Jue
13-2892D
051-00141

Williams Ohio Valley Midstream LLC
Park Place Corporate Center 2
2000 Commerce Drive
Pittsburgh, PA 15275
(412) 787-7300
(412) 787-6002 fax

April 14, 2015
(Via Federal Express)

RECEIVED
APR 17 2015
WV DEP / DIV. OF AIR QUALITY

Bev 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 NSR Modification Permit**
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 New Source Review (NSR) Modification Permit 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 NSR Modification Permit has been prepared and submitted to request authorization to:

- Increase the component counts for Process and Piping Fugitives — FUG (1S)
- Add Electric Driven Pipeline Delivery Pumps (Fugitives Only) — FUG (1S)
- Increase Truck/Rail Load-Out/Receipt Capacity to 58,200 bbl/day (Fugitives Only) — TLO (2S)
- Add Three (3) 90,000 gal Pressure Vessels (Stabilized Condensate) (Fugitives Only) — TKS (3S)
- Modify Capacity of Atmospheric Natural Gasoline Tanks to 454,000 Gal. Each — TKS (3S)
- Increase Waste Gas Volume and Average Waste Gas Heat Content to the Flare — FL-02 (5S/5E)
- Add Miscellaneous Equipment Fugitives (e.g., Compressor Rod Packing Leaks) — FUG2 (7S)

These modifications will result in an increase in facility-wide emissions as summarized on the following page:

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

EMISSIONS SUMMARY SHEET

Facility-Wide Emissions Summary [Tons per Year]			
Criteria Pollutants	**Potential Emissions (Including Fugitives)**		
	Current Permit	**Increase**	**Proposed Permit**
Nitrogen Oxides (NOX)	54.08	24.81	78.89
Carbon Monoxide (CO)	**86.19**	**49.70**	**135.89**
Volatile Organic Compounds (VOC)	**118.94**	**97.53**	**216.47**
Sulfur Dioxide (SO2)	0.41	0.04	0.45
Particulate Matter (PM10/2.5)	5.12	0.62	5.74
Lead (Pb)	---	---	---
Hazardous Air Pollutants (HAP)	**Potential Emissions (Including Fugitives)**		
	Current Permit	**Increase**	**Proposed Permit**
Benzene	0.14	0.08	0.21
Ethylbenzene	0.10	0.06	0.16
Formaldehyde (HCHO)	0.05	0.03	0.07
n-Hexane	6.05	3.35	9.40
Toluene	0.25	0.14	0.39
2,2,4-Trimethylpentane	0.20	0.11	0.32
Xylenes	0.69	0.38	1.08
Other HAP (Methanol (MeOH), etc.)	0.01	0.01	0.02
Total HAP	7.50	4.15	11.65
Greenhouse Gases (GHG)	**Potential Emissions (Including Fugitives)**		
	Current Permit	**Increase**	**Proposed Permit**
Carbon Dioxide (CO_2)	97,296	25,300	122,597
Methane (CH_4)	17	4	21
Nitrous Oxide (N_2O)	0.5	0.1	0.6
CO_2 Equivalent (CO_2e)	**97,858**	**25,446**	**123,304**

Bold/Shaded Cells Indicate that the PTE exceeds Title V Major Source Thresholds.

The increases in NOx, CO, VOC, HAP (most notably, n-Hexane), and CO2e emissions are primarily due to the large increase in the volume of the waste gas streams that are routed to the Process Flare (FL-02 (5S/5E)) --- **From 95.58 MMscf/yr to 192.66 MMscf/yr**.

Lesser increases in these pollutants result from increasing the average VOC and HAP content (thusly, the average Btu content) of the waste gas streams that are routed to the Process Flare (FL-02 (5S/5E)) --- **From 2,841 Btu/scf to 3,137 Btu/scf**.

Other increases in the VOC and HAP emissions result from additional fugitive emissions (FUG (1S)) associated with modifications to the Truck/Rail Load-Out (TLO (2S)), new and modified Pressure Vessels (TKS (3S), and new Misc Equipment Leaks (FUG2 (7S)).

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 (412) 787-4259 or Danell.Zawaski@Williams.com.

Sincerely,

Danell Zawaski (ver)

R. Danell Zawaski, P.E.
Environmental Specialist

Enclosures:
Application for NSR Construction Permit
Attachments A through S
Check for Application Fee

APPLICATION FOR
45CSR13 NEW SOURCE REVIEW
MODIFICATION PERMIT

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
Park Place Corporate Center 2
2000 Commerce Drive
Pittsburgh, PA 15275

Prepared by:

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

April 2015

APPLICATION FOR
45CSR13 NEW SOURCE REVIEW
MODIFICATION PERMIT

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Marshall County, West Virginia

TABLE OF CONTENTS

COVER LETTER

APPLICATION FOR NSR MODIFICATION PERMIT

ATTACHMENTS TO APPLICATION

- ATTACHMENT A Business Certificate
- ATTACHMENT B Location/Topographic Map
- ATTACHMENT C Installation and Start-Up Schedule
- ATTACHMENT D Regulatory Discussion
- ATTACHMENT E Plot Plan
- ATTACHMENT F Detailed Process Flow Diagram (PFD)
- ATTACHMENT G Process Description
- ATTACHMENT H Material Safety Data Sheets (MSDS) (And Representative Extended Gas Analysis)
- ATTACHMENT I Emission Units Table
- ATTACHMENT J Emission Points Data Summary Sheet(s)
- ATTACHMENT K Fugitive Emissions Data Summary Sheet(s)
- ATTACHMENT L Emissions Unit Data Sheet(s) (And Vendor Data)
- ATTACHMENT M Air Pollution Control Device Sheet(s) (And Vendor Data)
- ATTACHMENT N Supporting Emissions Calculations
- ATTACHMENT O Monitoring/Recordkeeping/Reporting/Testing Plans
- ATTACHMENT P Public Notice (Class I Legal Advertisement)
- ATTACHMENT Q Business Confidential Claims (NOT APPLICABLE)
- ATTACHMENT R Authority Forms (NOT APPLICABLE)
- ATTACHMENT S Title V Permit Revision Information (NOT APPLICABLE)

APPLICATION FEE

APPLICATION FOR
45CSR13 NSR
MODIFICATION PERMIT

GENERAL INSTRUCTIONS - Application forms are to be completed for any facility which emits the following regulated pollutants: Carbon Monoxide (CO), Lead, Nitrogen Oxides (NOx), Particulate Matter (PM), Particulate Matter less than 10 microns (PM10), Sulfur Dioxide (SO2), and Volatile Organic Compounds (VOCs) not listed as Hazardous Air Pollutants (HAPs) or Toxic Air Pollutants (TAPs) in accordance with Section '112 of the Clean Air Act or Rule 45CSR27.

- **Section I. General**
- **Section II. Additional Attachments and Supporting Documents**
- **Section III. Certification of Information**

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 (OVM)

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:
PARK PLACE CORPORATE CENTER 2
2000 COMMERCE DRIVE
PITTSBURGH, PA 15275

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 LIQUID (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):
R13-2892C - ISSUED 05/28/13

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.

RECEIVED
APR 17 2015
WV DEP / DIV OF AIR QUALITY

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 REQUEST AUTHORIZATION TO:

- **INCREASE THE COMPONENT COUNT FOR PIPING AND PROCESS FUGITIVES** — **FUG (1S)**
- **ADD ELECTRIC DRIVEN PIPELINE DELIVERY PUMPS (FUGITIVES ONLY)** — **FUG (1S)**
- **INCREASE TRUCK/RAIL LOAD-OUT/RECIEPT CAPACITY TO 58,200 BPD** — **TLO (2S)**
- **ADD THREE (3) 90,000 GAL PRESSURE VESSELS (STABILIZED CONDENSATE)** — **TKS (3S)**
- **MODIFY CAPACITY OF ATMOSPHERIC NATURAL GASOLINE TANKS TO 454,000 GAL. EACH** — **TKS (3S)**
- **INCREASE WASTE GAS VOLUME AND WASTE GAS HEAT CONTENT TO FLARE** — **FL-02 (5S/5E)**
- **ADD MISC EQUIPMENT FUGITIVES (E.G., COMPRESSOR ROD PACKING LEAKS)** — **FUG2 (7S)**

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: **INCREMENTAL WITH COMPLETION BY MID-2016**

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

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day: **24** Days Per Week: **7** Weeks Per Year: **52**

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

17. **Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), 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
- ☐ Haul Road Emissions
- ☐ Hot Mix Asphalt Plant
- ☐ Incinerator
- ☐ Indirect Heat Exchanger
- ☐ Quarry
- ☐ Solid Materials Sizing, Handling and Storage Facilities
- ☐ Storage Tanks (***)
- ☒ **General Emission Unit, specify:**
  - **NATURAL GAS-FIRED HEATERS (1-HTR/1E) AND 2-HTR/2E)**

(*) TRUCK/RAIL LOADOUT (TLO (2S)) ARE INSIGNIFICANT SOURCES OF EMISSIONS
(**) LEAK SOURCE DATA SHEET ONLY
(***) TANKS (TKS (3S)) AND TANKS (TKS2 (4S)) ARE INSIGNIFICANT SOURCES OF EMISSIONS. MODIFICATIONS TO THE EXISTING TANKS ARE NOT PROPOSED.

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 (FL-02 (5S/5E))**
- ☐ 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: _____ (Please use blue ink) DATE: 4/15/2015 (Please use blue ink)

35B. Printed name of signee: **DON WICBURG**	35C. Title: **VICE PRESIDENT AND GENERAL MANAGER**	
35D. E-mail: **DON.WICBURG@WILLIAMS.COM**	36E. Phone: **(304) 843-3158**	36F. FAX: **(304) 843-3131**
36A. Printed name of contact person: **R. DANELL ZAWASKI, P.E.**	36B. Title: **ENVIRONMENTAL SPECIALIST**	
36C. E-mail: **DANELL.ZAWASKI@WILLIAMS.COM**	36D. Phone: **(412) 787-4259**	36E. FAX: **(412) 787-6002**

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 (NA)**
- ☒ **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.

RECEIVED
APR 17 2015
WV DEP / DIV. OF AIR QUALITY

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."

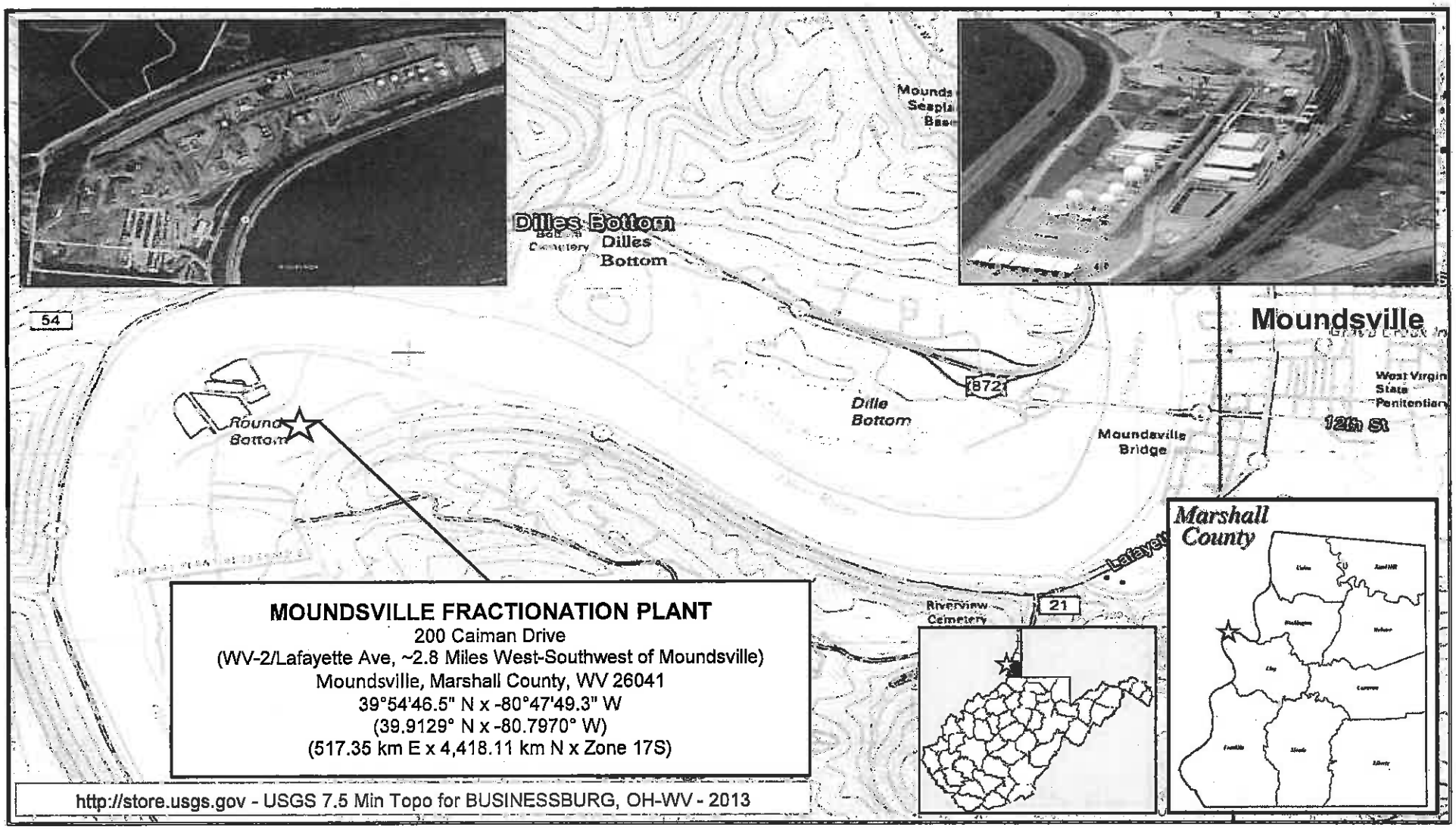
- **Address:**
  Williams Ohio Valley Midstream LLC
  Moundsville Natural Gas Liquids (NGL) Fractionation Plant
  200 Caiman Drive
  (WV-2/Lafayette Ave, ~2.8 Miles West-Southwest of Moundsville)
  Moundsville, Marshall County, WV 26041

- **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 C

Installation and Start-Up Schedule

"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."

