March 24, 2016

98 VANADIUM ROAD
BUILDING D, 2nd FLOOR
BRIDGEVILLE, PA 15017
(412) 221-1100
(412) 257-6103 (FAX)
http://www.se-env.com

West Virginia Dept. of Environmental Protection
Division of Air Quality – Permitting Section
601 57th Street, SE
Charleston, WV 25304

**RE: Application for NSR Construction Permit**
**North Liquid Management Facility**
**Icon Midstream Pipeline, LLC**
**Wetzel County, West Virginia**

To Whom It May Concern:
On behalf of our client, Icon Midstream Pipeline, we are pleased to submit on hard copy and two electronic copies of the Application for an NSR Construction Permit for its North Liquid Management Facility in Wetzel County.

A fee in the amount of $4,500 ($1,000 Construction Permit Fee + $1,000 NSPS Fee + $2,500 NESHAPS Fee) was determined to be applicable. A check, payable to WVDEP – Division of Air Quality in the amount of $4,500 is included herein.

Icon is eager to begin operation of this equipment at the earliest practical date. Consequently, if there are any questions or concerns regarding this application, please contact me at 412/221-1100, x 1628 or rdhonau@se-env.com and we will provide any needed clarification or additional information immediately.

Sincerely,

**SE TECHNOLOGIES, LLC**

Roger A. Dhonau, PE, QEP
Principal

Enclosures
Cc: Icon Midstream Pipeline, LLC – Shane Dowell

# ICON Midstream Pipeline, LLC

## APPLICATION FOR
## NSR CONSTRUCTION PERMIT

### North Liquids Management Facility
### Wetzel County, West Virginia

98 Vanadium Road
Bridgeville, PA 15017
(412) 221-1100

# APPLICATION FOR NSR PERMIT

## Icon Midstream Pipeline, LLC

### North Liquids Management Facility

### Wetzel County, West Virginia

**Table of Contents**

# SECTION I

# Application Form

WEST VIRGINIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

**DIVISION OF AIR QUALITY**

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.wvdep.org/daq

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

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

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

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

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

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

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

## *Section I. General*

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
**Icon Midstream Pipeline, LLC**

2. Federal Employer ID No. ***(FEIN):***
**47-1115453**

3. Name of facility *(if different from above):*
**North Liquid Management Facility**

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

5A. Applicant's mailing address:
**3130 Grants Lake Blvd. Suite 18859**
**Sugar Land, Texas 77496**

5B. Facility's present physical address:
**None. Off of County Route 56 near Galmish, WV**

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**
- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

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

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**
- If **YES,** please explain: **Applicant has a lease agreement with the land owner for installation of the facility**
- 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 Well Pad and Production Facility**

10. North American Industry Classification System **(NAICS)** code for the facility:
**211111**

11A. DAQ Plant ID No. (for existing facilities only):

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):

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

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

**From New Martinsville, take State Route 20 east approximately 12 miles to the community of Galmish approximately 1 mile past the town of Reader. Turn right on to CR 56 (Piney Fork Road). Proceed approximately 0.6 miles to the access road on the left. Proceed up the hill to the facility.**

| 12.B. New site address (if applicable): | 12C. Nearest city or town: **Reader** | 12D. County: **Wetzel** |
|---|---|---|
| 12.E. UTM Northing (KM): **4379.1617** | 12F. UTM Easting (KM): **525.8933** | 12G. UTM Zone: **17** |

13. Briefly describe the proposed change(s) at the facility: **Installation of natural gas and liquids management facility.**

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

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).

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

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

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

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

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

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

| | | |
|---|---|---|
| ☒ Bulk Liquid Transfer Operations | ☒ Haul Road Emissions | ☐ Quarry |
| ☐ Chemical Processes* | ☐ Hot Mix Asphalt Plant | ☐ Solid Materials Sizing, Handling and Storage Facilities |
| ☐ Concrete Batch Plant | ☐ Incinerator | ☒ Storage Tanks |
| ☐ Grey Iron and Steel Foundry | ☒ Natural Gas Compressors | |
| ☒ Dehydration | | |

***Leak Source Data Sheet Only**

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

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

| | | |
|---|---|---|
| ☐ Absorption Systems | ☐ Baghouse | ☒ Flare |
| ☐ Adsorption Systems | ☐ Condenser | ☐ Mechanical Collector |
| ☐ Afterburner | ☐ Electrostatic Precipitator | ☐ Wet Collecting System |

☒ Other Collectors, specify: **Catalyst and Vapor Recovery Unit**

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:

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

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

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

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§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: 3-15-2016 *(Please use blue ink)*

| 35B. Printed name of signee: **Shane Dowell** | | 35C. Title: **Operations Manager** |
|---|---|---|
| 35D. E-mail: **iconmidstream@gmail.com** | 36E. Phone: **304/904-1700** | 36F. FAX: **304/628-3111** |
| 36A. Printed name of contact person (if different from above): | | 36B. Title: |
| 36C. E-mail: | 36D. Phone: | 36E. FAX: |

**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**
- ☐ **Attachment R: Authority Forms**
- ☐ **Attachment S: Title V Permit Revision Information**
- ☒ **Application Fee**

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

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

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

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

# SECTION II

# Attachments

# ATTACHMENT A

# Business Registration

# State of West Virginia

# Certificate

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

Icon Midstream Pipeline, LLC

has filed the appropriate registration documents in my office according to the provisions of the West Virginia Code and hereby declare the organization listed above as duly registered with the Secretary of State's Office.

***Given under my hand and***
***the Great Seal of West Virginia***
***on this day of***
March 13, 2015

Natalie E Tennant

***Secretary of State***

# ATTACHMENT B

## Site Location Map


| | |
|---|---|
| DRAWN BY | DJF |
| DATE | 3/16/16 |
| CHECKED BY | RAD |
| SET JOB NO. | 215095 |
| SET DWG FILE | NORTH FACILITYm01.dwg |
| DRAWING SCALE | 1"=500' |

SE TECHNOLOGIES
98 Vanadium Road Bridgeville, PA 15017 (412) 221-1100

# ICON MIDSTREAM PIPELINE, LLC

## NORTH LIQUIDS MANAGEMENT FACILITY
## GALMISH, WEST VIRGINIA
## SITE LOCATION MAP

| DRAWING NAME | REV. |
|---|---|
| FIGURE 1 | 0 |

Plot: env045 03/23/2016 11:43 G:\ICON MIDSTREAM, LLC\215095\NORTH FACILITYm01.dwg

# ATTACHMENT C

# Construction Schedule

# Icon Midstream Pipeline, LLC
# North Liquids Management Facility
# Attachment C – Construction Schedule

Icon seeks approval to install a natural gas and liquids management facility. Upon receipt of approval of this application, Icon will install the equipment and connect to existing gathering lines. It is anticipated that all work can be completed within 45 days of receipt of approval.

# ATTACHMENT D

# Regulatory Analysis

# Icon Midstream Pipeline, LLC

## North Liquids Management Facility
## Attachment D – Regulatory Analysis

Both State and Federal environmental regulations governing air emissions apply to the planned North Station. The West Virginia Department of Environmental Protection (WVDEP) has been delegated the authority to implement certain federal air quality requirements for the state. Air quality regulations that potentially affect the modification are discussed herein.

### 1.1 PSD and NSR

The facility will be a minor source with respect to Prevention of Significant Deterioration (PSD) regulations as it will not have the potential to emit more than the annual emission thresholds of any PSD regulated pollutant with the voluntary restrictions (e.g., catalytic converters on engines).

The facility is within an area designated as attainment. Consequently, the facility is not subject to the New Source Review (NSR) regulations.

### 1.2 Title V Operating Permit Program

West Virginia has incorporated provisions of the federal Title V operating permit program. Thresholds for inclusion under the Title V program are 10 tpy of any single Hazardous Air Pollutant (HAP) or 25 tons of any combination of HAP and/or 100 tpy of all other regulated pollutants. Additionally, facilities regulated under certain New Source Performance Standards (NSPS) require facilities to have Title V permits.

The facility will be a minor source. Additionally, the NSPS regulating this facility does not trigger a Title V permit. Hence, a Title V permit will not be required for Icon Midstream's North Liquids Management Facility.

### 1.3 Aggregation

Source aggregation determinations are typically made based on the following criteria:

- Whether the facilities are under common control,
- Whether the facilities belong to the same Major Group (i.e. the first two digit code) as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement;
- Whether the facilities are located on one or more contiguous or adjacent properties; and the distance between all pollutant emitting activities,
- Whether the facilities can operate independently

Only if all criteria are met does a permitting authority aggregate the facilities into a single source.

The Icon Midstream facility will receive produced liquids and natural gas from area well pads via pipeline. After separation of liquids from the gas, a small fraction of the gas is taken for powering facility equipment with the vast majority being metered and injected into a pipeline for transportation to a gas processing facility owned and operated by others. The received liquids are separated into produced water, condensate and NGL prior to off-site shipment via truck transportation.

There are no liquids or gas routed to or received from any other Icon Midstream facility. Hence, no other Icon Midstream facilities in the area should be aggregated with this new facility. Additionally, gas and liquids generated by the well pads this facility will serve can be routed to other locations, such as is currently the situation. Hence, there is no interdependency between the well pads this Icon Midstream facility will serve and the Icon Midstream facility. Thus, the planned Icon Midstream facility should not be aggregated with the well pads it will serve. Additionally, this Icon Midstream facility is more than five (5) miles from the nearest well pad it serves.

The proposed facility is in close proximity (est. 200 yards) from portions of Dominion Transmission's Galmish Loading Terminal. This facility is under the same SIC Code as Icon Midstream, but under separate ownership. In addition, there will be no sharing of personnel. Gas and liquids being generated by this new Icon facility will be routed via pipeline to the Blue Racer facility in Natrium, WV, several miles away. As such, there is no interdependency between Dominion and Icon.. Thus, the two facilities should not be aggregated.

### 1.4 New Source Performance Standards

New Source Performance Standards (NSPS) regulations promulgated under 40 CFR 60 require new and reconstructed facilities to control emissions to the level achievable by Best-Available Control Technology (BACT). Specific NSPS requirements potentially applicable to the proposed modification to the North Station are as follows:

- 40 CFR 60, Subpart K/Ka/Kb – Storage Vessels for Petroleum Liquids/Volatile Organic Liquids
- 40 CFR 60, Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
- 40 CFR 60, Subpart KKK – Equipment Leaks of VOC from Onshore Natural Gas Processing Stations
- 40 CFR 60, Subpart IIII – Stationary Compression Ignition Internal Combustion Engines
- 40 CFR 60, Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines

- 40 CFR 60, Subpart OOOO - Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

1.4.1 Subpart K/Ka/Kb

These three subparts apply to volatile organic liquid storage tanks of specific sizes constructed in certain timeframes. Their consideration is appropriate due to the presence of the condensate tanks. Subpart K applies to tanks constructed or modified between 1973 and 1978 while Subpart Ka applies to tanks constructed between 1978 and 1984. Subpart Kb applies to storage tanks constructed or modified after 1984. The condensate tanks planned for this facility were constructed after 1984. Thus, Subparts K and Ka are not applicable, but Subpart Kb is tentatively applicable. However, the capacity of these tanks (16,800 gallons or 400 BBL) is less than the threshold for this regulation (19,800 gallons or 75 cubic meters). Hence, the rule does not apply. [40 CFR 60.111(a)(1), 40 CFR 60.111a(a)(1) and 40 CFR 60.110b(d)(2)]

1.4.2 Subpart Dc

This subpart limits SO2 and PM emissions from boilers and heaters fired by various fuels. While the primary thrust of this set of regulations it to control SOx and PM emissions from coal and oil-fired boilers and heaters, natural gas fired units are also covered under this rule. The planned heaters are well below the threshold of coverage for this rule (10 MMBTU/Hr). Thus, this rule does not apply.

1.4.3 Subpart KKK

This subpart limits VOC emissions from equipment at a natural gas processing station. In accordance with 40 CFR 60.631, a "*Natural gas processing plant* (gas plant) means any processing site engaged in the extraction of natural gas liquids from field gas, fractionation of mixed natural gas liquids to natural gas products, or both." Although the planned facility will separate received liquids into NGL and condensate, this operation does not rise to the definition of fractionation into products. Hence, the planned facility does not meet the definition of a processing station under this rule and this rule does not apply.

1.4.4 Subpart IIII

This subpart governs emissions from new compression ignition internal combustion engines CI ICE) manufactured after July 11, 2005. There are currently no compression ignition engines (e.g. diesel-fired emergency generator) at this station. The proposed modification will include only the addition of a single Spark Ignition Internal Combustion Engine. Hence, this rule does not apply.

1.4.5 Subpart JJJJ

This subpart governs emissions from new stationary spark ignition internal combustion engines (SI ICE) manufactured after July 1, 2007. The drivers for the VRU and Flash Gas Compressors presented in this application will be SI ICE units manufactured after this date. Accordingly, this

rule applies to those engines. In accordance with 40 CFR 60.4233(d), the 47 Hp Flash Gas Compressor must meet the requirements of 40 CFR 1048.101(c). In accordance with this rule, the HC + $NO_X$ standard is 3.8 g/kW-hr and the CO standard is 6.5 g/kW-hr. The engine will meet this requirement. Thus, the engine is compliant with Subpart JJJJ.

#### 1.4.6 Subpart OOOO

This subpart governs emissions from a broad spectrum of operations in the oil and natural gas industries, including operations at processing and fractionation plants. The potentially applicable sections of this rule set restrictions on pneumatic controllers present and set requirements for storage vessels with potential VOC emissions greater than 6 tons per year. This rule applies to the planned Icon Midstream facility.

One of the key components to this rule [40 CFR 60.5390(b)] is the requirement that all pneumatic controllers located between the well head and a processing plant must have a bleed rate of less than 6 scfh. All pneumatic controllers to be installed at the new station will meet these criteria.

This rule also stipulates that storage vessels with VOC emissions equal to or greater than 6 tpy must control those emissions by 95% by October 15, 2013. The condensate tanks will have estimated uncontrolled VOC emissions in excess of this amount. Hence this element of the rule applies to the planned facility. Icon Midstream will meet this requirement through installation of a vapor recovery unit. This device will collect organic vapors emitted by the condensate, compress it and routed to the inlet side of the adjacent Jay-Bee North facility. This system is anticipated to be close to 100 percent effective during operation. While there will be anticipated maintenance outages on the VRU system, its overall annual effectiveness is conservatively projected to be greater than 95%. For permitting purposes only a 95% control is claimed.

### 1.5 National Emission Standards for Hazardous Air Pollutants

National Emission Standards for Hazardous Air Pollutants (NESHAPs) promulgated under 40 CFR 63 regulate the emission of Hazardous Air Pollutants (HAPs) from certain industrial processes. In general, these rules apply to major sources of HAPs with a major source being defined as having the potential to emit more than 10 tpy of any individual HAP or 25 tpy of total HAPs. Emissions standards under these rules have been established as the Maximum Achievable Control Technology (MACT) for each source category. The following NESHAP source category standards are potentially applicable to the planned modification to the North Liquids Management Facility:

- 40 CFR 63, Subpart HH – NESHAP from Oil and Natural Gas Production Facilities
- 40 CFR 63, Subpart ZZZZ – NESHAP from Stationary Reciprocating Internal Combustion Engines

- 40 CFR 63, Subpart DDDDD – NESHAP for Industrial, Commercial and Institutional Boilers and Process Heaters

#### 1.5.1 Subpart HH

This Subpart contains MACT standards for major and area source dehydration units located at natural gas production facilities. The proposed equipment for this Icon Midstream facility includes a dehydration unit. Accordingly, this rule applies. However, as controlled benzene emissions will be less than 1 ton per year, the requirements are nominal

#### 1.5.2 Subpart ZZZZ

This Subpart governs emissions from a stationary reciprocating internal combustion engine (RICE) located both at major and area source of HAPs. The facility is not be a major source of HAPs, but is considered an area source of HAPs. Hence, this rule is potentially applicable to the facility. In accordance with 40 CFR 63.6590(a)(2)(iii), the driver for the proposed emergency generator will not be considered an Existing Stationary RICE. It will be considered "new" engines. Thus, the engine will meet the requirements of this rule by meeting the requirements of NSPS, Subpart JJJJ as described above.

#### 1.5.3 Subpart DDDDD

This Subpart applies to industrial process heaters of various sizes and fuel types located at facilities that are classified as a major source of HAPs. As the planned facility is not a major source of HAPs, this rule does not apply.

### 1.6 Chemical Accident Prevention

Subparts B-D of 40 CFR 68 present the requirements for the assessment and subsequent preparation of a Risk Management Plan (RMP) for a facility that stores more than a threshold quantity of a regulated substance listed in 40 CFR 68.130. If a facility stores, handles or processes one or more regulated substances in an amount greater than its corresponding threshold, the facility must prepare and implement an RMP. The North Liquids Management Facility does potentially store more than 10,000 lbs of a flammable mixture containing several of the substances listed in Table 3 in 40 CFR 68.130. However, an RMP is not required as this facility qualifies for the exclusion provided for remote oil and gas production facilities (40 CFR 68.115).

### 1.7 West Virginia State Requirements

#### 1.7.1 45 CSR 2

The facility is subject to the opacity requirement of 45 CSR 2. Emissions from the facility cannot exceed 10% over any six minute period.

1.7.2 45 CSR 4

This regulation prohibits the emission of objectionable odors. Icon Midstream is obligated to run the station in a manner that does not produce objectionable odors.

1.7.3 45 CSR 10

This regulation limits emissions of sulfur oxides. As the sulfur content of the Inlet Gas contains no measurable sulfur, emissions of sulfur oxides is negligible. Thus, while parts of this rule are applicable to the facility, no actions are required on the part of Icon Midstream to attain compliance. The various non-engine combustion units have a design heat input less than 10 MMBTU/Hr each and are therefore exempt from the requirements of this rule. Additionally, other fuel-burning units at the expanded facility (e.g. engines) are not subject to 45 CSR 10, Section 3 as they do not produce power by indirect heat transfer and are therefore not considered "fuel burning units". The fuel sulfur content is sufficiently low that the proposed engines will easily meet the requirements of this rule.

1.7.4 45 CSR 13

The state regulations applicable to the permitting of the proposed construction are in Title 45 Series 13 of the Code of State Regulations. The proposed modification to North Liquids Management Facility has the potential to emit several regulated pollutants in excess of the thresholds that define a Stationary Source. This modification will not materially change the facility's potential to emit. It will remain less than the thresholds that would classify the facility as a Major Source under 45 CSR 14.

1.7.5 45 CSR 16

This series of regulations is an incorporation, by reference, of the New Source Performance Standards codified under 40 CFR 60. As discussed under the federal regulations, the North Liquids Management Facility is subject to the emission limitations, monitoring, testing and recordkeeping of Subpart JJJJ.

1.7.6 45 CSR 30

The state regulations applicable to Title V operating permits are in Title 45 Series 30. The planned North Liquids Management Facility, as noted above, does not have the potential to emit any regulated pollutant about the threshold that would define it as a major facility. The installation of an emergency generator does not trigger the need for a Title V permit.

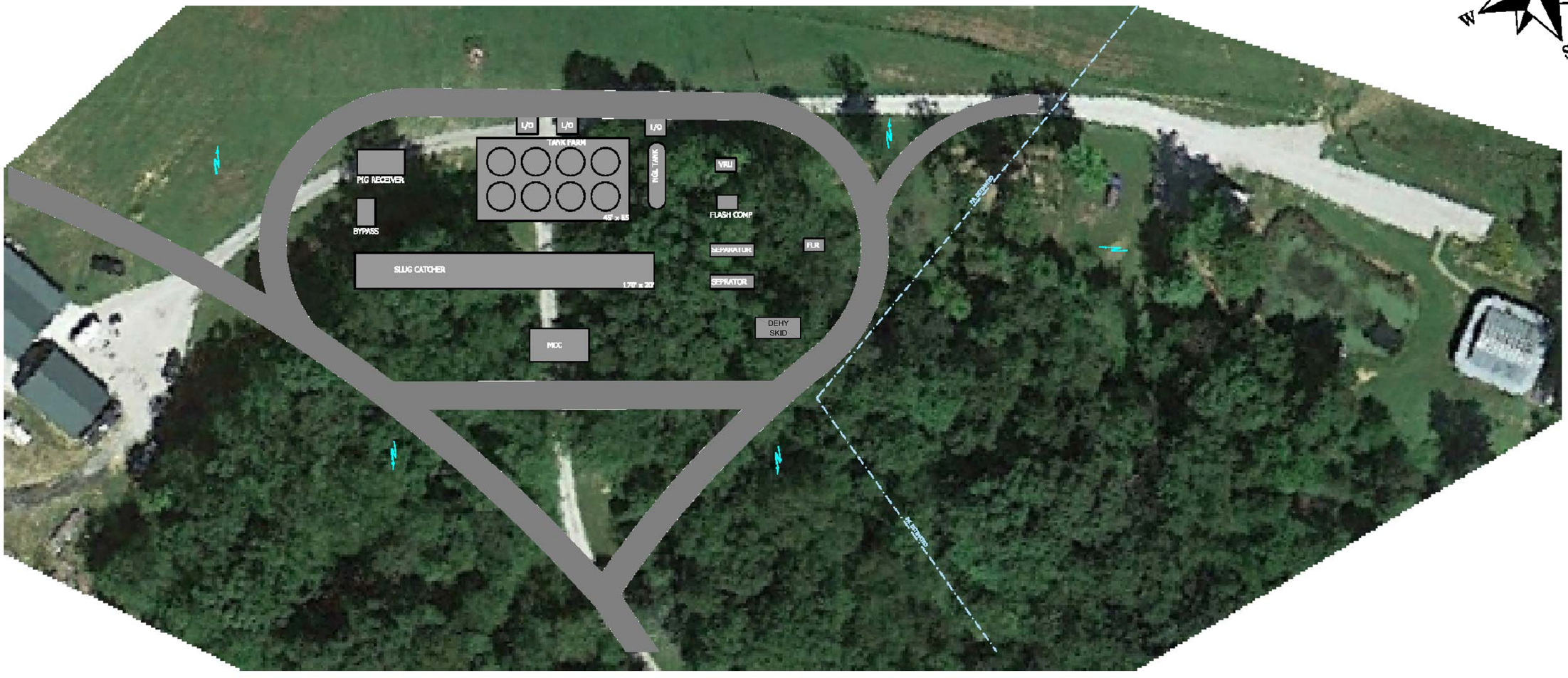
1.7.7 Other Applicable Requirements

Through Series 34, WVDEP has adopted the National Emission Standards for Hazardous Air Pollutants for Source Categories. Both of these topics have been addressed above.

