March 19, 2015

Bev McKeone
NSR Permitting Supervisor
WVDEP, Division of Air Quality
601 – 57th Street, SE
Charleston, West Virginia 25304

Re: 45CSR13 Permit Application
Camden 17, Well Pad Facility, Camden, West Virginia

Dear Ms. McKeone:

SLR International Corporation (SLR) has prepared the attached Rule 13 Application on behalf of CNX Gas Company, LLC (CNX Gas) for their Camden 17 well pad located near Camden, Lewis County, West Virginia.

CNX Gas plans to operate two nonconventional wells at the Camden 17 well pad along with associated equipment that includes the following:

(4) produced water storage vessels,
(2) condensate storage vessels,
(1) VDU Combustor 9.1 MMBtu/hr,
(2) GPU Units 1 mmBtu/hr, and
truck loading operations.

CNX Gas is proposing to monitor the gas rates sent to the VDU control device along with the gas quality of the stream in (Btu/scf). This additional monitoring and recordkeeping measure of the waste gas burn rate (mmBtu/hr) will assure the source's minor source status is maintained.

SLR International Corp 8 Capitol Street, Suite 300, Charleston, WV 25301
T: 681-205-8949 **F:** 681-205-8969 www.slrconsulting.com
Offices throughout USA, Canada, UK, Ireland, Australia, Singapore

If any additional information is needed, please don't hesitate contacting me by telephone at (304) 545-8563 or by e-mail at jhanshaw@slrconsulting.com.

Sincerely,
SLR International Corporation

Jesse Hanshaw, P.E.
Principal Engineer

JH:lev

Attachment: Rule 13 Permit Application
cc David Morris, CNX Gas LLC

SLR

global environmental solutions

CNX Gas Company, LLC

Camden 17 Well Pad

Camden, West Virginia

Rule 13 Permit Application

SLR Ref: 116.00894.00030

March 2015

Camden 17 Well Pad Rule 13 Permit Application

Prepared for:

CNX Gas Company, LLC
PO Box 1248
Jane Lew, WV 26378

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

Ethan Saturday

Ethan Saturday, E.I.
Staff Engineer

Jesse Hanshaw

Jesse Hanshaw, P.E.
Principal Engineer

CONTENTS

ATTACHMENTS

Notes:
ATTACHMENT Q - No information contained within this application is claimed confidential
ATTACHMENT R - No delegation of authority
ATTACHMENT S - Not a Title V Permit Revision

APPLICATION FOR PERMIT

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

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

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

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

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

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

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):*
CNX Gas Company, LLC

2. Federal Employer ID No. ***(FEIN):***
550738862

3. Name of facility *(if different from above):*
Camden 17 Well Pad

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

5A. Applicant's mailing address:
1000 Consol Energy Drive
Canonsburg, PA 15317

5B. Facility's present physical address:
185 Kemper Run Road
Camden, WV 26338

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:

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: **The applicant leases the site.**
- If **NO,** you are not eligible for a permit for this source.

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

10. North American Industry Classification System **(NAICS)** code for the facility:
212111

11A. DAQ Plant ID No. (for existing facilities only):
041-00067

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
PD15-004

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 the intersection of US-119/US-33 and county route 9 in Camden, WV, take County Route 9 north for 2.4 miles, slight left on Kemper Run road for 0.2 miles, turn left on access road for 0.2 miles then stay left to top of hill to well pad location.

12B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
N/A	Camden	Lewis
12.E. UTM Northing (KM): 4325.666	12F. UTM Easting (KM): 535.738	12G. UTM Zone: 17N

13. Briefly describe the proposed change(s) at the facility:
This permit application covers the construction of a well pad facility having the following equipment: 2 GPU units, 1 vapor destruction unit, and 6 – 210 BBL storage vessels

14A. Provide the date of anticipated installation or change: **05/22/2015** – 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: **05/22/2015**

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	☒ Indirect Heat Exchanger	
☐ General Emission Unit, specify:		

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

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

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

☒ Other Collectors, specify Vapor Destruction Unit - Enclosed Combustor

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 J. Michael Onifer *(Please use blue ink)* DATE: 3-18-15 *(Please use blue ink)*

35B. Printed name of signee: Mike Onifer		35C. Title: Senior Vice President, Gas Operations
35D. E-mail: craigneal@consolenergy.com	36E. Phone: 724-485-4000	36F. FAX
36A. Printed name of contact person (if different from above): Jesse Hanshaw		36B. Title: Principal Engineer, SLR
36C. E-mail: jhanshaw@slrconsulting.com	36D. Phone: 304-545-8563	36E. FAX: 681-205-8969

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.***

ATTACHMENT A

BUSINESS CERTIFICATE

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

State of West Virginia

Certificate

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

CNX GAS COMPANY LLC

was duly authorized under the laws of this state to transact business in West Virginia as a foreign limited liability company on June 29, 2001.

The company is filed as a term company, for the term ending June 29, 2026.

I further certify that the company's most recent annual report, as required by West Virginia Code §31B-2-211, has been filed with our office and that a certificate of cancellation has not been filed.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORIZATION

Given under my hand and the Great Seal of the State of West Virginia on this day of October 28, 2011

Natalie E. Tennant

Secretary of State

ATTACHMENT B

MAP

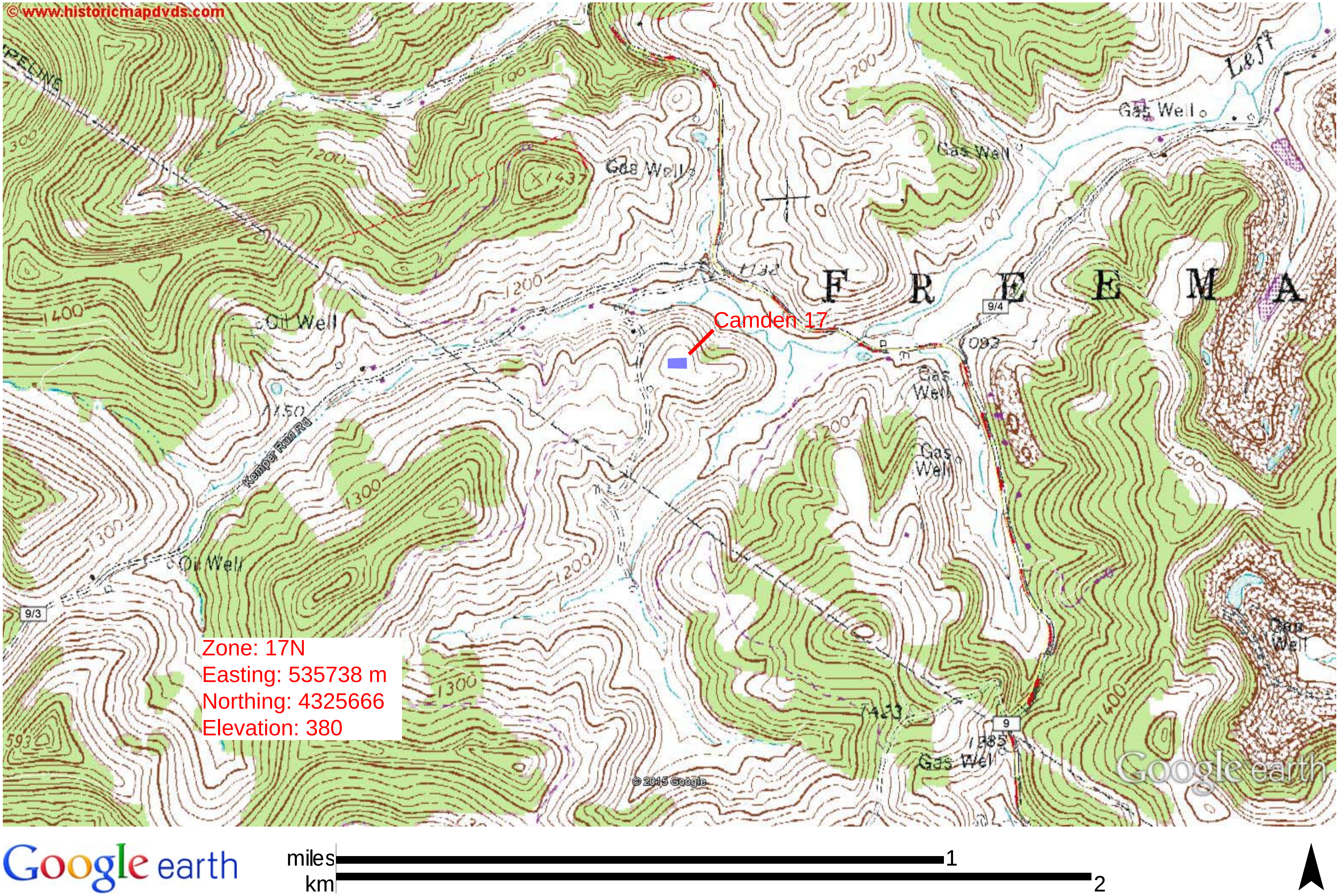
Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015