The Williams OVM Moundsville Natural Gas Liquids (NGL) Fractionation Plant is an existing facility. Proposed modifications and expansion includes:

- Increase the component counts for Process and Piping Fugitives — FUG (1S)
- Add Electric Driven Pipeline Delivery Pumps (Fugitives Only) — FUG (1S)
- Increase Truck/Rail Load-Out/Receipt Capacity to 58,200 bbl/day (Fugitives Only) — TLO (2S)
- Add Three (3) 90,000 gal Pressure Vessels (Stabilized Condensate) (Fugitives Only) — TKS (3S)
- Modify Capacity of Atmospheric Natural Gasoline Tanks to 454,000 Gal. Each — TKS (3S)
- Increase Waste Gas Volume and Average Waste Gas Heat Content to the Flare — FL-02 (5S)
- Add Miscellaneous Equipment Fugitives (e.g., Rod Packing Leaks) — FUG2 (7S)

Construction will commence promptly upon receipt of the Modification Permit.

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 (OVM)

MOUNDSVILLE FRACTIONATION PLANT (FRAC)

Application for Title V Operating Permit (45CSR30)

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 ***in***cluded in the PSD Major Source Determination in accordance with Section 2.26.b of 45CSR30.)

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

Furthermore, because the facility is an "anyway" Title V source, it is also subject to Title V permit requirements because the potential to emit (PTE) carbon dioxide equivalent (CO2e) is ≥ 100,000 tpy:

- **CO2e: TVOP Major Source with Controlled PTE ≥ 100,000 tpy**

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 operation 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 [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. However, the CAM Technical Guidance Document (EPA, 8/94) states that the requirements for flares contained in 40 CFR 60.18 (general control device requirements) has been designated as presumptively acceptable monitoring for CAM by EPA.

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 commonsense 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
- **CO2e: TVOP Major Source with Controlled PTE ≥ 100,000 tpy**

(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.

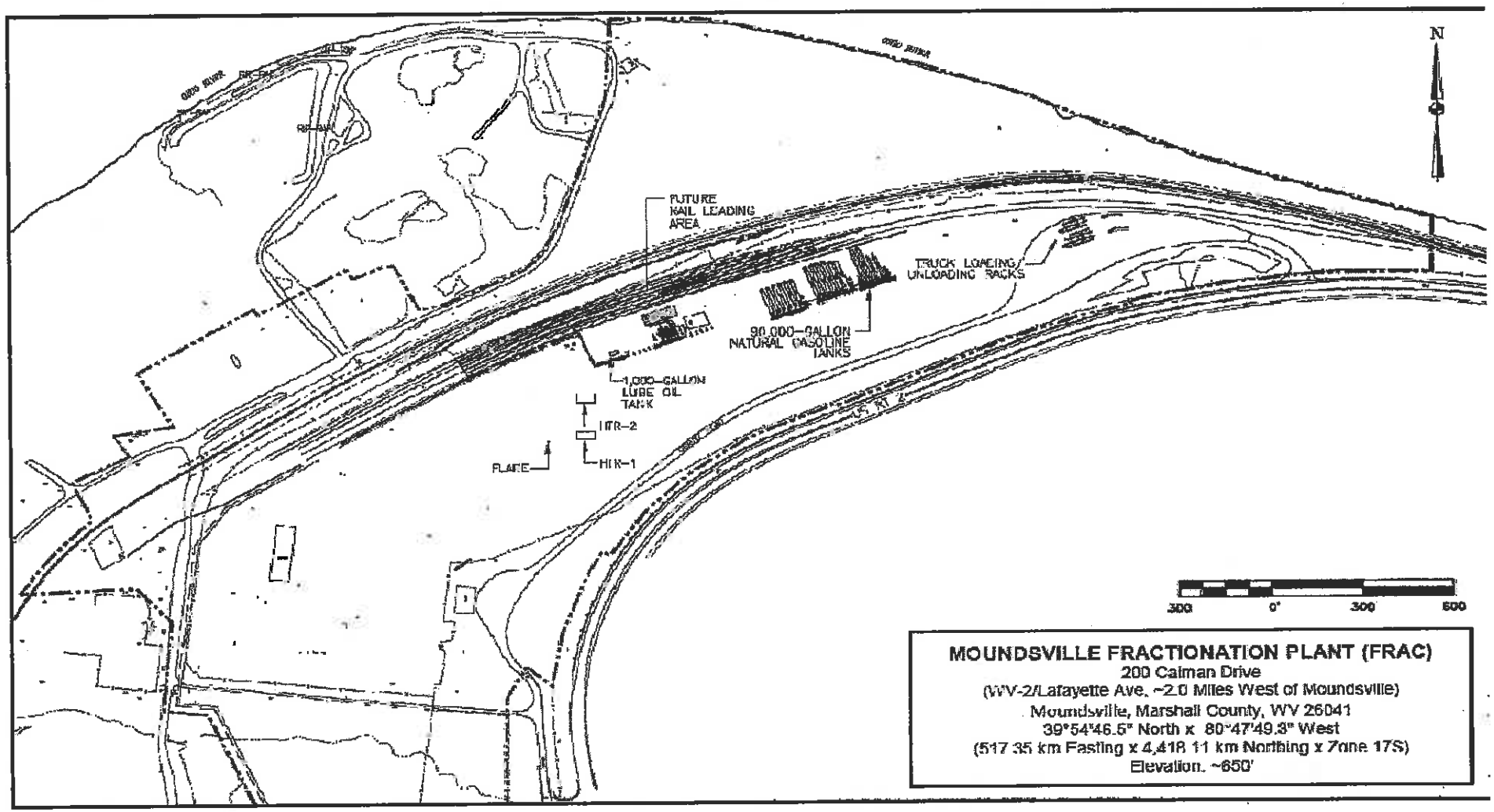
ATTACHMENT E

Plot Plan

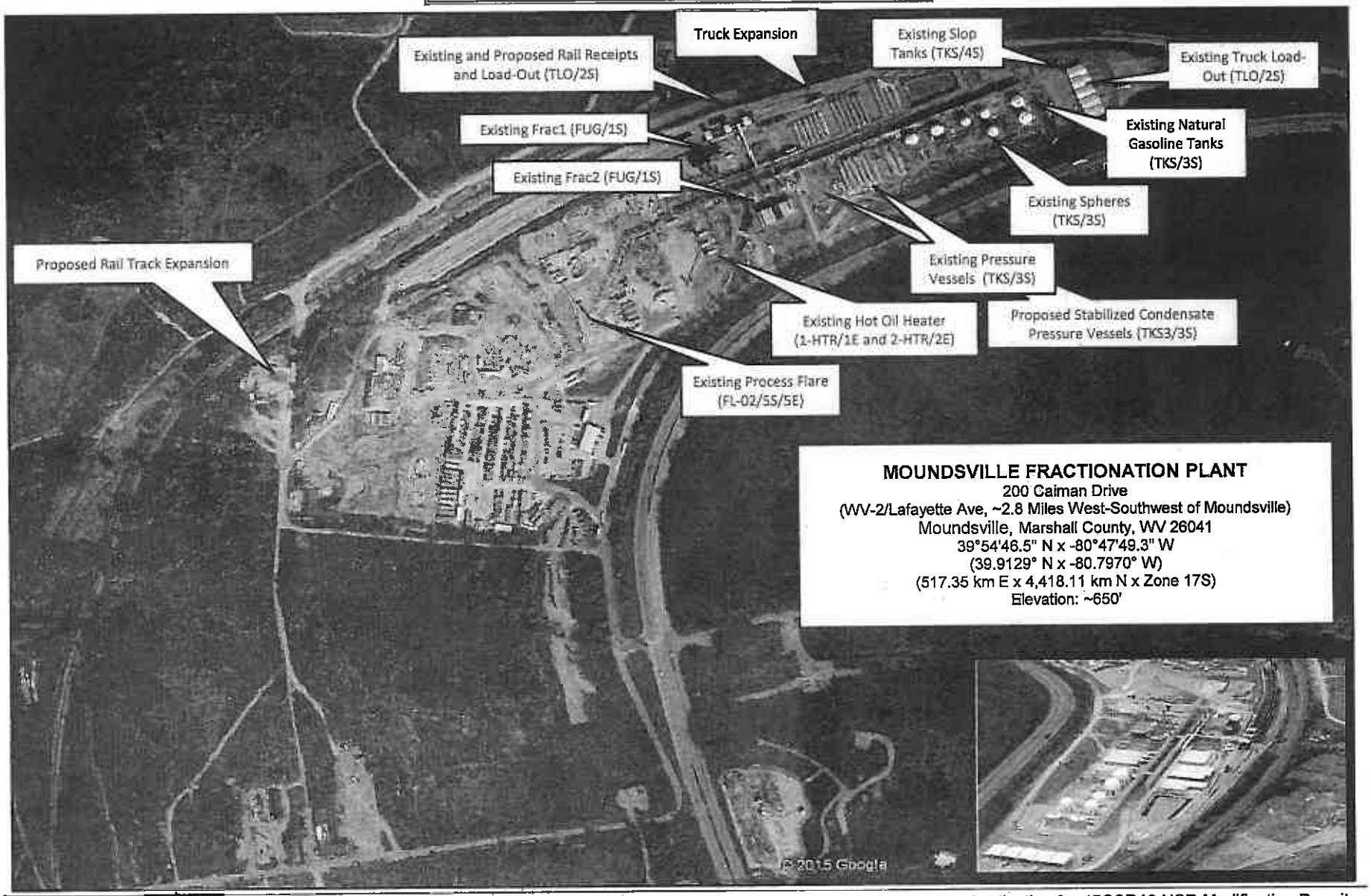
"21. Provide a **Plot Plan**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as Attachment E."

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

Attachment E - Plot Plan



Attachment E' - Aerial View



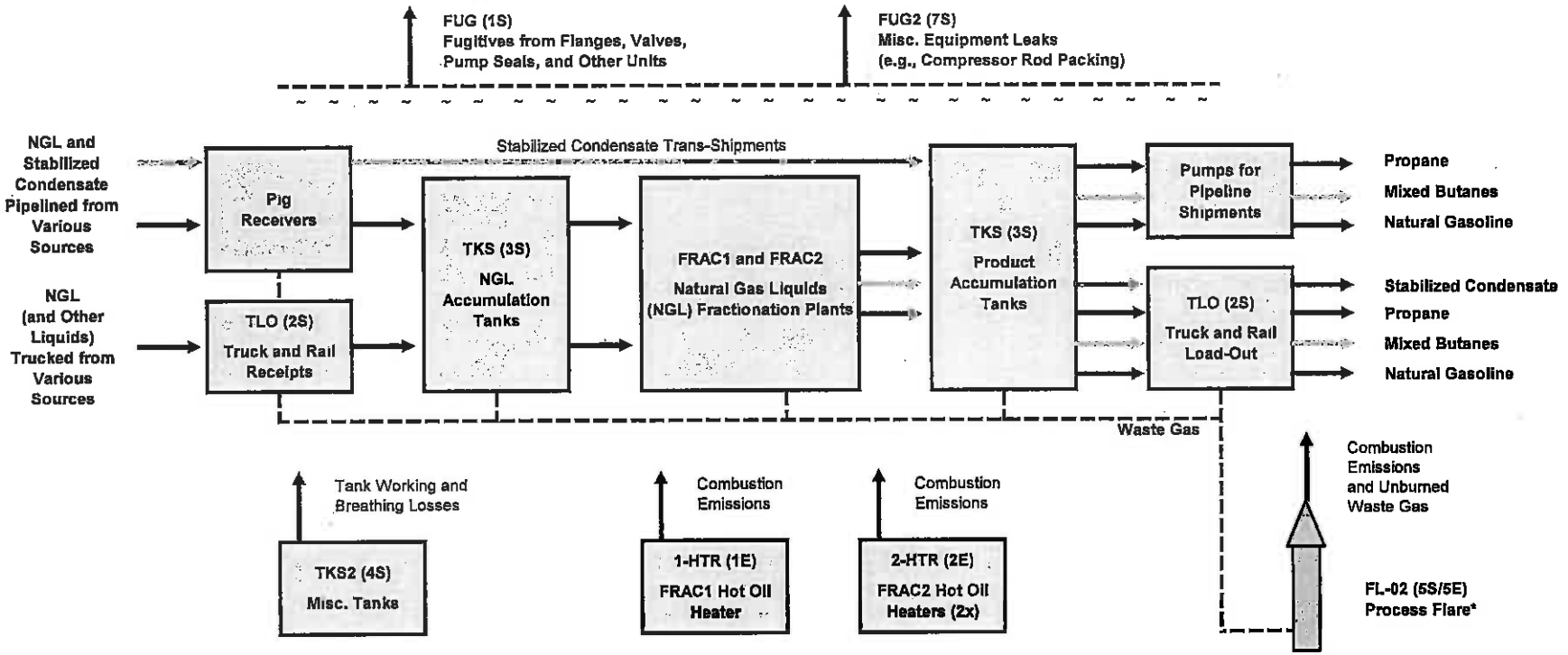
ATTACHMENT F

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
FUG1 (1S)	FRAC1 - Natural Gas Liquids Fractionation Plant 1 (Fugitives Only)
FUG (1S)	FRAC2 - Natural Gas Liquids Fractionation Plant 2 (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 NSR Modification Permit

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 Appendix 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)
- Add Electric Driven Pipeline Delivery Pumps FUG (1S)
- Increase Truck/Rail Load-Out/Receipt Capacity to 58,200 bbl/day TLO (2S)
- Add Three (3) 90,000 gal Pressure Vessels (Stabilized Condensate) TKS (3S)
- Modify Capacity of Atmospheric Natural Gasoline Tanks to 454,000 Gal. Each TKS (3S)
- Increase Waste Gas Volume and Average Waste Gas Heat Content to the Flare FL-02 (5S/5E)
- Add Miscellaneous Equipment Fugitives (e.g., Rod Packing Leaks) FUG2 (7S)