# ATTACHMENT E

# Site Layout Diagram

PRELIMINARY




NOTES:
1) PRELIMINARY SITE LAYOUT
2) NO SURVEY OR GEOTECH HAS BEEN COMPLETED TO DATE
3) PROPERTY LINES ARE ESTIMATED

CRITICAL WEIGHTS:
1) SLUG CATCHER 183,000 LB DRY WEIGHT W/O PIERS
360,000 LB WET WEIGHT W/O PIERS
2) TANK FARM 500,000 LB ESTIMATED WET WEIGHT

## PLAN VIEW

ISSUED FOR INFORMATION ONLY

| REV | DATE | REV | DATE |
|---|---|---|---|
| 0 | 11-05-15 | | |
| 1 | 3-15-16 | | |
| | | | |

ICON MIDSTREAM

GOVAN ENGINEERING
By Industry we Prosper

GOVAN ENGINEERING, LLC IS NOT RESPONSIBLE FOR LOCATING UNDERGROUND UTILITIES, LAND SURVEY OR DETERMINATION OF PLOT PLAN BOUNDARY REGARDING PIPING OR EQUIPMENT PLACEMENT. CONTRACTOR WILL VERIFY AUTHORIZED LAND USE WITH UTILITIES AND LAND OWNERS, THEN SURVEY AND STAKE ACCORDINGLY. CONTRACTOR WILL CALL 811 AT LEAST (2) DAYS BEFORE ACTUAL EXCAVATION. CONTRACTOR SHALL ALSO EXERCISE EXTREME CARE IN ALL ITS OPERATIONS TO AVOID DAMAGING EXISTING PIPELINES AND OTHER FACILITIES AND SHALL FURNISH THE NECESSARY MATERIALS, LABOR AND EQUIPMENT AND SHALL REPAIR, AT ITS SOLE COST ANY DAMAGED FACILITIES WHERE IN DAMAGE IS ATTRIBUTABLE TO CONTRACTOR'S OPERATIONS. PERMITS FOR ROAD CROSSINGS AND TEMPORARY ROAD ACCESS ARE COORDINATED VIA COLDWATER CONSULTING, LLC | CINCINNATI, OHIO | PHONE: 513-223-2983.

TITLE: DULANEY FACILITY
GENERAL ARRANGEMENT

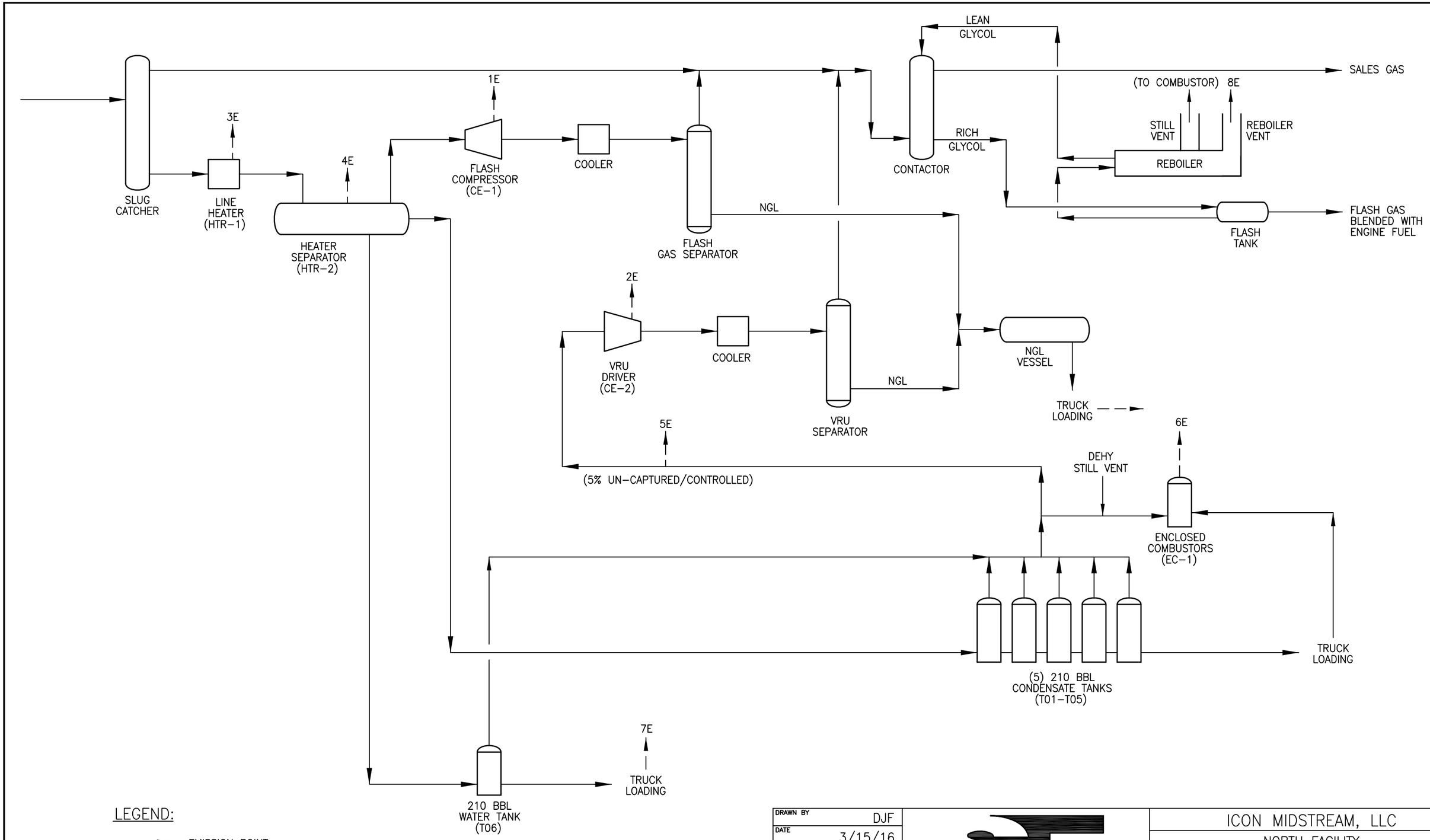
DRAWN: RMG | DATE: 11-05-2015
SCALE: 1" = 60'

CUSTOMER: ICON MIDSTREAM

DRAWING NO. 100102-D070 | SHEET 1 OF 1 | REV. 0

# ATTACHMENT F

# Process Flow Diagram




LEGEND:

— — ► EMISSION POINT

| | |
|---|---|
| DRAWN BY | DJF |
| DATE | 3/15/16 |
| CHECKED BY | RAD |
| SET JOB NO. | 215095 |
| SET DWG FILE | NORTH FDb01.dwg |
| DRAWING SCALE | N.T.S. |


TECHNOLOGIES
98 Vanadium Road Bridgeville, PA 15017 (412) 221–1100


ICON MIDSTREAM, LLC

NORTH FACILITY
ALMA, WEST VIRGINIA
PROCESS FLOW DIAGRAM

| DRAWING NAME | REV. |
|---|---|
| FIGURE 2 | 1 |

# ATTACHMENT G

# Process Description

# Icon Midstream Pipeline, LLC
# North Liquids Management Facility
# Attachment G – Process Description

Icon Midstream plans to install its North Liquids Management Facility in Wetzel County. (See Site Location Map). The Station will receive and manage natural gas and produced fluids (primarily raw condensate) from area production well pads owned and operated by others. At the station inlet, gas and produced fluids will be passed through a slug catcher where liquids will be separated from the gas. The gas will be dehydrated and injected into a pipeline for transportation to a processing facility owned and operated by others.. A portion of the gas will be used as fuel for Icon's equipment.

Liquids exiting the Slug Catcher will pass through a line heater and then enter a heated separator. In the heated separator, the liquids are first separated into Condensate and Produced Water (Brine). As the pressure is reduced, lighter components of the condensate is flashed off. The stabilized condensate is routed to a series of five 210 BBL aboveground storage tanks prior to transportation (via truck) to a processing facility owned and operated by others. The separated water is routed to a single 210 BBL aboveground storage tank prior to off-site transportation by others for re-use or disposal. The flash gas coming off of the heated separator will be routed to a flash gas compressor and passed through an air cooler. A fraction of the flash gas condenses during the pressurization and cooling process. This liquid (Natural Gas Liquids or NGL) will then be accumulated in a pressure vessel (approximately 120 psia) and transported via a pressurized tanker truck to a fractionation facility owned by others for further processing.

Vapors emitted by the stabilized condensate storage tanks will be captured by a hard piping system that will route the vapors to a Vapor Recovery Unit (VRU). This unit will compress the vapors and inject the gas into the sales line. Any liquids condensing during this pressurization and cooling process are routed to the NGL tank.

Any vapors not handled by the VRU or Flash Gas compressor will be controlled by enclosed combustors if/when one or both of the VRU or Flash Gas compressor are down for maintenance or other mechanical reasons. Vapors associated with produced water and condensate truck loading will also be routed to the enclosed combustor. As NGL truck loading will be via vapor balance between the pressurized storage vessels and the pressurized tanker truck, there will only be emissions associated with the connection/disconnection of the transfer lines.

In summary, emission sources at this facility will include the following:

- One Flash Gas Compressor Engine – Arrow VR 260 47 Hp
- One VRU Gas Compressor Engine – Cummins G8.3 118 Hp
- One 250 MBTU/Hr Line Heater
- One 1.0 MMBTU/Hr Separator Heater
- One 130 MMSCFD Dehydration Unit
- Five 210 BBL Stabilized Condensate Tanks
- One 210 BBL Produced Water Tank
- Stabilized Condensate/Produced water truck loading
- NGL truck loading
- Fugitive Emissions – Facility Roadways
- Fugitive Emissions – Component Leaks

# ATTACHMENT I

# Emission Unit Table

## Emission Units Table

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

| Emission Unit ID[1] | Emission Point ID[2] | Emission Unit Description | Year Installed/ Modified | Design Capacity | Type[3] and Date of Change | Control Device[4] |
|---|---|---|---|---|---|---|
| CE-1 | 1E | Flash Gas Compressor Engine (Arrow VR 260) | Upon Receipt of Permit | 47 Hp | **NEW** | 1C (NSCR) |
| CE-2 | 2E | VRU Compressor Engine (Cummins G8.3) | Upon Receipt of Permit | 118 Hp | **NEW** | 2C (NSCR) |
| HTR-1 | 3E | Line Heater | Upon Receipt of Permit | 0.25 MMBTU/Hr | **NEW** | None |
| HTR-2 | 4E | Separator Heater | Upon Receipt of Permit | 1.0 MMBTU/Hr | **NEW** | None |
| T01 | 5E/6E | Condensate Tank | Upon Receipt of Permit | 210 BBL | **NEW** | VRU-1/EC-1 |
| T02 | 5E/6E | Condensate Tank | Upon Receipt of Permit | 210 BBL | **NEW** | VRU-1/EC-1 |
| T03 | 5E/6E | Condensate Tank | Upon Receipt of Permit | 210 BBL | **NEW** | VRU-1/EC-1 |
| T04 | 5E/6E | Condensate Tank | Upon Receipt of Permit | 210 BBL | **NEW** | VRU-1/EC-1 |
| T05 | 5E/6E | Condensate Tank | Upon Receipt of Permit | 210 BBL | **NEW** | VRU-1/EC-1 |
| EC-1 | 6E | Enclosed Combustor (Two at 10.0 MMBTU/Hr Each) | Upon Receipt of Permit | 20 MMBTU/Hr | **NEW** | N/A |
| T06 | 5E/6E | Produced Water Tank | Upon Receipt of Permit | 210 BBL | **NEW** | VRU-1/EC-1 |
| TL-1 | 6E | Condensate Truck Loading | Upon Receipt of Permit | 1,050,000 Gallons/Yr. | **NEW** | EC-1 |
| TL-2 | 7E | Produced Water Truck Loading | Upon Receipt of Permit | 58,800 Gallons/Yr. | **NEW** | None |
| RBV-1 | 8E | Reboiler Vent | Upon Receipt of Permit | 2.0 MMBTU/Hr | **NEW** | None |
| RSV-1 | 6E | Reboiler Still Vent | Upon Receipt of Permit | 130 MMSCFD | **NEW** | EC-1 |
| --- | --- | Fugitive VOC Emissions – Fittings and Connections | Upon Receipt of Permit | N/A | **NEW** | None |
| --- | --- | Haul Roads | Upon Receipt of Permit | 1 Truck per day max. | **NEW** | None |

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

# ATTACHMENT J

# Emission Points Data Summary Sheets

## ATTACHMENT J

## Emission Points Data Summary Sheet
## New Equipment Only

### 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$^4$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ID No. | Source | ID No. | Device Type | Short Term[2] | Max (hr/yr) | | lb/hr | ton/yr | lb/hr | ton/yr | | | |
| **1E** | Upward Vertical Stack | CE-1 | Flash Comp. Driver Engine | 1C | NSCR | C | 8760 | $NO_x$ | 1.33 | 5.81 | 0.21 | 0.91 | GAS | EE | |
| | | | | | | | | CO | 0.53 | 2.31 | 0.41 | 1.81 | GAS | EE | |
| | | | | | | | | VOC | 0.01 | 0.06 | 0.01 | 0.06 | GAS | EE | |
| | | | | | | | | $SO_2$ | <0.01 | <0.01 | <0.01 | <0.01 | GAS | EE | |
| | | | | | | | | PM/PM10 | <0.01 | <0.01 | <0.01 | 0.01 | Solid | EE | |
| | | | | | | | | Formaldehyde | 0.01 | 0.04 | 0.01 | 0.04 | Gas | EE | |
| | | | | | | | | CO2e | 54 | 238 | 54 | 238 | Gas | EE | |
| **2E** | Upward Vertical Stack | CE-2 | VRU Driver Engine | 2C | NSCR | C | 8760 | $NO_x$ | 3.88 | 14.81 | 0.26 | 1.14 | GAS | EE | |
| | | | | | | | | CO | 2.24 | 9.80 | 0.52 | 2.28 | GAS | EE | |
| | | | | | | | | VOC | 0.03 | 0.13 | 0.03 | 0.13 | GAS | EE | |
| | | | | | | | | $SO_2$ | <0.01 | <0.01 | <0.01 | <0.01 | GAS | EE | |
| | | | | | | | | PM/PM10 | 0.05 | 0.22 | 0.05 | 0.22 | Solid | EE | |
| | | | | | | | | Formaldehyde | 0.02 | 0.09 | 0.02 | 0.09 | Gas | EE | |
| | | | | | | | | CO2e | 124 | 542 | 124 | 542 | Gas | EE | |

| 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$^4$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ID No. | Source | ID No. | Device Type | Short Term[2] | Max (hr/yr) | | lb/hr | ton/yr | lb/hr | ton/yr | | | |
| **3E** | Upward Vertical Vent | HTR-1 | Line Heater | | None | C | 8760 | $NO_x$ | 0.02 | 0.09 | 0.02 | 0.09 | GAS | EE | |
| | | | | | | | | CO | 0.02 | 0.07 | 0.02 | 0.07 | GAS | EE | |
| | | | | | | | | VOC | <0.01 | <0.01 | <0.01 | <0.01 | GAS | EE | |
| | | | | | | | | PM/PM10 | <0.01 | 0.01 | <0.01 | 0.01 | Solid | EE | |
| | | | | | | | | Benzene | <0.01 | <0.01 | <0.01 | <0.01 | Gas | EE | |
| | | | | | | | | Formaldehyde | <0.01 | <0.01 | <0.01 | <0.01 | Gas | EE | |
| | | | | | | | | CO2e | 25 | 107 | 25 | 107 | Gas | EE | |
| **4E** | Upward Vertical Vent | HTR-2 | Separator Heater | | None | C | 8760 | $NO_x$ | 0.08 | 0.36 | 0.08 | 0.36 | GAS | EE | |
| | | | | | | | | CO | 0.07 | 0.30 | 0.07 | 0.30 | GAS | EE | |
| | | | | | | | | VOC | <0.01 | 0.02 | <0.01 | 0.02 | GAS | EE | |
| | | | | | | | | PM/PM10 | 0.01 | 0.03 | 0.01 | 0.03 | Solid | EE | |
| | | | | | | | | Benzene | <0.01 | <0.01 | <0.01 | <0.01 | Gas | EE | |
| | | | | | | | | Formaldehyde | <0.01 | <0.01 | <0.01 | <0.01 | Gas | EE | |
| | | | | | | | | CO2e | 98 | 430 | 98 | 430 | Gas | EE | |

| 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$^4$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ID No. | Source | ID No. | Device Type | Short Term[2] | Max (hr/yr) | | lb/hr | ton/yr | lb/hr | ton/yr | | | |
| **5E** | Upward Vertical Vent | T01-T05 | Cond. Tanks Un-captured emissions | VRU-1 + EC-1 | Vapor Recovery Unit | C | 8760 | $NO_x$ | | | | | GAS | EE | |
| | | | | | | | | CO | | | | | GAS | EE | |
| | | | | | | | | VOC | 111.26 | 487.3 | 5.50 | 24.38 | GAS | EE | |
| | | | | | | | | PM/PM10 | | | | | Solid | EE | |
| | | | | | | | | Benzene | | | | | Gas | EE | |
| | | | | | | | | n-Hexane | 3.33 | 14.6 | 0.17 | 0.73 | Gas | EE | |
| | | | | | | | | CO2e | | | | | Gas | EE | |
| **6E** | Upward Vertical Vent | EC-1 | Cond. Tanks + Water Tank + Cond. Truck Loading + Dehy Still Vent | EC-1 | Enclosed Combustors | C | 8760 | $NO_x$ | | | 0.63 | 1.50 | GAS | EE | |
| | | | | | | | | CO | | | 3.44 | 8.17 | GAS | EE | |
| | | | | | | | | VOC | | | 5.85 | 11.39 | GAS | EE | |
| | | | | | | | | PM/PM10 | | | <0.01 | 0.39 | Solid | EE | |
| | | | | | | | | Benzene | | | 0.12 | 0.54 | Gas | EE | |
| | | | | | | | | n-Hexane | | | 0.25 | 0.62 | Gas | EE | |
| | | | | | | | | Ethylbenzene | | | 0.35 | 1.52 | Gas | EE | |
| | | | | | | | | Toluene | | | 0.21 | 0.92 | Gas | EE | |
| | | | | | | | | Xylenes | | | 0.47 | 2.05 | Gas | EE | |
| | | | | | | | | CO2e | | | 1,159 | 2,599 | Gas | EE | |

| 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$^4$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ID No. | Source | ID No. | Device Type | Short Term[2] | Max (hr/yr) | | lb/hr | ton/yr | lb/hr | ton/yr | | | |
| **7E** | Upward Vertical Vent | TL-2 | Produced Water Truck Loading | | None | | | $NO_x$ | | | | | GAS | EE | |
| | | | | | | | | CO | | | | | GAS | EE | |
| | | | | | | | | VOC | 0.13 | <0.01 | 0.13 | <0.01 | GAS | EE | |
| | | | | | | | | PM/PM10 | | | | | GAS | EE | |
| | | | | | | | | Benzene | | <0.01 | | <0.01 | Solid | EE | |
| | | | | | | | | n-Hexane | | <0.01 | | <0.01 | Gas | EE | |
| | | | | | | | | CO2e | | | | | Gas | EE | |
| **8E** | Upward Vertical Vent | RBV-1 | Re-Boiler Vent | | None | | | $NO_x$ | 0.20 | 0.88 | 0.20 | 0.88 | GAS | EE | |
| | | | | | | | | CO | 0.17 | 0.74 | 0.17 | 0.74 | GAS | EE | |
| | | | | | | | | VOC | 0.01 | 0.05 | 0.01 | 0.05 | GAS | EE | |
| | | | | | | | | PM/PM10 | 0.02 | 0.07 | 0.02 | 0.07 | GAS | EE | |
| | | | | | | | | Benzene | <0.01 | <0.01 | <0.01 | <0.01 | Solid | EE | |
| | | | | | | | | Formaldehyde | <0.01 | <0.01 | <0.01 | <0.01 | Gas | EE | |
| | | | | | | | | CO2e | 242 | 1,058 | 242 | 1,058 | Gas | EE | |

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that un-captured 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., un-captured 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 (i.e., 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, $H_2S$, Inorganics, Lead, Organics, $O_3$, NO, $NO_2$, $SO_2$, $SO_3$, etc. **DO NOT LIST** $CO_2$, $H_2$, $H_2O$, $N_2$, $O_2$, 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).

## ATTACHMENT J

### Emission Points Data Summary Sheet
### New Equipment

| 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. ($^{o}$F) | 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 |
| 1E | 0.5 | 1050 | 310 | 45 | 750 | 8 | | |
| 2E | 0.5 | 1127 | 528 | 45 | 750 | 8 | | |
| 3E | 0.25 | 1100 | Est 200 | 1 | 750 | 8 | | |
| 4E | 0.33 | 1100 | Est. 300 | <1 | 750 | 8 | | |
| 5E | N/A (Fugitive) | N/A (Fugitive) | N/A (Fugitive) | N/A (Fugitive) | 750 | N/A (Fugitive) | | |
| 6E | 2.0 | 1100 | Est. 300 | | 750 | 12 | | |
| 7E | 0.5 | Ambient | <10 | <1 | 750 | 10 | | |
| 8E | 0.5 | Ambient | 3-4 | <1 | 750 | 14 | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

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

# ATTACHMENT K

## Fugitive Emissions Summary Sheet

# Icon Midstream Pipeline, LLC
# North Liquids Management Facility
# Attachment K – Fugitive Emissions Data

## Equipment Fugitive Emissions

As noted in the process description, Icon Midstream Pipeline plans to install various equipment at its North Liquids Management Facility. This equipment will contain a variety of piping containing natural gas and separated liquids under pressure. During the normal course of operation minor leaks from valves, pressure release devices and various fittings associated with this piping may occur. The number of valves, flanges, etc. has been estimated to reflect the equipment that will be installed with this permit. A potential emission rate of 2.47 tpy of VOCs and 12.94 tpy $CO_2e$ has been estimated.