9/4
Camden 17
Kemper Run Rd
9/3
Deer Run Rd
9
Camden
33
20
© 2014 Google
20/1
Google earth
miles
1
km
1


© www.historicmapdvds.com
Camden 17
Zone: 17N
Easting: 535738 m
Northing: 4325666
Elevation: 380
F R E E M A
Gas Well
Oil Well
Kemper Run Rd
© 2015 Google
Google earth
miles
1
km
2

ATTACHMENT C

INSTALLATION AND START-UP

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

INSTALLATION AND STARTUP SCHEDULE

CNX Gas Company, LLC is preparing this facility for an anticipated initial startup date of May 22, 2015.

ATTACHMENT D

REGULATORY DISCUSSION

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

REGULATORY DISCUSSION

APPLICABLE REGULATIONS

This facility is subject to the following applicable rules and regulations:

Federal and State:

45 CSR 2 – Particulate Matter Standards from Combustion of Fuel in Indirect Heat Exchangers

The indirect heat exchangers consisting of the GPU heaters are subject to the visible emission standard of §45-2-3 as follows:

3.1. No person shall cause, suffer, allow or permit emission of smoke and/or particulate matter into the open air from any fuel burning unit which is greater than ten (10) percent opacity based on a six minute block average.

However, in accordance with the exemptions defined with §45-2-11 these sources have limited requirements as follows:

11.1. Any fuel burning unit(s) having a heat input under ten (10) million B.T.U.'s per hour will be exempt from sections 4, 5, 6, 8 and 9. However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

Therefore, the heat exchangers at this site are exempt from the weight emission standards of section 4 and the control of fugitive particulate matter standards of section 5. The additionally exempt sections of this rule, section 6, 8, and 9 pertain to registration, testing, monitoring, recordkeeping and reporting as well as startup, shutdown and malfunctions.

45 CSR 6 - Open Burning Prohibited

This state rule is geared towards reducing particulate matter emissions from the combustion of refuse and is specific to burning solid waste such as trash, but also includes combustion of waste gas in flares. The rule sets PM limits and establishes a 20% visible emission limit, both of which shouldn't be any problem for the gas fired flare to meet.

The weight rate of waste gas going to the VDU flare is estimated by ProMax simulation to be 24.27 lb/hr or 0.0121 tph. Therefore, the corresponding Rule 6 PM limit would be 0.066 lb/hr. [E(lb/hr) = 5.43 * 0.0121]

When using emission factors for flare combustion devices presented in AP-42 Chapter 13 it specifies that gas combustion sources should not have PM emissions and therefore no factor is given.

45 CSR 10 - Emission of Sulfur Oxides

The well pad facility evaluated within this application utilizes fuel burning units, but they are all less than the exemption threshold of 10 MMBtu/hr as stated in 45CSR§10-10.1 as follows:
10.1 Any fuel burning units having a design heat input under ten (10) million BTU's per hour will be exempt from section 3 and sections 6 through 8. However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

40 CFR 60 Subpart OOOO – Gas Wells NSPS

The Gas wells located on the Camden 17 pad will have completed their flow back process by the time the surface equipment is permitted. Therefore they were required to follow the standards of flowback dictated within §60.5375 (a)(3) and (4) for wells that are hydraulically fractured and commence flowback after August 23, 2011.

40 CFR 61 - This facility is subject to the asbestos inspection and notification requirements related to construction activities containing asbestos.

45 CSR 4 - No Objectionable Odors

45 CSR 11 - Standby Plans for Emergency Episodes.

45 CSR 13 - Permits for Construction, Modification, Relocation, and Operation of Stationary Source of Air Pollutants

The company has applied for a Rule 13 since the facility has plans to operate a flare.

WV Code § 22-5-4 (a) (14)

The Secretary can request any pertinent information such as annual emission inventory reporting. This station is required to submit an annual air emission inventory.

45 CSR 17 - Fugitive Particulate Emissions

NON-APPLICABILITY DETERMINATIONS

The following requirements have been determined “not applicable” due to the following:

45 CSR 27 - To Prevent and Control the Emissions of Toxic Air Pollutants

This rule is not applicable because natural gas is included as a petroleum product and contains less than 5% benzene by weight. 45CSR § 27-2.4 exempts equipment "used in the production and distribution of petroleum products providing that such equipment does not produce or contact materials containing more than 5% benzene by weight."

45 CSR 30 – Requirements for Operating Permits – Title V of the Clean Air Act

This facility does not meet the emission threshold to trigger a 45 CSR 30 Title V Operating Permit nor is it subject to any Federal Standards that trigger the need for a Title V Permit.

40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

There are no stationary spark ignition internal combustion engines on site.

40 CFR 60 Subpart OOOO - Storage Vessel NSPS

The storage vessels have been demonstrated to have PTEs < 6tpy with the use of permitted vapor destruction unit control device. Therefore, the storage vessels at this site are not considered affected sources under this regulation.

40 CFR 60 Subpart OOOO – Pneumatic Control Valve NSPS

The site was evaluated and found to contain only intermittent venting pneumatic control valves rated at less than 6 scf/hr. Therefore the site is not proposing to install or operate any affected continuous bleed pneumatic devices defined by this NSPS for control valves.

40 CFR 63 Subpart ZZZZ – NESHAP for Stationary Reciprocating Internal Combustion Engines

There are no stationary reciprocating internal combustion engines on site.

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

There are no plans of installing a TEG dehydration unit at this site.