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 proposes to install pumps for shipment of product to pipelines. These pumps will be driven by electric motors. These pumps will not result in additional 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) ANAYSIS**
- **INLET NATURAL GAS LIQUIDS (NGL) SUMMARY**
- **PROPANE/BUTANE SUMMARY**
- **NATURAL GASOLINE ANAYSIS**
- **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

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

Attachment H

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	0.9406	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	1.8658	11.0105	9.7381	10.4340
17	3-Methylpentane	11.87	21188.4	0.9690	1.1736	6.8524	6.0805	6.5863
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	2.2284	2.0802
21	2-4-Dimethylpentane	13.83	364.9	0.1360	0.1647	0.8617	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	2.1883	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	1857.8	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	17.60	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	0.9458
34	Toluene	19.38	1660.4	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	982.0	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	5.8858
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	2.8768
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	0.0662	0.0547
50	n-Propylcyclohexane	25.69	1655.9	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	0.7602
54	tert-Butylcyclohexane	27.18	1593.4	0.0480	0.0581	0.3394	0.4686	0.4216
55	n-Decane	27.36	7229.4	0.1650	0.1998	1.1669	1.7038	1.6364
57	sec-Butylbenzene	27.67	1954.9	0.0670	0.0690	0.4031	0.5563	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 45CSR13 NSR Modification Permit

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 °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	0.076	0 021	32.26	0.09	0.03	40
Ethane	74-84-0	C2H6	2.36	1.19	1,868	2.36	1.19	1,870
VOC	Various	C3+	97 57	98 79	155,384	100.00	100.00	155,390
Benzene	71-43-2	C6H6	0 05	0 07	102	0.05	0.07	110
Ethylbenzene	110-54-3	C6H14	2 5E-02	4 5E-02	71	2.9E-02	0.05	80
n-Hexane	100-41-4	C8H10	3 32	4 79	7,531	3.32	4.79	7,540
Toluene	108-88-3	C7H8	0 08	0 13	203	0.09	0.13	210
2,2,4-TMP	540-84-1	C8H18	0 08	0 14	226	0.08	0.15	230
Xylenes	1330-20-7	C8H10	0 60	1 06	1,667	0.60	1.06	1,670
Total HAP	Various	C6 thru C8	4 15	6 23	9,800	4.16	6.26	9,840

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

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 °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	---	---	---	---	---	---
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	C8H13	---	---	---	---	---	---
Xylenes	1330-20-7	C8H10	---	---	---	---	---	---
Total HAP	Various	C6 thru C8	---	---	---	---	---	---

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

Attachment H

NATURAL GASOLINE ANALYSIS

Williams Quality Control Facility

Extended Analysis by GPA 2186

Sample Information

Sample Name	Sample Information
Corrosion	Gas V-2951 020916 1245 - Ext
Vapor Pressure (calc), psia	No Sample Submitted for Analysis
Vapor Pressure (meas), psia	10.99
Saybolt Color	8.57
Doctor's Test	+22
Water Content, ppmw	Positive
Distillation, deg F	21
10%	
90%	125.1
FBP	513.9
Technician	619.3
Method Name	Lab Technician
Injection Date	Extended-Olefin Method - Diablo
Report Date	2015-02-09 13:40:13
	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	0.0182	0.0099	0.0131
Iso-Butane	6.94	28560.4	0.0687	0.0489	0.0560
n-Butane	7.34	1279981.9	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	39.23	302873.2	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	0.3380	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	11.85	4062840.7	3.9170	6.2567	11.7805	10.4041	11.1617
18	3-Methylpentane	12.09	2497522.5	2.3930	3.8224	7.1970	6.3581	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	184846.4	0.0600	0.0958	0.1805	0.1654	0.1929
21	Methylcyclopentane	13.94	901456.4	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	0.2676	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	495681.0	0.4170	0.6661	1.2541	1.2879	1.2998
28	3-Methylhexane	15.99	2301624.3	1.8060	2.8879	5.4376	5.5940	5.6966
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	0.6605
31	n-Heptane	17.14	4495024.5	3.7250	5.9500	11.2030	11.5043	11.8079
32	Methylcyclohexane	18.49	2323756.8	1.9950	3.0269	5.6992	5.7349	5.2311
33	2-5-Dimethylhexane	18.63	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	1.4726
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	1.4076	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	0.8036	1.5128	1.6460	1.3376
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	3.1306	4.1151	4.0246
49	Isopropylbenzene	29.00	181654.8	0.1230	0.1965	0.3698	0.4566	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	30.36	84706.8	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	32.16	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	0.6260	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	0.1631	0.1248
59	1-2-3-Trimethylbenzene	33.41	144574.6	0.0880	0.1561	0.2977	0.3667	0.2861
60	n-Butylcyclohexane	34.14	145805.2	0.0890	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 45CSR13 NSR Modification Permit

Attachment H

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 °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	---	---	---	--	--	---
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	0.17	0.16	360
Ethylbenzene	100-41-4	C8H10	4 3E-02	5 3E-02	121	4.6E-02	5.7E-02	130
n-Hexane	110-54-3	C6H14	9 33	9 30	21,187	9.33	9.31	21,190
Toluene	108-88-3	C7H8	0 53	0 57	1,288	0.53	0.57	1,290
2,2,4-TMP	540-84-1	C8H18	0 25	0 33	755	0.25	0.33	760
Xylenes	1330-20-7	C8H10	9 1E-01	1 1E+00	2,547	9.1E-01	1.1E+00	2,550
Total HAP	Various	C6 thru C8	11 24	11 53	26,249	11.25	11.54	26,280

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

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 °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	---	---	---	--	--	---
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	0.02	0.02	40
Ethylbenzene	100-41-4	C8H10	4 3E-03	7 5E-03	12	7.1E-03	1.2E-02	20
n-Hexane	110-54-3	C6H14	0 93	1 32	2,119	0.93	1.32	2,120
Toluene	108-88-3	C7H8	0 05	0 08	129	0.05	0.08	130
2,2,4-TMP	540-84-1	C8H18	0 03	0 05	75	0.03	0.05	80
Xylenes	1330-20-7	C8H10	9 1E-02	1 6E-01	255	9.3E-02	1.6E-01	260
Total HAP	Various	C6 thru C8	1 12	1 63	2,625	1.13	1.65	2,650

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

Attachment H

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	17.1780
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	4062840.7	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	46.66	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	0.1654	0.1929
21	Methylcyclopentane	13.94	901455.4	0.9080	1.4504	2.7308	2.3553	2.2064
22	2-4-Dimethylpentane	14.26	40687.6	0.2920	0.4664	0.8782	0.9018	0.9399
23	Benzene	14.86	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	2032413.6	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	0.5526	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	0.0260	0.0399	0.0752	0.0880	0.0885
37	4-methylheptane	20.98	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	1.4076	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	0.8036	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	181654.8	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	0.1760
53	1-3-5-Trimethylbenzene	30.88	151968.3	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 45CSR13 NSR Modification Permit

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 °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	---	---	---	---	---	---
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	1.7E-01	1.5E-01	352	1.7E-01	1.6E-01	360
Ethylbenzene	100-41-4	C8H10	4.3E-02	5.3E-02	121	4.6E-02	5.7E-02	130
n-Hexane	110-54-3	C6H14	9.33	9.30	21,187	9.33	9.31	21,190
Toluene	108-88-3	C7H8	5.3E-01	5.7E-01	1,288	5.3E-01	5.7E-01	1,290
2,2,4-TMP	540-84-1	C8H18	2.5E-01	3.3E-01	755	2.5E-01	3.3E-01	760
Xylenes	1330-20-7	C8H10	9.1E-01	1.1E+00	2,547	9.1E-01	1.1E+00	2,550
Total HAP	Various	C6 thru C8	11.24	11.53	26,249	11.25	11.54	26,280

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

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 °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	---	CO2	---	---	---	---	---	---
Methane	75-82-8	CH4	95.39	91.57	40,322	100.00	100.00	40,400
Ethane	74-84-0	C2H6	4.48	8.05	3,547	4.54	8.18	3,600
VOC	Various	C3+	0.14	0.37	165	0.17	1.00	200
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 45CSR13 NSR Modification Permit

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 °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	1 6E-02	2 9E-02	44	1.8E-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	3 6E-01	6 6E-01	997	3.6E-01	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 45CSR13 NSR Modification Permit

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***	3,590.6	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	—	—	0.0169	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	—	—	2.6838	128.69
Toluene***	4,273.7	4,474.9	0.0836	3.74	—	—	0.5303	23.73	0.05	2.37	0.5303	23.73	—	—	0.1145	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	—	—	0.0655	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		100.0		100.0		100.0		100.0		100.00	
Btu/scf (HHV):			**3,308**		**2,689**		**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:			**155,390**		**134,700**		**227,710**		**160,700**		**227,800**		**200**		**145,400**	
HAP lb/MMscf:			**9,840**		—		**26,280**		**2,650**		**26,280**		—		**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

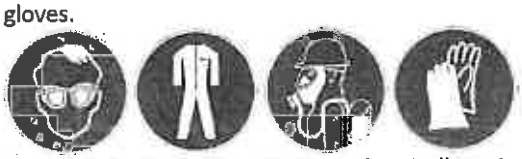
Ontario	OEL TWA (ppm)	1000 ppm
Prince Edward Island	OEL TWA (ppm)	1000 ppm
Saskatchewan	OEL STEL (ppm)	1250 ppm
Saskatchewan	OEL TWA (ppm)	1000 ppm

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

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) :

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: Evacúate 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) Hazard Classes : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120

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)

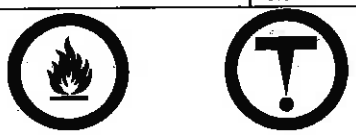
U.S. - California - Priority Toxic Pollutants - Human Health Criteria
U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Acute
U.S. - California - SCAQMD - Toxic Air Contaminants - Non-Cancer Chronic
U.S. - California - 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 45CSR13 NSR Modification Permit

Attachment I

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[(a)]	Design Capacity	Type[3] and Date of Change	Control Device[4]
1S	FUG[(b)]	Fractionation Plant 1 (Fugitives Only)	2011	12,500 bpd (ave)	Existing	LDAR
		Fractionation Plant 2 (Fugitives Only)	2013	30,000 bpd (ave)	Existing	
2S	TLO	**Truck/Rail Load-Out**	**tbd**	**58,200 bpd (ave)[(c)]**	**Modified**	**FL-02 (5E)**
3S	TKS	**Stabilized Condensate Tanks**	**tbd**	**3 tanks @ 90,000 gals ea**	**New**	**Pressure Vessels (Insig-nificant 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[(d)]	TKS2[(d)]	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**	**tbd**	**28,000 lb/hr**	**Modified**	**None**
7S[(e)]	FUG2[(e)]	**Miscellaneous Equipment Leaks**	**tbd**	**---**	**New**	**None**

(a) Initial Construction Permit issued in December 2011, earliest start-up was in 2012.

(b) Previously Frac1 and Frac2; however, the new label (i.e., FUG (1S)), accounts for the facility-wide pipe and fitting fugitives.

(c) Total TLO (2S) capacity is the sum of Frac1, Frac2, Stabilized Condensate, plus a 20% contingency.

(d) TKS2 (4S) was previously listed as "insignificant sources". The total TKS2 (4S) PTE is VOC = 0.40 tpy and HAP = 0.11 tpy.

(e) Newly identified source - Misc Equipment Leaks (e.g., Reciprocating Compressor Rod Packing Leaks).

[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 45CSR13 NSR Modification Permit

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			
TKS2 (4S)	Upward Vertical	TKS2 (4S)	TKS2 (4S)	na	na	C	8,760	NOX	—	—	—	—	Gas	—	
								CO	—	—	—	—	Gas	—	
								VOC	0.09	0.40	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	0.02	0.10	0.02	0.10	Gas	AP-42	
								Toluene	—	—	—	—	Gas	AP-42	
								2,2,4-TMP	—	—	—	—	Gas	AP-42	
								Xylenes	—	—	—	—	Gas	AP-42	
								Other HAP	3E-03	1E-02	3E-03	1E-02	Gas	AP-42	
								Total HAP	0.03	0.11	0.03	0.11	Gas	AP-42	
								CO	—	—	—	—	Gas	EPA	
								CH4	—	—	—	—	Gas	EPA	
								N2O	—	—	—	—	Gas	EPA	
								CO2e	—	—	—	—	Gas	EPA	

Misc Tanks (TKS2 (4S))
(Slop Oil, Diesel Fuel, Gasoline, Methanol)

Continued ...

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

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			
		Frac1 - Hot Oil Heater (1-HTR (1E))						NOX	4.46	19.56	4.46	19.56	Gas	AP-42	
								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 ...