Estimates of these emissions are included in the calculations (Attachment N) and summarized on the form included in this section. These calculations are based on emission factors accepted by the American Petroleum Institute and EPA.

## Pigging Emission Estimates

There will be launching and receiving operations at this facility. The interior volume of both the receiver and launcher is approximately 64 cubic feet. Thus, as shown in the calculations in Attachment N, each launching and receiving event will release 4930 cubic feet of gas. With a density of 0.058 lb/cubic foot, each event will release approximately 286 pounds of gas. VOCs comprise 18.3% (by weight) of this gas. Thus, each event releases 52.3 pounds of VOCs. Additionally, with methane comprising 60.7% (by weight) of this gas, each event releases 173.6 lbs of methane or 2.17 tons $CO_{2e}$. It is anticipated that there will be a maximum of 150 launching and receiving events each per year. Thus, annual pigging and receiving emissions will be 7.85 tons of VOCs and 651 tons of $CO_{2e}$.

## Facility Blowdown Emission Estimates

There will be two small gas compressors associated with emissions control equipment that will require blowdowns to allow for routine maintenance. As shown in the attached spreadsheets, the blowdown volume associated with the VGR260 driver is 89 scf and for the G8.3 is 433 scf. There will be a maximum of 36 blow downs per compressor per year. Thus, there is a potential for 18,792 cubic feet of gas emitted from blow downs [(89+433)x36].

The density of this gas at STP is 0.058 lb/scf (see the Inlet Gas spreadsheet in the calculations). Thus, the mass of gas released is 1090 pounds (18,792 x 0.058). As the percentage of VOCs in the gas (by weight) is 18.3 percent (see Inlet Gas spreadsheet in the calculations), the VOC emissions from pigging operations are estimated at approximately 199.5 lbs or 0.10 tons per year.

As the methane concentration in this gas is 60.7 % (by weight), methane emissions will be 662 pounds (1090 x 0.607) per year. Using a GHG factor of 25, methane emissions from blowdowns in $CO_{2e}$ will be 8.3 tons $CO_2e$ (166.1 x 25[GHG factor] /2000).

## Storage Tank and Haul Road Fugitive Emissions

Water and condensate this facility will be accumulated in atmospheric tanks prior to off-site shipment In addition to flash, working and breathing losses from these tanks (presented in Attachment N), there will be emissions associated with the loading of the condensate tanks and fugitive dust emissions from the tank trucks entering and exiting the site. There will be a projected maximum of one condensate, NGL and/or water truck trips per day. Emissions from these sources are summarized in the attached form and the calculations are presented in Attachment N.

## 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 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).

| APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS |
|---|
| 1.) Will there be haul road activities?<br>☒ Yes ☐ No<br>☒ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET. |
| 2.) Will there be Storage Piles?<br>☐ Yes ☒ No<br>☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET. |
| 3.) Will there be Liquid Loading/Unloading Operations?<br>☒ Yes ☐ No<br>☒ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET. |
| 4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation?<br>☐ Yes ☒ No<br>☐ If YES, 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.)?<br>☒ Yes ☐ No<br>☒ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET. |
| 6.) Will there be General Clean-up VOC Operations?<br>☐ Yes ☒ No<br>☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET. |
| 7.) Will there be any other activities that generate fugitive emissions?<br>☐ Yes ☒ No<br>☐ If YES, 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.” |

| **FUGITIVE EMISSIONS SUMMARY** | All Regulated Pollutants - Chemical Name/CAS [1] | Maximum Potential Uncontrolled Emissions [2] | | Maximum Potential Controlled Emissions [3] | | Est. Method Used [4] |
|---|---|---|---|---|---|---|
| | | lb/hr | ton/yr | lb/hr | ton/yr | |
| Haul Road/Road Dust Emissions<br>Paved Haul Roads | | | | | | |
| Unpaved Haul Roads | PM | 10.6 | 0.41 | 10.6 | 0.41 | EE |
| Storage Pile Emissions | | | | | | |
| Loading/Unloading Operations<br>**(Uncaptured Emissions Only)** | VOCs | 17.9 | 1.12 | 17.9 | 1.12 | EE |
| Wastewater Treatment Evaporation & Operations | | | | | | |
| Equipment Leaks | Inlet Natural Gas(VOCs) | 0.56 | 2.47 | 0.56 | 2.47 | EE |
| General Clean-up VOC Emissions | | | | | | |
| Other: Blow Downs | Inlet Natural Gas(VOCs) | N/A | 0.1 | N/A | 0.1 | EE |

[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 (including $CO_2$ and methane), 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 minutes (e.g. 5 lb VOC/20 minute batch).

[3] Give 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).

[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).

# ATTACHMENT L

## Emission Unit Data Sheets

**Attachment L**
**EMISSIONS UNIT DATA SHEET**
**BULK LIQUID TRANSFER OPERATIONS**

Furnish the following information for each new or modified bulk liquid transfer area or loading rack, as shown on the *Equipment List Form* and other parts of this application. This form is to be used for bulk liquid transfer operations such as to and from drums, marine vessels, rail tank cars, and tank trucks.

Identification Number (as assigned on *Equipment List Form*): **TL-1 and TL-2**

1. Loading Area Name: **Tank Truck Loading Area**

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):

☐ Drums ☐ Marine Vessels ☐Rail Tank Cars ☒ Tank Trucks

3. Loading Rack or Transfer Point Data:

| | |
|---|---|
| Number of pumps | **3 (on truck)** |
| Number of liquids loaded | **3** |
| Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time | **2** |

4. Does ballasting of marine vessels occur at this loading area?

☐ Yes ☐ No ☒ Does not apply

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point: **None**

6. Are cargo vessels pressure tested for leaks at this or any other location?

☐ Yes ☒ No

If YES, describe:

| 7. Projected Maximum Operating Schedule (for rack or transfer point as a whole): | | | | |
|---|---|---|---|---|
| Maximum | Jan. - Mar. | Apr. - June | July - Sept. | Oct. - Dec. |
| hours/day | **3** | **3** | **3** | **3** |
| days/month | **30** | **30** | **30** | **30** |
| days/year | **340** | **340** | **340** | **340** |

| 8. Bulk Liquid Data *(add pages as necessary):* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pump ID No. | | **N/A** | **N/A** | **N/A** | | | |
| Liquid Name | | **Produced Water** | **Conden-sate** | **NGL** | | | |
| Max. daily throughput (1000 gal/day) | | **3.36** | **8.4** | **9.24** | | | |
| Max. annual throughput (1000 gal/yr) | | **58.8** | **1050** | **672** | | | |
| Loading Method [1] | | **SP** | **BF** | **BF** | | | |
| Max. Fill Rate (gal/min) | | **60** | **70** | **80** | | | |
| Average Fill Time (min/loading) | | **56** | **60** | **60** | | | |
| Max. Bulk Liquid Temperature ($^{o}$F) | | **70** | **70** | **70** | | | |
| True Vapor Pressure [2] | | **0.3 psia** | **7.45 psia** | **92 psia** | | | |
| Cargo Vessel Condition [3] | | **U** | **U** | **U** | | | |
| Control Equipment or Method [4] | | **TO** | **TO** | **VB** | | | |
| Minimum control efficiency (%) | | **68.6** | **68.6** | **99+** | | | |
| Maximum Emission Rate | Loading (lb/hr) | **0.13** | **17.9** | **N/A** | | | |
| | Annual (lb/yr) | **2.27** | **2237** | **N/A** | | | |
| Estimation Method [5] | | **AP-42** | **AP-42** | | | | |

[1] BF = Bottom Fill SP = Splash Fill SUB = Submerged Fill

[2] At maximum bulk liquid temperature

[3] B = Ballasted Vessel, C = Cleaned, U = Uncleaned (dedicated service), O = other (describe)

[4] List as many as apply (complete and submit appropriate *Air Pollution Control Device Sheets*):CA = Carbon Adsorption LOA = Lean Oil AdsorptionCO = Condensation SC = Scrubber (Absorption)CRA = Compressor-Refrigeration-Absorption TO = Thermal Oxidation or Incineration
CRC = Compression-Refrigeration-Condensation VB = Dedicated Vapor Balance (closed system)
O = other (descibe)

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance
TM = Test Measurement based upon test data submittal
O = other (describe)

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 |
|---|---|
| **Truck load-outs per month and volume of liquid removed each load-out** | **Truck load-outs per month and volume of liquid removed each load-out** |
| REPORTING | TESTING |
| **Truck load-outs per month and volume of liquid removed each load-out** | **None** |

**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

**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 **N/A**

# NATURAL GAS FIRED BOILER/LINE HEATER DATA SHEET

| Source ID #[1] | Status[2] | Design Heat Input (mmBtu/hr)[3] | Hours of Operation (hrs/yr)[4] | Fuel Heating Value (Btu/scf)[5] | |
|---|---|---|---|---|---|
| HTR-1 | NEW | 0.25 MMBTU/Hr | 8760 | 1287 BTU/scf (HHV) | |
| HTR-2 | NEW | 1.0 MMBTU/Hr | 8760 | 1287 BTU/scf (HHV) | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

1. Enter the appropriate Source Identification Numbers (Source ID #) for each boiler or line heater located at the compressor station. Boilers should be designated BLR-1, BLR-2, BLR-3, etc. Heaters or Line Heaters should be designated HTR-1, HTR-2, HTR-3, etc. Enter glycol dehydration unit Reboiler Vent data on the *Glycol Dehydration Unit Data Sheet*.
2. Enter the Status for each boiler or line heater using the following:

   EXIST Existing Equipment  NEW Installation of New Equipment
   REM Equipment Removed
3. Enter boiler or line heater design heat input in mmBtu/hr.
4. Enter the annual hours of operation in hours/year for each boiler or line heater.
5. Enter the fuel heating value in Btu/standard cubic foot.

# STORAGE TANK DATA SHEET

| Source ID #[1] | Status[2] | Content[3] | Volume[4] | Dia[5] | Throughput[6] | Orientation[7] | Liquid Height[8] |
|---|---|---|---|---|---|---|---|
| T01 | NEW | Condensate | 210 BBL | 10.0 | 210,000 gallons/yr | VERT | 8 feet |
| T02 | NEW | Condensate | 210 BBL | 10.0 | 210,000 gallons/yr | VERT | 8 feet |
| T03 | NEW | Condensate | 210 BBL | 10.0 | 210,000 gallons/yr | VERT | 8 feet |
| T04 | NEW | Condensate | 210 BBL | 10.0 | 210,000 gallons/yr | VERT | 8 feet |
| T05 | NEW | Condensate | 210 BBL | 10.0 | 210,000 gallons/yr | VERT | 8 feet |
| T06 | NEW | Produced Water | 210 BBL | 10.0 | 58,800 gallons/yr | VERT | 8 feet |

1. Enter the appropriate Source Identification Numbers (Source ID #) for each storage tank located at the compressor station. Tanks should be designated T01, T02, T03, etc.
2. Enter storage tank Status using the following:

   EXIST Existing Equipment  NEW Installation of New Equipment
   REM Equipment Removed
3. Enter storage tank content such as condensate, pipeline liquids, glycol (DEG or TEG), lube oil, etc.
4. Enter storage tank volume in gallons.
5. Enter storage tank diameter in feet.
6. Enter storage tank throughput in gallons per year.
7. Enter storage tank orientation using the following:

   VERT Vertical Tank  HORZ Horizontal Tank
8. Enter storage tank average liquid height in feet.

# NATURAL GAS COMPRESSOR/GENERATOR ENGINE DATA SHEET

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Source Identification Number[1] | | CE-1 | | CE-2 | | | |
| Engine Manufacturer and Model | | Arrow VRG260 | | Cummins G8.3 | | | |
| Manufacturer's Rated bhp/rpm | | 47/1800 | | 118/1800 | | | |
| Source Status[2] | | **NS** | | **NS** | | | |
| Date Installed/Modified/Removed[3] | | Upon Receipt of Permit | | Upon Receipt of Permit | | | |
| Engine Manufactured/Reconstruction Date[4] | | 5/12/2010 | | 10/01/2013 | | | |
| Is this a Certified Stationary Spark Ignition Engine according to 40CFR60 Subpart JJJJ? (Yes or No)[5] | | No | | No | | | |
| Engine, Fuel and Combustion Data | Engine Type[6] | RB4S | | RB4S | | | |
| | APCD Type[7] | NSCR | | NSCR | | | |
| | Fuel Type[8] | RG | | RG | | | |
| | $H_2S$ (gr/100 scf) | <1 | | <1 | | | |
| | Operating bhp/rpm | 47/1800 | | 118/1800 | | | |
| | BSFC (Btu/bhp-hr) | 9889 | | 8032 | | | |
| | Fuel throughput ($ft^3$/hr) | 361 | | 750 | | | |
| | Fuel throughput ($MMft^3$/yr) | 3.16 | | 6.57 | | | |
| | Operation (hrs/yr) | 8760 | | 8760 | | | |
| Reference[9] | Potential Emissions[10] | lbs/hr | tons/yr | lbs/hr | tons/yr | lbs/hr | tons/yr |
| AP | $NO_X$ | 0.21 | 0.91 | 0.26 | 1.14 | | |
| AP | CO | 0.41 | 1.81 | 0.52 | 2.28 | | |
| AP | VOC | 0.01 | 0.06 | 0.03 | 0.13 | | |
| AP | $SO_2$ | <0.01 | <0.01 | 0.00 | 0.00 | | |
| AP | $PM_{10}$ | 0.01 | 0.04 | 0.05 | 0.22 | | |
| AP | Formaldehyde | 0.01 | 0.04 | 0.02 | 0.09 | | |
| AP | Total HAPs | 0.02 | 0.07 | 0.03 | 0.14 | | |
| AP | CO2e | 54 | 238 | 124 | 542 | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

1. Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. If more than three (3) engines exist, please use additional sheets.

2. Enter the Source Status using the following codes:

| | | | |
|---|---|---|---|
| NS | Construction of New Source (installation) | ES | Existing Source |
| MS | Modification of Existing Source | RS | Removal of Source |

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

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

5. Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart JJJJ. If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance according to 40CFR§60.4243a(2)(i) through (iii), as appropriate.

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

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

| | | | |
|---|---|---|---|
| LB2S | Lean Burn Two Stroke | RB4S | Rich Burn Four Stroke |
| LB4S | Lean Burn Four Stroke | | |

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

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

8. Enter the Fuel Type using the following codes:

| | | | |
|---|---|---|---|
| PQ | Pipeline Quality Natural Gas | RG | Raw Natural Gas |

9. Enter the Potential Emissions Data Reference designation using the following codes. Attach all referenced data to this *Compressor/Generator Data Sheet(s)*.

| | | | | |
|---|---|---|---|---|
| MD | Manufacturer's Data | AP | AP-42 | |
| GR | GRI-HAPCalc™ | OT | Other _____ | (please list) |

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

# ATTACHMENT M

# Air Pollution Control Device Sheets

USA COMPRESSION

# Emissions Report

10/08/2015

## USA Compression Unit 5302 VR260/MHGF108

| | | | |
|---|---|---|---|
| Engine Serial Number : | 4B081005142 | Engine Manufactured Date : | 05/12/2010 |
| Max HP : | 47 | Max RPM : | 1800 |
| Number of Engine Cylinders : | 4 | Total Displacement (in3) : | 253 |
| Combustion Type & Setting : | 4 Stroke Rich Burn | Fuel Delivery Method: | Carburetor |
| Compression Ratio : | 8:01 | Combustion Air Treatment : | Naturally Aspirated |
| Engine Modified/Reconstructed? : | | | |
| Compressor Frame Serial # : | 5609x78 | Unit Packaged Date : | 12/28/2009 |
| Compressor Frame Max RPM : | 1800 | # of Compressor Throws : | 0 |

**AIR ENVIRONMENTAL REGULATIONS**

County and State Selected for Quote: Marion WV

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NSPS JJJJ | NOx | g/hp-hr | CO | g/hp-hr | VOC | g/hp-hr | | |
| Ozone Non-Attainment / General Permit | NOx | g/hp-hr | CO | g/hp-hr | VOC | g/hp-hr | CH2O | g/hp-hr |

**RAW ENGINE EMISSIONS**

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

Fuel Consumption : 9,889 HHV BTU/bhp-hr

| | g/bhp-hr | lb/MMBTU | lb/hr | TPY |
|---|---|---|---|---|
| Nitrogen Oxides (NOx) : | 12.80 | | 1.326 | 5.808 |
| Carbon Monoxide (CO) : | 5.10 | | 0.528 | 2.313 |
| Volatile Organic Compounds (NMNEHC excluding CH2O ) : | 0.04 | | 0.004 | 0.018 |
| Formaldehyde (CH2O) : | 0.09 | | 0.009 | 0.039 |
| Particulate Matter (PM) Filterable+Condensable : | | 0.0194 | 0.009 | 0.040 |
| Sulfur Dioxide (SO2) : | | 0.0006 | 0.000 | 0.001 |

| | g/bhp-hr | lb/MMBTU | lb/hr | Metric Tonne/yr |
|---|---|---|---|---|
| Carbon Dioxide (CO2) : | | 110 | 51.13 | 203.11 |
| Methane (CH4) : | | 0.23 | 0.11 | 0.43 |

**CONTROLLED EMISSIONS**

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

| | % Reduction Required to Comply with JJJJ & Non-Attainment / General Permit Limits | lb/hr | TPY |
|---|---|---|---|
| Nitrogen Oxides (NOx) : | 0 | 1.326 | 5.808 |
| Carbon Monoxide (CO) : | 0 | 0.528 | 2.313 |
| Volatile Organic Compounds (NMNEHC excluding CH2O ) : | 0 | 0.004 | 0.018 |
| Formaldehyde (CH2O) : | 0 | 0.009 | 0.039 |
| Particulate Matter (PM) Filterable+Condensable : | 0 | 0.009 | 0.040 |
| Sulfur Dioxide (SO2) : | 0 | 0.000 | 0.001 |

| | % Reduction Required to Comply with JJJJ & Non-Attainment / General Permit Limits | lb/hr | Metric Tonne/yr |
|---|---|---|---|
| Carbon Dioxide (CO2) : | 0 | | |
| Methane (CH4) : | 0 | 0.11 | 0.43 |

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

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

MIRATECH

Proposal Number: TJ-13-2071 Rev(2)

# Equipment Specification Report

## Engine Data

| | |
|---|---|
| **Number of Engines:** | 1 |
| **Application:** | Air Compression |
| **Engine Manufacturer:** | Arrow |
| **Model Number:** | VRG 260 |
| **Power Output:** | 47 bhp |
| **Power Output:** | 0.6 wt% sulfated ash or less |
| **Type of Fuel:** | Natural Gas |
| **Exhaust Flow Rate:** | 310 acfm (cfm) |
| **Exhaust Temperature:** | 1230 F |

## System Details

| | |
|---|---|
| **Housing Model Number:** | VXC-1408-04-HSG |
| **Element Model Number:** | VX-RE-08XC |
| **Number of Catalyst Layers:** | 1 |
| **Number of Spare Catalyst Layers:** | 1 |
| **System Pressure Loss:** | 2.0 inches of WC (Clean) |
| **Sound Attenuation:** | 28-32 dBA insertion loss |
| **Exhaust Temperature Limits:** | 750 – 1250°F (catalyst inlet); 1350°F (catalyst outlet) |

## NSCR Housing & Catalyst Details

| | |
|---|---|
| **Model Number:** | VXC-1408-04-XC1 |
| **Material:** | Carbon Steel |
| **Inlet Pipe Size & Connection:** | 4 inch FF Flange, 150# ANSI standard bolt pattern |
| **Outlet Pipe Size & Connection:** | 4 inch FF Flange, 150# ANSI standard bolt pattern |
| **Overall Length:** | 53 inches |
| **Weight Without Catalyst:** | 152 lbs |
| **Weight Including Catalyst:** | 162 lbs |
| **Instrumentation Ports:** | 1 inlet/1 outlet (1/2" NPT) |

## Emission Requirements

| Exhaust Gases | Engine Outputs (g/bhp-hr) | Reduction (%) | Warranted Converter Ouputs (g/bhp-hr) | Requested Emissions Targets |
|---|---|---|---|---|
| $CH_2O$ | 0.09 | | | |
| CO | 5.1 | 21.6 | 4 | 4 g/bhp-hr |
| NMHC* | 0.04 | 0 | 1 | 1 g/bhp-hr |
| $NO_x$** | 12.8 | 84.4 | 2 | 2 g/bhp-hr |
| O2 | 0.5% | | | |
| H2O | 18.5% | | | |

*† MIRATECH warrants the performance of the converter, as stated above, per the MIRATECH General Terms and Conditions of Sale.*

*MW referenced as $CH_4$ **MW referenced as $NO_2$

USA COMPRESSION

# Emissions Report

10/08/2015

## USA Compression Unit 6208 G8.3/JGP2

| | | | |
|---|---|---|---|
| Engine Serial Number : | 73592519 | Engine Manufactured Date : | 11/01/2013 |
| Max HP : | 118 | Max RPM : | 1800 |
| Number of Engine Cylinders : | 6 | Total Displacement (in3) : | 505 |
| Combustion Type & Setting : | | Fuel Delivery Method: | Carburetor |
| Compression Ratio : | 10.5:1 | Combustion Air Treatment : | Naturally Aspirated |
| Engine Modified/Reconstructed? : | | | |
| Compressor Frame Serial # : | F43775 | Unit Packaged Date : | 01/13/2014 |
| Compressor Frame Max RPM : | 1800 | # of Compressor Throws : | 2 |