40 CFR 63 HHH - National Emission Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities

This subpart is related to Natural Gas Transmission Facilities which are major sources of HAPs. This federal regulation is not applicable since this facility is neither a transmission facility nor is it a major source of HAPs.

40 CFR 60 Subpart KKK - Natural Gas Processing Plant NSPS

This subpart is not applicable because this station is not a processing site engaged in extracting natural gas liquids by fractionation from natural gas.

> *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.*

40 CFR 60 Subpart K, Ka, Kb - Storage Vessel NSPS

The six produced water and condensate storage tanks are exempt under 60.110b(d) (4) in accordance with the following: Vessels with a design capacity less than or equal to 1,589.874 m^3 (approx 420,000 gallons) used for petroleum or condensate stored, processed, or treated prior to custody transfer.

40 CFR 63 Subpart DDDDD - Boilers & Process Heaters Located at Major Sources of HAPs

This subpart is not applicable because this facility is not a major source of HAPs.

40 CFR 63 Subpart JJJJJJ - Boilers & Process Heaters Located at Area Sources of HAPs

This subpart is not applicable because the process heaters at this facility use natural gas fuel, which is exempt from regulation under this area source GACT standard.

40 CFR 82 Subpart F - Ozone Depleting Substances

The purpose of this subpart is to reduce emissions of class I and class II refrigerants and their substitutes. The facility does not utilize class I and class II refrigerants and their substitutes.

ATTACHMENT E

PLOT PLAN

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

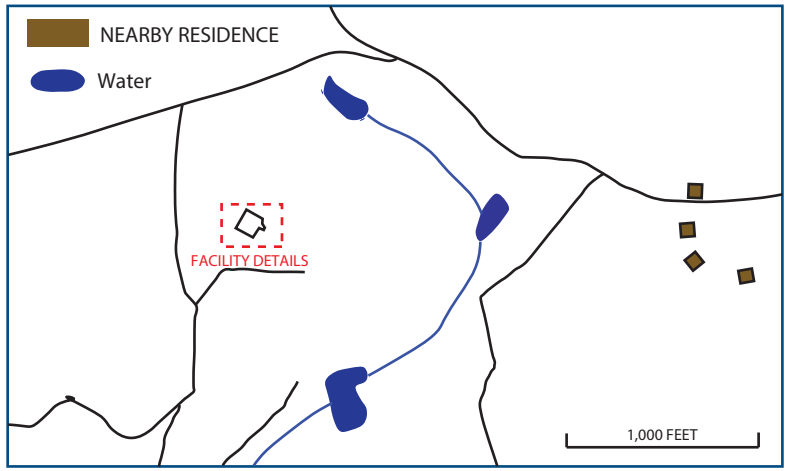
N

ELEVATION: 1250 FEET

REFERENCE CORDINATES (LAT/LONG):
39.07937/-80.58682°

LEGEND

- BUILDING
- NATURAL GAS WELL
- U UNPAVED
- P PAVED



T01
T03
T05
T02
T04
T06
GPU-2
(2e)
GPU-1
(1e)
VDU-1
(3e)
17A
17B
U
U
Access Road

50 100 150 200 Feet

Report
Regulation 13 Application

Drawing
PLOT PLAN

Date February 13, 2015 | FIGURE 1

CNX Gas Company, LLC
Camden 17 Well Pad
Camden, West Virginia

SLR

ATTACHMENT F

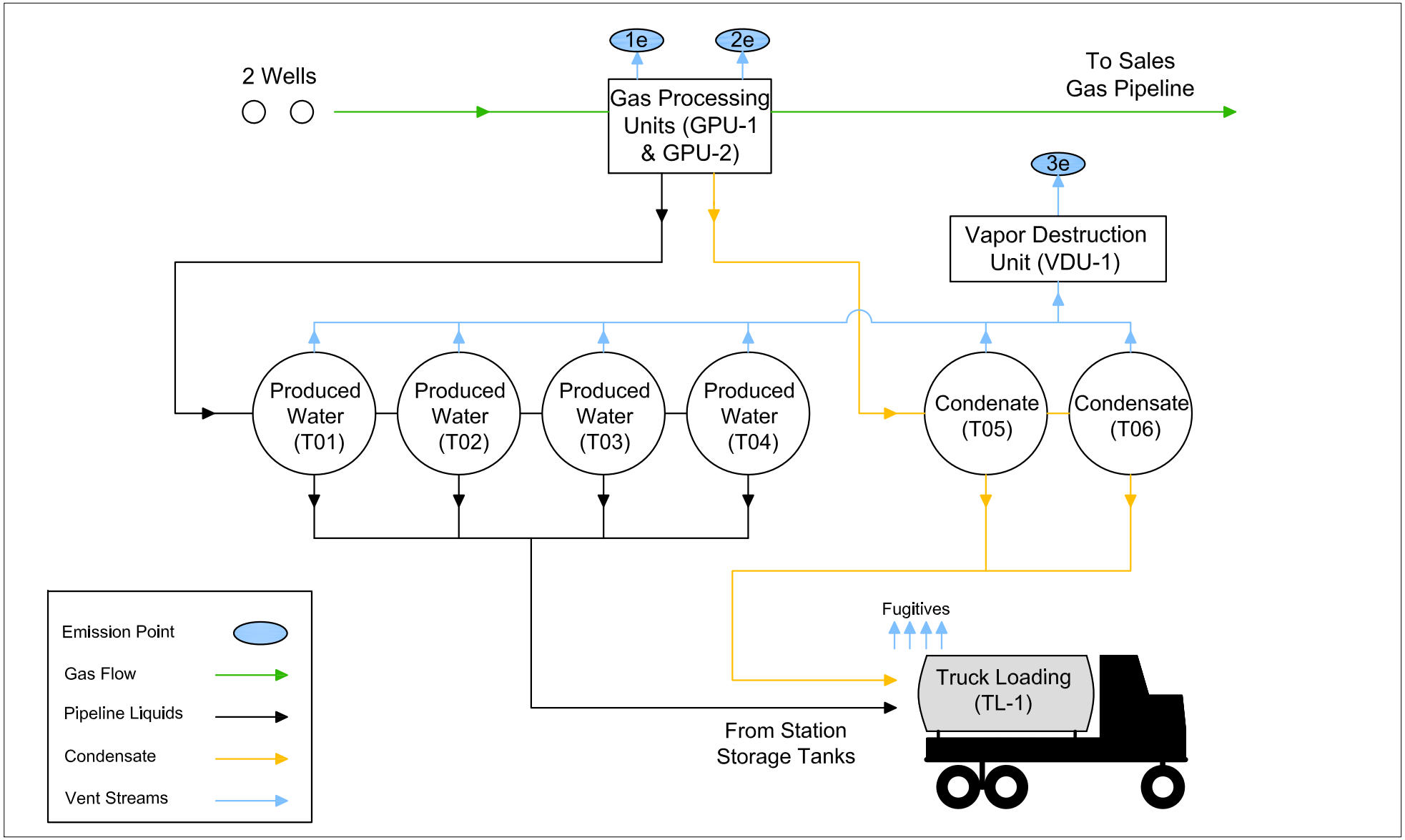
PROCESS FLOW DIAGRAM

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015



Process Flow Diagram
CNX Gas LLC
Camden 17
Camden, West Virginia

ATTACHMENT G

PROCESS DESCRIPTION

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

PROCESS DESCRIPTION

CNX Gas Company, LLC is applying for coverage under 45CSR13, Regulation 13, for the construction and operation of an enclosed combustion device at the Camden 17 well pad. The Camden 17 site would like to have the coverage and benefit of utilizing combustion control for its storage vessels. This will allow the site to handle additional condensate flow if present during the latter stages of production at reduced reservoir pressures.