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/m³)*
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
	Frac2 - Hot Oil Heaters (2x) (2-HTR (2E)) (TOTAL BOTH UNITS)							NOX	6.47	28.34	6.47	17.03	Gas	Vendor	
								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 45CSR13 NSR Modification Permit

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/m³)*
		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/5S)	Flare	FL-02 (5S/5S)	FL-02 (5S/5S)	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 45CSR13 NSR Modification Permit

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			
		FACILITY -WIDE SUMMARY (Including Fugtives (FUG (1S) and FUG2 (7S))						NOX	10.93	47.89	96.49	78.89	Gas		
								CO	17.05	74.67	187.86	135.89	Gas		
								VOC	28,057.58	14,244.78	300.83	216.47	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	18.65	10.01	0.21	0.21	Gas		
								Ethylbenzene	9.37	5.19	0.12	0.16	Gas		
								HCHO	0.02	0.07	0.06	0.07	Gas		
								n-Hexane	1,125.18	592.18	12.17	9.40	Gas		
								Toluene	52.06	27.35	0.55	0.39	Gas		
								2,2,4-TMP	39.07	20.60	0.42	0.32	Gas		
								Xylenes	185.71	96.70	1.88	1.08	Gas		
								Other HAP	0.00	0.02	0.01	0.02	Gas		
								Total HAP	1,430.05	752.12	15.41	11.65	Gas		
								CO2	26,287	115,135	115,455	122,597	Gas		
								CH4	844.49	473.67	96.51	21.18	Gas		
								N2O	0.05	0.22	0.87	0.60	Gas		
								CO2e	47,414	127,042	116,023	123,304	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 45CSR13 NSR Modification Permit

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 45CSR13 NSR Modification Permit

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) *(At 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 45CSR13 NSR Modification Permit

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 45CSR13 NSR Modification Permit

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**	**56.52**	**233.99**	**19.78**	**73.05**	**O - AP-42**
	Benzene	**0.09**	**0.37**	**4.05**	**4.13**	**MB**
	E-Benzene	**0.09**	**0.37**	**4.05**	**4.13**	**MB**
	n-Hexane	**1.72**	**7.55**	**0.52**	**2.29**	**MB**
	Toluene	**0.09**	**0.37**	**4.05**	**4.13**	**MB**
	2,2,4-TMP	**0.09**	**0.37**	**4.05**	**4.13**	**MB**
	Xylenes	**0.09**	**0.37**	**4.05**	**4.13**	**MB**
	Other HAP	**negligible**	**negligible**	**negligible**	**negligible**	**MB**
	Total HAP	**2.15**	**9.42**	**0.65**	**2.86**	**MB**
	CO	**---**	**---**	**---**	**---**	**---**
	CH4	**8.68**	**38.01**	**3.51**	**15.36**	**O - GWP**
	N2O	**---**	**---**	**---**	**---**	**---**
	CO2e	**217**	**950**	**88**	**384**	**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 45CSR13 NSR Modification Permit

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]	77	77/0/0/0/0/0 na	≤ 5	5,977
	Heavy Liquid VOC[8]	---	---	---	---
	Non-VOC[9]	---	---	---	---
Valves[10]	Gas VOC	592	592/0/0/0/0/0 na	≤ 5	6,688
	Light Liquid VOC	6,307	6,307/0/0/0/0/0 na	≤ 5	48,720
	Heavy Liquid VOC	---	---	---	---
	Non-VOC	---	---	---	---
Safety Relief Valves[11]	Gas VOC	---	---	---	---
	Light Liquid VOC	---	---	---	---
	Non-VOC	---	---	---	---
Open Ended Lines[12]	Gas VOC	7	7/0/0/0/0/0 na	≤ 5	278
	Light Liquid VOC	29	29/0/0/0/0/0 na	≤ 5	779
	Non-VOC	---	---	---	---
Sampling Connections[13]	Gas VOC	---	---	---	---
	Light Liquid VOC	---	---	---	---
	Non-VOC	---	---	---	---
Compressors	Gas VOC	---	---	---	---
	Non-VOC	---	---	---	---
Flanges / Connectors	Gas VOC	648	648/0/0/0/0/0 na	≤ 5	2,745
	Light Liquid VOC	8,208	8,208/0/0/0/0/0 na	≤ 5	20,753
	Non-VOC	---	---	---	---
Other*	Gas VOC	124	124/0/0/0/0/0 na	≤ 5	21,006
	Light Liquid VOC	215	215/0/0/0/0/0 na	≤ 5	31,112
	Non-VOC	---	---	---	---
				TOTAL (lb/yr)	**138,059**
				TOTAL (tpy)	**69.03**

*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 L

Emissions Unit Data Sheet(s)

"28. Fill out the **Emissions Unit Data Sheet(s)** as Attachment L."

- **HEATER DATA SHEETS**
  - **Frac1 Hot Oil Heater (1-HTR (1E))**
  - **Frac2 Hot Oil Heaters (2-HTR (2E))**
    - **Vendor Data**

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **1-HTR (1E)**

1. Name or type and model of proposed affected source: **FRAC1 HOT OIL HEATER (1-HTR (1E))**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: **45.54 MMBTU/HR NATURAL GAS-FIRED HOT OIL HEATER**
4. Name(s) and maximum amount of proposed material(s) produced per hour: **45.54 MMBTU/HR NATURAL GAS-FIRED HOT OIL HEATER**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: **NA**

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

45.54 MMBTU/HR NATURAL GAS-FIRED HOT OIL HEATER

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

COMMERCIAL NATURAL GAS W/ NEGLIGIBLE SULFUR AND ASH

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air: **5%**

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

45.54 MMBTU/HR NATURAL GAS-FIRED HOT OIL HEATER

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

NA

(g) Proposed maximum design heat input: **45.54** × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

a.	NO_X	**4.46**	lb/hr	---	grains/ACF
b.	SO_2	**0.03**	lb/hr	---	grains/ACF
c.	CO	**3.75**	lb/hr	---	grains/ACF
d.	PM_{10}	**0.34**	lb/hr	---	grains/ACF
e.	Hydrocarbons	**0.35**	lb/hr	---	grains/ACF
f.	VOCs	**0.25**	lb/hr	---	grains/ACF
g.	Pb	**NA**	lb/hr	---	grains/ACF
h.	Specify other(s)				
	N-HEXANE	**0.08**	lb/hr	---	grains/ACF
	TOTAL HAP	**0.08**	lb/hr	---	grains/ACF
	CO2E	**5,333**	lb/hr	---	grains/ACF
			lb/hr	---	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
FUEL CONSUMPTION	**FUEL CONSUMPTION**
REPORTING	TESTING
NA	**NA**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NA

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **2-HTR (2E)**

1. Name or type and model of proposed affected source:

   FRAC2 HOT OIL HEATERS (QTY: 2) (2-HTR (2E))

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   89.85 MMBTU/HR NATURAL GAS-FIRED HOT OIL HEATERS (EACH)

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   89.85 MMBTU/HR NATURAL GAS-FIRED HOT OIL HEATERS (EACH)

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   NA

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

89.85 MMBTU/HR NATURAL GAS-FIRED HOT OIL HEATERS (EACH)

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

COMMERCIAL NATURAL GAS W/ NEGLIGIBLE SULFUR AND ASH

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air: **5%**

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

89.85 MMBTU/HR NATURAL GAS-FIRED HOT OIL HEATERS (EACH)

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

NA

(g) Proposed maximum design heat input: **89.85** × 10^6 BTU/hr.

7. Projected operating schedule:

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

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

a.	NO_X	**3.23**	lb/hr each	---	grains/ACF
b.	SO_2	**0.05**	lb/hr each	---	grains/ACF
c.	CO	**6.65**	lb/hr each	---	grains/ACF
d.	PM_{10}	**0.67**	lb/hr each	---	grains/ACF
e.	Hydrocarbons	**0.56**	lb/hr each	---	grains/ACF
f.	VOCs	**0.36**	lb/hr each	---	grains/ACF
g.	Pb	**NA**	lb/hr each	---	grains/ACF
h.	Specify other(s)				
	N-HEXANE	**0.16**	lb/hr each	---	grains/ACF
	TOTAL HAP	**0.17**	lb/hr each	---	grains/ACF
	CO2E	**10,491**	lb/hr each each	---	grains/ACF
			lb/hr	---	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
FUEL CONSUMPTION	**FUEL CONSUMPTION**
REPORTING	TESTING
NA	**NA**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE. .

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NA

2-HTR - Frac2 Hot Oil Heater

Aleksa, Deborah M

From: Jeff Oliver [joliver@Heatec.com]
Sent: Wednesday, March 06, 2013 6:49 AM
To: Matthews, Jeff; Ferraro, Christopher
Cc: Aleksa, Deborah M; Johnson, Johnny
Subject: RE: Emissions info

Jeff,

HHV fired Input

Sincerely,

Jeff Oliver
Southeast Regional Sales Manager
o: 423-821-5200
f: 423-821-7873
c: 423-667-2273
Email: joliver@heatec.com
www.heatec.com

From: Matthews, Jeff [mailto:jeff.matthews@urs.com]
Sent: Monday, March 04, 2013 4:52 PM
To: Jeff Oliver; Ferraro, Christopher
Cc: Aleksa, Deborah M; Johnson, Johnny
Subject: RE: Emissions info
Importance: High

Could you please let us know whether these emission rates are based on Absorbed, Fired (LHV), or Fired (HHV)?

Jeff Matthews, P.E.
Technology Manager
URS Corporation
Work: 303-843-3041
Cell: 720-648-7717
Email: Jeff.Matthews@urs.com
http://www.urscorp.com

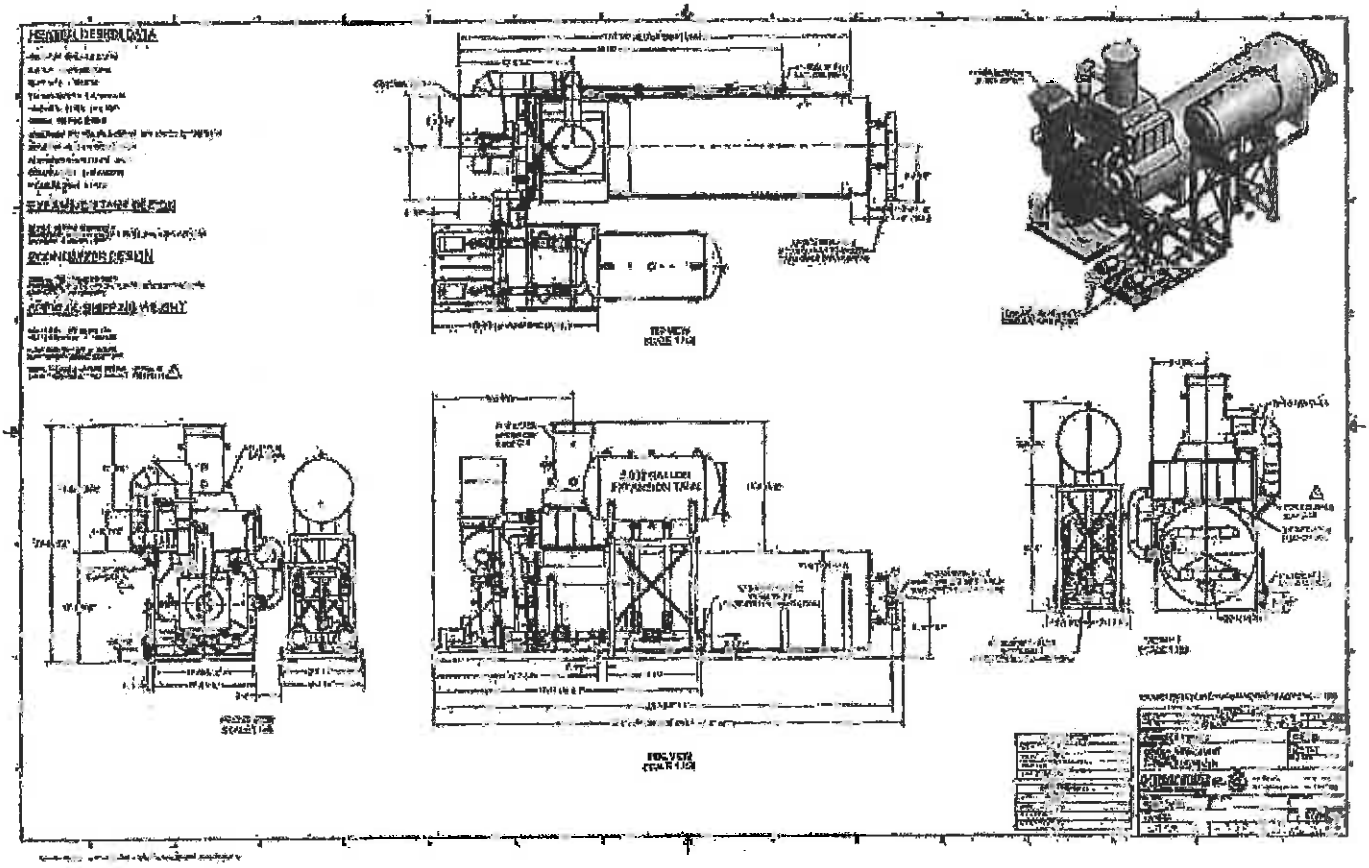
From: Jeff Oliver [mailto:joliver@Heatec.com]
Sent: Tuesday, February 26, 2013 7:00 AM
To: Ferraro, Christopher
Cc: Matthews, Jeff; Aleksa, Deborah M; Johnson, Johnny
Subject: RE: Emissions info

Below are typical emission levels for a burner like this.

	Natural Gas	
	Lbs/MMBTU	PPM
NOx	0.036	30
CO	0.074	100
VOC	0.004	
Particulates	0.01	

Parts Per Million (PPM) @ 3% O2 Dry

2-HTR - Frac2 Hot Oil Heater



2-HTR - Frac2 Hot Oil Heater

Used 89.85 MMBTU/Hr
Capacity Each Heater

Provider of Quality Heating Equipment, Engineering, Service & Expertise since 1977

HEATEC, INC.
P.O. BOX 72769 • CHATTANOOGA, TN 37407
5200 WILSON ROAD • CHATTANOOGA, TN 37410

HEATEC

EQUIPMENT DESIGN DATA:

The equipment will be designed to meet the following criteria. (Values are per each heater & for the single triplex pump skid total.)