**AIR ENVIRONMENTAL REGULATIONS**

County and State Selected for Quote: Marion WV

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NSPS JJJJ | NOx | 1.00 | g/hp-hr | CO | 2.0 | g/hp-hr | VOC | 0.7 | g/hp-hr | | |
| Ozone Non-Attainment / General Permit | NOx | | g/hp-hr | CO | | g/hp-hr | VOC | | g/hp-hr | CH2O | g/hp-hr |

**RAW ENGINE EMISSIONS**

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

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

| | g/bhp-hr | lb/MMBTU | lb/hr | TPY |
|---|---|---|---|---|
| Nitrogen Oxides (NOx) : | 13.00 | | 3.382 | 14.813 |
| Carbon Monoxide (CO) : | 8.60 | | 2.237 | 9.798 |
| Volatile Organic Compounds (NMNEHC excluding CH2O ) : | | 0.03 | | |
| Formaldehyde (CH2O) : | | 0.02 | | |
| Particulate Matter (PM) Filterable+Condensable : | | 0.0483 | 0.051 | 0.223 |
| Sulfur Dioxide (SO2) : | | 0.0006 | 0.001 | 0.003 |

| | g/bhp-hr | lb/MMBTU | lb/hr | Metric Tonne/yr |
|---|---|---|---|---|
| Carbon Dioxide (CO2) : | 452.00 | | 117.58 | 467.14 |
| Methane (CH4) : | | 0.23 | | |

**CONTROLLED EMISSIONS**

Catalytic Converter Make and Model: VXC-1460-04-HSG

Catalyst Element Type:

Number of Catalyst Elements currently in Housing: 1

Air/Fuel Ratio Control : Yes

Other Engine Emissions Control Equipment :

| | % Reduction Required to Comply with JJJJ & Non-Attainment / General Permit Limits | lb/hr | TPY |
|---|---|---|---|
| Nitrogen Oxides (NOx) : | 92 | 0.260 | 1.139 |
| Carbon Monoxide (CO) : | 77 | 0.520 | 2.279 |
| Volatile Organic Compounds (NMNEHC excluding CH2O ) : | | | |
| Formaldehyde (CH2O) : | 0 | | |
| Particulate Matter (PM) Filterable+Condensable : | 0 | 0.051 | 0.223 |
| Sulfur Dioxide (SO2) : | 0 | 0.001 | 0.003 |

| | % Reduction Required to Comply with JJJJ & Non-Attainment / General Permit Limits | lb/hr | Metric Tonne/yr |
|---|---|---|---|
| Carbon Dioxide (CO2) : | 0 | 117.58 | 467.14 |
| Methane (CH4) : | 0 | | |

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

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

HY-BON EDI
Vent Gas Management

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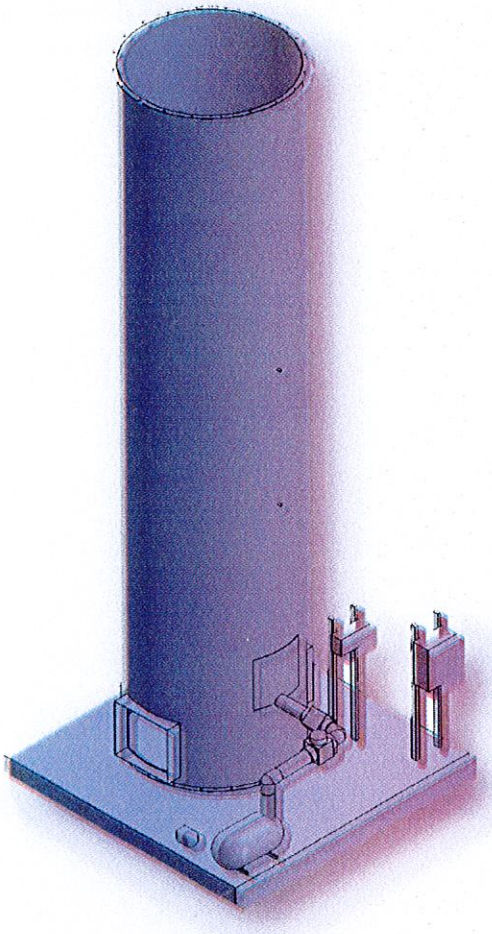
Midland, TX 79703
432-697-2292
hy-bon.com

100 Ayers Blvd.
Belpre, OH 45714
740-401-4000
ediplungerlift.com

With the fairly recent publication of the NSPS OOOO emission standard, all storage tank facilities constructed on or after August 23, 2011 will be allowed to emit 6 Tons or less of VOC's per year. This regulation not only forces companies to monitor and control their emissions, but it also forces the *means* of emission monitoring and controlling to be more reliable and exact. In response to such a stringent protocol, HY-BON Engineering Company is pleased to offer the **CH10.0** enclosed Vapor Combustor Unit (VCU). Built upon a foundation of 60+ years' experience with tank vapors, the VCU is the solution for reducing residual tank vapor emissions when a Vapor Recovery Unit (VRU) is not sufficient or a viable option.



- EPA 40 CFR 60, Quad O Compliant
- Completely Enclosed Combustion
- 99.99% Destruction Efficiency
- Fully Automated System
- Output Operational Data via Thumb Drive
- Capable of SCADA Integration

| | |
|---|---|
| **GENERAL PROPERTIES** | |
| TYPE | Enclosed Tank Battery Flare |
| AMBIENT TEMPERATURE | -20 °F to +100 °F |
| PILOT FUEL REQUIREMENTS | Propane or Site Gas<br>@5psi of natural gas = 13.3 SCFM<br>@5psi of propane = 12.5 SCFM |
| BURNER SIZE | 10.0 million BTU/hr |
| INLET PRESSURE REQUIRMENTS | Minimum 0.5 oz/in$^2$ (~1.0 inches w.c.) |
| TURN DOWN RATIO | 5:1 |
| DESTRUCTION EFFICIENCY | 99.99% DRE |
| **MECHANICAL PROPERTIES** | |
| DESIGN WIND SPEED | 100 MPH |
| AMBIENT TEMPERATURE | -20 °F to +120 °F |
| ELECTRICAL AREA CLASSIFICATION | General Area Classification (Non-Hazardous) |
| ELEVATION | up to 3,000ft ASL |
| **PROCESS PROPERTIES** | |
| SMOKELESS CAPACITY | 100% |
| OPERATING TEMPERATURE | 800 °F to 2000 °F (1500 °F Nominal) |
| **UTILITIES** | |
| PILOT GAS | Process Gas |
| ELECTRICITY | 1 Phase, 60 Hz, 120V/10A |
| SOLAR PANEL OPTION AVAILABLE | YES |

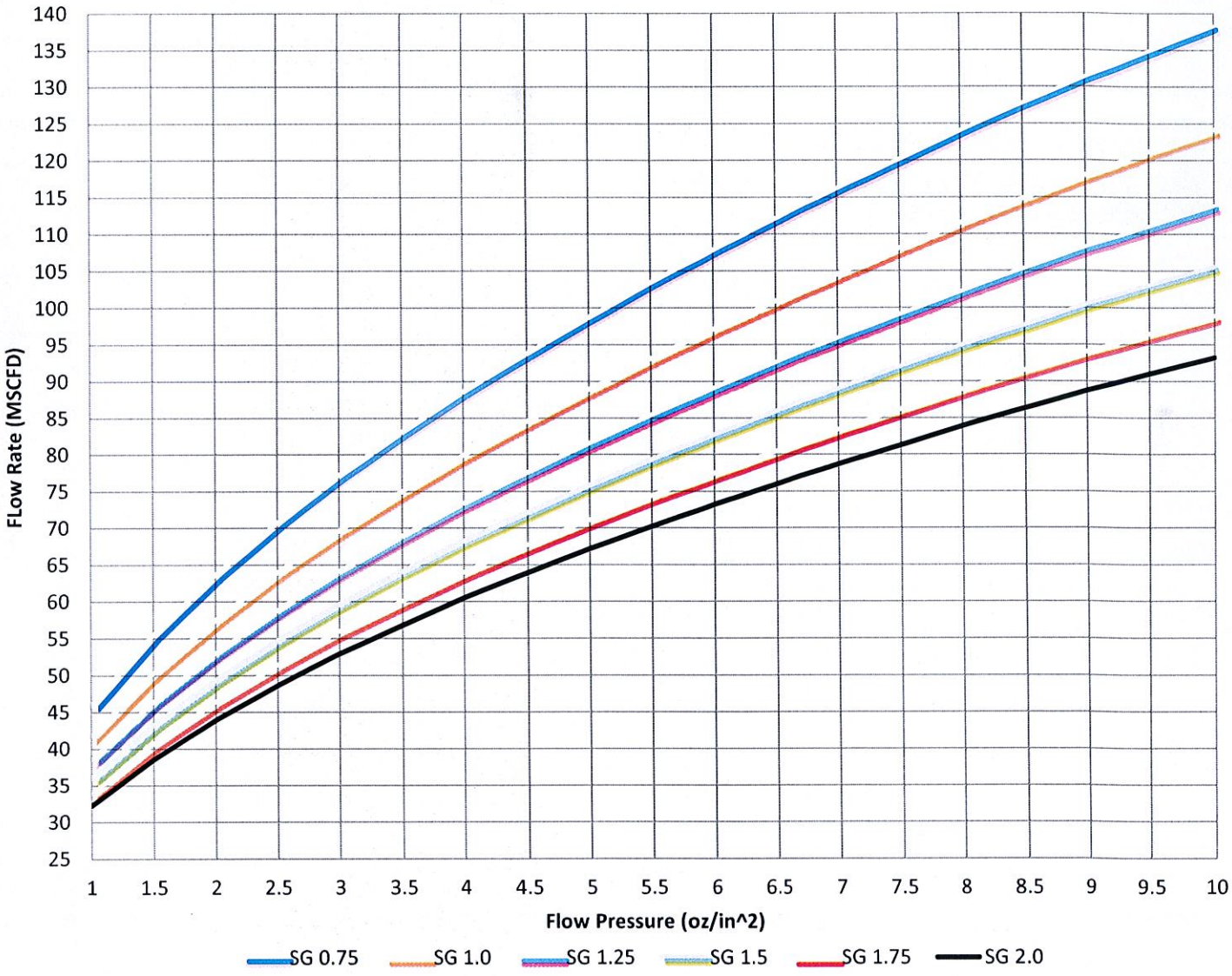
Revision #3: 09/04/2015

HY-BON EDI
Vent Gas Management

2404 Commerce Dr.
Midland, TX 79703
432-697-2292
hy-bon.com

100 Ayers Blvd.
Belpre, OH 45714
740-401-4000
ediplungerlift.com

**CH10.0: Flow Rate vs Flow Pressure with Corresponding Specific Gravity**



# ATTACHMENT N

## Supporting Calculations

# Icon Midstream Pipeline ,LLC

**North**
**Wetzel County, WV**

## POTENTIAL EMISSIONS SUMMARY

| Source | Description | NOx lb/hr | CO lb/hr | CO2e lb/Hr | VOC lb/hr | SO2 lb/hr | PM lb/hr | n-Hexane tpy | benzene lb/hr | formaldehyde lb/hr | Total HAPs lb/hr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HTR-1 | Line Heater | 0.02 | 0.02 | 24 | 0.00 | 0.00 | 0.00 | | | | |
| CE-1 | Flash Compressor | 0.21 | 0.41 | 54 | 0.01 | 0.00 | 0.01 | | 0.001 | 0.010 | 0.0149 |
| CE-2 | VRU Compressor Engine | 0.26 | 0.52 | 124 | 0.03 | 0.00 | 0.05 | | 0.014 | 0.021 | 0.1125 |
| HTR-2 | Separator Heater | 0.08 | 0.07 | 95 | 0.00 | 0.00 | 0.01 | | | 0.000 | 0.000 |
| RBV-1 | Dehy Reboiler Vent | 0.20 | 0.17 | 242 | 0.01 | 0.00 | 0.02 | 0.004 | 0.004 | 0.000 | 0.004 |
| T01-T06 | Condensate and Water Tank (Flash+Breathing+Working )[1] | | | | 5.60 | | | 0.167 | | | 0.180 |
| | Fugitive VOC Emissions | | | 3 | 0.56 | | | | | | |
| | Flash Gas Compressor Blowdowns | | | N/A | N/A | | | | | | |
| | Haul Road Fugitive Dust | | | | | | 4.43 | | | | |
| | Pigging Emissions | | | N/A | N/A | | | | | | |
| TL-2 | Water Truck Loading | | | | 0.13 | | | | | | |
| | NGL Truck Loading | | | | 0.90 | | | | | | |
| TL-1 | Condensate Truck Loading (Uncaptured)[2] | | | | 0.78 | | | | | | 0.05 |
| EC-1 | Captured/Controlled Tank,Truck Loading and Dehy Still Vent Emissions[3] | 0.63 | 3.44 | 1,159 | 5.85 | 0.00 | 0.00 | 0.250 | 0.120 | 0.0000 | 1.40 |
| | **Total** | **1.40** | **4.63** | **1,701** | **13.88** | **0.00** | **4.52** | **0.421** | **0.138** | **0.03** | **1.76** |

| Source | | NOx tpy | CO tpy | CO2e tpy | VOC tpy | SO2 tpy | PM tpy | n-Hexane tpy | benzene tpy | formaldehyde tpy | Total HAPs tpy |
|---|---|---|---|---|---|---|---|---|---|---|---|
| HTR-1 | Line Heater | 0.09 | 0.07 | 104 | 0.00 | 0.00 | 0.01 | | | 0.00 | |
| CE-1 | Flash Compressor | 0.91 | 1.81 | 238 | 0.06 | 0.00 | 0.04 | | 0.003 | 0.04 | 0.07 |
| CE-2 | VRU Compressor Engine | 1.14 | 2.28 | 542 | 0.13 | 0.00 | 0.22 | | 0.007 | 0.09 | 0.49 |
| HTR-2 | Separator Heater | 0.35 | 0.29 | 418 | 0.02 | 0.00 | 0.03 | | | 0.00 | 0.00 |
| RBV-1 | Dehy Reboiler Vent | 0.88 | 0.74 | 1,058 | 0.05 | 0.01 | 0.07 | 0.016 | 0.000 | 0.00 | 0.02 |
| T01-T06 | Condensate and Water Tank (Flash+Breathing+Working )[1] | | | | 24.53 | | | 0.730 | | | 0.80 |
| | Fugitive VOC Emissions | | | 13 | 2.47 | | | | | | |
| | Flash Gas Compressor Blowdowns | | | 8 | 0.10 | | | | | | |
| | Haul Road Fugitive Dust | | | | | | 2.33 | | | | |
| | Pigging Emissions | | | 651 | 7.85 | | | | | | |
| TL-2 | Water Truck Loading | | | | 0.01 | | | | | | |
| | NGL Truck Loading | | | | 0.04 | | | | | | |
| TL-1 | Condensate Truck Loading (Uncaptured)[2] | | | | 0.05 | | | | | | 0.01 |
| EC-1 | Captured/Controlled Tank,Truck Loading and Dehy Still Vent Emissions[3] | 1.50 | 8.17 | 2599 | 11.39 | 0.00 | 0.39 | 0.620 | 0.540 | 0.00 | 5.65 |
| | **Total** | **4.86** | **13.36** | **5,632** | **46.69** | **0.01** | **3.08** | **1.366** | **0.551** | **0.14** | **7.04** |

[1] Condensate tank emissions are captured are routed to VRU with Combustor as backup.
Per WVDEP Guidance on VRUs, a capture efficiency of 95% is claimed. This represents uncaptured.
[2] Truck loading VOC emissions captured at 98.7% per AP-42 Chapter 5.2.2.1.1 for NSPS-certified trucks. This entry represents the 1.3% not captured.
[3] 98.7% captured truck loading emissions routed to combustor EC-1

# Icon Midstream Pipeline, LLC

## North
## Wetzel County, WV

**Controlled Emission Rates**

**Source CE-2**

**Engine Data:**

| | | |
|---|---|---|
| Engine Manufacturer | Cummins | |
| Engine Model | G8.3 | |
| Type (Rich-burn or Low Emission) | Rich Burn | |
| Aspiration (Natural or Turbocharged) | Natural | |
| Manufacturer Rating | 118 | hp |
| Speed at Above Rating | 1,800 | rpm |
| Configeration ( In-line or Vee) | In-line | |
| Number of Cylinders | 6 | |
| Engine Bore | 4.490 | inches |
| Engine Stroke | 5.320 | inches |
| Engine Displacement | 505 | cu. in. |
| Engine BMEP | 103 | psi |
| Fuel Consumption (HHV) | 8,924 | Btu/bhp-hr |

**Emission Rates:**

| | g/bhp-hr | lb/hr | tons/year | g/hr | lb/day | AP-42 4strokerich lb/mmbtu | |
|---|---|---|---|---|---|---|---|
| Oxides of Nitrogen, NOx | 1.000 | 0.26 | 1.14 | 118 | 6.24 | | Comment |
| Carbon Monoxide CO | 2.000 | 0.52 | 2.28 | 236 | 12.49 | | 453.59 grams = 1 pound |
| VOC (NMNEHC) | 0.110 | 0.03 | 0.13 | 13 | 0.69 | | 2,000 pounds = 1 ton |
| CO2 | 452 | 118 | 515 | 53,336 | 2,822 | | |
| CO2e | | 124 | 542 | | | | |
| | | | | | | | 0 ppmv H2S |
| **Total Annual Hours of Operation** | **8,760** | | | | | | |
| SO2 | | 0.0006 | 0.0028 | | | 0.0006 | |
| PM (Condensable + Filterable) | | 0.0509 | 0.2228 | | | 0.0483 | Per Mfg. |
| $CH_4$ | | 0.1261 | 0.5524 | | | 0.0022 | Factor From 40 CFR 98, Table C-2 |
| $N_2O$ | | 0.0115 | 0.0502 | | | 0.0002 | Factor From 40 CFR 98, Table C-2 |
| acrolein | | 0.0028 | 0.0121 | | | 0.00263 | |
| acetaldehyde | | 0.0029 | 0.0129 | | | 0.00279 | |
| formaldehyde | 0.080 | 0.0208 | 0.0912 | | | | Per Mfg. |
| benzene | | 0.0017 | 0.0073 | | | 0.00158 | |
| toluene | | 0.0006 | 0.0026 | | | 0.000558 | |
| ethylbenzene | | 3E-05 | 0.0001 | | | 2.48E-05 | |
| xylene s | | 0.0002 | 0.0009 | | | 0.000195 | |
| methanol | | 0.0032 | 0.0141 | | | 0.00306 | |
| total HAPs | | 0.0322 | 0.1411 | | | | |

**Exhaust Parameters:**

| | | | | | |
|---|---|---|---|---|---|
| Exhaust Gas Temperature | 1,127 | deg. F | | | |
| Exhaust Gas Mass Flow Rate | | lb/hr | | | |
| Exhaust Gas Mass Flow Rate | 528 | acfm | | | |
| Exhaust Stack Height | 137 | inches | | | |
| | 8.67 | feet | | | |
| Exhaust Stack Inside Diameter | 6 | inches | | | |
| | 0.500 | feet | | | |
| Exhaust Stack Velocity | 44.8 | ft/sec | 4 | x acfm | |
| | 2,689.1 | ft/min | 3.1416 | x ( stack diameter )^2 | |

# Icon Midstream Pipeline, LLC

North
Wetzel County, WV

**Potential Emission Rates**

**Line Heater**
**Source HTR-1**

| | | |
|---|---|---|
| Burner Duty Rating | 250.0 | Mbtu/hr |
| Burner Efficiency | 98.0 | % |
| Gas Heat Content (HHV) | 1291.5 | Btu/scf |
| Total Gas Consumption | 4,740.5 | scfd |
| H2S Concentration | 0.000 | Mole % |
| Hours of Operation | 8760 | |

| | | | | |
|---|---|---|---|---|
| NOx | 0.0198 | lbs/hr | 0.087 | TPY |
| CO | 0.0166 | lbs/hr | 0.073 | TPY |
| CO2e | 24 | lbs/hr | 104 | tpy |
| VOC | 0.0011 | lbs/hr | 0.005 | TPY |
| SO2 | 0.0001 | lbs/hr | 0.001 | TPY |
| H2S | 0.0000 | lbs/hr | 0.000 | TPY |
| PM10 | 0.0015 | lbs/hr | 0.007 | TPY |
| CHOH | 0.0000 | lbs/hr | 0.000 | TPY |

**AP-42 Factors Used**

| | | | |
|---|---|---|---|
| **NOx** | **100** | **Lbs/MMCF** | |
| **CO** | **84** | **Lbs/MMCF** | |
| **$CO_2$** | **120,000** | **Lbs/MMCF** | **Global Warming Potential = 1** |
| **VOC** | **5.5** | **Lbs/MMCF** | |
| **PM** | **7.6** | **Lbs/MMCF** | |
| **$SO_2$** | **0.6** | **Lbs/MMCF** | |
| **$CH_4$** | **2.3** | **Lbs/MMCF** | **Global Warming Potential = 21** |
| **$N_2O$** | **2.2** | **Lbs/MMCF** | **Global Warming Potential =310** |
| **HCOH** | **0.075** | **Lbs/MMCF** | |