DESCRIPTION OF PROCESS

Natural gas, condensate and produced water will be collected from two nonconventional Marcellus horizontal wells located onsite. The gas and liquids mixture will flow through one of two 1.0 mmBtu/hr gas processing units (GPU-1 & GPU-2), which are both housed as one package skid unit.

In the GPU, the well stream is divided into sales gas, produced water, and condensate. The gas will leave the GPUs and go directly into the sales gas line. The produced water removed is routed to one of four 210 barrel (bbl) produced water storage tanks (T01-T04). The condensate will flow to one of two 210 bbl condensate storage tanks (T05-T06).

The emissions from each of the storage vessels will be routed to a closed vent system directed to the vapor destruction unit (VDU-1). VDU combustor emissions for NO_x, CO, and SO_2 were estimated based on 8760 hours per year operating at maximum rated capacity. The VOC emissions were estimated as 2% of the uncontrolled VOCs predicted using the Promax simulation calculations for storage vessel emissions. The close vent system will be operated in accordance with §60.5411(c) to assure all emissions are routed to the control device and the VDU will continuously monitor pilot light availability.

The contents of the produced water storage vessels are hauled away by 100 bbl trucks (TL-1) at an expected maximum turnover rate of 600 bbl per day from the four tanks. The condensate tank contents are hauled away by 200 bbl trucks at an expected maximum turnover rate of 100 bbl per day between the two tanks. The combined emissions generated by truck loading events for produced water and condensate were evaluated on an uncontrolled basis and found to be relatively minimal at 6.77 tpy VOCs.

AGGREGATION DISCUSSION

CNX Gas has reviewed CONE midstream plans to potentially locate a salt desiccant dryer system on the Camden 17 well site. Although all indications are that this unit will not create any additional emission sources at the site, the unit was conservatively evaluated for aggregation purposes. The only possible emission source associated with the unit would be a liquid knock out stream, which CNX Gas has agreed to route this liquid stream to their condensate storage vessel. These liquids were accounted for within the condensate tank throughputs.

ATTACHMENT H

SAFETY DATA SHEETS (SDS)

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	Natural Gas Condensate, Sweet or Sour
Synonyms	Sweet Condensate, Sour Condensate, Lease Condensate (Sweet or Sour), Field Condensate (Sweet or Sour), Casing Head Gasoline (Sweet or Sour), Natural Gas Liquids (Sweet or Sour), Gas Drips (Sweet or Sour), Natural Gas Condensate C2-C8 (Sweet or Sour)
Chemical Family	Petroleum Hydrocarbon
Intended Use	Feedstock
MARPOL Annex I Category	Naphthas and Condensates

Supplier

J.P. Morgan Ventures Energy Corp.
383 Madison Avenue, 10th Floor
New York, NY 10017

JP Morgan Commodities Canada Corp.
Suite 600, Vintage Towers II, 326 11th Avenue SW
Calgary, Alberta
T2R 0C5

24 Hour Emergency Numbers

Chemtrec: 800-424-9300
JP Morgan Technical Information: 212-834-5788 (USA), 403-532-2000 (Canada)
California Poison Control: 800-356-3219

2. HAZARDS IDENTIFICATION

GHS Classification

H224	Flammable liquid – Category 1
H304	May be fatal if swallowed and enters airways – Category 1
H319	Eye damage/irritation – Category 2
H335	May cause respiratory irritation – Category 3
H336	Specific target organ toxicity (single exposure) – Category 3
H350	Carcinogenicity – Category 1B
H411	Hazardous to the aquatic environment, chronic toxicity – Category 2

Hazards Not Otherwise Classified

May contain or release poisonous hydrogen sulfide gas

Label Elements

Signal Words Danger

GHS Hazard Statements

H224	Extremely flammable liquid and vapor
H350	May cause cancer
H304	May be fatal if swallowed and enters airways
H319	Causes serious eye irritation
H336	May cause drowsiness or dizziness
H315	Causes skin irritation
H331	Toxic if inhaled
H411	Toxic to aquatic life with long lasting effects

GHS Precautionary Statements

P201	Obtain special instructions before use
P202	Do not handle until all safety precautions have been read and understood
P210	Keep away from heat/sparks/open flames/hot surfaces – no smoking
P233	Keep container tightly closed
P240	Ground/bond container and receiving equipment

2. HAZARDS IDENTIFICATION

P241	Use explosion-proof electrical/ventilating/lighting equipment
P242	Use only non-sparking tools
P243	Take precautionary measures against static discharge
P261	Avoid breathing dust/fume/gas/mist/vapours/spray
P264	Wash thoroughly after handling
P271	Use only outdoors or in a well-ventilated area
P273	Avoid release to the environment
P280	Wear protective gloves / protective clothing / eye protection / face protection
P361, P352, P362	IF ON SKIN OR HAIR: Remove/take off immediately all contaminated clothing. Wash with plenty of soap and water. Take off contaminated clothing and wash before reuse.
P305,P351,P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P313	If eye irritation persists, get medical advice/attention
P301,P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
P331	Do NOT induce vomiting
P304,P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P312	Call a POISON CENTER or doctor/physician if you feel unwell
P370,P378	In case of fire: Use dry chemical, carbon dioxide, or foam for extinction
P391	Collect spillage
P405	Store locked up
P403,P233, P235	Store in a well-ventilated place. Keep container tightly closed, Keep cool
P501	Dispose of contents/container to approved facility

3. COMPOSITION / INFORMATION ON INGREDIENTS

Components	CAS Registration No.	Concentration (%)
Natural Gas Condensate C2-C8	68919-39-1	100
Benzene	71-43-2	0.1 - 5
n-Butane	106-97-8	5 - 15
Cyclohexane	110-82-7	< 1 - 5
Ethyl Benzene	100-41-4	< 1 - 3
n-Heptane	142-82-5	10 - 20
n-Hexane	110-54-3	2 - 50
Hexane (all isomers)	mixture	2 - 50
Hydrogen Sulfide	7783-06-4	< 0.1 - 20
Methylcyclohexane	108-87-2	5 - 10
n-Nonane	111-84-2	5 - 15
n-Octane	111-65-9	10 - 20
n-Pentane	109-66-0	5 - 20
n-Propane	74-98-6	<1 - 8
Toluene	108-88-3	< 1 - 15
1,2,4 Trimethyl Benzene	95-63-6	< 1 – 4
Xylene, all isomers	1330-20-7	< 1 – 12

4. FIRST AID MEASURES

Inhalation (Breathing) Move the exposed person to fresh air. If not breathing, clear airways and give artificial respiration. If breathing is difficult, humidified oxygen should be administered by qualified personnel. Seek medical attention if breathing difficulties continue.

4. FIRST AID MEASURES

Eye Contact

Flush eyes with water for at least 15 minutes. Hold eyelids apart to ensure complete irrigation of the eye. Remove contact lenses, if worn, after initial flushing. Do not use eye ointment. Seek medical attention.