Heater Capacity (Btu/hr) (MW)	70,076,952	20.54
Heater Circulation Rate (Gal/min) (m^3/hr)	1,980	450
Heater Inlet Temperature (°F) (°C)	250	121
Heater Outlet Temperature (°F) (°C)	400	204
Minimum Allowable Circulation Rate (Gal/min) (m^3/hr) 80 %	1,584	360
Input (HHV) (Btu/hr) (MW)	88,366,653	25.90
Stack Temperature (°F) (°C)	542	283
Calculated Heater Efficiency % LHV [See Note 1]	88	88
Calculated Heater Efficiency % HHV [See Note 1]	79	79
User / Valve / Pipe ΔP (psid) (kPa) [See Note 2]	40	276
Heater Calculated ΔP (psid) (kPa) (Clean)	13	87
Pump Head Design (psid) (kPa)	53	363
Heater Volume (Gallons) (m^3)	2,675	10
Tank Cold Volume (Gallons) (m^3)	1,250	5
User Volume (Gallons) (m^3) [See Note 2]	4,901	19
Total Volume (Gallons) (m^3)	8,826	33
Tank Capacity (Gallons) (m^3)	5,000	19
Total Surface Area (ft^2) (m^2)	7,735	719
Overall Flux Rate (Btu/hr-ft^2) (kW/m^2)	9,059	29
Radiant Surface Area (ft^2) (m^2)	1,717	160
Average Radiant Flux Rate (Btu/hr-ft^2) (kW/m^2) AICHE	21,913	69
Maximum Radiant Flux Rate (Btu/hr-ft^2) (kW/m^2) AICHE	29,583	93
Maximum Metal Temperature (°F) (°C) AICHE	558	292
Maximum Film Temperature (°F) (°C) AICHE	533	278
Combustion Loading (Btu/hr-ft^3) (kW/m^3)	33,727	349
Average Flue Gas Velocity Across Insulation (ft/s) (m/s)	90	28
Average Oil Velocity (ft/s) (m/s)	8	3

Note 1: Based on HHV of typical natural gas. Guaranteed efficiency is 1% less.

Note 2: Customer to confirm their equipment volume and pressure drop, which are not in Heatec's scope of supply.

2-HTR - Frac2 Hot Oil Heater

Used 54.00 MMBTU/Hr
Average Each Heater

Provider of Quality Heating Equipment, Engineering, Service & Expertise since 1977

HEATEC, INC.
P.O. BOX 72760 • CHATTANOOGA, TN 37407
[illegible] WILSON ROAD • CHATTANOOGA, TN 37430

HEATEC®

	IP UNITS	SI UNITS
Heater Capacity (Btu/hr) (MW)	**43,200,000**	**12.66**
Heater Circulation Rate (Lb/hr) (kg/hr)	773,784	350,890
Heater Circulation Rate (Gal/min) (m^3/hr)	1,980	450
Heater Inlet Temperature (°F) (°C)	307	153
Heater Outlet Temperature (°F) (°C)	400	204
Minimum Allowable Circulation Rate (Gal/min) (m^3/hr) 80 %	1,584	360
Minimum Allowable Circulation Rate (Gal/min) (m^3/hr) 5 fps	1,247	283
Input (HHV) (Btu/hr) (MW)	53,189,496	15.59
Stack Temperature (°F) (°C)	448	231
Calculated Heater Efficiency % LHV [See Note 1]	90	90
Calculated Heater Efficiency % HHV [See Note 1]	81	81
User / Valve / Pipe ΔP (psid) (kPa) [See Note 2]	37	255
Heater Calculated ΔP (psid) (kPa) (Clean)	19	130
Pump Head Design (psid) (kPa)	56	385
Heater Volume (Gallons) (m^3)	2,606	10
Tank Cold Volume (Gallons) (m^3)	19	0
User Volume (Gallons) (m^3) [See Note 2]	4,901	19
Total Volume (Gallons) (m^3)	7,526	28
Tank Capacity (Gallons) (m^3)	75	0
Total Surface Area (ft^2) (m^2)	8,487	789
Overall Flux Rate (Btu/hr-ft^2) (kW/m^2)	5,090	16
Radiant Surface Area (ft^2) (m^2)	1,717	160
Average Radiant Flux Rate (Btu/hr-ft^2) (kW/m^2) AICHE	14,898	47
Maximum Radiant Flux Rate (Btu/hr-ft^2) (kW/m^2) AICHE	20,112	63
Maximum Metal Temperature (°F) (°C) AICHE	502	261
Maximum Film Temperature (°F) (°C) AICHE	485	252
Combustion Loading (Btu/hr-ft^3) (kW/m^3)	20,301	210
Average Film Coefficient (Btu/hr-ft^2-F) (W/m^2-K)	237	1,345
Average Reynolds Number	261,428	261,428
Average Flue Gas Velocity Across Insulation (ft/s) (m/s)	49	15
Average Oil Velocity (ft/s) (m/s)	8	2
Average Prandtl Number	23	23
H/W or L/D Ratio	4	4

ATTACHMENT M

Air Pollution Control Device Sheet(s)

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

- **PROCESS FLARE DATA SHEET (FL-02 (5S/5E))**
  - **Vendor Data**

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): **PROCESS FLARE (FL-02 (5S/5E))**

Equipment Information

1. Manufacturer: **ZEECO**

   Model No.

2. Method: ☒ **Elevated flare** ☐ Ground flare ☐ Other Describe

3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

4. Method of system used:
   ☐ Steam-assisted ☒ **Air-assisted** ☐ Pressure-assisted ☐ Non-assisted

5. Maximum capacity of flare:
   28,000 LB/HR
   (Smokeless Design Capacity)

6. Dimensions of stack:
   Diameter **1.25 FT**
   Height **190 FT**

7. Estimated combustion efficiency:
   (Waste gas destruction efficiency)
   Estimated: **99%**
   Minimum guaranteed: **99%**

8. Fuel used in burners:
   ☒ **Natural Gas**
   ☐ Fuel Oil, Number
   ☐ Other, Specify:

9. Number of burners: **1**
   Rating: **620,000,000** BTU/HR

10. Will preheat be used? ☐ Yes ☒ No

11. Describe method of controlling flame:
    A FRAME-FRONT PENETRATING TYPE IGNITION SYSTEM, W/ CONTINUOUS BURNING PILOT

12. Flare height: **190 FT**

13. Flare tip inside diameter: **1.25 FT**

14. Natural gas flow rate to flare pilot flame per pilot:
    1.25 SCF/MIN
    75.00 SCF/HR

15. Number of pilot lights: **3**
    Total **0.24 MMBTU/HR**

16. Will automatic re-ignition be used?
    ☒ Yes ☐ No

17. If automatic re-ignition will be used, describe the method:
    EACH PILOT HAS A SEPARATE AUTO-IGNITION AND FLAME SENSING SYSTEM (THERMOCOUPLE)

18. Is pilot flame equipped with a monitor? ☒ **Yes** ☐ No
    If yes, what type? ☒ **Thermocouple** ☐ Infra-Red ☐ Ultra Violet ☐ Camera with monitoring control room ☐ Other, Describe:

19. Hours of unit operation per year: **8,760**

Steam Injection

20. Will steam injection be used? ☐ Yes ☒ No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29.

Name	Quantity Grains of H_2S/100 ft^3	Quantity (LB/hr, ft^3/hr, etc)	Source of Material
FUEL/PURGE GAS	NEGLIGIBLE	2,418 SCFH - AVE	PILOT/PURGE
PROPANE/BUTANE	NEGLIGIBLE	1,142 SCFH - AVE	RAIL CAR DE-GAS
NAT'L GAS LIQUID (NGL)	NEGLIGIBLE	8,920 SCFH - AVE	OFF-SPEC
BUTANE BLANKET	NEGLIGIBLE	4,320 SCFH - AVE	NAT'L GASOLINE TK
MIXED WASTE	NEGLIGIBLE	5,735 SCFH - AVE	HOSE BLOWDOWN
STABILIZED CONDENSATE	NEGLIGIBLE	600 SCFH - AVE	HOSE BLOWDOWN

30. Estimate total combustible to flare: **3,264 LB/HR (AVE) - Smokeless**
(Maximum mass flow rate of waste gas) **28,000 LB/HR (MAX) - Smokeless**

31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.:
23,134 SCF/HR (AVE) **192.66 MMSCF/YR (MAX)**

32. Give composition of carrier gases:
NA

33. Temperature of emission stream: **AMBIENT °F** Mean heating value of emission stream: **3,137 BTU/SCF** Mean molecular weight MW: **56.32 LB/LB-MOLE**	34. Identify and describe all auxiliary fuels to be burned. **NA** BTU/scf BTU/scf BTU/scf BTU/scf
35. Temperature of flare gas: **1,290 °F**	36. Flare gas flow rate: **3,264 LB/HR**
37. Flare gas heat content: **3,137 BTU/SCF**	38. Flare gas exit velocity: **175.4 FT/SEC**

39. Maximum rate during emergency for one major piece of equipment or process unit: **350,227 LB/HR**

40. Maximum rate during emergency for one major piece of equipment or process unit: **6,984 MMBTU/HR**

41. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
NA

42. Describe the collection material disposal system:
NA

43. Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet? **YES**

44. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:	RECORDKEEPING:
Monitor presence of pilot flame	**Maintain records of date and duration of pilot flame outages**
REPORTING:	TESTING:
na	**Operate flare in accordance with requirements of 40 CFR 60.18 (General Control Device Requirements)**

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.
NA – ASSUME 100%

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
99% VOC AND HAP

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
28,000 LB/HR

URS	Williams Moundsville, WV	Doc. Number:	30917-40-15-07-210-001
		Rev.	2

URS

Moundsville Fractionator and Terminal

Flare

Mechanical Equipment Data Sheet Package for Permanent Flare

DOC. # 30917-40-15-07-210-001

REV.	DESCRIPTION	BY	CHKD	PRO/SDE/PEM	DATE
2	Updated Process Conditions	RLW	CJC	JSM/CJF/EMS	5/7/13
1	Added warehouse spare air assist blower	HDP	CJC	JSM/CJF/EMS	2/19/2013
0	Issued for Purchase	CJC	RMW	JSM/CJF/EMS	1/31/2013
B	Issued for Bid	CJC	HDP	RMW	11/8/2012
A	Issued for IDR	CJC		RMW	11/5/2012

Revisions

CLIENT:	Williams
PROJECT:	Moundsville Fractionator and Terminal
URS JOB NO.:	30917-40

					FLARE API 537		DATASHEET NO.		REV
							30917-40-15-07-210-001		2
			NO.	BY	DATE	REVISION	SHEET	OF	DATE
			A	CJC	11/5/12	Issued for IDR	1	12	4/08/13
			B	CJC	11/8/12	Issued for Bid	BY	CHK'D	APPR
			0	CJC	1/31/13	Issued for Purchase			
			1	HDP	2/19/13	Added warehouse spare blower	P.O.		
			2	RMW	4/08/13	Updated Process Conditions	REQ		
1	TAG	FL-1241	SERVICE DESC	Permanent Flare			VENDOR		
2			MANUFACT'R	Zeeco			SIZE	By vendor	
3	PROJ	30811	MODEL NUM	AFTA-24/56					
4	PURCHASER SUPPLIED - GENERAL INFORMATION								
5					Note				REV
6	Purchaser					URS Energy and Construction			
7	Reference Number					N/A			
8	Plant Owner / Operator					Williams			0
9	Reference Number					N/A			
10	Vendor Reference Number					T24495F			0
11									
12									
13	Jobsite Location					Moundsville, WV			
14	Jobsite Climate					Humid Continental			
15	Unit Tag					N/A			
16	Equipment Number					FL-1241			2
17	Service					Permanent Flare			
18	Quantity Required					One			
19	Is Smokeless Required? (Yes/No)					Yes - Ringelmann 1, see sheet 4 for capacity			
20	Preferred Smokeless Method					Air assist			
21	Local Codes								B
22	Is P&ID Attached? (Yes/No)					No			
23									
24									
25	Ambient Conditions								
26	Maximum Recorded Temperature			°F		99			
27	Minimum Recorded Temperature			°F		-20			
28	Minimum Design Temperature (winterization)			°F		-20			
29	Minimum Design Metal Temperature			°F	9	-50			
30	Summer Max. Design Temperature (dry bulb)			°F		100			
31	Relative Humidity			%		100 max, 86 ave, 10 min			B
32	Wind Speed, Yearly mean			mph	11	11.2			
33	Predominant Wind, (Y/N / Direction)					West			
34	Peak Solar Radiation			$Btu/h\text{-}ft^2$	31	250			B
35	Include Solar w/ Flare Radiation (Yes/No)				31	Yes			B
36	Jobsite Elevation			ft above sea level		696			
37	Average Barometric Pressure			psia		14.33			
38									
39									
40	Structural code					IBC 2009 / ASCE 7-05			B
41	Wind								
42	Exposure Factor					C			
43	Occupancy Factor					III			
44	Structural designs wind speed (3 sec gust)			mph		90			B
45	Importance Factor					1.0			
46									
47									
48	Seismic								
49	Site Class					D			B
50	Occupancy Category					III			
51	Importance Factor					1.25			
52	S_s					10.2% g			
53	S_1					5.5% g			
54	F_a					1.6			
55	F_v					2.4			
56									
57									
58									
59									
60									
61									
62									

	TAG NO.	FL-1241	FLARE API 537	DATASHEET NO. 30917-40-15-07-210-001	REV 2	SHT 2	OF 12	
1	PURCHASER SUPPLIED - GENERAL INFORMATION (Continued)							
2			Note					REV
3	Minimum Flare Height	ft		190				0
4	Anticipated Flare Header Diameter	inch		24				0
5	Approx. Flare Header Length	ft		450				0
6	Flare Header Network Volume	ft^3		not available				
7	Plot Space Available, (Length/Width)			300 ft radius				
8	Aircraft Warning Lights Required? (Yes/No)			No (if height is under 200 feet)				
9								
10								
11	Welding Code			ASME BPVC, Section IX, Welding				
12	Weld Inspection			ASME BPVC, Section V, AWS D1.1, API 537				
13	Surface Prep. & Paint Requirements		14	See note				
14	Special Erection Requirements			By vendor				
15								
16	Flare Inlet Nozzle Location Above Grade	ft		25				0
17	Nozzle Loads on Flare Inlet							
18	Fx, Fy, Fz	lb		Per API 537				0
19	Mx, My, Mz	ft-lb		Per API 537				0
20	Special Piping Treatment							
21	Fireproofing			N/A				
22	Insulation			N/A				
23	Supports			pipe supports for all pilot, FFG, and electrical conduit on stack to be provided by Seller				
24	Covering			N/A				
25	Heat Tracing (Elec., Steam)			N/A				
26	Attached piping			Seller provides 2" and larger as prefabricated spools; smaller than 2" as random lengths. All within				
27				Top 10' of tip exit shall be stainless steel.				
28	Utilities Available (Design / Normal)							
29	Steam Pressure	psi (g)		N/A				
30	Steam Temperature	°F		N/A				
31	Location of Steam Conditions			N/A				
32	Blower Power, (Volts / Phase / Freq)			460V / 3 phase/ 60 Hz				
33	Instr. Power, (Volts / Phase / Freq)			120 / 1phase/ 60 Hz				
34	Electrical Classification, (Cl / Gp / Div)			Class I / Div 2 / Group C and D				1
35	Instrument Air	psi (g)		135 max, 60-100 normal				
36	Plant Air	psi (g)		135 max, 60-100 normal				
37	Nitrogen	psi (g)		N/A				
38	Fuel Gas, (psi (g) / Case #) (City gas)		28	See fuel gas composition, page 9				B
39	Purge Gas, (psi (g) / Case #) (City gas)		28	See fuel gas composition, page 9				B
40	Utility Costs			N/A				
41				N/A				
42								
43	Nearby Structures (Dist, Height)	ft		300 ft radius area is clear				
44	Other Active Flares			Maintenance flare				B
45	Direction from Current Flare			NW				B
46	Heat Release	Btu/h		TBD				B
47	Radiant Fraction			N/A				
48	Other Inactive Flares			N/A				
49	Cooling Towers			N/A				
50	Electrical Substations			N/A				
51	Property Line			N/A				
52								
53								
54								
55								
56								
64								
65								
66								
67								
68								