# Icon Midstream Pipeline, LLC

**North**
**Wetzel County, WV**

**Controlled Emission Rates**

**Source CE-1**

**Engine Data:**

| | | |
|---|---|---|
| Engine Manufacturer | Arrow | |
| Engine Model | VGR260 | |
| Type (Rich-burn or Low Emission) | Rich Burn | |
| Aspiration (Natural or Turbocharged) | Natural | |
| Manufacturer Rating | 47.0 | hp |
| Speed at Above Rating | 1,800 | rpm |
| Configeration ( In-line or Vee) | In Line | |
| Number of Cylinders | 4 | |
| Engine Bore | 4.134 | inches |
| Engine Stroke | 4.724 | inches |
| Engine Displacement | 254 | cu. in. |
| Fuel Consumption | 9,889 | Btu/bhp-hr |

| **Emission Rates:** | g/bhp-hr | lb/hr | tons/year | g/hr | lb/day | AP-42 4strokerich lb/mmbtu | |
|---|---|---|---|---|---|---|---|
| Oxides of Nitrogen, NOx | 2.0 | 0.21 | 0.91 | 94 | 4.97 | | Comment |
| Carbon Monoxide CO | 4.0 | 0.41 | 1.81 | 188 | 9.92 | | 453.59 grams = 1 pound |
| VOC (NMNEHC) | 0.1 | 0.01 | 0.06 | 6 | 0.32 | | 2,000 pounds = 1 ton |
| CO2e | | 54 | 238 | 0 | 1,304 | | |
| **Total Annual Hours of Operation** | **8,760** | | | | | | |
| SO2 | | 0.0003 | 0.0012 | | | 0.0006 | |
| PM (Condensable + Filterable) | | 0.009 | 0.0395 | | | 0.0194 | MFG. Spec |
| CO2 | | 51.126 | 223.9324 | | | 110 | |
| $CH_{4\ CO2e}$ | | 2.6725 | 11.7056 | | | 0.23 | **MFG. Spec** |
| $N_2O\ CO_{2e}$ | | 0.5518 | 2.4169 | | | 0.0001 | Factor From 40 CFR 98, Table C-2 |
| acrolein | | 0.0012 | 0.0054 | | | 0.00263 | |
| acetaldehyde | | 0.0013 | 0.0057 | | | 0.00279 | |
| formaldehyde | 0.095 | 0.01 | 0.0431 | | | | **MFG. Spec** |
| benzene | | 0.0007 | 0.0032 | | | 0.00158 | |
| toluene | | 0.0002 | 0.0010 | | | 0.000508 | |
| ethylbenzene | | 1E-05 | 0.0001 | | | 2.48E-05 | |
| xylene s | | 9E-05 | 0.0004 | | | 0.000195 | |
| methanol | | 0.0014 | 0.0062 | | | 0.00306 | |
| total HAPs | | 0.0149 | 0.0651 | | | | |

# Icon Midstream Pipeline, LLC

## North
## Wetzel County, WV

**Controlled Emission Rates**

**Source CE-1**
**Un-Controlled**

**Engine Data:**

| | | |
|---|---|---|
| Engine Manufacturer | FORD | |
| Engine Model | VR260 | |
| Type (Rich-burn or Low Emission) | Rich Burn | |
| Aspiration (Natural or Turbocharged) | Natural | |
| Manufacturer Rating | 47.0 | hp |
| Speed at Above Rating | 1,800 | rpm |
| Configeration ( In-line or Vee) | In Line | |
| Number of Cylinders | 4 | |
| Engine Bore | 4.134 | inches |
| Engine Stroke | 4.724 | inches |
| Engine Displacement | 254 | cu. in. |
| Fuel Consumption | 9,889 | Btu/bhp-hr |

| **Emission Rates:** | g/bhp-hr | lb/hr | tons/year | g/hr | lb/day | AP-42 4strokerich lb/mmbtu | |
|---|---|---|---|---|---|---|---|
| Oxides of Nitrogen, NOx | 12.8 | 1.33 | 5.81 | 602 | 31.83 | | Comment |
| Carbon Monoxide CO | 5.1 | 0.53 | 2.31 | 240 | 12.68 | | 453.59 grams = 1 pound |
| VOC (NMNEHC) | 0.0 | 0.00 | 0.01 | 1 | 0.07 | | 2,000 pounds = 1 ton |
| CO2e | | 54 | 238 | 0 | 1,304 | | |
| **Total Annual Hours of Operation** | **8,760** | | | | | | |
| SO2 | | 0.0003 | 0.0012 | | | 0.0006 | |
| PM2.5 | | 0.0044 | 0.0193 | | | 0.0095 | |
| PM (Condensable) | | 0.0046 | 0.0202 | | | 0.00991 | |
| CO2 | | 51.126 | 223.9324 | | | 110 | |
| $CH_{4\ CO2e}$ | | 2.6725 | 11.7056 | | | 0.23 | **MFG. Spec** |
| $N_2O\ CO_{2e}$ | | 0.5518 | 2.4169 | | | 0.0001 | Factor From 40 CFR 98, Table C-2 |
| acrolein | | 0.0012 | 0.0054 | | | 0.00263 | |
| acetaldehyde | | 0.0013 | 0.0057 | | | 0.00279 | |
| formaldehyde | 0.095 | 0.01 | 0.0431 | | | | **MFG. Spec** |
| benzene | | 0.0007 | 0.0032 | | | 0.00158 | |
| toluene | | 0.0002 | 0.0010 | | | 0.000508 | |
| ethylbenzene | | 1E-05 | 0.0001 | | | 2.48E-05 | |
| xylene s | | 9E-05 | 0.0004 | | | 0.000195 | |
| methanol | | 0.0014 | 0.0062 | | | 0.00306 | |
| total HAPs | | 0.0149 | 0.0651 | | | | |

# Icon Midstream Pipeline,LLC

North
Wetzel County, WV

**tential Emission Ra**

## Source RBV-1

| | | |
|---|---|---|
| Burner Duty Rating | 2000.0 | Mbtu/hr |
| Burner Efficiency | 98.0 | % |
| Gas Heat Content (HHV) | 808.5 | Btu/scf |
| Total Gas Consumption | 60,584 | scfd |
| H2S Concentration | 0.000 | Mole % |
| Hours of Operation | 8760 | |

| | | | | |
|---|---|---|---|---|
| NOx | 0.2001 | lbs/hr | 0.876 | TPY |
| CO | 0.1681 | lbs/hr | 0.736 | TPY |
| CO2 | 240.1 | lbs/hr | 1051.6 | TPY |
| CO2e | 242 | lbs/hr | 1,058 | tpy |
| VOC | 0.0110 | lbs/hr | 0.048 | TPY |
| SO2 | 0.0012 | lbs/hr | 0.005 | TPY |
| H2S | 0.0000 | lbs/hr | 0.000 | TPY |
| PM10 | 0.0152 | lbs/hr | 0.067 | TPY |
| CHOH | 0.0002 | lbs/hr | 0.001 | TPY |
| Benzene | 0.0000 | lbs/hr | 0.000 | TPY |
| N-Hexane | 0.0036 | lbs/hr | 0.016 | TPY |
| Toluene | 0.0000 | lbs/hr | 0.000 | TPY |
| Total HAPs | 0.0038 | lbs/hr | 0.016 | TPY |

**AP-42 Factors Used**

| | | | |
|---|---|---|---|
| **NOx** | **100** | **Lbs/MMCF** | |
| **CO** | **84** | **Lbs/MMCF** | |
| **$CO_2$** | **120,000** | **Lbs/MMCF** | **Global Warming Potential = 1** |
| **VOC** | **5.5** | **Lbs/MMCF** | |
| **PM** | **7.6** | **Lbs/MMCF** | |
| **$SO_2$** | **0.6** | **Lbs/MMCF** | |
| **$CH_4$** | **2.3** | **Lbs/MMCF** | **Global Warming Potential = 25** |
| **$N_2O$** | **2.2** | **Lbs/MMCF** | **Global Warming Potential =310** |
| **HCOH** | **0.075** | **Lbs/MMCF** | |
| **Benzene** | **0.0021** | **Lbs/MMCF** | |
| **n-Hexane** | **1.8** | **Lbs/MMCF** | |
| **Toluene** | **0.0034** | **Lbs/MMCF** | |

# Icon Midstream Pipeline, LLC

**North**
**Wetzel County, WV**

**tential Emission Ra**

## Source EC-1

## Enclosed Combustor Pilot

| | | |
|---|---|---|
| Burner Duty Rating | 58.5 | Mbtu/hr |
| Burner Efficiency | 98.0 | % |
| Gas Heat Content (HHV) | 1291.5 | Btu/scf |
| Total Gas Consumption | 1109.3 | scfd |
| H2S Concentration | 0.000 | Mole % |
| Hours of Operation | 8760 | |

| | | | | |
|---|---|---|---|---|
| NOx | 0.0059 | lbs/hr | 0.026 | TPY |
| CO | 0.0049 | lbs/hr | 0.022 | TPY |
| CO2 | 7.0 | lbs/hr | 30.8 | TPY |
| CO2e | 7 | lbs/hr | 31 | TPY |
| VOC | 0.0003 | lbs/hr | 0.001 | TPY |
| SO2 | 0.0000 | lbs/hr | 0.000 | TPY |
| H2S | 0.0000 | lbs/hr | 0.000 | TPY |
| PM10 | 0.0004 | lbs/hr | 0.002 | TPY |
| CHOH | 0.0000 | lbs/hr | 0.000 | TPY |
| Benzene | 0.0000 | lbs/hr | 0.000 | TPY |
| N-Hezane | 0.0001 | lbs/hr | 0.000 | TPY |
| Toluene | 0.0000 | lbs/hr | 0.000 | TPY |
| Total HAPs | 0.0001 | lbs/hr | 0.000 | TPY |

**AP-42 Factors Used (Tables 1.4.1-1.4.3)**

| | | | |
|---|---|---|---|
| **NOx** | **100** | **Lbs/MMCF** | |
| **CO** | **84** | **Lbs/MMCF** | |
| **$CO_2$** | **120,000** | **Lbs/MMCF** | **Global Warming Potential = 1** |
| **VOC** | **5.5** | **Lbs/MMCF** | |
| **PM** | **7.6** | **Lbs/MMCF** | |
| **$SO_2$** | **0.6** | **Lbs/MMCF** | |
| **$CH_4$** | **2.3** | **Lbs/MMCF** | **Global Warming Potential = 25** |
| **$N_2O$** | **2.2** | **Lbs/MMCF** | **Global Warming Potential =298** |
| **HCOH** | **0.075** | **Lbs/MMCF** | |
| **Benzene** | **0.0021** | **Lbs/MMCF** | |
| **n-Hexane** | **1.8** | **Lbs/MMCF** | |
| **Toluene** | **0.0034** | **Lbs/MMCF** | |

# Icon Midstream Pipeline, LLC

**North**
**Wetzel County, WV**

**Potential Emission Rates**

## Source EC-1

## Enclosed Vapor Combustor

| | | | | |
|---|---|---|---|---|
| Destruction Efficiency | 98.0 | % | | |
| Gas Heat Content (HHV) | 693.0 | Btu/scf | | |
| Max Flow to T-E | 0.01343 | MMSCFH | 103.238 | MMCF/Yr |
| Max BTUs to Flare | 9.31 | MMBTU/Hr | 44,166 | MMBTU/Yr |

| | | | | |
|---|---|---|---|---|
| NOx | 0.63 | lbs/hr | 1.50 | tpy |
| CO | 3.44 | lbs/hr | 8.17 | tpy |
| CO2 | 1,087.89 | lbs/hr | 2,581.28 | tpy |
| CO2e | 1,158.87 | lb/hr | 2,599.27 | tpy |
| VOC | 5.85 | lb/hr | 11.39 | tpy |
| CH4 | 0.02 | lbs/hr | 0.0486 | tpy |
| N2O | 0.002 | lbs/hr | 0.0049 | tpy |
| PM | 0.004 | lb/hr | 0.39 | tpy |
| Benzene | 0.120 | lb/hr | 0.54 | tpy |
| CHOH | 0.000 | lb/hr | 0.0039 | tpy |
| n-Hexane | 0.250 | lb/hr | 0.62 | tpy |
| Ethylbenzene | 0.350 | lb/hr | 1.52 | tpy |
| Toluene | 0.210 | lb/hr | 0.92 | tpy |
| Xylenes | 0.470 | lb/hr | 2.05 | tpy |
| Total HAPs | 1.400 | lb/hr | 5.65 | tpy |

Notes: Condensate Tank and Water Tank vapors to combustor as backup for VRU Only.
From Attached Work Sheet, max loading to the combustors is 332,334 scfd and 9.31 MMBTU/Hr

VOC and HAP emissions represent 2% of the captured emissions

**Factors Used**

| | | | |
|---|---|---|---|
| **AP-42 Table 13.5-1** | **NOx** | **0.068** | **Lbs/MMBTU** |
| **AP-42 Table 13.5-1** | **CO** | **0.37** | **Lbs/MMBTU** |
| **40 CFR 98 Table C-1** | **CO2** | **116.89** | **Lbs/MMBTU** |
| **40 CFR 98 Table C-2** | **CH4** | **0.0022** | **Lbs/MMBTU** |
| **40 CFR 98 Table C-2** | **N2O** | **0.00022** | **Lbs/MMBTU** |
| **AP-42 Table 1.4-2** | **PM** | **7.6** | **lb/MMSCF** |
| **AP-42 Table 1.4-3** | **CHOH** | **0.075** | **lb/MMSCF** |

# Icon Midstream Pipeline, LLC

**North**
**Wetzel County, WV**

### Potential Emission Rates

## Separator Heater
## Source HTR-2

| | | |
|---|---|---|
| Burner Duty Rating | 1000.0 | Mbtu/hr |
| Burner Efficiency | 98.0 | % |
| Gas Heat Content (HHV) | 1291.5 | Btu/scf |
| Total Gas Consumption | 18961.9 | scfd |
| H2S Concentration | 0.000 | Mole % |
| Hours of Operation | 8760 | |

| | | | | |
|---|---|---|---|---|
| NOx | 0.0790 | lbs/hr | 0.346 | TPY |
| CO | 0.0664 | lbs/hr | 0.291 | TPY |
| CO2e | 95 | lbs/hr | 418 | tpy |
| VOC | 0.0043 | lbs/hr | 0.019 | TPY |
| SO2 | 0.0005 | lbs/hr | 0.002 | TPY |
| H2S | 0.0000 | lbs/hr | 0.000 | TPY |
| PM10 | 0.0060 | lbs/hr | 0.026 | TPY |
| CHOH | 0.0001 | lbs/hr | 0.000 | TPY |

**AP-42 Factors Used**

| | | | |
|---|---|---|---|
| **NOx** | **100** | **Lbs/MMCF** | |
| **CO** | **84** | **Lbs/MMCF** | |
| **$CO_2$** | **120,000** | **Lbs/MMCF** | **Global Warming Potential = 1** |
| **VOC** | **5.5** | **Lbs/MMCF** | |
| **PM** | **7.6** | **Lbs/MMCF** | |
| **$SO_2$** | **0.6** | **Lbs/MMCF** | |
| **$CH_4$** | **2.3** | **Lbs/MMCF** | **Global Warming Potential = 21** |
| **$N_2O$** | **2.2** | **Lbs/MMCF** | **Global Warming Potential =310** |
| **HCOH** | **0.075** | **Lbs/MMCF** | |

## Icon Midstream Pipeline, LLC

**North**
**Wetzel County, WV**

### Fugitive VOC Emissions

| | | |
|---|---|---|
| Volatile Organic Compounds, non-methane and non-ethane from gas analysis: | 20.63 | weight percent |
| Methane from gas analysis: | 58.26 | weight percent |
| Carbon Dioxide from gas analysis: | 0.33 | weight percent |
| Gas Density | 0.0595 | lb/scf |

| Emission Source: | Number | Oil & Gas Production* | VOC % | VOC, lb/hr | VOC TPY | CO2 lb/Hr | CO2 TPY | CH4 lb/hr | CH4 TPY | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|
| **Valves:** | | | | | | | | | | |
| Gas/Vapor: | 55 | 0.02700 scf/hr | 20.6 | 0.018 | 0.080 | 0.000 | 0.001 | 0.051 | 0.2254 | 5.637 |
| Light Liquid: | 64 | 0.05000 scf/hr | 100.0 | 0.190 | 0.834 | | | | | 0.000 |
| Heavy Liquid (Oil): | - | 0.00050 scf/hr | 100.0 | 0.000 | 0.000 | | | | | 0.000 |
| Low Bleed Pneumatic | 4 | 1.39000 scf/hr | 20.6 | 0.068 | 0.299 | 0.193 | 0.844 | 0.193 | 0.8440 | 21.944 |
| **Relief Valves:** | 22 | 0.04000 scf/hr | 20.6 | 0.011 | 0.047 | 0.000 | 0.001 | 0.030 | 0.1336 | 3.340 |
| **Open-ended Lines, gas:** | - | 0.06100 sfc/hr | 20.6 | 0.000 | 0.000 | | | | | 0.000 |
| **Open-ended Lines, liquid:** | - | 0.05000 lb/hr | 100.0 | 0.000 | 0.000 | | | | | 0.000 |
| **Pump Seals:** | | | | | | | | | | 0.000 |
| Gas: | - | 0.00529 lb/hr | 20.6 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.0000 | 0.000 |
| Light Liquid: | - | 0.02866 lb/hr | 100.0 | 0.000 | 0.000 | | | | | 0.000 |
| Heavy Liquid (Oil): | - | 0.00133 lb/hr | 100.0 | 0.000 | 0.000 | | | | | 0.000 |
| **Compressor Seals, Gas:** | 2 | 0.01940 lb/hr | 20.6 | 0.008 | 0.035 | 0.000 | 0.001 | 0.001 | 0.0059 | 0.148 |
| **Connectors:** | | | | | | | | | | 0.000 |
| Gas: | 104 | 0.00300 scf/hr | 20.6 | 0.004 | 0.017 | 0.000 | 0.000 | 0.011 | 0.0474 | 1.184 |
| Light Liquid: | 44 | 0.00700 scf/hr | 100.0 | 0.308 | 1.349 | | | | | 0.000 |
| Heavy Liquid (Oil): | - | 0.00030 scf/hr | 100.0 | 0.000 | 0.000 | | | | | 0.000 |
| **Flanges:** | | | | | | | | | | 0.000 |
| Gas: | 48 | 0.00086 lb/hr | 20.6 | 0.009 | 0.037 | 0.000 | 0.001 | 0.024 | 0.1053 | 2.634 |
| Light Liquid: | 88 | 0.00300 scf/hr | 100.0 | 0.016 | 0.069 | | | | | 0.000 |
| Heavy Liquid: | 0 | 0.0009 scf/hr | 100.0 | 0.000 | 0.000 | | | | | 0.000 |

***Fugitive Calculations:***

| | lb/hr | t/y |
|---|---|---|
| VOC | **0.563** | **2.468** |
| CH4 | **0.118** | **0.518** |
| CO2 | **0.001** | **0.004** |
| CO2e | **2.955** | **12.94** |

Notes: *Factors are from 40 CFR 98, Table W-1A (scf/hr), where available. Remaining are API (lb/hr)

**Icon Midstream Pipeline, CCL**
**GAS ANALYSIS INFORMATION**

**North**
**Wetzel County, WV**

## Inlet Gas Composition Information

| | Fuel Gas mole % | Fuel M.W. lb/lb-mole | Fuel S.G. | Fuel Wt. % | LHV, dry Btu/scf | HHV, dry Btu/scf | AFR vol/vol | VOC NM / NE | Z Factor | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, N2 | 0.3808 | 0.107 | 0.004 | 0.499 | | | - | | 0.0038 | |
| Carbon Dioxide, CO2 | 0.1622 | 0.071 | 0.002 | 0.334 | | | - | | 0.0016 | |
| Hydrogen Sulfide, H2S | | - | - | - | | | - | | - | |
| Helium, He | | - | - | - | | | - | | - | |
| Oxygen, O2 | | - | - | - | | | - | | - | |
| Methane, CH4 | 77.6248 | 12.453 | 0.430 | 58.257 | 705.9 | 784.0 | 7.398 | | 0.7747 | |
| Ethane, C2H6 | 14.4188 | 4.336 | 0.150 | 20.283 | 233.4 | 255.2 | 2.405 | | 0.1430 | |
| Propane | 3.3306 | 1.469 | 0.051 | 6.871 | 77.1 | 83.8 | 0.793 | 6.871 | 0.0327 | |
| Iso-Butane | 0.6710 | 0.390 | 0.013 | 1.824 | 20.1 | 21.8 | 0.208 | 1.824 | 0.0065 | |
| Normal Butane | 1.2759 | 0.742 | 0.026 | 3.469 | 38.4 | 41.6 | 0.395 | 3.469 | 0.0123 | |
| Iso Pentane | 0.3729 | 0.269 | 0.009 | 1.259 | 13.8 | 14.9 | 0.142 | 1.259 | 0.0037 | |
| Normal Pentane | 0.3483 | 0.251 | 0.009 | 1.176 | 12.9 | 14.0 | 0.133 | 1.176 | 0.0035 | |
| Hexanes | 0.9196 | 0.792 | 0.027 | 3.707 | 40.5 | 43.7 | 0.416 | 3.707 | 0.0091 | |
| Heptane + | 0.4951 | 0.496 | 0.017 | 2.321 | 25.3 | 27.2 | 0.259 | 2.321 | 0.0049 | |
| | 100.000 | 21.376 | 0.738 | | 1,167.4 | 1,286.3 | 12.150 | 20.627 | 0.9959 | - |

**Gas Density (STP) = 0.059**

| | |
|---|---|
| Ideal Gross (HHV) | 1,286.3 |
| Ideal Gross (sat'd) | 1,264.6 |
| | - |
| Real Gross (HHV) | 1,291.5 |
| Real Net (LHV) | 1,172.2 |

