yes, describe the changes below.

Also, please provide **Suggested Title V Draft Permit language** for the proposed Title V Permit revision (including all applicable requirements associated with the permit revision and any associated monitoring /recordkeeping/ reporting requirements), OR attach a marked up pages of current Title V Permit. Please include appropriate citations (Permit or Consent Order number, condition number and/or rule citation (e.g. 45CSR§7-4.1)) for those requirements being added / revised.

4. Active NSR Permits/Permit Determinations/Consent Orders Associated With This Permit Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
R13-2892D	10/19/2015	
R13-2892E	Pending	
	/ /	

5. Inactive NSR Permits/Obsolete Permit or Consent Orders Conditions Associated With This Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
	/ /	
	/ /	
	/ /	

6. Change in Potential Emissions

Pollutant	Change in Potential Emissions (+ or -), TPY
Nitrogen Oxides (NOx)	0.00
Carbon Monoxide (CO)	0.00
Volatile Organic Compounds (VOC)	+21.11
Sulfur Dioxide (SO2)	0.00
Particulate Matter (PM)	0.00
Formaldehyde (HCHO)	0.00
Total Hazardous Air Pollutants (HAPs)	+4.61

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

7. Certification For Use Of Minor Modification Procedures ***(Required Only for Minor Modification Requests)***

Note:	*This certification must be signed by a responsible official. Applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:*

i. Proposed changes do not violate any applicable requirement;

ii. Proposed changes do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit;

iii. Proposed changes do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient air quality impacts, or a visibility increment analysis;

iv. Proposed changes do not seek to establish or change a permit term or condition for which there is no underlying applicable requirement and which permit or condition has been used to avoid an applicable requirement to which the source would otherwise be subject (synthetic minor). Such terms and conditions include, but are not limited to a federally enforceable emissions cap used to avoid classification as a modification under any provision of Title I or any alternative emissions limit approved pursuant to regulations promulgated under § 112(j)(5) of the Clean Air Act;

v. Proposed changes do not involve preconstruction review under Title I of the Clean Air Act or 45CSR14 and 45CSR19;

vi. Proposed changes are not required under any rule of the Director to be processed as a significant modification;

Notwithstanding subparagraph 45CSR§30-6.5.a.1.A. (items i through vi above), minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in rules of the Director which are approved by the U.S. EPA as a part of the State Implementation Plan under the Clean Air Act, or which may be otherwise provided for in the Title V operating permit issued under 45CSR30.

Pursuant to 45CSR§30-6.5.a.2.C., the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 45CSR§30-6.5.a.1.A. The use of Minor permit modification procedures are hereby requested for processing of this application.

(Signed): Paul V. Hunter *(Please use blue ink)* Date: 2016 / 06 / 09 *(Please use blue ink)*

Named (typed): **Paul V. Hunter** Title: **General Manager Ohio River Supply Hub**

Note: Please check if the following included (if applicable):

☐	Compliance Assurance Monitoring Form(s)
☐	Suggested Title V Draft Permit Language

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

APPLICATION FEE
NSR Permit Modification

Include a check payable to WVDEP – Division of Air Quality.

Any permittee other than a small business as defined in section 507(c) of the federal Clean Air Act which requests a Class II administrative update to a valid existing permit pursuant to this section shall submit a permit application fee of three hundred dollars (**$300**).

Additional charges may apply, depending on the nature of the application as outlined in Section 3.4.b. of Regulation 22, and shown below:

-	NSPS Requirements:	**$1,000**	(Subpart OOOO)
-	NESHAP Requirements:	$2,500	NA
-	New Major Source:	$10,000	NA
-	Major Modification:	$5,000	NA

Total application fee is **$1,300**.

WILLIAMS FIELD SERVICES GROUP, INC
PO BOX 21218
TULSA, OK 74121-1218

COMPANY NUMBER: 4000

CHECK NUMBER: 4000143834

PAY DATE	SUPPLIER NO.	SUPPLIER NAME	CHECK TOTAL
07-JUN-16	526257	WV DEP - DIVISION OF AIR QUALITY	1,300.00

Invoice Date	Invoice Or Credit Memo / Invoice Description	Gross	Discount	Net
06-JUN-16	06-JUN-16-526257 / PAYMENT FOR 45CSR13 CLASS II ADMINI	1,300.00	0.00	1,300.00
		Page Totals	0.00	1,300.00

Supplier Support 1-866-778-2665

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WILLIAMS FIELD SERVICES GROUP, INC
PO BOX 21218
TULSA, OK 74121-1218
Company Number: 4000

JPMorgan Chase Bank, N.A. 70-2322/719
Chicago, IL

Check Number: 4000143834
Check Date: 07-JUN-16

One Thousand Three Hundred Dollars And Zero Cents

Pay To The Order Of:
WV DEP - DIVISION OF AIR QUALITY
601 57TH ST SE
CHARLESTON, WV 25304 United States

PAY (USD)	$1,300.00

Authorized Signature

MA1353 (6/11)

⑈4000143834⑈ ⑆071923226⑆ 00940116 7⑈

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