Skin Contact

Remove contaminated shoes and clothing, and flush affected areas with large amounts of water. If skin surface is damaged, apply a clean dressing and seek medical attention. If skin surface is not damaged, clean affected area thoroughly with mild soap and water. Seek medical attention if tissue appears damaged or if pain or irritation persists. Launder or discard contaminated clothing.

Ingestion (Swallowing)

Aspiration hazard. Do not induce vomiting or give anything by mouth because the material can enter the lungs and cause severe lung damage. If spontaneous vomiting is about to occur, place victim's head below knees. If victim is drowsy or unconscious, place on the left side with head down. Do not leave victim unattended and observe closely for adequacy of breathing. Seek medical attention
.

Most Important Symptoms and Effects

Acute: Headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue
Delayed: Dry skin and possible irritation with repeated or prolonged exposure

Potential Acute Health Effects

Inhalation: Breathing high concentrations may be harmful. Mist or vapor can irritate the throat and lungs. Breathing this material may cause central nervous system depression with symptoms including nausea, headache, dizziness, fatigue, drowsiness or unconsciousness. This material may contain or liberate hydrogen sulfide, a poisonous gas with the smell of rotten eggs. Hydrogen sulfide and other hazardous vapors may evolve and collect in the headspace of storage tanks or other enclosed vessels. The smell disappears rapidly because of olfactory fatigue so odor may not be a reliable indicator of exposure. Effects of overexposure include irritation of the eyes, nose, throat and respiratory tract, blurred vision, photophobia (light sensitivity) and pulmonary edema (fluid accumulation in lungs). Severe exposures can result in nausea, vomiting, muscle weakness or convulsions, respiratory failure and death.
Eye Contact: This product can cause eye irritation from short-term contact with liquid, mists or vapors. Symptoms include stinging, watering, redness and swelling. Effects may be more serious with repeated or prolonged contact. Hydrogen sulfide vapors may cause moderate to severe eye irritation and photophobia (light sensitivity).
Skin Contact: This product is a skin irritant. Contact may cause redness, itching, burning and skin damage.
Ingestion: Ingestion may result in nausea, vomiting, diarrhea and restlessness. Aspiration (inadvertent suction) of liquid into the lungs must be avoided as even small quantities in the lungs can produce chemical pneumonitis, pulmonary edema or hemorrhage and even death.

Potential Chronic Health Effects

Chronic effects of overexposure are similar to acute effects including central nervous system (CNS) effects and CNS depression. Effects may also include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting and skin dermatitis.

Notes to Physician

This material may contain or liberate hydrogen sulfide. In high doses, hydrogen sulfide may produce pulmonary edema and respiratory depression or paralysis. The first priority in treatment should be providing adequate ventilation and administering 100% oxygen. If unresponsive to supportive care, nitrites (amyl nitrite by inhalation or sodium nitrite by I.V.) may be an effective antidote, if delivered within the first few minutes of exposure. For adults, the dose is 10 ml of a $3NaNO_2$ solution (0.5 gm $NaNO_2$ in 15 ml water) IV over 2 to 4 minutes. The dosage should be adjusted in children or in the

4. FIRST AID MEASURES

presence of anemia and methemoglobin levels, arterial blood gases, and electrolyties should be monitored.

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

Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis. Inhalation overexposure can produce toxic effects, monitor for respiratory distress. If cough or breathing difficulties develop, evaluate for upper respiratory tract inflammation, bronchitis and pneumonitis.

Skin contact may aggravate an existing dermatitis. High pressure injection injuries may cause necrosis of underlying tissue regardless of superficial appearance.

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

5. FIRE FIGHTING MEASURES

Flammability Classification
OSHA Classification (29 CFR 1910.1200): Flammable Liquid
NFPA Class-1B Flammable Liquid
NFPA Ratings: Health: 3, Flammability: 4, Reactivity: 0

Flash Point
< -46^{o}C, < -50^{o}F (ASTM D-56)

Flammable Limits
Lower Limit: < 1%
Upper Limit: 10%

Autoignition Temperature
232^{o}C, 450^{o}F

Combustion Products
Highly dependent on combustion conditions. Fume, smoke, carbon monoxide, carbon dioxide, sulfur and nitrogen oxides, aldehydes and unburned hydrocarbons.

Fire and Explosion Hazards
This material is extremely flammable and can be ignited by heat, sparks, flames or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment and electronic devices such as cell phones, computers, calculators and pagers which have not been certified as intrinsically safe). Vapors are heavier than air and can accumulate in low areas. May create vapor/air explosion hazard indoors, in confined spaces, outdoors or in sewers. Vapors may travel considerable distances to a remote source of ignition where they can ignite, flash back or explode. Product can accumulate a static charge that may cause a fire or explosion. A product container, if not properly cooled, can rupture in the heat of a fire.

Extinguishing Media
Dry chemical, carbon dioxide or foam is recommended. Water spray is recommended to cool or protect exposed materials or structures. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Water may be

5. FIRE FIGHTING MEASURES

ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters.

Fire Fighting Use water spray to cool fire-exposed containers and to protect personnel. Isolate immediate hazard area and keep unauthorized personnel out. Water spray may be useful in minimizing or dispersing vapors and to protect personnel. Cool equipment exposed to fire with water. Avoid spreading burning liquid with water used for cooling. For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear protective clothing. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by regulations, a self-contained breathing apparatus should be worn. Wear other appropriate protective equipment as conditions warrant.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Extremely Flammable. Spillage of liquid product will create a fire hazard and may form an explosive atmosphere. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof electrical equipment is recommended. Product may contain or release poisonous hydrogen sulfide gas. If the presence of dangerous amounts of H_2S around the spilled product is suspected, additional or special actions may be warranted including access restrictions and the use of protective equipment. Stay upwind and away from spill/release. Isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment as conditions warrant per Exposure Controls/Personal Protection guidelines.

Environmental Precautions Stop the leak if it can be done without risk. Prevent spilled material from entering waterways, sewers, basements or confined areas. Contain release to prevent further contamination of soils, surface water or groundwater. Clean up spill as soon as possible using appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil.

Methods for Containment and Clean Up Immediate cleanup of any spill is recommended. Build dike far ahead of spill for containment and later recovery or disposal of spilled material. Absorb spill with inert material such as sand or vermiculite and place in suitable container for disposal. If spilled on water, remove with appropriate equipment like skimmers, booms or absorbents. In case of soil contamination, remove contaminated soil for remediation or disposal in accordance with applicable regulations.

Reporting Report spills/releases as required, to appropriate local, state and federal authorities. US Coast Guard and Environmental Protection Agency regulations require immediate reporting of spills/release that could reach any waterway including intermittent dry creeks. Report spill/release to the National Response Center at (800) 424-8802. In case of accident or road spill, notify Chemtrec at (800) 424-9300.

7. HANDLING AND STORAGE

Precautions for Safe Handling Extremely flammable. May vaporize easily at ambient temperatures. The vapor is heavier than air and may create an explosive mixture of vapor and air. Beware of accumulation in confined spaces and low lying areas.