**Icon Midstream, LLC**
**GAS ANALYSIS INFORMATION**

**North**
**Wetzel County, WV**

## Condenstate Tank Breathing Vapor

| | Fuel Gas mole % | Fuel M.W. lb/lb-mole | Fuel S.G. | Fuel Wt. % | LHV, dry Btu/scf | HHV, dry Btu/scf | AFR vol/vol | VOC NM / NE | Z Factor | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, N2 | 0.185 | 0.052 | 0.002 | 0.078 | | | - | | 0.0018 | |
| Carbon Dioxide, CO2 | 0.018 | 0.008 | 0.000 | 0.012 | | | - | | 0.0002 | |
| Hydrogen Sulfide, H2S | - | - | - | - | | | - | | - | |
| Water | - | - | - | - | | | - | | - | |
| Oxygen, O2 | - | - | - | - | | | - | | - | |
| Methane, CH4 | - | - | - | - | | | - | | - | |
| Ethane, C2H6 | 0.202 | 0.061 | 0.002 | 0.091 | 3.3 | 3.6 | 0.034 | | 0.0020 | |
| Propane | 10.137 | 4.470 | 0.154 | 6.703 | 234.7 | 255.1 | 2.415 | 6.703 | 0.0996 | |
| Iso-Butane | 8.852 | 5.145 | 0.178 | 7.716 | 265.6 | 287.9 | 2.741 | 7.716 | 0.0860 | |
| Normal Butane | 30.537 | 17.749 | 0.613 | 26.617 | 919.4 | 996.2 | 9.457 | 26.617 | 0.2952 | |
| Iso Pentane | 15.123 | 10.911 | 0.377 | 16.363 | 559.4 | 605.1 | 5.763 | 16.363 | 0.1512 | |
| Normal Pentane | 17.412 | 12.563 | 0.434 | 18.840 | 645.4 | 698.0 | 6.636 | 18.840 | 0.1741 | |
| Hexanes | 13.160 | 11.341 | 0.392 | 17.007 | 579.5 | 625.9 | 5.956 | 17.007 | 0.1300 | |
| Heptane + | 4.374 | 4.383 | 0.151 | 6.573 | 223.1 | 240.7 | 2.292 | 6.573 | 0.0435 | |
| | 100.000 | 66.683 | 2.302 | | 3,430.4 | 3,712.3 | 35.295 | 99.819 | 0.9837 | - |

**Gas Density (STP) = 0.186**

| | |
|---|---|
| Ideal Gross (HHV) | 3,712.3 |
| Ideal Gross (sat'd) | 3,648.3 |
| | - |
| Real Gross (HHV) | 3,774.0 |
| Real Net (LHV) | 3,487.4 |

**Icon Midstream, LLC**
**GAS ANALYSIS INFORMATION**

**North**
**Wetzel County, WV**

## Dehydration Still Vent Gas

| | Fuel Gas mole % | Fuel M.W. lb/lb-mole | Fuel S.G. | Fuel Wt. % | LHV, dry Btu/scf | HHV, dry Btu/scf | AFR vol/vol | VOC NM / NE | Z Factor | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen, N2 | 0.002 | 0.000 | 0.000 | 0.004 | | | - | | 0.0000 | |
| Carbon Dioxide, CO2 | 0.065 | 0.028 | 0.001 | 0.255 | | | - | | 0.0006 | |
| Hydrogen Sulfide, H2S | - | - | - | - | | | - | | - | |
| Water | 90.900 | 3.638 | 0.126 | 32.622 | | | - | | 0.9095 | |
| Oxygen, O2 | - | - | - | - | | | - | | - | |
| Methane, CH4 | 0.315 | 0.051 | 0.002 | 0.453 | 2.9 | 3.2 | 0.030 | | 0.0031 | |
| Ethane, C2H6 | 0.613 | 0.184 | 0.006 | 1.653 | 9.9 | 10.8 | 0.102 | | 0.0061 | |
| Propane | 0.479 | 0.211 | 0.007 | 1.894 | 11.1 | 12.1 | 0.114 | 1.894 | 0.0047 | |
| Iso-Butane | 0.178 | 0.103 | 0.004 | 0.928 | 5.3 | 5.8 | 0.055 | 0.928 | 0.0017 | |
| Normal Butane | 0.508 | 0.295 | 0.010 | 2.647 | 15.3 | 16.6 | 0.157 | 2.647 | 0.0049 | |
| Iso Pentane | 0.170 | 0.123 | 0.004 | 1.100 | 6.3 | 6.8 | 0.065 | 1.100 | 0.0017 | |
| Normal Pentane | 0.219 | 0.158 | 0.005 | 1.417 | 8.1 | 8.8 | 0.083 | 1.417 | 0.0022 | |
| Hexanes | 1.462 | 1.260 | 0.044 | 11.297 | 64.4 | 69.5 | 0.662 | 11.297 | 0.0144 | |
| Heptane + | 5.090 | 5.100 | 0.176 | 45.731 | 259.6 | 280.1 | 2.668 | 45.731 | 0.0506 | |
| | 100.000 | 11.153 | 0.385 | | 382.9 | 413.6 | 3.936 | 65.014 | 0.9997 | - |

**Gas Density (STP) = 0.031**

| | |
|---|---|
| Ideal Gross (HHV) | 413.6 |
| Ideal Gross (sat'd) | 407.3 |
| | - |
| Real Gross (HHV) | 413.7 |
| Real Net (LHV) | 383.0 |

## Stone Energy Corporation

**GAS INFORMATION**

Specific Graivity of Air, @ 29.92 in. Hg and 60 -F, 28.9625
One mole of gas occupies, @ 14.696 psia & 32 -F 359.2 cu ft. per lb-mole
One mole of gas occupies, @ 14.696 psia & 60 -F 379.64 cu ft. per lb-mole

Hydrogen Sulfide (H2S) conversion chart:

| | | | |
|---|---|---|---|
| 0 | grains H2S/100 scf | = | 0.00000 mole % H2S |
| | | | 0.0 ppmv H2S |
| 0 | mole % H2S | = | 0 grains H2S/100 scf |
| | | | 0.0 ppmv H2S |
| 0 | ppmv H2S | = | 0.000 grains H2S/100 scf |
| | | | 0.00000 mole % H2S |

**Ideal Gas at 14.696 psia and 60°F**

| | | MW lb/mol | Specific Gravity | Lb per Cu Ft | Cu Ft per Lb | LHV, dry Btu/scf | HHV, dry Btu/scf | LHV Btu/lb | HHV Btu/lb | cu ft of air / 1 cu ft of gas | Z factor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen | N2 | 28.013 | 0.9672 | 0.0738 | 13.552 | 0 | 0 | 0 | 0 | 0 | 0.9997 |
| Carbon Dioxide | CO2 | 44.010 | 1.5196 | 0.1159 | 8.626 | 0 | 0 | 0 | 0 | 0 | 0.9964 |
| Hydrogen Sulfide | H2S | 34.076 | 1.1766 | 0.0898 | 11.141 | 587 | 637 | 6,545 | 7,100 | 7.15 | 0.9846 |
| Helium | He | 4.003 | 0.1382 | 0.0105 | 94.848 | | | | | | 1.0006 |
| Oxygen | O2 | 31.999 | 1.1048 | 0.0843 | 11.864 | 0 | 0 | 0 | 0 | 0 | 0.9992 |
| Methane | CH4 | 16.043 | 0.5539 | 0.0423 | 23.664 | 909.4 | 1,010.0 | 21,520 | 23,879 | 9.53 | 0.9980 |
| Ethane | C2H6 | 30.070 | 1.0382 | 0.0792 | 12.625 | 1,618.7 | 1,769.6 | 20,432 | 22,320 | 16.68 | 0.9919 |
| Propane | C3H8 | 44.097 | 1.5226 | 0.1162 | 8.609 | 2,314.9 | 2,516.1 | 19,944 | 21,661 | 23.82 | 0.9825 |
| Iso-Butane | C4H10 | 58.124 | 2.0069 | 0.1531 | 6.532 | 3,000.4 | 3,251.9 | 19,629 | 21,257 | 30.97 | 0.9711 |
| Normal Butane | C4H10 | 58.124 | 2.0069 | 0.1531 | 6.532 | 3,010.8 | 3,262.3 | 19,680 | 21,308 | 30.97 | 0.9667 |
| Iso Pentane | C5H12 | 72.151 | 2.4912 | 0.1901 | 5.262 | 3,699.0 | 4,000.9 | 19,478 | 21,052 | 38.11 | 1.0000 |
| Normal Pentane | C5H12 | 72.151 | 2.4912 | 0.1901 | 5.262 | 3,706.9 | 4,008.9 | 19,517 | 21,091 | 38.11 | 1.0000 |
| Hexane | C6H14 | 86.178 | 2.9755 | 0.2270 | 4.405 | 4,403.8 | 4,755.9 | 19,403 | 20,940 | 45.26 | 0.9879 |
| Heptane | C7H16 | 100.205 | 3.4598 | 0.2639 | 3.789 | 5,100.0 | 5,502.5 | 22,000 | 23,000 | 52.41 | 0.9947 |

**Real Gas at 14.696 psia and 60°F**

| | | MW lb/mol | Specific Gravity | Lb per Cu Ft | Cu Ft per Lb | LHV, dry Btu/scf | HHV, dry Btu/scf | LHV Btu/lb | HHV Btu/lb | cu ft of air / 1 cu ft of gas | Gal/Mole | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nitrogen | N2 | 28.013 | 0.9672 | 0.0738 | 13.552 | 0 | 0 | 0 | 0 | 0 | 4.1513 | |
| Carbon Dioxide | CO2 | 44.010 | 1.5196 | 0.1159 | 8.626 | 0 | 0 | 0 | 0 | 0 | 6.4532 | |
| Hydrogen Sulfide | H2S | 34.076 | 1.1766 | 0.0898 | 11.141 | 621 | 672 | 6,545 | 7,100 | 7.15 | 5.1005 | |
| Helium | He | 4.003 | 0.1382 | 0.0105 | 94.848 | | | | | | 3.8376 | |
| Oxygen | O2 | 31.999 | 1.1048 | 0.0843 | 11.864 | 0 | 0 | 0 | 0 | 0 | 3.3605 | |
| Methane | CH4 | 16.043 | 0.5539 | 0.0423 | 23.664 | 911 | 1,012 | 21,520 | 23,879 | 9.53 | 6.4172 | |
| Ethane | C2H6 | 30.070 | 1.0382 | 0.0792 | 12.625 | 1,631 | 1,783 | 20,432 | 22,320 | 16.68 | 10.126 | |
| Propane | C3H8 | 44.097 | 1.5226 | 0.1162 | 8.609 | 2,353 | 3,354 | 19,944 | 21,661 | 23.82 | 10.433 | |
| Iso-Butane | C4H10 | 58.124 | 2.0069 | 0.1531 | 6.532 | 3,101 | 3,369 | 19,629 | 21,257 | 30.97 | 12.386 | |
| Normal Butane | C4H10 | 58.124 | 2.0069 | 0.1531 | 6.532 | 3,094 | 3,370 | 19,680 | 21,308 | 30.97 | 11.937 | |
| Iso Pentane | C5H12 | 72.151 | 2.4912 | 0.1901 | 5.262 | 3,709 | 4,001 | 19,478 | 21,052 | 38.11 | 13.86 | |
| Normal Pentane | C5H12 | 72.151 | 2.4912 | 0.1901 | 5.262 | 3,698 | 4,009 | 19,517 | 21,091 | 38.11 | 13.713 | |
| Hexane | C6H14 | 86.178 | 2.9755 | 0.2270 | 4.405 | 4,404 | 4,756 | 19,403 | 20,940 | 45.26 | 15.566 | 16.3227 |
| Heptane | C7H16 | 100.205 | 3.4598 | 0.2639 | 3.789 | 5,101 | 5,503 | 22,000 | 23,000 | 52.41 | 17.468 | 17.468 |

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: North Station
File Name: C:\Rogers_Files\Misc\Jay-Bee Oil & Gas\Icon Midstream\North\Icon North.ddf
Date: March 14, 2016

DESCRIPTION:

Description: Icon Midstream Pipeline, LLC
North Station 130 MMSCFD Dehy
100 Deg F and 500 PSI Inlet
Flash Tank to Station Fuel
Still Vent to Combustor

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

| Component | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| Methane | 0.0156 | 0.375 | 0.0685 |
| Ethane | 0.0570 | 1.369 | 0.2498 |
| Propane | 0.0653 | 1.568 | 0.2862 |
| Isobutane | 0.0319 | 0.766 | 0.1399 |
| n-Butane | 0.0914 | 2.193 | 0.4003 |
| Isopentane | 0.0380 | 0.912 | 0.1665 |
| n-Pentane | 0.0490 | 1.175 | 0.2145 |
| n-Hexane | 0.1361 | 3.267 | 0.5962 |
| Other Hexanes | 0.1179 | 2.829 | 0.5163 |
| Heptanes | 0.3223 | 7.734 | 1.4115 |
| Benzene | 0.1230 | 2.952 | 0.5388 |
| Toluene | 0.2101 | 5.041 | 0.9200 |
| Ethylbenzene | 0.3474 | 8.337 | 1.5215 |
| Xylenes | 0.4676 | 11.224 | 2.0483 |
| C8+ Heavies | 0.4590 | 11.015 | 2.0103 |
| Total Emissions | 2.5316 | 60.759 | 11.0885 |
| Total Hydrocarbon Emissions | 2.5316 | 60.759 | 11.0885 |
| Total VOC Emissions | 2.4590 | 59.015 | 10.7703 |
| Total HAP Emissions | 1.2842 | 30.821 | 5.6248 |
| Total BTEX Emissions | 1.1481 | 27.554 | 5.0286 |

UNCONTROLLED REGENERATOR EMISSIONS

| Component | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| Methane | 1.5628 | 37.507 | 6.8451 |
| Ethane | 5.7027 | 136.864 | 24.9777 |
| Propane | 6.5345 | 156.828 | 28.6212 |
| Isobutane | 3.1930 | 76.633 | 13.9855 |
| n-Butane | 9.1392 | 219.340 | 40.0296 |

| | | | |
|---|---|---|---|
| Isopentane | 3.8020 | 91.247 | 16.6526 |
| n-Pentane | 4.8964 | 117.514 | 21.4463 |
| n-Hexane | 13.6121 | 326.690 | 59.6210 |
| Other Hexanes | 11.7881 | 282.914 | 51.6318 |
| Heptanes | 32.2254 | 773.411 | 141.1474 |
| Benzene | 12.3011 | 295.226 | 53.8788 |
| Toluene | 21.0054 | 504.128 | 92.0034 |
| Ethylbenzene | 34.7374 | 833.697 | 152.1497 |
| Xylenes | 46.7648 | 1122.356 | 204.8300 |
| C8+ Heavies | 45.8974 | 1101.537 | 201.0305 |
| Total Emissions | 253.1622 | 6075.893 | 1108.8505 |
| Total Hydrocarbon Emissions | 253.1622 | 6075.893 | 1108.8505 |
| Total VOC Emissions | 245.8967 | 5901.522 | 1077.0277 |
| Total HAP Emissions | 128.4208 | 3082.098 | 562.4829 |
| Total BTEX Emissions | 114.8087 | 2755.408 | 502.8619 |

FLASH GAS EMISSIONS

| Component | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| Methane | 0.3913 | 9.391 | 1.7139 |
| Ethane | 0.3710 | 8.904 | 1.6250 |
| Propane | 0.1721 | 4.131 | 0.7539 |
| Isobutane | 0.0518 | 1.242 | 0.2267 |
| n-Butane | 0.1086 | 2.606 | 0.4755 |
| Isopentane | 0.0368 | 0.884 | 0.1614 |
| n-Pentane | 0.0368 | 0.882 | 0.1610 |
| n-Hexane | 0.0524 | 1.257 | 0.2294 |
| Other Hexanes | 0.0617 | 1.480 | 0.2702 |
| Heptanes | 0.0560 | 1.345 | 0.2454 |
| Benzene | 0.0014 | 0.034 | 0.0062 |
| Toluene | 0.0014 | 0.034 | 0.0063 |
| Ethylbenzene | 0.0013 | 0.030 | 0.0055 |
| Xylenes | 0.0011 | 0.027 | 0.0049 |
| C8+ Heavies | 0.0078 | 0.187 | 0.0342 |
| Total Emissions | 1.3514 | 32.435 | 5.9193 |
| Total Hydrocarbon Emissions | 1.3514 | 32.435 | 5.9193 |
| Total VOC Emissions | 0.5891 | 14.140 | 2.5805 |
| Total HAP Emissions | 0.0576 | 1.382 | 0.2523 |
| Total BTEX Emissions | 0.0052 | 0.125 | 0.0229 |

FLASH TANK OFF GAS

| Component | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| Methane | 19.5649 | 469.557 | 85.6941 |
| Ethane | 18.5499 | 445.198 | 81.2486 |
| Propane | 8.6059 | 206.542 | 37.6940 |
| Isobutane | 2.5876 | 62.103 | 11.3339 |
| n-Butane | 5.4283 | 130.280 | 23.7760 |
| Isopentane | 1.8420 | 44.209 | 8.0681 |
| n-Pentane | 1.8378 | 44.106 | 8.0494 |

| | | | |
|---|---|---|---|
| n-Hexane | 2.6188 | 62.850 | 11.4702 |
| Other Hexanes | 3.0840 | 74.017 | 13.5080 |
| Heptanes | 2.8017 | 67.241 | 12.2714 |
| Benzene | 0.0709 | 1.702 | 0.3106 |
| Toluene | 0.0717 | 1.722 | 0.3142 |
| Ethylbenzene | 0.0629 | 1.510 | 0.2756 |
| Xylenes | 0.0556 | 1.335 | 0.2437 |
| C8+ Heavies | 0.3901 | 9.362 | 1.7085 |
| Total Emissions | 67.5722 | 1621.734 | 295.9664 |
| Total Hydrocarbon Emissions | 67.5722 | 1621.734 | 295.9664 |
| Total VOC Emissions | 29.4575 | 706.979 | 129.0236 |
| Total HAP Emissions | 2.8800 | 69.119 | 12.6143 |
| Total BTEX Emissions | 0.2612 | 6.269 | 1.1441 |

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

| Component | lbs/hr | lbs/day | tons/yr |
|---|---|---|---|
| Methane | 0.4069 | 9.766 | 1.7823 |
| Ethane | 0.4280 | 10.273 | 1.8747 |
| Propane | 0.2375 | 5.699 | 1.0401 |
| Isobutane | 0.0837 | 2.008 | 0.3665 |
| n-Butane | 0.2000 | 4.799 | 0.8758 |
| Isopentane | 0.0749 | 1.797 | 0.3279 |
| n-Pentane | 0.0857 | 2.057 | 0.3755 |
| n-Hexane | 0.1885 | 4.524 | 0.8256 |
| Other Hexanes | 0.1796 | 4.309 | 0.7865 |
| Heptanes | 0.3783 | 9.079 | 1.6569 |
| Benzene | 0.1244 | 2.986 | 0.5450 |
| Toluene | 0.2115 | 5.076 | 0.9263 |
| Ethylbenzene | 0.3486 | 8.367 | 1.5270 |
| Xylenes | 0.4688 | 11.250 | 2.0532 |
| C8+ Heavies | 0.4668 | 11.203 | 2.0445 |
| Total Emissions | 3.8831 | 93.194 | 17.0078 |
| Total Hydrocarbon Emissions | 3.8831 | 93.194 | 17.0078 |
| Total VOC Emissions | 3.0481 | 73.155 | 13.3508 |
| Total HAP Emissions | 1.3418 | 32.203 | 5.8771 |
| Total BTEX Emissions | 1.1533 | 27.679 | 5.0515 |

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

| Component | Uncontrolled tons/yr | Controlled tons/yr | % Reduction |
|---|---|---|---|
| Methane | 92.5392 | 1.7823 | 98.07 |
| Ethane | 106.2263 | 1.8747 | 98.24 |
| Propane | 66.3152 | 1.0401 | 98.43 |
| Isobutane | 25.3194 | 0.3665 | 98.55 |
| n-Butane | 63.8056 | 0.8758 | 98.63 |
| Isopentane | 24.7207 | 0.3279 | 98.67 |

| | | | |
|---|---|---|---|
| n-Pentane | 29.4957 | 0.3755 | 98.73 |
| n-Hexane | 71.0912 | 0.8256 | 98.84 |
| Other Hexanes | 65.1398 | 0.7865 | 98.79 |
| Heptanes | 153.4189 | 1.6569 | 98.92 |
| Benzene | 54.1894 | 0.5450 | 98.99 |
| Toluene | 92.3176 | 0.9263 | 99.00 |
| Ethylbenzene | 152.4253 | 1.5270 | 99.00 |
| Xylenes | 205.0737 | 2.0532 | 99.00 |
| C8+ Heavies | 202.7390 | 2.0445 | 98.99 |
| Total Emissions | 1404.8169 | 17.0078 | 98.79 |
| Total Hydrocarbon Emissions | 1404.8169 | 17.0078 | 98.79 |
| Total VOC Emissions | 1206.0514 | 13.3508 | 98.89 |
| Total HAP Emissions | 575.0972 | 5.8771 | 98.98 |
| Total BTEX Emissions | 504.0060 | 5.0515 | 99.00 |

EQUIPMENT REPORTS:

COMBUSTION DEVICE

| | |
|---|---|
| Ambient Temperature: | 55.00 deg. F |
| Excess Oxygen: | 5.00 % |
| Combustion Efficiency: | 99.00 % |
| Supplemental Fuel Requirement: | 1.21e+000 MM BTU/hr |

| Component | Emitted | Destroyed |
|---|---|---|
| Methane | 1.00% | 99.00% |
| Ethane | 1.00% | 99.00% |
| Propane | 1.00% | 99.00% |
| Isobutane | 1.00% | 99.00% |
| n-Butane | 1.00% | 99.00% |
| Isopentane | 1.00% | 99.00% |
| n-Pentane | 1.00% | 99.00% |
| n-Hexane | 1.00% | 99.00% |
| Other Hexanes | 1.00% | 99.00% |
| Heptanes | 1.00% | 99.00% |
| Benzene | 1.00% | 99.00% |
| Toluene | 1.00% | 99.00% |
| Ethylbenzene | 1.00% | 99.00% |
| Xylenes | 1.00% | 99.00% |
| C8+ Heavies | 1.00% | 99.00% |