	TAG NO.	FL-1241	FLARE API 537	DATASHEET NO. 30917-40-15-07-210-001	REV 2	SHT 2	OF 12	
1	PURCHASER SUPPLIED - GENERAL INFORMATION (Continued)							
2			Note					REV
3	Minimum Flare Height	ft		180				0
4	Anticipated Flare Header Diameter	inch		24				0
5	Approx. Flare Header Length	ft		450				0
6	Flare Header Network Volume	ft^3		not available				
7	Plot Space Available, (Length/Width)			300 ft radius				
8	Aircraft Warning Lights Required? (Yes/No)			No (if height is under 200 feet)				
9								
10								
11	Welding Code			ASME BPVC, Section IX, Welding				
12	Weld Inspection			ASME BPVC, Section V, AWS D1.1, API 537				
13	Surface Prep. & Paint Requirements		14	See note				
14	Special Erection Requirements			By vendor				
15								
16	Flare Inlet Nozzle Location Above Grade	ft		25				0
17	Nozzle Loads on Flare Inlet							
18	Fx, Fy, Fz	lb		Per API 537				0
19	Mx, My, Mz	ft-lb		Per API 537				0
20	Special Piping Treatment							
21	Fireproofing			N/A				
22	Insulation			N/A				
23	Supports			pipe supports for all pilot, FFG, and electrical conduit on stack to be provided by Seller				
24	Covering			N/A				
25	Heat Tracing (Elec., Steam)			N/A				
26	Attached piping			Seller provides 2" and larger as prefabricated spools; smaller than 2" as random lengths. All within				
27				Top 10' of tip exit shall be stainless steel.				
28	Utilities Available (Design / Normal)							
29	Steam Pressure	psi (g)		N/A				
30	Steam Temperature	°F		N/A				
31	Location of Steam Conditions			N/A				
32	Blower Power, (Volts / Phase / Freq)			460V / 3 phase/ 60 Hz				
33	Instr. Power, (Volts / Phase / Freq)			120 / 1phase/ 60 Hz				
34	Electrical Classification, (Cl / Gp / Div)			Class I / Div 2 / Group C and D				1
35	Instrument Air	psi (g)		135 max, 60-100 normal				
36	Plant Air	psi (g)		135 max, 60-100 normal				
37	Nitrogen	psi (g)		N/A				
38	Fuel Gas, (psi (g) / Case #) (City gas)		28	See fuel gas composition, page 9				B
39	Purge Gas, (psi (g) / Case #) (City gas)		28	See fuel gas composition, page 9				B
40	Utility Costs			N/A				
41				N/A				
42								
43	Nearby Structures (Dist, Height)	ft		300 ft radius area is clear				
44	Other Active Flares			Maintenance flare				B
45	Direction from Current Flare			NW				B
46	Heat Release	Btu/h		T8D				B
47	Radiant Fraction			N/A				
48	Other Inactive Flares			N/A				
49	Cooling Towers			N/A				
50	Electrical Substations			N/A				
51	Property Line			N/A				
52								
53								
54								
55								
56								
64								
65								
66								
67								
68								

	TAG NO.	FL-1241	FLARE API 537			DATASHEET NO.	REV	SHT	OF
						30917-40-15-07-210-001	2	3	12
1	PROCESS DESIGN CONDITIONS - PURCHASER								
2									
3			Note	Alternate 0: Propane	Rev	Alternate 1: Butane	Rev	Alternate 2: Propane	Rev
4	Design Flare Capacity	lb/h		279,000		280,000		350,227	2
5	Smokeless Capacity (lb/h / opacity)			28,000/ Ringelmann 1		28,000/ Ringelmann 1		28,000/ Ringelmann 1	2
6	Gas Temperature	°F		73		38		84	2
7	Static Pressure at Flare Inlet	psi (g)		5		5		6	2
8	Flare Inlet Diameter	inch	30	24	0	24	0	24	2
9									
10	Heat Release (LHV)	MM Btu/h		5,562		5,606	B	6,984	2
11	Duration @ Max. Rate	min		30		30		30	2
12	Relief Source			Depropanizer		Debutanizer		Depropanizer	2
13	Controlling Case For . . .			By vendor		By vendor		By vendor	2
14									
15									
16	GAS COMPOSITION (Mole%)								
17	Nitrogen			0.00%		0.00%		0.00%	2
18	CO2			0.00%		0.00%		0.00%	2
19	Methane			0.00%		0.00%		0.00%	2
20	Ethane			6.54%		0.00%		0.49%	2
21	Propane			91.80%		3.04%		97.99%	2
22	i-butane			1.31%		31.17%		1.37%	2
23	n-butane			0.25%		64.48%		0.15%	2
24	i-pentane			0.00%		1.18%		0.00%	2
25	n-pentane			0.00%		0.13%		0.00%	2
26	22-Mbutane			0.00%		0.00%		0.00%	2
27	2-Mpentane			0.00%		0.00%		0.00%	2
28	3-Mpentane			0.00%		0.00%		0.00%	2
29	n-hexane			0.00%		0.00%		0.00%	2
30	n-heptane			0.00%		0.00%		0.00%	2
31	n-Octane			0.00%		0.00%		0.00%	2
32	n-Nonane			0.00%		0.00%		0.00%	2
33	H20			0.00%		0.00%		0.00%	2
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57	TOTAL (should be 100%)			100.00%		100.00%		100.00%	2
58									
59									
60									
61									
62	Molecular Weight			43.3		57.7		44.2	2
63	Lower Heating Value	Btu/lb		19,970		19,660		19,941	2
64	Ratio of Specific Heats	Cp/Cv		N/A		N/A		N/A	2
65	Viscosity	cP		N/A		N/A		N/A	2
66	Dew Point @ static inlet press.	°F		N/A		N/A		N/A	2
67	UEL	% in air		N/A		N/A		N/A	2
68	LEL	% in air		N/A		N/A		N/A	2

	TAG NO.	FL-1241	FLARE API 537			DATASHEET NO. 30917-40-15-07-210-001	REV 2	SHT 4	OF 12
1	PROCESS DESIGN CONDITIONS - PURCHASER								
2									
3			Note	Actual Seller Design	0				
4	Design Flare Capacity	lb/h		350,227	2				
5	Smokeless Capacity (lb/h / opacity)			28000/ Ringelmann 1	0				
6	Gas Temperature	°F		84	2				
7	Static Pressure at Flare Inlet	psi (g)		8.0	2				
8	Flare Inlet Diameter	inch	30	24	0				
9									
10	Heat Release (LHV)	MM Btu/h		6,984	2				
11	Duration @ Max. Rate	min		30	2				
12	Relief Source			Depropanizer	2				
13	Controlling Case For . . .			By vendor	2				
14									
15									
16	GAS COMPOSITION (Mole%)								
17	Nitrogen			0.00%	2				
18	CO2			0.00%	2				
19	Methane			0.00%	2				
20	Ethane			0.49%	2				
21	Propane			97.99%	2				
22	I-butane			1.37%	2				
23	n-butane			0.15%	2				
24	I-pentane			0.00%	2				
25	n-pentane			0.00%	2				
26	22-Mbutane			0.00%	2				
27	2-Mpentane			0.00%	2				
28	3-Mpantane			0.00%	2				
29	n-hexane			0.00%	2				
30	n-heptane			0.00%	2				
31	n-Octane			0.00%	2				
32	n-Nonane			0.00%	2				
33	H20			0.00%	2				
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57	TOTAL (should be 100%)			100.00%	2				
58									
59									
60									
61									
62	Molecular Weight			44.2	2				
63	Lower Heating Value	Btu/lb		19,941	2				
64	Ratio of Specific Heats	Cp/Cv		N/A	2				
65	Viscosity	cP		N/A	2				
66	Dew Point @ static inlet press.	°F		N/A	2				
67	UEL	% in air		N/A	2				
68	LEL	% in air		N/A	2				

TAG NO.	FL-1241	FLARE API 537	DATASHEET NO. 30917-40-15-07-210-001	REV 2	SHT 5	OF 12

			Note	Specified	REV	Based on Case / Flow	REV
	REQUIRED SYSTEM PERFORMANCE - PURCHASER						
FLOW PERFORMANCE							
	Hydraulic Capacity	lb/h		Up to full flow conditions for each specified case			
	Static Inlet Pressure	psi (g)		8 (allowable)	2		
	Peak Exit Velocity	ft/s		By vendor		449 (Design Case)	0
	Peak Mach Number			0.75 (max)	0	0.60 (Design Case)	0
RADIATION PERFORMANCE							
	Peak Radiation at Grade	Btu/h-ft^2	31	1500 Btu/hr-ft2		All specified cases	B
	Distance to Peak Radiation	ft		By vendor			
	Distance to 500	Btu/h-ft^2, ft	31	280	B	All specified cases	B
NOISE PERFORMANCE							
	SPL at Flare Base	dBA	4	85		Smokeless case	B
	SPL at ft from base	dBA		N/A			
	SPL at ft from base	dBA		N/A			
SMOKELESS PERFORMANCE							
	Smokeless Capacity	lb/h		28,000		28,000	0
	Smokeless Definition (R0 / R1 / R2)			R1		R1	0
SMOKELESS STEAM CONSUMPTION							
	Primary Steam	lb/h		N/A			
	Secondary Steam	lb/h		N/A			
	Tertiary Steam	lb/h		N/A			
	Max. Total Steam	lb/h		N/A			
	Continuous Steam	lb/h		N/A			
	S/HC ratio @ Design Smokeless Rate			N/A			
SMOKELESS AIR REQUIREMENTS							
	Continuous (min.)	hp		By vendor		75	0
	Second Stage	hp		By vendor		N/A	0
	Third Stage	hp		By vendor		N/A	0
	Max. Total Power	hp		By vendor		75	0
	Design Air Capacity	SCFM		By vendor			
	Design Blower Pressure	in wc		By vendor			
UTILITY CONSUMPTION							
	Purge Gas	SCFH		By vendor		870	0
	Pilot Gas	SCFH		By vendor		65 X 3	0
	Ignition Gas (Intermittent)	SCFH		By vendor		110	0
	Ignition Air (Intermittent)	SCFH		By vendor		1100	0
	Assist Gas	(SCFH) / (lb/h waste)		By vendor			
	Supplemental Gas	SCFH		By vendor			

	TAG NO.	FL-1241		FLARE API 537		DATASHEET NO. 30917-40-15-07-210-001	REV 2	SHT 6	OF 12
1	MECHANICAL DESIGN DATA (FLARE BURNER)								
2			Note	Purchaser - Specified	REV	Vendor - Proposed / Actual			REV
3	FLARE BURNER BODY								
4	Tip, (Type / Model)			By vendor		AFTA - 24/56			0
5	Quantity of Burners			By vendor		1			0
6	Smokeless Method			By vendor		Air Assist			0
7	Overall Length	ft		By vendor		10			0
8	Upper Section Length	ft		By vendor		5			0
9	Material / Diam. / Thickness	inch	9	310SS / By vendor / By vendor	0	310 SS / 24 / TBD			0
10	Lower Section Length	ft		By vendor		5			0
11	Material / Diam. / Thickness	inch		By vendor		SA 516 Gr. 60 / 24			0
12	Connection, (Type / Size)	inch		By vendor	0	BW / TBD			0
13	Lining Length	ft		By vendor		N/A			0
14	Material / Thickness	inch		By vendor		N/A			0
15	Muffler, (Length / Diameter)	ft/inch		By vendor					
16	Windshield, (Type / Material)			By vendor					
17	Flame Retention, (Y/N / Material)			By vendor		Y / 310 SS			0
18	Lifting lugs (on tip)			By vendor					
19									
20	STEAM ASSIST EQUIPMENT			N/A					
21	Primary Steam Material								
22	Connection (Type / Size)	inch							
23									
24	Secondary Steam Material								
25	Connection (Type / Size)	inch							
26									
27	Tertiary Steam Material								
28	Connection (Type / Size)	inch							
29									
30									
31	AIR ASSIST EQUIPMENT								
32	Air Plenum Length	ft		By vendor		160			0
33	Air Plenum Diameter	inch		By vendor		54			0
34	Connection Type / Size	inch		By vendor		Plate Flg/ 54"(bottom), 56" (top)			0
35									
36									
37	PILOTS								
38	Quantity			2 minimum	B	3			0
39	Rating - Each	Btu/h		By vendor		65000			0
40	Gas Pressure	psig		By vendor		15			0
41	Inspirator Type			By vendor					
42	Inspirator Material			By vendor					
43	Gas Orifice Size	inch		By vendor					
44	Strainer (Y/N)			By vendor					
45	Flame Monitors (per pilot / per flare)			By vendor		1/3			0
46	Flame Monitor Type			By vendor		Thermocouple			0
47	Pilot Fuel Connection (Type/Size)	inch		By vendor		FNPT / 3/4"			0
48	Fuel Gas Manifold (Y/N)			By vendor		Y			0
49	Manifold Connection (Type/Size)	inch		By vendor		FNPT / 3/4"			0
50	Ignition Connection (Type/Size)	inch		flanged at base	0	BW / 1"			0
51	Retractable Pilots (Y/N)			N					
52	Retractable Thermocouples (Y/N)			Y		Y			0
53									
54									
55	IGNITION SYSTEM								
56	Type (FFG / Electronic / Other)		15	FFG	0				
57	Distance from Stack	ft		400 (at KO drum)	0				
58	Automatic / Manual Ignition		21	Manual with automatic relight	B				
59	Electrical Classification (Cl / Gp / Div)			Class I / Group C & D / Div 2	0	Class I / Group C & D / Div 2			0
60	Remote Alarm Contacts - Quantity			By vendor					
61	Remote Ignition Contact (Y/N)			Y					
62	Pressure Regulators - Quantity			By vendor		2			0
63	Pressure Gauges - Quantity			By vendor		3			0
64	Pilot Selector Valves - Type / Quantity			By vendor		/3			1
65	Pilot Indicator Lights (Y/N)			Y		3			0
66	Piping connections			flanged at tip and base					
67									
68									