7. HANDLING AND STORAGE

Use non-sparking tools and explosion-proof equipment. Open container slowly to relieve any pressure. Bond and ground all equipment when transferring from one vessel to another. Can accumulate static charge by flow or agitation. Can be ignited by static discharge. Explosion-proof electrical equipment is recommended and may be required by fire codes.

Warning! Use of this material in spaces without adequate ventilation may result in the generation of hazardous levels of combustion products and/or inadequate oxygen levels for breathing. Odor is an inadequate warning for hazardous conditions.

To prevent and minimize fire or explosion risk from static accumulation and discharge, effectively bond and/or ground product transfer system. Do not use electronic devices (such as cellular phones, computers, calculators, pagers, etc.) in or around any fueling operation or storage area unless the devices are certified as intrinsically safe. Electrical equipment and fittings should comply with local fire codes.

Precautions for Safe Storage

Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces and all sources of ignition. Post area warnings: 'No Smoking or Open Flame'. Keep away from incompatible material. Outdoor or detached storage of portable containers is preferred. Indoor storage should meet OSHA standards and appropriate fire codes.

In a tank, barge or other closed container, the vapor space above materials containing hydrogen sulfide may result in concentrations of H_2S immediately dangerous to life or health. Check atmosphere for oxygen content, H_2S and flammability prior to entry.

Portable containers should never be filled while they are in or on a motor vehicle or marine craft. Static electricity may ignite vapors when filling non-grounded containers or vehicles on trailers. To avoid static buildup, do not use a nozzle lock open device. Use only approved containers. Keep containers tightly closed. Place the container on the ground before filling. Keep the nozzle in contact with the container during filling.

Empty containers retain liquid and vapor residues and can be dangerous. Do NOT pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat, flame, sparks, static electricity or other sources of ignition; they may explode and cause injury or death. Do not attempt to refill or clean containers since residue is difficult to remove. Empty drums should be completely drained, properly closed and returned to the supplier or a qualified drum reconditioner. All containers should be disposed of in an environmentally safe manner in accordance with government regulations.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH Exposure Limits	OSHA Exposure Limits	NIOSH Exposure Limits
Natural Gas Condensate	300 ppm TWA 500 ppm STEL (as gasoline)	300 ppm TWA 500 ppm STEL (as petroleum distillate (naphtha))	450 ppm TWA 1100 ppm IDLH (as petroleum distillate (naphtha))
Benzene	0.5 ppm TWA 2.5 ppm STEL Skin	1 ppm TWA 5 ppm STEL Skin	0.5 ppm TWA 1 ppm STEL Skin 500 ppm IDLH
n-Butane	800 ppm TWA		800 ppm TWA

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Component	ACGIH Exposure Limits	OSHA Exposure Limits	NIOSH Exposure Limits
Cyclohexane	100 ppm TWA	300 ppm TWA	300 ppm TWA 1300 ppm IDLH
Ethyl Benzene	100 ppm TWA 125 ppm STEL	100 ppm TWA 125 ppm STEL	100 ppm TWA 125 ppm STEL 800 ppm IDLH
n-Heptane	400 ppm TWA 500 ppm STEL	500 ppm TWA	85 ppm TWA 440 ppm Ceiling 750 ppm IDLH
n-Hexane	50 ppm TWA Skin	500 ppm TWA	50 ppm TWA 1100 ppm IDLH
Hexane (all isomers)	500 ppm TWA 1000 ppm STEL		100 ppm TWA 510 ppm IDLH Ceiling
Hydrogen Sulfide	10 ppm TWA 15 ppm STEL	20 ppm Ceiling 50 ppm Peak	10 ppm Ceiling 100 ppm IDLH
Methylcyclohexane	400 ppm TWA	500 ppm TWA	400 ppm TWA 1200 ppm IDLH
n-Nonane	200 ppm TWA		200 ppm TWA
n-Octane	300 ppm TWA	500 ppm TWA	75 ppm TWA 385 ppm Ceiling 1000 ppm IDLH
n-Pentane	600 ppm TWA	1000 ppm TWA	120 ppm TWA 610 ppm Ceiling 1500 ppm IDLH
n-Propane	2500 ppm TWA	1000 ppm TWA	1000 ppm TWA 2100 ppm IDLH
Toluene	50 ppm TWA Skin	200 ppm TWA 300 ppm Ceiling 500 ppm Peak-10 min	100 ppm TWA 150 ppm STEL 500 ppm IDLH
1,2,4 Trimethyl Benzene	25 ppm TWA	25 ppm TWA	25 ppm TWA
Xylene, all isomers	100 ppm TWA 150 ppm STEL	100 ppm TWA 150 ppm STEL	900 ppm IDLH

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

ACGIH - American Conference of Government Industrial Hygienists, OSHA - Occupational Safety and Health Administration, NIOSH - National Institute for Industrial Safety and Health, TWA - Time Weighted Average (8 hour average for ACGIH and OSHA, 10 hour average for NIOSH), STEL - 15 Minute Short Term Exposure Level, Skin - indicates potential for cutaneous absorption of liquid or vapor through the eyes or mucous membranes, Ceiling - Ceiling Level, Peak - Acceptable peak over the ceiling concentration for a specified number of minutes, IDLH - Immediately Dangerous to Life and Health

Personal Protective Equipment

General Considerations Consider the potential hazards of this material, applicable exposure limits, job activities and other substances in the work place when designing engineering controls and selecting personal protective equipment.

Engineering Controls Use process enclosures, local exhaust ventilation or other engineering controls to maintain airborne levels below the recommended exposure limits. An emergency eye wash station and safety shower should be located near the work station.

Personal Protective Equipment

Personal Protective Equipment

If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, personal protective equipment (PPE) is recommended. A hazard assessment of the work should be conducted by a qualified professional to determine what PPE is required.

Respiratory Protection

A respiratory protection program that meets or exceeds OSHA 29 CFR 1910.134 and ANSI Z.88.2 should be followed whenever workplace conditions warrant the use of a respirator. When airborne concentrations are expected to exceed the established exposure limits given in Section 8, use a NIOSH approved air purifying respirator equipped with organic vapor cartridges/canisters. Use a full-face positive-pressure supplied air respirator in circumstances where air-purifying respirators may not provide adequate protection or where there may be the potential for airborne exposure above the exposure limits. If exposure concentration is unknown, IDLH conditions exist or there is a potential for exposure to hydrogen sulfide above exposure limits, use a NIOSH approved self contained breathing apparatus (SCBA) or equivalent operated in a pressure demand or other positive pressure mode.

Eye Protection

Eye protection that meets or exceeds ANSI Z.87.1 is recommended if there is a potential for liquid contact to the eyes. Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing or spraying of this material. A face shield may be necessary depending on conditions of use.

Skin and Body Protection

Avoid skin contact. Wear long-sleeved fire-retardant garments while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, arm covers, impervious gloves, boots and additional facial protection.

Hand Protection

Avoid skin contact. Use impervious gloves (e.g., PVC, neoprene, nitrile rubber). Check with glove suppliers to confirm the breakthrough performance of gloves. PVC and neoprene may be suitable for incidental contact. Nitrile rubber should be used for longer term protection when prolonged or frequent contact may occur. Gloves should be worn on clean hands and hands should be washed after removing gloves. Also wash hands with plenty of mild soap and water before eating, drinking, smoking, using toilet facilities or leaving work.