ABSORBER

| | |
|---|---|
| Calculated Absorber Stages: | 1.29 |
| Specified Dry Gas Dew Point: | 7.00 lbs. H2O/MMSCF |
| Temperature: | 100.0 deg. F |
| Pressure: | 500.0 psig |
| Dry Gas Flow Rate: | 130.0000 MMSCF/day |

Glycol Losses with Dry Gas: 1.0478 lb/hr
Wet Gas Water Content: Saturated
Calculated Wet Gas Water Content: 100.22 lbs. H2O/MMSCF
Specified Lean Glycol Recirc. Ratio: 3.00 gal/lb H2O

| Component | Remaining in Dry Gas | Absorbed in Glycol |
|---|---|---|
| Water | 6.97% | 93.03% |
| Carbon Dioxide | 99.84% | 0.16% |
| Nitrogen | 99.99% | 0.01% |
| Methane | 99.99% | 0.01% |
| Ethane | 99.96% | 0.04% |
| Propane | 99.93% | 0.07% |
| Isobutane | 99.90% | 0.10% |
| n-Butane | 99.86% | 0.14% |
| Isopentane | 99.85% | 0.15% |
| n-Pentane | 99.81% | 0.19% |
| n-Hexane | 99.68% | 0.32% |
| Other Hexanes | 99.76% | 0.24% |
| Heptanes | 99.39% | 0.61% |
| Benzene | 88.91% | 11.09% |
| Toluene | 83.98% | 16.02% |
| Ethylbenzene | 77.05% | 22.95% |
| Xylenes | 69.11% | 30.89% |
| C8+ Heavies | 96.83% | 3.17% |

FLASH TANK

Flash Control: Combustion device
Flash Control Efficiency: 98.00 %
Flash Temperature: 95.0 deg. F
Flash Pressure: 40.0 psig

| Component | Left in Glycol | Removed in Flash Gas |
|---|---|---|
| Water | 99.99% | 0.01% |
| Carbon Dioxide | 54.51% | 45.49% |
| Nitrogen | 6.96% | 93.04% |
| Methane | 7.40% | 92.60% |
| Ethane | 23.51% | 76.49% |
| Propane | 43.16% | 56.84% |
| Isobutane | 55.23% | 44.77% |
| n-Butane | 62.74% | 37.26% |
| Isopentane | 67.52% | 32.48% |
| n-Pentane | 72.85% | 27.15% |
| n-Hexane | 83.95% | 16.05% |
| Other Hexanes | 79.47% | 20.53% |
| Heptanes | 92.04% | 7.96% |
| Benzene | 99.46% | 0.54% |
| Toluene | 99.69% | 0.31% |
| Ethylbenzene | 99.84% | 0.16% |
| Xylenes | 99.90% | 0.10% |
| C8+ Heavies | 99.26% | 0.74% |

REGENERATOR

No Stripping Gas used in regenerator.

| Component | Remaining in Glycol | Distilled Overhead |
|---|---|---|
| Water | 29.60% | 70.40% |
| Carbon Dioxide | 0.00% | 100.00% |
| Nitrogen | 0.00% | 100.00% |
| Methane | 0.00% | 100.00% |
| Ethane | 0.00% | 100.00% |
| Propane | 0.00% | 100.00% |
| Isobutane | 0.00% | 100.00% |
| n-Butane | 0.00% | 100.00% |
| Isopentane | 0.74% | 99.26% |
| n-Pentane | 0.69% | 99.31% |
| n-Hexane | 0.60% | 99.40% |
| Other Hexanes | 1.26% | 98.74% |
| Heptanes | 0.54% | 99.46% |
| Benzene | 5.03% | 94.97% |
| Toluene | 7.93% | 92.07% |
| Ethylbenzene | 10.43% | 89.57% |
| Xylenes | 12.93% | 87.07% |
| C8+ Heavies | 12.12% | 87.88% |

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 514.70 psia
Flow Rate: 5.43e+006 scfh

| Component | Conc. (vol%) | Loading (lb/hr) |
|---|---|---|
| Water | 2.11e-001 | 5.44e+002 |
| Carbon Dioxide | 1.62e-001 | 1.02e+003 |
| Nitrogen | 3.80e-001 | 1.52e+003 |
| Methane | 7.75e+001 | 1.78e+005 |
| Ethane | 1.44e+001 | 6.19e+004 |
| Propane | 3.32e+000 | 2.10e+004 |
| Isobutane | 6.70e-001 | 5.57e+003 |
| n-Butane | 1.27e+000 | 1.06e+004 |
| Isopentane | 3.72e-001 | 3.84e+003 |
| n-Pentane | 3.48e-001 | 3.59e+003 |
| n-Hexane | 4.14e-001 | 5.10e+003 |
| Other Hexanes | 4.99e-001 | 6.15e+003 |

| | | |
|---|---|---|
| Heptanes | 3.99e-001 | 5.72e+003 |
| Benzene | 9.98e-003 | 1.12e+002 |
| Toluene | 9.98e-003 | 1.32e+002 |
| Ethylbenzene | 9.98e-003 | 1.52e+002 |
| Xylenes | 9.98e-003 | 1.52e+002 |
| C8+ Heavies | 5.99e-002 | 1.46e+003 |
| Total Components | 100.00 | 3.06e+005 |

DRY GAS STREAM

Temperature: 100.00 deg. F
Pressure: 514.70 psia
Flow Rate: 5.42e+006 scfh

| Component | Conc. (vol%) | Loading (lb/hr) |
|---|---|---|
| Water | 1.47e-002 | 3.79e+001 |
| Carbon Dioxide | 1.62e-001 | 1.02e+003 |
| Nitrogen | 3.81e-001 | 1.52e+003 |
| Methane | 7.76e+001 | 1.78e+005 |
| Ethane | 1.44e+001 | 6.19e+004 |
| Propane | 3.33e+000 | 2.10e+004 |
| Isobutane | 6.70e-001 | 5.56e+003 |
| n-Butane | 1.27e+000 | 1.06e+004 |
| Isopentane | 3.72e-001 | 3.84e+003 |
| n-Pentane | 3.48e-001 | 3.58e+003 |
| n-Hexane | 4.13e-001 | 5.09e+003 |
| Other Hexanes | 4.99e-001 | 6.14e+003 |
| Heptanes | 3.98e-001 | 5.69e+003 |
| Benzene | 8.89e-003 | 9.92e+001 |
| Toluene | 8.40e-003 | 1.11e+002 |
| Ethylbenzene | 7.71e-003 | 1.17e+002 |
| Xylenes | 6.91e-003 | 1.05e+002 |
| C8+ Heavies | 5.81e-002 | 1.41e+003 |
| Total Components | 100.00 | 3.06e+005 |

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 2.52e+001 gpm

| Component | Conc. (wt%) | Loading (lb/hr) |
|---|---|---|
| TEG | 9.84e+001 | 1.40e+004 |
| Water | 1.50e+000 | 2.13e+002 |
| Carbon Dioxide | 1.14e-012 | 1.61e-010 |
| Nitrogen | 1.34e-013 | 1.90e-011 |
| Methane | 5.00e-018 | 7.10e-016 |
| Ethane | 8.07e-008 | 1.14e-005 |
| Propane | 4.34e-009 | 6.16e-007 |
| Isobutane | 1.22e-009 | 1.73e-007 |

| | | |
|---|---|---|
| n-Butane | 2.55e-009 | 3.61e-007 |
| Isopentane | 2.00e-004 | 2.84e-002 |
| n-Pentane | 2.39e-004 | 3.38e-002 |
| n-Hexane | 5.75e-004 | 8.15e-002 |
| Other Hexanes | 1.06e-003 | 1.50e-001 |
| Heptanes | 1.24e-003 | 1.76e-001 |
| Benzene | 4.59e-003 | 6.51e-001 |
| Toluene | 1.27e-002 | 1.81e+000 |
| Ethylbenzene | 2.85e-002 | 4.04e+000 |
| Xylenes | 4.90e-002 | 6.95e+000 |
| C8+ Heavies | 4.46e-002 | 6.33e+000 |
| Total Components | 100.00 | 1.42e+004 |

RICH GLYCOL STREAM

Temperature: 100.00 deg. F
Pressure: 514.70 psia
Flow Rate: 2.69e+001 gpm
NOTE: Stream has more than one phase.

| Component | Conc. (wt%) | Loading (lb/hr) |
|---|---|---|
| TEG | 9.29e+001 | 1.39e+004 |
| Water | 4.79e+000 | 7.19e+002 |
| Carbon Dioxide | 1.07e-002 | 1.61e+000 |
| Nitrogen | 1.27e-003 | 1.90e-001 |
| Methane | 1.41e-001 | 2.11e+001 |
| Ethane | 1.62e-001 | 2.43e+001 |
| Propane | 1.01e-001 | 1.51e+001 |
| Isobutane | 3.85e-002 | 5.78e+000 |
| n-Butane | 9.71e-002 | 1.46e+001 |
| Isopentane | 3.78e-002 | 5.67e+000 |
| n-Pentane | 4.51e-002 | 6.77e+000 |
| n-Hexane | 1.09e-001 | 1.63e+001 |
| Other Hexanes | 1.00e-001 | 1.50e+001 |
| Heptanes | 2.35e-001 | 3.52e+001 |
| Benzene | 8.68e-002 | 1.30e+001 |
| Toluene | 1.53e-001 | 2.29e+001 |
| Ethylbenzene | 2.59e-001 | 3.88e+001 |
| Xylenes | 3.58e-001 | 5.38e+001 |
| C8+ Heavies | 3.51e-001 | 5.26e+001 |
| Total Components | 100.00 | 1.50e+004 |

FLASH TANK OFF GAS STREAM

Temperature: 95.00 deg. F
Pressure: 54.70 psia
Flow Rate: 8.91e+002 scfh

| Component | Conc. (vol%) | Loading (lb/hr) |
|---|---|---|

| | | |
|---|---|---|
| Water | 1.71e-001 | 7.22e-002 |
| Carbon Dioxide | 7.10e-001 | 7.33e-001 |
| Nitrogen | 2.69e-001 | 1.77e-001 |
| Methane | 5.20e+001 | 1.96e+001 |
| Ethane | 2.63e+001 | 1.85e+001 |
| Propane | 8.31e+000 | 8.61e+000 |
| Isobutane | 1.90e+000 | 2.59e+000 |
| n-Butane | 3.98e+000 | 5.43e+000 |
| Isopentane | 1.09e+000 | 1.84e+000 |
| n-Pentane | 1.09e+000 | 1.84e+000 |
| n-Hexane | 1.29e+000 | 2.62e+000 |
| Other Hexanes | 1.52e+000 | 3.08e+000 |
| Heptanes | 1.19e+000 | 2.80e+000 |
| Benzene | 3.87e-002 | 7.09e-002 |
| Toluene | 3.32e-002 | 7.17e-002 |
| Ethylbenzene | 2.52e-002 | 6.29e-002 |
| Xylenes | 2.23e-002 | 5.56e-002 |
| C8+ Heavies | 9.76e-002 | 3.90e-001 |
| Total Components | 100.00 | 6.86e+001 |

FLASH TANK GLYCOL STREAM

Temperature: 95.00 deg. F
Flow Rate: 2.68e+001 gpm

| Component | Conc. (wt%) | Loading (lb/hr) |
|---|---|---|
| TEG | 9.33e+001 | 1.39e+004 |
| Water | 4.81e+000 | 7.19e+002 |
| Carbon Dioxide | 5.88e-003 | 8.79e-001 |
| Nitrogen | 8.86e-005 | 1.32e-002 |
| Methane | 1.05e-002 | 1.56e+000 |
| Ethane | 3.82e-002 | 5.70e+000 |
| Propane | 4.37e-002 | 6.53e+000 |
| Isobutane | 2.14e-002 | 3.19e+000 |
| n-Butane | 6.12e-002 | 9.14e+000 |
| Isopentane | 2.56e-002 | 3.83e+000 |
| n-Pentane | 3.30e-002 | 4.93e+000 |
| n-Hexane | 9.17e-002 | 1.37e+001 |
| Other Hexanes | 7.99e-002 | 1.19e+001 |
| Heptanes | 2.17e-001 | 3.24e+001 |
| Benzene | 8.67e-002 | 1.30e+001 |
| Toluene | 1.53e-001 | 2.28e+001 |
| Ethylbenzene | 2.60e-001 | 3.88e+001 |
| Xylenes | 3.60e-001 | 5.37e+001 |
| C8+ Heavies | 3.50e-001 | 5.22e+001 |
| Total Components | 100.00 | 1.49e+004 |

FLASH GAS EMISSIONS

Flow Rate: 4.22e+003 scfh

Control Method: Combustion Device
Control Efficiency: 98.00

| Component | Conc. (vol%) | Loading (lb/hr) |
|---|---|---|
| Water | 5.99e+001 | 1.20e+002 |
| Carbon Dioxide | 3.97e+001 | 1.94e+002 |
| Nitrogen | 5.68e-002 | 1.77e-001 |
| Methane | 2.19e-001 | 3.91e-001 |
| Ethane | 1.11e-001 | 3.71e-001 |
| Propane | 3.51e-002 | 1.72e-001 |
| Isobutane | 8.00e-003 | 5.18e-002 |
| n-Butane | 1.68e-002 | 1.09e-001 |
| Isopentane | 4.59e-003 | 3.68e-002 |
| n-Pentane | 4.58e-003 | 3.68e-002 |
| n-Hexane | 5.46e-003 | 5.24e-002 |
| Other Hexanes | 6.43e-003 | 6.17e-002 |
| Heptanes | 5.02e-003 | 5.60e-002 |
| Benzene | 1.63e-004 | 1.42e-003 |
| Toluene | 1.40e-004 | 1.43e-003 |
| Ethylbenzene | 1.06e-004 | 1.26e-003 |
| Xylenes | 9.42e-005 | 1.11e-003 |
| C8+ Heavies | 4.12e-004 | 7.80e-003 |
| Total Components | 100.00 | 3.16e+002 |

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.17e+004 scfh

@ 98% control

| Component | Conc. (vol%) | Loading (lb/hr) | |
|---|---|---|---|
| Water | 9.09e+001 | 5.06e+002 | |
| Carbon Dioxide | 6.45e-002 | 8.79e-001 | |
| Nitrogen | 1.53e-003 | 1.32e-002 | |
| Methane | 3.15e-001 | 1.56e+000 | |
| Ethane | 6.13e-001 | 5.70e+000 | |
| Propane | 4.79e-001 | 6.53e+000 | |
| Isobutane | 1.78e-001 | 3.19e+000 | |
| n-Butane | 5.08e-001 | 9.14e+000 | |
| Isopentane | 1.70e-001 | 3.80e+000 | |
| n-Pentane | 2.19e-001 | 4.90e+000 | |
| n-Hexane | 5.11e-001 | 1.36e+001 | - 0.27 |
| Other Hexanes | 4.42e-001 | 1.18e+001 | |
| Heptanes | 1.04e+000 | 3.22e+001 | |
| Benzene | 5.09e-001 | 1.23e+001 | - 0.25 |
| Toluene | 7.37e-001 | 2.10e+001 | - 0.42 |
| Ethylbenzene | 1.06e+000 | 3.47e+001 | - 0.69 |
| Xylenes | 1.42e+000 | 4.68e+001 | - 0.94 |
| C8+ Heavies | 8.71e-001 | 4.59e+001 | |
| Total Components | 100.00 | 7.60e+002 | |
| VOC | | 245.8 | - 4.92 |

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.07e+001 scfh

| Component | Conc. (vol%) | Loading (lb/hr) |
|---|---|---|
| Methane | 3.47e+000 | 1.56e-002 |
| Ethane | 6.76e+000 | 5.70e-002 |
| Propane | 5.28e+000 | 6.53e-002 |
| Isobutane | 1.96e+000 | 3.19e-002 |
| n-Butane | 5.60e+000 | 9.14e-002 |
| Isopentane | 1.88e+000 | 3.80e-002 |
| n-Pentane | 2.42e+000 | 4.90e-002 |
| n-Hexane | 5.63e+000 | 1.36e-001 |
| Other Hexanes | 4.87e+000 | 1.18e-001 |
| Heptanes | 1.15e+001 | 3.22e-001 |
| Benzene | 5.61e+000 | 1.23e-001 |
| Toluene | 8.12e+000 | 2.10e-001 |
| Ethylbenzene | 1.17e+001 | 3.47e-001 |
| Xylenes | 1.57e+001 | 4.68e-001 |
| C8+ Heavies | 9.60e+000 | 4.59e-001 |
| Total Components | 100.00 | 2.53e+000 |

# Icon Midstream Pipeline, LLC
# North Liquids Management Facility
# Tank Emissions Calculations

Icon Midstream operates five 210 BBL atmospheric pressure tanks that receives condensate that has been received via pipeline and separated from entrained water and NGL. Condensate is accumulated in these tanks, pending truck transportation to a fractionation facility. A maximum of 25,000 BBL will pass through these tanks per year. In addition, Icon also operated a single 210 BBL tank where produced water is accumulated prior to truck transportation to a re-use center or a disposal facility. A maximum of 1400 BBL will pass through this tank per year. The following summarizes potential emissions from these tanks.

Emissions from the condensate tanks will be a combination of flash emissions (as the pressure is reduced on the liquid to atmospheric) plus working and breathing losses while the condensate is in the tanks. Using data from a well pad that will be routing condensate to this facility, flash and working/breathing losses were calculated (following this summary). In a similar manner, flash emissions from the water tank were determined using actual data from a produced water tank from a well pad similar to those routing produced water to the North facility. Working and breathing losses for the water tank is considered negligible.

Emissions from the condensate tanks and produced water tank are routed to a vapor recovery unit via a hard pipe system. A capture and control efficiency of 95% is claimed. It is important to note that when the VRU is down for maintenance or repair, the condensate tank vapors are routed to a combustor with a 98% capture and control efficiency.

| | Flash Emissions (tpy) | W&B Emissions (tpy) | Uncontrolled Total (tpy) | Un-captured Total (tpy) |
|---|---|---|---|---|
| Condensate | 483.56 VOCs | 3.74 VOCs | 487.30 VOCs | 24.37 VOCs |
| | 15.8 HAPs | 0.12 HAPs | 15.9 HAPs | 0.80 HAPs |
| | 14.5 n-Hexane | 0.11 n-Hexane | 14.6 n-hexane | 0.73 n-Hexane |
| Water | 0.16 VOC | <0.01 VOCs | 0.16 VOCs | 0.01 VOCs |
| | 0.01 HAPs | <0.01 HAPs | 0.01 HAPs | <0.01 HAPs |
| | <0.01 n-Hexane | <0.01 n-Hexane | <0.01 n-Hexane | <0.01 n-Hexane |
| Total | **483.72 VOCs** | **3.74 VOCs** | **488.76VOCs** | **24.38 VOCs** |
| | **5.00 HAPs** | **0.12 HAPs** | **15.9 HAPs** | **0.80 HAPs** |
| | **1.45 n-Hexane** | **0.11 n-Hexane** | **14.6 n-Hexane** | **0.73 n-Hexane** |

It is assumed that emissions will generally be continuous and consistent over the year. However, in order to account for day to day variances, the requested hourly maximum emissions are 25% higher than a straight extrapolation from the annual emission rates.

**Loading to Enclosed Combustor from Tank Emissions**

As noted above, Flash, working and Breathing losses from the condensate tanks are normally controlled by a VRU. When that unit is down for maintenance or repairs, the gas flow is routed to an enclosed combustor (EC-1). As noted in the following worksheets, there are 689.14 tpy of Flash Gas and 3.74 tpy of Working and Breathing potential emissions from the condensate tanks. This is equivalent to 158.2 lb/hr. As it is the largest component of this gas stream, the flash gas characteristics are assumed to be representative of the entire gas stream. Thus, this gas will have a density of 0.112 lb/scf and a heat content of 2282 BTU/scf. Potential loading to the combustor is then 1412.5 scf/hr (33,900 scfd) and 3.22 MMBTU/Hr.

For permitting purposes, it is assumed that the VRU will be unavailable for 500 hours per year. Thus annual loading to the combustor will be 706,250 scf [33,900 scf/day x 500/24] or 1,612 MMBTU/Yr.

The stream going to the combustor when the VRU is down has a composition that is 70.3% VOCs and 2.1% n-Hexane. Thus, with a 98% destruction efficiency and maximum loading of 158.2 lb/hr, potential VOC emissions would be 2.22 lb/hr [158.2 x 0.703 x 0.02]. Potential n-Hexane emissions would be 0.067 lb/hr [158.2 x 0.021 x 0.02].