	TAG NO.	FL-1241		FLARE API 537		DATASHEET NO. 30917-40-15-07-210-001	REV 2	SHT 7	OF 12
1	MECHANICAL DESIGN DATA (PURGE DEVICE / STACK)								
2			Note	Purchaser - Specified	REV	Vendor - Proposed / Actual			REV
3	**PURGE CONSERVATION DEVICE**								
4	Type, (Buoyancy / Velocity / None)			Velocity		Velocity			0
5	Outside Diameter	inch		By vendor					
6	Overall Length	ft		By vendor					
7	Material / Thickness			By vendor					
8	Inlet, (Type / Size)	inch		By vendor					
9	Outlet, (Type / Size)	inch		By vendor					
10	Drain, (Type / Size)	inch		N/A					
11	Loop Seal Depth (ref 23251)	inch		N/A					
12									
13	**STACK**								
14	Overall Height	ft		199		190			0
15	Support Method			By vendor	0	Self-Supporting			0
16	Design Pressure	psi (g)			0	10 (riser), 2 (air plenum)			0
17	Design Temperature	°F	9	-50 to 550		-50 to 550			0
18	Riser Material			Low temperature carbon steel	0	SA-516 Gr 60			0
19	Upper Section Length	ft		By vendor					
20	Material / Diam. / Thickness	inch		By vendor					
21	Middle Section Length	ft		By vendor					
22	Material / Diam. / Thickness	inch		By vendor					
23	Lower Section Length	ft		By vendor					
24	Material / Diam. / Thickness	inch		By vendor					
25	Inlet, (Type / Size)	inch		By vendor					
26	Drain, (Type / Size)	inch		By vendor					
27	Derrick, Base (Shape / Size)	ft		N/A					
28	Guy Wire Dead Man Radius	ft		N/A					
29	Corrosion allowance	in		1/16" min (carbon steel), 0" (SS)	1				
30	Deflection	in/100ft		By vendor					
31	**PIPING ON STACK**								
32	Pilot Gas Lines - Quantity			One per pilot		One with manifold at tip			0
33	Material / Size, inch / Schedule			By vendor		SA-106 Gr. B/ 1" / 40			0
34	Ignition Lines - Quantity			By vendor		3			0
35	Material / Size, inch / Schedule			SS/By vendor/By vendor		304 SS/ 1" / 40			0
36	Primary Steam - (Mat'l / Size, inch / Sched)			N/A					
37	Secondary Steam - (Mat'l / Size, inch / Sched)			N/A					
38	Tertiary Steam - (Mat'l / Size, inch / Sched)			N/A					
39									
40	Drain Line - (Mat'l / Size, inch / Sched)			None					
41	Assist Gas Line - (Mat'l / Size, inch / Sched)			N/A					
42	T/C Conduit - (Mat'l / Size, inch)			By vendor		316L / 1/2"			0
43	Ignition / Power Conduit - (Mat'l / Size, inch)			By vendor		N/A			0
44	ACWL Power Conduit - (Mat'l / Size, inch)			By vendor					
45									
46	Manway Access			By vendor		24" opening			1
47									
48									
49									
50	Skirt Access and Venting			Provide (2) 20" access openings at the bottom of the flare stack for external inspection of the flare riser.		24" opening and 2-4" vent holes			1
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
68									

	TAG NO.	FL-1241	FLARE API 537		DATASHEET NO.	REV	SHT	OF
					30917-40-15-07-210-001	2	8	12
1	MECHANICAL DESIGN DATA (ANCILLARIES)							
2			Note	Purchaser - Specified	REV	Vendor - Proposed / Actual		REV
3	AIR ASSIST BLOWER SYSTEM			By vendor				
4	Fan Quantity			By vendor	0	one installed, see note 37		1
5	Fan, (Type / Material)			By vendor		Vane Axial / TBD		0
6	Fan Location			Grade	B	In ductwork		0
7	Damper Quantity			By vendor				
8	Damper Control (Required / Included)			By vendor				
9	Motor, (Type / Speed)			By vendor				
10	Motor Enclosure			By vendor		TEAO		0
11	Motor Nameplate HP			By vendor		75		0
12	Motor / Fan - Lubrication			By vendor				
13	Max. Motor Current - Winter Amp			By vendor				
14	Supplemental Requirements			By vendor		Inlet Bell & Bird Screen		0
15								
16	LADDERS & PLATFORMS					N/A		0
17	Top Platform, (Deg. / Size, ft)				0			
18	Step-off Platforms Quantity				0			
19	Buoyancy Seal Access				0			
20	Instrument Access Quantity				0			
21	Ladders Type				0			
22	Material / Finish				0			
23	L&P Specification				0			
24								
25	AIRCRAFT WARNING SYSTEM			N/A (if height < 200 ft)	B	N/A		0
26	Quantity							
27	Location							
28	Color / Type, (Strobe / Beacon / Paint)							
29	Retractable							
30	Painting Specification							
31								
32	EST. EQUIPMENT WEIGHTS, (lb)		10					
33	Flare Tip			By vendor		4000 lb		0
34	Purge Reduction Device			By vendor				
35	Gas/Air Risers + Piping			By vendor				
36	Support System			By vendor				
37	Ladders & Platforms			By vendor				
38	Liquid Seal			By vendor				
39	Knockout Drum			N/A				
40	Control Panels			By vendor				
41								
42	SMOKE SUPPRESSION CONTROL							
43	Flare Gas Flow Detector			Optional	B	Not included		0
44	Smoke Detector			Optional	B	Not included		0
45	Control Strategy, (Auto / Manual)			Manual	B			
46								
47	CODES							
48	API 521, Pressure Relieving & Depressuring Syst.			Yes				
49	API 537, Flare Details			Yes				
50	STS-1, Steel Stacks			Yes				
51	ASME BPVC, Section II, Material			Yes				
52	ASME BPVC, Section V, Inspection			Yes				
53	ASME BPVC, Section IX, Welding			Yes				
54	ASME B31.3 Piping			Yes				
55	AWS D1.1 Structural Welding			Yes				
56	IBC 2009/ ASCE 7-05			Yes				
57	API 661, Pressure Relieving & Depressuring Syst.							B
58								
59	SCOPE OF SUPPLY							
60	Required			Flare Burner, Pilot, Pilot Igniters,				
61				Pilot Flame Detectors, Velocity Seal, Piping,				
62				Wind Shields, Support Structure,				
63				Heat Shields, Testing and Inspection,				
64					0			B
65								
66	Optional			Smoke Suppression Control,				
67				Air Assist (as required), Ladders and				
68				Platforms				

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**
  - Modified - Process and Piping Fugitive Emissions (FUG (1S)) – Light Liquid Service
  - Modified - Process and Piping Fugitive Emissions (FUG (1S)) – Gas Service and Summary
  - 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 45CSR13 NSR Modification Permit

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	Update Fractionation Plant 1 (Fugitives Only)	12,500 bpd (ave)	—	—	—	—	15.76	69.03	—	—	—	—	88	384
		Update Fractionation Plant 2 (Fugitives Only)	30,000 bpd (ave)												
2S	TLO	Modified Truck/Rail Load-Out	58,200 bpd (ave)	No Emissions Except as Included in Fugitives (1S) and Blowdown/Purge (5S)											
3S	TKS	NEW 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)	Modified 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	NEW Misc Equipment Leaks	—	—	—	—	—	4.02	4.02	—	—	—	—	0.00	0.00
		TOTAL PTE (w/ Fugitives):		96.49	78.89	187.86	135.89	300.83	216.47	0.25	0.45	3.16	5.74	116,023	123,304
		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

margin	20.0%

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

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

Attachment N

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	Update Fractionation Plant 1 (Fugitives Only)	0.03	0.11	0.03	0.11	—	—	0.52	2.29	0.03	0.11	0.03	0.11	0.03	0.11	—	—	0.65	2.86
		Update Fractionation Plant 2 (Fugitives Only)																		
2S	TLO	Modified Truck/Rail Load-Out	No Emissions Except as Included in Fugitives (1S) and Blowdown/Purge (5S)																	
3S	TKS	NEW 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)	Modified 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	NEW Misc Equipment Leaks	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		TOTAL PTE (w/ Fugitives):	0.21	0.21	0.12	0.16	0.06	0.07	12.17	9.40	0.55	0.39	0.42	0.32	1.88	1.08	0.01	0.02	15.41	11.65
		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 45CSR13 NSR Modification Permit
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	Update Fractionation Plant 1 (Fugitives Only)	12,500 bpd (ave)	8,760	---	---	---	15	384	---	---	88	384
		Update Fractionation Plant 2 (Fugitives Only)	30,000 bpd (ave)										
2S	TLO	Modified Truck/Rail Load-Out	58,200 bpd (ave)	8,760	---	No Emissions Except as Included in Fugitives (1S) and Blowdown/Purge (5S)							
3S	TKS	NEW 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)	Modified 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	NEW Misc Equipment Leaks	---	8,760	---	---	---	---	---	---	---	---	---

TOTAL PTE:	122,597		21		0.6		123,304						
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.

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

Attachment N

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	Update Fractionation Plant 1 (Fugitives Only)	12,500 bpd (ave)	—	—	—	—	4.11	18.02	0.03	0.11	0.65	2.86	217	950
		Update Fractionation Plant 2 (Fugitives Only)	30,000 bpd (ave)												
2S	TLO	Modified Truck/Rail Load-Out	58,200 bpd (ave)	No Emissions Except as Included in Fugitives (1S) and Blowdown/Purge (5S)											
3S	TKS	NEW 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)	Modified Process Flare	—	—	—	—	—	28,000	14,006	1,123	583	1,427	741	20,883	10,837
7S	FUG2	NEW Misc Equipment Leaks	—	—	—	—	—	4.02	4.02	—	—	—	—	—	—
		TOTAL PTE:		10.93	36.58	17.05	51.43	28,703	17,071	1,132	623	1,440	795	47,414	90,375

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

Modified - Process and Piping Fugitive Emissions (FUG (1S)) - Light Liquid Service

Natural Gasoline Service

Unit	Description	Component (Unit) Type (Light Liquid)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Tot Hydrocarbons (THC) lb/hr	Tot Hydrocarbons (THC) tpy	VOC 100.00 Wgt% lb/hr	VOC 100.00 Wgt% tpy	n-Hexane 9.31 Wgt% lb/hr	n-Hexane 9.31 Wgt% tpy	Hex,BTEX,TMP-ea 0.45 Wgt% lb/hr	Hex,BTEX,TMP-ea 0.45 Wgt% tpy	Total HAP 11.54 Wgt% lb/hr	Total HAP 11.54 Wgt% tpy	CH4 — Wgt% lb/hr	CH4 — Wgt% tpy	CO2e GWP = 25 lb/hr	CO2e GWP = 25 tpy
FUG-L (1S)	Process Piping Fugitives (Light Liquid - Natural Gasoline)	Valves	2,136	0.00551	84%	1.88	8.25	1.88	8.25	0.18	0.77	0.01	0.04	0.22	0.95	—	—	—	—
		Pump Seals	26	0.02866	69%	0.23	1.00	0.23	1.00	0.02	0.09	1.0E-03	4.5E-03	0.03	0.11	—	—	—	—
		Other	72	0.01853	0%	1.18	5.19	1.18	5.19	0.11	0.48	0.01	0.02	0.14	0.60	—	—	—	—
		Connectors	1,864	0.00046	33%	0.58	2.53	0.58	2.53	0.05	0.24	2.6E-03	0.01	0.07	0.29	—	—	—	—
		Flanges	872	0.00024	0%	0.21	0.93	0.21	0.93	0.02	0.09	9.4E-04	4.1E-03	0.02	0.11	—	—	—	—
		Open-ended lines	10	0.00309	0%	0.03	0.13	0.03	0.13	2.8E-03	0.01	1.3E-04	5.8E-04	0.00	0.01	—	—	—	—
			4,978		Pre-Controlled Fugitives:			14.79	64.79	1.38	6.03	0.07	0.29	1.71	7.48	—	—	—	—
					Controlled Fugitives:			4.11	18.02	0.38	1.68	0.02	0.08	0.47	2.08	—	—	—	—

Propane/Butane Service

Unit	Description	Component (Unit) Type (Gas)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Total Hydro-carbons (THC) lb/hr	Total Hydro-carbons (THC) tpy	VOC 100.00 Wgt% lb/hr	VOC 100.00 Wgt% tpy	n-Hexane 0.00 Wgt% lb/hr	n-Hexane 0.00 Wgt% tpy	BTEX,TMP-ea 0.00 Wgt% lb/hr	BTEX,TMP-ea 0.00 Wgt% tpy	Total HAP 0.00 Wgt% lb/hr	Total HAP 0.00 Wgt% tpy	CH4 — Wgt% lb/hr	CH4 — Wgt% tpy	CO2e GWP = 25.00 lb/hr	CO2e GWP = 25.00 tpy
FUG-L (1S)	Process Piping Fugitives (Light Liquid - Propane/Butane)	Valves	4,171	0.00551	84%	3.68	16.11	3.68	16.11	—	—	—	—	—	—	—	—	—	—
		Pump Seals	51	0.02866	69%	0.45	1.99	0.45	1.99	—	—	—	—	—	—	—	—	—	—
		Other	143	0.01853	0%	2.37	10.37	2.37	10.37	—	—	—	—	—	—	—	—	—	—
		Connectors	3,729	0.00046	33%	1.16	5.07	1.16	5.07	—	—	—	—	—	—	—	—	—	—
		Flanges	1,743	0.00024	0%	0.42	1.85	0.42	1.85	—	—	—	—	—	—	—	—	—	—
		Open-ended lines	19	0.00309	0%	0.06	0.26	0.06	0.26	—	—	—	—	—	—	—	—	—	—
			9,857		Pre-Controlled Fugitives:			29.03	127.17	—	—	—	—	—	—	—	—	—	—
			14,836		Controlled Fugitives:			8.14	35.65	—	—	—	—	—	—	—	—	—	—

See following Page for Facility Total - Pre-Controlled and Controlled Fugitive (FUG (1S)) Emissions

Notes: 1 - Assumed 8,760 hours per year of fugitive emissions.