Special Considerations

Workplace monitoring plans should consider the possibility that heavy metals such as mercury may concentrate in process vessels and equipment presenting the possibility of exposure during sampling and maintenance operations. Mercury and other heavy metals may be present in trace quantities in crude oil, raw natural gas and condensates. Storage and processing of these materials can result in these metals, including elemental mercury, accumulating in enclosed vessels and piping, typically at the low point of the processing equipment. Mercury may also concentrate in sludges, sands, scales, waxes and filter media.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear to dark brown liquid	**Physical Form**	Liquid
Odor	Strong hydrocarbon, sulfurous odor possible	**Odor Threshold**	Not established
pH	Neutral	**Vapor Pressure**	5 - 15 psi (Reid)
Vapor Density	>1 (air = 1)	**Boiling Point/Range**	-20-1000^{o}F/-17-538^{o}C

9. PHYSICAL AND CHEMICAL PROPERTIES

Percent Volatile	>50%	**Partition Coefficient**	Not established
Specific Gravity	0.6 - 0.8 @ 60°F	**Density**	6.3 lb/gal @ 60°F
Molecular Weight	Not determined	**Evaporation Rate**	Not established
Flash Point	<100°F/<38°C	**Test Method**	ASTM D-56
Explosive Limits	< 1% LEL, 10% UEL	**Autoignition Temperature**	450°F/232°C
Solubility in Water	Slightly soluble in water		

10. STABILITY AND REACTIVITY

Stability Stable under normal anticipated storage and handling temperatures and pressures. Extremely flammable liquid and vapor. Vapor can cause flash fire.
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Conditions to Avoid Avoid high temperatures and all possible sources of ignition. Prevent vapor accumulation.

Incompatibility (Materials to Avoid) Avoid contact with strong oxidizing agents such as strong acids, alkalies, chlorine and other halogens, dichromates or permanganates, which can cause fire or explosion.

Hazardous Decomposition Products Hazardous decomposition products are not expected to form curing normal storage. The use of hydrocarbon fuel in an area without adequate ventilation may result in hazardous levels of combustion products (e.g., oxides of carbon, sulfur and nitrogen, benzene and other hydrocarbons) and/or dangerously low oxygen levels.

Hazardous Polymerization Not known to occur

11. TOXICOLOGICAL INFORMATION

Overview This product is a clear to dark brown liquid with a strong hydrocarbon odor. It may also have a sulfurous or rotten egg odor. Hydrogen sulfide, an extremely flammable and very toxic gas is expected to be present. This product is a volatile and extremely flammable liquid that may cause flash fires. Keep away from heat, sparks and flames and other sources of ignition. This product contains benzene, which may cause cancer or be toxic to blood forming organs. It contains material that has caused cancer based on animal data. Never siphon this product by mouth. If swallowed, this product may be aspirated into the lungs and cause lung damage or death.

This material may contain benzene and ethyl benzene at concentrations above 0.1%. Benzene is considered to be a known human carcinogen by OSHA, IARC and NTP. IARC has ethyl benzene, gasoline and gasoline engine exhaust as possibly carcinogenic to humans (Group 2B) based on laboratory animal studiesal studies.

Toxicological Information of the Material.

Acute Toxicity **Dermal:** Low Toxicity: LD50 > 2000 mg/kg (rabbit)
Causes mild skin irritation. Repeated exposure may cause skin dryness or cracking that can lead to dermatitis.

Inhalation: Hydrogen Sulfide is Extremely Toxic: LC100 = 600 ppm(v), 30 min (man)

11. TOXICOLOGICAL INFORMATION

Product expected to have low degree of toxicity by inhalation: LC 50 > 5.2 mg/l (vapor)
Effect of overexposure may include irritation of the digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of central nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued inhalation may result in unconsciousness and/or death.

Ingestion: Product expected to have low degree of toxicity by ingestion: Oral LD50 > 5 g/kg (rat), > 10 g/kg (mice)
Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal.

Eye Damage / Irritation
Causes serious eye irritation.

Sensitization
Skin: Not expected to be a skin sensitizer
Respiratory: Not expected to be a respiratory sensitizer

Specific Target Organ Toxicity
Single Exposure: High concentrations may cause irritation of the skin, eyes, digestive tract, irritation of the respiratory tract, nausea, vomiting, diarrhea and signs of central nervous system depression (e.g., headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue). Continued inhalation may result in unconsciousness and/or death.

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

Conditions Aggravated by Overexposure
Disorders of the organs or organ systems that may be aggravated by significant exposure to this material or its components include the skin, respiratory system, liver, kidneys, CNS, cardiovascular system and blood-forming system.

Carcinogenicity
May cause cancer based on component information.

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

Unleaded gasoline has been identified as a possible carcinogen by the International Agency for Research on Cancer.

Germ Cell Mutagenicity
Inadequate information available, not expected to be mutagenic.

11. TOXICOLOGICAL INFORMATION

Reproductive and Developmental Toxicity

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

Additional Information

Hydrogen Sulfide (H_2S). This material may contain or liberate H_2S, a poisonous gas with the smell of rotten eggs. Odor is not a reliable indicator of exposure because olfactory fatigue causes the smell to disappear. H_2S has a broad range of effects depending on the airborne concentration and length of exposure:
10 ppm: eye and respiratory tract irritation
100 ppm: coughing, headache, dizziness, nausea, eye irritation, loss of sense of smell in minutes
200 ppm: potential for pulmonary edema after 20 minutes
500 ppm: loss of consciousness after short exposures, potential for respiratory arrest
1000 ppm: Immediate loss of consciousness may lead rapidely to death, prompt cardiopulmonary resuscitation may be required.

Toxicological Information of Components

Benzene 71-43-2

Acute Data:
Dermal LD50 > 9400 mg/kg (Rabbit), (Guinea Pig)
LC50 = 9980 ppm (Mouse); 10000 ppm/7hr (Rat)
Oral LD50 = 4700 mg/kg (Mouse); 930 mg/kg (Rat); 5700 mg/kg (Mammal)
Carcinogenicity: Benzene is an animal carcinogen and is known to produce acute myelogenous leukemia (a form of cancer) in humans. Benzene has been identified as a human carcinogen by NTP, IARC and OSHA.
Target Organs: Prolonged or repeated exposures to benzene vapors has been linked to bone marrow toxicity which can result in blood disorders such as leukopenia, thrombocytopenia, and aplastic anemia. All of these diseases can be fatal.
Developmental: Exposure to benzene during pregnancy demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased body eight and increased skeletal variations in rodents. Alterations in hematopoeisis have been observed in the fetuses and offspring of pregnant mice.
Mutagenicity: Benzene exposure has resulted in chromosomal aberrations in human lymphocytes and animal bone marrow cells, and DNA damage in mammalian cells in vitro

Cyclohexane 110-82-7

Acute Toxicity:
Dermal LD50 => 2 g/kg (Rabbit)
LC50 > 4,044 ppm (4-hr, Rat)
Oral LD50 > 2 g/kg (Rat)
Target Organs: Cyclohexane can cause eye, skin and mucous membrane irritation, CNS depressant and narcosis at elevated concentrations. In experimental animals exposed to lethal concentrations by inhalation or oral route, generalized vascular damage and degenerative changes in the heart, lungs, liver, kidneys and brain were identified.
Developmental: Cyclohexane has been the focus of substantial testing in laboratory animals. Cyclohexane was not found to be genotoxic in several tests including unscheduled DNA synthesis, bacterial and mammalian cell mutation assays, and in vivo chromosomal aberration. An increase in chromosomal aberrations in bone marrow cells of rats exposed to cyclohexane was reported in the 1980's. However, a careful reevaluation of slides from this study by the laboratory which conducted the study indicates these findings were in error, and that no significant chromosomal effects were

11. TOXICOLOGICAL INFORMATION

observed in animals exposed to cyclohexane. Findings indicate long-term exposure to cyclohexane does not promote dermal tumorigenesis.