**Icon Midstream Pipeline - North**

# Flash Emission Calculations

Using Gas-Oil Ratio Method

## Un-Controlled

| Site specific data | | | |
|---|---|---|---|
| Gas-Oil-ratio | = | 500 | scf/bbl Using Actual GOR from RPT-8 |
| Throughput | = | 25,000 | bbl/yr |
| Stock tank gas molecular weight | = | 39.56 | g/mole |

| Conversions | | | |
|---|---|---|---|
| 1 lb | = | 453.6 | g |
| 1 mole | = | 22.4 | L |
| 1 scf | = | 28.32 | L |
| 1 ton | = | 2000 | lb |

**Equations**

$$E_{TOT} = Q\frac{(bbl)}{(yr)} \times R\frac{(scf)}{(bbl)} \times \frac{28.32(L)}{1(scf)} \times \frac{1(mole)}{22.4(L)} \times MW\frac{(g)}{(mole)} \times \frac{1(lb)}{453.6(g)}) \times \frac{1(ton)}{2000(lb)}$$

$E_{TOT}$ = Total stock tank flash emissions (TPY)

R = Measured gas-oil ratio (scf/bbl)

Q = Throughput (bbl/yr)

MW = Stock tank gas molecular weight (g/mole)

$$E_{spec} = E_{TOT} \times X_{spec}$$

$E_{spec}$ = Flash emission from constituent

$X_{spec}$ = Weight fraction of constituent in stock tank gas

# Flash Emissions

| Constituent | TPY |
|---|---|
| Total | 689.1416 |
| **VOC** | **483.5638** |
| Nitrogen | 1.72E-01 |
| Carbon Dioxide | 1.08E+00 |
| Methane | 6.84E+01 |
| Ethane | 1.36E+02 |
| Propane | 1.79E+02 |
| Isobutane | 4.83E+01 |
| n-Butane | 1.11E+02 |
| 2,2 Dimethylpropane | 1.36E+00 |
| Isopentane | 3.80E+01 |
| n-Pentane | 3.99E+01 |
| 2,2 Dimethylbutane | 1.44E+00 |
| Cyclopentane | 0.00E+00 |
| 2,3 Dimethylbutane | 2.09E+00 |
| 2 Methylpentane | 1.11E+01 |
| 3 Methylpentane | 6.62E+00 |
| n-Hexane | 1.45E+01 |
| Methylcyclopentane | 1.05E+00 |
| Benzene | 2.48E-01 |
| Cyclohexane | 1.50E+00 |
| 2-Methylhexane | 3.21E+00 |
| 3-Methylhexane | 3.16E+00 |
| 2,2,4 Trimethylpentane | 0.00E+00 |
| Other C7's | 3.00E+00 |
| n-Heptane | 4.64E+00 |
| Methylcyclohexane | 2.89E+00 |
| Toluene | 5.65E-01 |
| Other C8's | 4.72E+00 |
| n-Octane | 1.57E+00 |
| Ethylbenzene | 3.45E-02 |
| M & P Xylenes | 4.07E-01 |
| O-Xylene | 5.51E-02 |
| Other C9's | 1.96E+00 |
| n-Nonane | 4.69E-01 |
| Other C10's | 7.37E-01 |
| n-Decane | 9.65E-02 |
| Undecanes (11) | 1.03E-01 |

$E_{TOT}$

Sum of C3+

**Icon Midstream Pipeline - North**

# Flash Emission Calculations - Produced Water

Using Gas-Water Ratio Method

## Un-Controlled

| Site specific data | | | |
|---|---|---|---|
| Gas-Water-ratio | = | 4.06 | scf/bbl Using GOW from comparable well pad |
| Throughput | = | 1,400 | bbl/yr |
| Stock tank gas molecular weight | = | 39.56 | g/mole |

| Conversions | | | |
|---|---|---|---|
| 1 lb | = | 453.6 | g |
| 1 mole | = | 22.4 | L |
| 1 scf | = | 28.32 | L |
| 1 ton | = | 2000 | lb |

**Equations**

$$E_{TOT} = Q\frac{(bbl)}{(yr)} \times R\frac{(scf)}{(bbl)} \times \frac{28.32(L)}{1(scf)} \times \frac{1(mole)}{22.4(L)} \times MW\frac{(g)}{(mole)} \times \frac{1(lb)}{453.6(g)}) \times \frac{1(ton)}{2000(lb)}$$

$E_{TOT}$ = Total stock tank flash emissions (TPY)
R = Measured gas-oil ratio (scf/bbl)
Q = Throughput (bbl/yr)
MW = Stock tank gas molecular weight (g/mole)

$$E_{spec} = E_{TOT} \times X_{spec}$$

$E_{spec}$ = Flash emission from constituent
$X_{spec}$ = Weight fraction of constituent in stock tank gas

# Flash Emissions

| Constituent | TPY | |
|---|---|---|
| Total | 0.3134 | $E_{TOT}$ |
| **VOC** | **0.1603** | Sum of C3+ |
| Nitrogen | 5.21E-03 | |
| Carbon Dioxide | 4.72E-03 | |
| Methane | 9.27E-02 | |
| Ethane | 5.04E-02 | |
| Propane | 3.60E-02 | |
| Isobutane | 9.00E-03 | |
| n-Butane | 2.54E-02 | |
| 2,2 Dimethylpropane | 3.98E-04 | |
| Isopentane | 1.28E-02 | |
| n-Pentane | 1.77E-02 | |
| 2,2 Dimethylbutane | 6.61E-04 | |
| Cyclopentane | 0.00E+00 | |
| 2,3 Dimethylbutane | 1.28E-03 | |
| 2 Methylpentane | 7.11E-03 | |
| 3 Methylpentane | 4.58E-03 | |
| n-Hexane | 1.24E-02 | HAP |
| Methylcyclopentane | 1.15E-03 | |
| Benzene | 2.26E-04 | HAP |
| Cyclohexane | 1.59E-03 | |
| 2-Methylhexane | 3.45E-03 | |
| 3-Methylhexane | 3.59E-03 | |
| 2,2,4 Trimethylpentane | 0.00E+00 | |
| Other C7's | 3.30E-03 | |
| n-Heptane | 6.02E-03 | |
| Methylcyclohexane | 3.19E-03 | |
| Toluene | 4.95E-04 | HAP |
| Other C8's | 5.47E-03 | |
| n-Octane | 1.72E-03 | |
| Ethylbenzene | 3.45E-05 | HAP |
| M & P Xylenes | 2.82E-04 | HAP |
| O-Xylene | 3.13E-05 | HAP |
| Other C9's | 1.66E-03 | |
| n-Nonane | 3.10E-04 | |
| Other C10's | 3.64E-04 | |
| n-Decane | 6.27E-05 | |
| Undecanes (11) | 5.95E-05 | |

# Condensate Truck Loading Lost Emissions Per AP-42

Per AP-42, Chapter 5.2.2.1.1, the uncontrolled loading loss emission factor $L_L$ can be estimated as follows:

$$L_L = 12.46[SPM/T]$$

Where:

$L_L$ = uncontrolled loading loss in pounds per 1000 gallons of liquid loaded
S= saturation factor (0.6)
P=true vapor pressure of liquid loaded: 7.45 psia
M= Molecular weight of vapor in lb/lb-mole (66.6 From Lab Report)
T= temperature of bulk liquid loaded in deg R or 460+deg F (60 Deg F)

Thus, $L_L = 12.46[0.6 \times 7.45 \times 66.6]/[460+60]$
$L_L = 7.13$ lb/1000 gallons loaded

Based on sample data of breathing vapor (attached), these emissions are 99.6% VOCs. It is assumed that vapor composition from truck loading is the same as that from the tank breathing vapors.

Given a maximum loading of 200 BBL (8400 gallons) a day, uncontrolled VOC emissions are estimated at 59.65 lb of VOC per day [8.4 x 7.13 x .996]. With all daily loading taking place within 1 hour, the hourly uncontrolled emission rate is estimated at 59.65 lb/hr. NSPS certified trucks will be used for condensate transportation. Thus, a 98.7% capture efficiency can be claimed. Accordingly, potential un-captured VOC emissions are estimated at 0.76 lb/hr.

Maximum annual throughput is 25,000 BBL (1,050,000 gallons) per year. Thus, un-captured VOC emissions are conservatively estimated at 96.9 pounds per year [1050 x 7.13 x .996 x 1.3%] or 0.05 tons per year.

Based on the attached analysis of a representative tank's breathing emissions, HAPs represent 6.8 percent of the emissions. Thus, hourly un-captured HAPs emissions equals 0.05 lb/hr [8.4 x 7.13 x 1.3% x 6.8%]. Annual maximum uncaptured HAPs emissions are estimated at 6.6 lb/yr [1050 x 7.13 x 1.3% x 6.8%] or <0.01 tpy.

**Loading to Combustor from Truck Loading**
Captured emissions are 98.7% of total emissions or 59.11 lb/Hr during loading [8.4 x 7.13 x 98.7%]. Using the composition of the measured condensate breathing vapors from a well that will be sending condensate to this facility (a heat content of 3921 BTU/scf and a density of 0.186 lb/scf) total hourly load to the combustor from truck loading will be 59.11/0.186 or 318 scf/hr. Heat loading to the combustor will be 1.25 MMBTU/Hr.

Annual loading to the combustor will be 7389 lbs [1050 x 7.13 x .987] or 39,727 scf and 155.77 MMBTU/Hr.

Using a combustion efficiency of 98%, captured/controlled VOC emissions are 1.18 lb/hr [8.4 x 7.13 x 98.7% x 0.02] and 148 lb/yr [1050 x 7.13 x 98.7% x 2%] or 0.07 tpy.

# NGL Truck Loading Lost Emissions

As noted in the project overview, NGL will be produced and accumulated in a pressure vessel at this facility. NGL loading to a transport truck will be accomplished by simply connecting the tank truck to the pressurized storage vessel and allowing it to fill to the point where it equalizes with the pressure of the bulk storage tank or brought to the maximum pressure of the transport truck, depending upon the pressure rating of the transport truck and the operating pressure of the bulk storage tank. Thus, the only emissions are the small amount of NGL left in the connection line at the time of disconnection.

The gap between the valve for the tank truck and the valve for the bulk storage tank is estimated at 0.029 cubic feet. Using liquid propane as a surrogate for NGL, this represents a release of 0.90 lb of VOCs during each disconnect [31.12 lb/cf x 0.029 cf].

NGL will be loaded at a maximum rate of 16,000 BBL/yr. With an estimated 200 BBL/tank truck, this represents a maximum of 80 truckloads or 80 disconnects per year. Thus, annual VOC emissions from NGL loading will be  72 pounds [0.90 x 80] or 0.04 tpy.

# Icon Midstream Pipeline, LLC
# North Liquids Management Facility
# Total Loading to Combustor

Three waste gas streams are being routed to the combustor: Tank Emissions, Truck Loading Emissions and the Dehydration Unit's still vent gases. The following is a summary of the hourly and annual loading to the combustor from these three sources:

| | SCF/Hr | MMBTU/Hr | MMSCF/Yr | MMBTU/Yr |
|---|---|---|---|---|
| Tanks Emissions | 1413.4 | 3.22 | 0.7063 | 1,612 |
| Truck Loading | 318 | 1.25 | 0.0397 | 156 |
| Dehy Still Vent | 11,700 | 4.84 | 102.492 | 42,398 |
| **TOTAL** | **13,431** | **9.31** | **103.238** | **44,166** |

These values were entered into the Combustor Work Sheet in the preceding calculations spreadsheet.

The facility will be equipped with two Hy-Bon CH 10.0 enclosed combustors. The combined capacity of these two units is 20.0 MMBTU/Hr. Thus, there is sufficient capacity to control emissions during day to day variations in flow, even at maximum throughput. A conservative 98% control efficiency is claimed.

From the Tank Emissions calculations sheet, the Condensate Truck Loading calculations sheet and the GRI-GLYCalc report, the following controlled potential emissions are estimated (note that the tanks emit to the combustor a maximum of 500 hrs per year):

| | Tanks | | Truck Loading | | Dehy Still Vent | | **Total** | |
|---|---|---|---|---|---|---|---|---|
| | lb/hr | tpy | lb/hr | tpy | lb/hr | tpy | **lb/hr** | **tpy** |
| VOC | 2.21 | 0.55 | 1.18 | 0.07 | 2.46 | 10.77 | **5.85** | **11.39** |
| n-Hexane | 0.07 | 0.02 | 0.04 | <0.01 | 0.14 | 0.60 | **0.25** | **0.62** |
| Benzene | <0.01 | <0.01 | <0.01 | <0.01 | 0.12 | 0.54 | **0.12** | **0.54** |
| Toluene | <0.01 | <0.01 | <0.01 | <0.01 | 0.21 | 0.92 | **0.21** | **0.92** |
| Ethylbenzene | <0.01 | <0.01 | <0.01 | <0.01 | 0.35 | 1.52 | **0.35** | **1.52** |
| Xylenes | <0.01 | <0.01 | <0.01 | <0.01 | 0.47 | 2.05 | **0.47** | **2.05** |

These values have been inserted into the enclosed combustor emissions sheet in the preceding Excel spreadsheet.

## FUGITIVE EMISSIONS FROM UNPAVED HAULROADS

*UNPAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)*

| | | PM | PM-10 |
|---|---|---|---|
| k = | Particle size multiplier | 0.80 | 0.36 |
| s = | Silt content of road surface material (%) | 10 | 3 |
| p = | Number of days per year with precipitation >0.01 in. | 157 | 157 |

| Item Number | Description | Number of Wheels | Mean Vehicle Weight (tons) | Mean Vehicle Speed (mph) | Miles per Trip | Maximum Trips per Hour | Maximum Trips per Year | Control Device ID Number | Control Efficiency (%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Produced Water Tanker Trucks | 10 | 27 | 10 | 0.6 | 1 | 18 | None | 0 |
| 2 | Condensate Truck | 18 | 27 | 10 | 0.6 | 1 | 125 | None | 0 |
| 3 | NGL Trucks | 18 | 27 | 10 | 0.6 | 1 | 75 | None | 0 |
| 4 | | | | | | | | | |
| 5 | | | | | | | | | |
| 6 | | | | | | | | | |
| 7 | | | | | | | | | |
| 8 | | | | | | | | | |

**Source:** *AP-42 Fifth Edition – 13.2.2 Unpaved Roads*

$E = k \times 5.9 \times (s \div 12) \times (S \div 30) \times (W \div 3)^{0.7} \times (w \div 4)^{0.5} \times ((365 - p) \div 365) =$ lb/Vehicle Mile Traveled (VMT)

Where:

| | | PM | PM-10 |
|---|---|---|---|
| k = | Particle size multiplier | 0.80 | 0.36 |
| s = | Silt content of road surface material (%) | 10 | 3 |
| S = | Mean vehicle speed (mph) | 10 | 10 |
| W = | Mean vehicle weight (tons) | 27 | 27 |
| w = | Mean number of wheels per vehicle | 18 | 18 |
| p = | Number of days per year with precipitation >0.01 in. | 157 | 157 |

For lb/hr: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

For TPY: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = Tons/year

SUMMARY OF UNPAVED HAULROAD EMISSIONS

| Item No. | PM | | | | PM-10 | | | |
|---|---|---|---|---|---|---|---|---|
| | Uncontrolled | | Controlled | | Uncontrolled | | Controlled | |
| | lb/hr | TPY | lb/hr | TPY | lb/hr | TPY | lb/hr | TPY |
| 1 | 3.0 | 0.03 | 3.0 | 0.03 | 0.4 | <0.01 | 0.4 | <0.01 |
| 2 | 3.8 | 0.24 | 3.8 | 0.24 | 0.51 | 0.03 | 0.51 | 0.03 |
| 3 | 3.8 | 0.14 | 3.8 | 0.14 | 0.51 | 0.02 | 0.51 | 0.02 |
| 4 | | | | | | | | |
| 5 | | | | | | | | |
| 6 | | | | | | | | |
| 7 | | | | | | | | |
| 8 | | | | | | | | |
| TOTALS | 10.6 | 0.41 | 10.6 | 0.41 | 1.42 | 0.05 | 1.42 | 0.05 |

## FUGITIVE EMISSIONS FROM PAVED HAULROADS

*INDUSTRIAL PAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)*

| | | |
|---|---|---|
| I = | Industrial augmentation factor (dimensionless) | |
| n = | Number of traffic lanes | |
| s = | Surface material silt content (%) | |
| L = | Surface dust loading (lb/mile) | |

| Item Number | Description | Mean Vehicle Weight (tons) | Miles per Trip | Maximum Trips per Hour | Maximum Trips per Year | Control Device ID Number | Control Efficiency (%) |
|---|---|---|---|---|---|---|---|
| 1 | None | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |

**Source:** *AP-42 Fifth Edition – 11.2.6 Industrial Paved Roads*

$E = 0.077 \times I \times (4 \div n) \times (s \div 10) \times (L \div 1000) \times (W \div 3)^{0.7}$ = lb/Vehicle Mile Traveled (VMT)

Where:

| | | |
|---|---|---|
| I = | Industrial augmentation factor (dimensionless) | |
| n = | Number of traffic lanes | |
| s = | Surface meterial silt content (%) | |
| L = | Surface dust loading (lb/mile) | |
| W = | Average vehicle weight (tons) | |

For lb/hr: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

For TPY: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = Tons/year

SUMMARY OF PAVED HAULROAD EMISSIONS

| Item No. | Uncontrolled | | Controlled | |
|---|---|---|---|---|
| | lb/hr | TPY | lb/hr | TPY |
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| TOTALS | | | | |

GAS ANALYTICAL SERVICES

# C6+ Gas Analysis Report

**Gas Analytical**

Report Date: Mar 9, 2016 9:09a

| | | | |
|---|---|---|---|
| Client: | Jay-Bee Oil & Gas | Date Sampled: | Feb 25, 2016 |
| Site: | Sleepy 3H | Analysis Date: | Mar 8, 2016 1:05p |
| Field No: | | Collected By: | Justin Whipkey |
| Meter: | | Date Effective: | Mar 1, 2016 12:00a |
| Source Laboratory | Clarksburg (Bridgeport), WV | Sample Pressure (PSI): | 1,235.0 |
| **Lab File No:** | **X_CH1-10062.CHR** | Sample Temp (°F): | 97 |
| Sample Type: | Spot | Field H2O: | No Test |
| Reviewed By: | | Field H2S: | No Test |

| Component | Mol % | Gal/MSCF |
|---|---|---|
| Methane | 77.6248 | |
| Ethane | 14.4188 | 3.83 |
| Propane | 3.3306 | 0.92 |
| I-Butane | 0.6710 | 0.22 |
| N-Butane | 1.2759 | 0.40 |
| I-Pentane | 0.3729 | 0.14 |
| N-Pentane | 0.3483 | 0.13 |
| Nitrogen | 0.3808 | |
| Oxygen | <MDL | |
| Carbon Dioxide | 0.1622 | |
| Hexanes+ | 1.4147 | 0.58 |
| TOTAL | 100.0000 | 6.21 |

| Analytical Results at Base Conditions (Real) | |
|---|---|
| BTU/SCF (Dry): | 1,295.3098 BTU/ft³ |
| BTU/SCF (Saturated): | 1,273.6435 BTU/ft³ |
| PSIA: | 14.730 PSI |
| Temperature (°F): | 60.00 °F |
| Z Factor (Dry): | 0.99622 |
| Z Factor (Saturated): | 0.99579 |

| Analytical Results at Contract Conditions (Real) | |
|---|---|
| BTU/SCF (Dry): | 1,295.3098 BTU/ft³ |
| BTU/SCF (Saturated): | 1,273.6435 BTU/ft³ |
| PSIA: | 14.730 PSI |
| Temperature (°F): | 60.00 °F |
| Z Factor (Dry): | 0.99622 |
| Z Factor (Saturated): | 0.99579 |

| Calculated Specific Gravities | | | |
|---|---|---|---|
| Ideal Gravity: | 0.7391 | Real Gravity: | 0.7416 |
| Molecular Wt: | 21.4055 lb/lbmol | | |

Gross Heating Values are Based on:
GPA 2145-09, 2186
Compressibility is Calculated using AGA-8.

| Source | Date | Notes |
|---|---|---|



<MDL = Less than Method Detection Limits, NG = Not Given, NT = Not Tested

# Attachment O
# Monitoring, Recordkeeping, Reporting and Testing Plan

# ATTACHMENT O

# Icon Midstream Pipeline, LLC

# North Liquids Management Facility

# Monitoring, Recordkeeping, Reporting and Testing Plan

## I. Monitoring

Engines

Icon Midstream (Icon) will monitor and record engine hours of operation on a daily basis. Additionally, Icon will monitor the amount of gas managed by the station on a daily basis as well as gas consumed in operating the compressor engines on a daily basis. Together, this information will allow the company to determine emissions for each engine, utilizing the catalyst manufacturer's warranted emission factors.

The air to fuel ratio will be monitored on a weekly basis to ensure proper operation of the catalytic converters. Additionally, the catalytic converters will be inspected and maintained in accordance with the manufacturer's specifications.

Condensate/NGL and Produced Water Tanks

Icon will monitor and record the volume of produced water and condensate being loading out on a monthly basis.

Dehydration Unit

Icon Midstream will monitor and record daily gas throughput and glycol recirculation rate.

## II. Recordkeeping

Icon will maintain accurate operating records of both engines and the facility throughput for each year on a 12-month rolling average. Records will include monthly fuel consumption (facility-wide), hours of operation for each engine, a total gas consumed by the heaters (a total for both heaters) and the amount of gas and each liquid managed by the facility. These records will be signed and dated by an authorized representative.

All inspections, preventive maintenance, failures, duration of failure events, replacements and/or repair of catalytic converters will be recorded, signed and dated by an authorized representative.

All inspections, maintenance, failures, replacements and/or repair of valves and non-welded connections will be recorded, signed and dated by an authorized representative.

All records will be kept either on site or at the nearest office location for a period of at least five (5) years.

## III. Testing

Within 180 days of achieving the maximum facility throughput, Icon will conduct emissions testing of the VRU Driver engine as stipulated under Subpart JJJJ to demonstrate compliance with the emission rates set forth in the permit application. Due to its size, subsequent testing of the VRU compressor engine is not required. The Flash Gas compressor driver engine does not require testing.

## IV. Reporting

Icon will submit certified emission statements on an annual basis in accordance with WVDEP, Division of Air Quality requirements.

# Attachment P
# Public Notice Affidavit

# Affidavit Notice Will Be Submitted Upon Receipt

# AIR QUALITY PERMIT NOTICE
## Notice of Application

Notice is given that Icon Midstream Pipeline, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit for its North Liquids Management Facility located off of Piney Fork Road near the community of Galmish, in Wetzel County., West Virginia (Lat.39.56173, Long. -80.698581)

The applicant estimates the increase in potential to discharge the following regulated air pollutants:

4.86 tons of Nitrogen Oxides per year
13.36 tons of Carbon Monoxide per year
46.69 tons of Volatile Organics per year
0.01 tons of Sulfur Dioxide per year
3.08 tons of Particulate Matter per year
0.55 tons of Benzene
1.52 tons of Ethylbenzene
1.37 tons of n-Hexane
0.92 tons of Toluene
2.05 tons of Xylenes
0.14 tons of formaldehyde
5,632 tons of $CO_{2e}$ per year

Startup of the modified operation is planned to begin on or about the 30th day of July, 2016. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

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

Dated this the **(Day)** day of **(Month)**, **(Year)**.

By: Mr. Shane Dowell
Operations Manager
Icon Midstream Pipeline, LLC