2 - Gas/Vapor emissions calculated using EPA "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017, Nov 1995.

TABLE 2.4 O&G PROD (AVE)	Light Liquid kg/hr	Light Liquid lb/hr
Valves	0.00250	0.00551
Pump Seals	0.01300	0.02866
Others	0.00750	0.01853
Connectors	0.00021	0.00046
Flanges	0.00011	0.00024
Open-Ended Lines	0.00140	0.00309

3 - Component counts are based on Actual Counts and Design estimates, plus a 20% margin

4 - "Other" components include compressor seals, relief valves, diaphragms, drains, meters, etc.

5 - To be conservative, the gas characteristics were assumed to be both 100% VOC and 100% CH4.

6 - The facility has implemented an LDAR Program. Control effectiveness is estimated as follows:

CONTROL EFFECTIVENESS FOR AN LDAR PROGRAM AT A SOCMI PROCESS UNIT

Equipment Type and Service	Control Effectiveness (%) Monthly Monitoring 10,000 ppmv Leak Definition	Quarterly Monitoring 10,000 ppmv Leak Definition	HON[a]
Valves - gas	87	67	92
Valves - light liquid	84	61	88
Pumps - light liquid	69	45	75
Compressors - gas	[b]	[b]	93
Connectors - gas and light liquid	[b]	33	[b]
Pressure relief devices - gas	[b]	44	[b]

[a] Control effectiveness attributed to the requirements of the HON equipment leak regulation is estimated based on equipment-specific leak definitions and performance levels.

[b] Data are not available to estimate control effectiveness.

Modified - Process and Piping Fugitive Emissions (FUG (1S)) - Gas Service

Gas Service

Unit	Description	Component (Unit) Type (Gas)	Unit Count	THC Factor lb/hr/Unit	LDAR Control Credit	Total Hydrocarbons (THC) lb/hr	Total Hydrocarbons (THC) tpy	VOC 100.00 Wgt% lb/hr	VOC 100.00 Wgt% tpy	n-Hexane 4.01 Wgt% lb/hr	n-Hexane 4.01 Wgt% tpy	BTEX,TMP-ea 0.22 Wgt% lb/hr	BTEX,TMP-ea 0.22 Wgt% tpy	Total HAP 5.10 Wgt% lb/hr	Total HAP 5.10 Wgt% tpy	CH4 100.00 Wgt% lb/hr	CH4 100.00 Wgt% tpy	CO2e GWP = 25.00 lb/hr	CO2e GWP = 25.00 tpy
FUG-G (1S)	Process Piping Fugitives (Gas) (Assume Waste Gas Composition)	Valves	592	0.00992	87%	0.76	3.34	0.76	3.34	0.03	0.13	1.7E-03	0.01	0.04	0.17	0.76	3.34	19	84
		Pump Seals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		Other	124	0.01940	0%	2.40	10.50	2.40	10.50	0.10	0.42	5.2E-03	0.02	0.12	0.54	2.40	10.50	60	263
		Connectors	432	0.00044	33%	0.13	0.56	0.13	0.56	0.01	0.02	2.8E-04	1.2E-03	0.01	0.03	0.13	0.56	3	14
		Flanges	216	0.00086	0%	0.19	0.81	0.19	0.81	0.01	0.03	4.0E-04	1.8E-03	0.01	0.04	0.19	0.81	5	20
		Open-ended lines	7	0.00441	0%	0.03	0.14	0.03	0.14	1.3E-03	0.01	6.9E-05	3.0E-04	1.6E-03	0.01	0.03	0.14	1	3
			1,371		Pre-Controlled Fugtives:	8.68	38.01	8.68	38.01	0.35	1.52	0.02	0.08	0.44	1.94	8.68	38.01	217	950
					Controlled Fugtives:	3.51	15.36	3.51	15.36	0.14	0.62	0.01	0.03	0.18	0.78	3.51	15.36	88	384

Facility Total - Pre-Controlled Fugitive (FUG (1S)) Emissions

Description	Unit	VOC		n-Hexane		BTEX,TMP-ea		Total HAP		CH4		CO2e	
Natural Gasoline Service	FUG-L (1S)	14.79	64.79	1.38	6.03	0.07	0.29	1.71	7.48	—	—	—	—
Propane/Butane Service	FUG-L (1S)	29.03	127.17	—	—	—	—	—	—	—	—	—	—
Gas Service	FUG-G (1S)	8.68	38.01	0.35	1.52	0.02	0.08	0.44	1.94	8.68	38.01	217	950
TOTAL PRE-CONTROL FUGITIVE EMISSIONS:		52.50	229.97	1.72	7.55	0.09	0.37	2.15	9.42	8.68	38.01	217	950

Facility Total - Controlled Fugitive (FUG (1S)) Emissions

Description	Unit	VOC		n-Hexane		BTEX,TMP-ea		Total HAP		CH4		CO2e	
Natural Gasoline Service	FUG-L (1S)	4.11	18.02	0.38	1.68	0.02	0.08	0.47	2.08	—	—	—	—
Propane/Butane Service	FUG-L (1S)	8.14	35.65	—	—	—	—	—	—	—	—	—	—
Gas Service	FUG-G (1S)	3.51	15.36	0.14	0.62	0.01	0.03	0.18	0.78	3.51	15.36	88	384
TOTAL CONTROLLED FUGITIVE EMISSIONS:		15.76	69.03	0.52	2.29	0.03	0.11	0.65	2.86	3.51	15.36	88	384

Notes: 1 - Assumed 8,760 hours per year of fugitive emissions.

2 - Gas/Vapor emissions calculated using EPA "Protocol for Equipment Leak Emission Estimates", EPA-453/R-95-017, Nov 1995.

TABLE 2.4 O&G PROD (AVE)	Gas kg/hr	Gas lb/hr
Valves	0.00450	0.00992
Pump Seals	na	na
Others	0.00880	0.01940
Connectors	0.00020	0.00044
Flanges	0.00039	0.00086
Open-Ended Lines	0.00200	0.00441

3 - Component counts are based on Actual Counts and Design estimates, plus a 20% margin

4 - "Other" components include compressor seals, relief valves, diaphragms, drains, meters, etc.

5 - To be conservative, the gas characteristics were assumed to be both 100% VOC and 100% CH4.

6 - The facility has implemented an LDAR Program. Control effectiveness is estimated as follows:

CONTROL EFFECTIVENESS FOR AN LDAR PROGRAM AT A SOCMI PROCESS UNIT

Equipment Type and Service	Control Effectiveness (%) Monthly Monitoring 10,000 ppmv Leak Definition	Quarterly Monitoring 10,000 ppmv Leak Definition	HON[a]
Valves - gas	87	67	92
Valves - light liquid	84	61	88
Pumps - light liquid	69	45	75
Compressors - gas	[b]	[b]	93
Connectors - gas and light liquid	[b]	33	[b]
Pressure relief devices - gas	[b]	44	[b]

[a] Control effectiveness attributed to the requirements of the HON equipment leak regulation is estimated based on equipment-specific leak definitions and performance levels.
[b] Data are not available to estimate control effectiveness.

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 45.54 MMBtu/hr (HHV) 8,760 hr/yr 44,647 scf/hr 391.11 MMscf/yr 920 Btu/scf (LHV) 1,020 Btu/scf (HHV)	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
		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
		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	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---
		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
		40CFR98 - Table C-1	CO2	119,317	117	5,327	23,333	na	5,327	23,333
		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.

Williams Ohio Valley Midstream LLC

MOUNDSVILLE FRACTIONATION PLANT

Application for 45CSR13 NSR Modification Permit

Attachment N

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 89.85 MMBtu/hr (Max - Each) 54.00 MMBtu/hr (Ave - Each) 108.00 MMBtu/hr (Ave - Total) (HHV) 8,760 hr/yr 88,088 scf/hr (Each) 927.53 MMscf/yr (Total) 920 Btu/scf (LHV) 1,020 Btu/scf (HHV)	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
		EPA AP-42 Table 1.4-2	PM10/2.5	7.60	0.01	0.67	5.86	na	0.67	3.52
		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
		EPA AP-42 Table 1.4-3	Ethylbenzene	---	---	---	---	---	---	---
		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
		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	---	---	---	---	---	---	---
		EPA AP-42 Table 1.4-3	Xylenes	---	---	---	---	---	---	---
		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
		40CFR98 - Table C-1	CO2	118,969	117	10,480	91,803	na	10,480	55,173
		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.

Williams Ohio Valley Midstream LLC
MOUNDSVILLE FRACTIONATION PLANT
Application for 45CSR13 NSR Modification Permit
Attachment N

Modified - 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	28,000 lb/hr (max)	9.28 lb/hr E-Benzene	192.66 MMscf/yr	4.82 tpy E-Benzene
n-Hexane	4.01 Weight %	6,050 lb/MMscf		1,123.03 lb/hr n-Hexane		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

NEW - 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 AP-42 Table 3.2-1, 3.2-2, 3.2-3 07/00			GAS-FIRED TURBINES 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 AP-42 Table 1.4-1, 1.4-2, 1.4-3 (<100 MMBtu/hr) 07/98			FLARES 13.5-1 01/95	DIESEL ENGINES 3.4-1, 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*	3.33E-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

Fuel Type	40 CFR 98 - DEFAULT EMISSION FACTORS Table C-1 to Subpart C of Part 98 Default HHV	Table C-2 to Subpart C of Part 98 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

*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.

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 °F	=	(°C*9/5)+32
1.0 °R	=	°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

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 Ohio Valley Midstream LLC proposes that the content and format for all monitoring, recordkeeping, reporting and testing requirements remain unchanged from the current permit. Update the emissions limitations and fuel consumption limitations with appropriate values specified in Attachment N – Emission Calculations.

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."

The applicant shall cause such legal advertisement to appear a minimum of one (1) day in the newspaper most commonly read in the area where the facility exists or will be constructed. The notice must be published no earlier than five (5) working days of receipt by this office of your application. The original affidavit of publication must be received by this office no later than the last day of the public comment period.

Types and amounts of pollutants discharged must include all regulated pollutants (PM, PM10, VOC, SO2, Xylene, etc.) and their potential to emit or the permit level being sought in units of tons per year (including fugitive emissions).

- 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 thru 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 New Source Review (NSR) Modification Permit for the existing Moundsville Fractionation Plant. The application requests authorization to increase truck/rail load-out capacity, install three additional pressure vessels, and increase waste gas volumes and heat content to the flare.

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:

24.81	tons of nitrogen oxides (NOX) per year
49.70	tons of carbon monoxide (CO) per year
97.53	tons of volatile organic compounds (VOC) per year
0.04	tons of sulfur dioxide (SO2) per year
0.62	tons of particulate matter (PM10/2.5) per year
0.08	tons of benzene per year
0.06	tons of ethylbenzene per year
0.03	tons of formaldehyde (HCHO) per year
3.35	tons of n-hexane per year
0.14	tons of toluene per year
0.11	tons of 2,2,4-trimethylpentane per year
0.38	tons of xylenes per year
0.01	tons of other/miscellaneous HAPs per year
4.15	tons of total hazardous air pollutants (HAP) per year
25,446	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 1227, during normal business hours.

Dated this the _____ day of _____ 20____.

By: Mr. Don Wicburg, Vice President and General Manager
Williams Ohio Valley Midstream LLC
100 Teletech Drive, Suite 2
Moundsville, WV 26041

ATTACHMENT Q

Business Confidential Claims

(NOT APPLICABLE)

---

also

ATTACHMENT R

Authority Forms

(NOT APPLICABLE)

---

also

ATTACHMENT S

Title V Permit Revision Information

(NOT APPLICABLE)

APPLICATION FEE

NSR Construction Permit

Include a check payable to WVDEP – Division of Air Quality.

- As per WV Rule 22 (45CSR22) filed on May 6, 1991, a **minimum fee of $1,000** must be submitted for each 45CSR13 permit application filed with the WVDEP-DAQ.
- Additional fees may apply, depending on the nature of the application as outlined in Section 3.4.b. of Regulation 22, and shown below:

NSPS Requirements (40CFR60) (NSPS OOOO)	**$ 1,000**
NESHAPS or Toxic Air Pollutant Requirements (40CFR61 and/or 40CFR63)	$ 2,500
PSD or Nonattainment Review (45CSR14 and/or 45CSR19):	
(1) New Major Source or	$ 10,000
(2) Major Modification	$ 5,000

Total application fee is **$2,000** [= $1,000 minimum fee + $1,000 additional fees]

***** End of Application for 45CSR13 NSR Modification Permit ****