Ethyl Benzene 100-41-4

Acute Toxicity:
Dermal LD50 = 17800 mg/kg (Rabbit)
LC50 = 4000 ppm/4 hr; 13367 ppm (Rat)
Oral LD50 = 3500 mg/kg (Rat)
Carcinogenicity: Rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study demonstrated limited evidence of kidney, liver, and lung cancer. Ethyl benzene has been listed as a possible human carcinogen by IARC. Ethyl benzene has not been listed as a carcinogen by NTP or OSHA.
Target Organs: In rats and mice exposed to 0, 75, 250, or 750 ppm ethyl benzene in a two year inhalation study there was mild damage to the kidney (tubular hyperplasia), liver (eosinophilio foci,hypertrophy, necrosis), thyroid (hyperplasia) and pituitary (hyperplasia).

n-Hexane 110-54-3

Acute Toxicity:
Dermal LD50 = >2,000 mg/kg (Rabbit)
LC50 > 3,367 ppm (4 hr, Rat)
Oral LD50 > 5,000 mg/kg (Rat)
Target Organs: Excessive exposure to n-hexane can result in peripheral neuropathies. The initial symptoms are symmetrical sensory numbness and paresthesias of distal portions of the extremities. Motor weakness is typically observed in muscles of the toes and fingers but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. The neurotoxic properties of n-hexane are potentiated by exposure to methyl ethyl ketone and methyl isobutyl ketone. Prolonged exposure to high concentrations of n-hexane (>1,000 ppm) has resulted in decreased sperm count and degenerative changes in the testes of rats but not those of mice.

Hydrogen Sulfide 7783-06-4

Acute Toxicity:
Dermal - No data
LCLo= 600 ppm, 30 min (Human)
Hydrogen sulfide concentrations will vary significantly depending on the source and sulfur content of the product. Sweet natural gas condensate (<0.5% sulfur) may contain toxicologically significant levels of hydrogen sulfide in the vapor spaces of bulk storage tanks and transport compartments. Concentrations of H_2S as low as 10 ppm over an 8 hour workshift may cause eye or throat irritation. Prolonged breathing of 50-100 ppm H_2S vapors can produce significant eye and respiratory irritation. Sour condensates commonly contain extremely high concentrations of H_2S (500-70,000 ppm) in the vapor spaces of bulk storage vessels. Exposure to 250-600 ppm for 15-30 minutes can produce headache, dizziness, nervousness, staggering gait, nausea and pulmonary edema or bronchial pneumonia. Concentrations >1,000 ppm will cause immediate unconsciousness and death through respiratory paralysis. Rats and mice exposed to 80 ppm H_2S, 6 hrs/day, 5 days/week for 10 weeks, did not produce any toxicity except for irritation of nasal passages. H_2S did not affect reproduction and development (birth defects or neurotoxicity) in rats exposed to concentrations of 75-80 ppm or 150 ppm H_2S, respectively. Over the years a number of acute cases of H_2S poisonings have been reported. Complete and rapid recovery is the general rule. However, if the exposure was sufficiently intense and sustained causing cerebral hypoxia (lack of oxygen to the brain), neurologic effects such as amnesia, intention tremors or brain damage are possible.

Toluene 108-88-3

Acute Toxicity:
Dermal LD50 = 14 g/kg (Rabbit)

11. TOXICOLOGICAL INFORMATION

LC50 = 8,000 ppm (4-hr, Rat)
Oral LD50 = 2.5 - 7.9 g/kg (Rat)
Target Organs: Epidemiology studies suggest that chronic occupational overexposure to toluene may damage color vision. Subchronic and chronic inhalation studies with toluene produced kidney and liver damage, hearing loss and central nervous system (brain) damage in laboratory animals. Intentional misuse by deliberate inhalation of high concentrations of toluene has been shown to cause liver, kidney, and central nervous system damage, including hearing loss and visual disturbances.
Developmental: Exposure to toluene during pregnancy has demonstrated limited evidence of developmental toxicity in laboratory animals. The effects seen include decreased fetal body weight and increased skeletal variations in both inhalation and oral studies.

1,2,4 Trimethyl Benzene 95-63-6
Acute Toxicity:
Dermal LD50 = No data available
LC50 = 18 gm/m^3/4hr (Rat)
Oral LD50 = 3-6 g/kg (Rat)

Xylenes 1330-20-7
Acute Toxicity:
Dermal LD50 >3.16 ml/kg (Rabbit)
LC50= 5000 ppm/4 hr. (Rat)
Oral LD50 = 4300 mg/kg (Rat)
Target Organs: A six week inhalation study with xylene produced hearing loss in rats.
Developmental: Both mixed xylenes and the individual isomers produced limited evidence of developmental toxicity in laboratory animals. Inhalation and oral administration of xylene resulted in decreased fetal weight, increased incidences of delayed ossification, skeletal variations and resorptions.

12. ECOLOGICAL INFORMATION

Toxicity

This material is expected to be toxic to aquatic organisms with the potential to cause long term adverse effects in the aquatic environment. Acute aquatic toxicity studies on samples of gasoline and naphtha streams show acute toxicity values greater than 1 mg/l and mostly in the range of 1 to 100 mg/l. These tests were carried out on water accommodated fractions in closed systems to prevent evaporative loss. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition.

Classification H411, Chronic Category 2

96 hours LC50: 8.3 mg/l (Cyprinodon variegatus)
96 hours LC50: 1.8 mg/l (Mysidopsis bahia)
48 hours LC50: 3.0 mg/l (Daphnia magna)
96 hours LC50: 2.7 mg/l (Oncorhynchus mykiss)

Coating action of oil can kill birds, plankton, aquatic life, algae and fish.

Persistence and Degradability

This material is not readily biodegradable. Most of the nonvolatile constituents are inherently biodegradable. Some of the highest molecular weight components are persistent in water. The individual hydrocarbon components of this material are differentially soluble in water with aromatic hydrocarbons tending to be more water soluble than aliphatic hydrocarbons. If spilled, the lighter components will generally

12. ECOLOGICAL INFORMATION

evaporate but depending on local environmental conditions (temperature, wind, soil type, mixing or wave action in water, etc), photo-oxidation and biodegradation, the remainder may become dispersed in the water column or absorbed to soil or sediment. Because of their differential solubility, the occurrence of hydrocarbons in groundwater will be at different proportions than the parent material. Under anaerobic conditions, such as in anoxic sediments, rates of biodegradation are negligible.

Persistence per IOPC Fund Definition: Non-Persistent

Bioaccumulative Potential: Contains components with the potential to bioaccumulate. The octanol water coefficient values measured for the hydrocarbon components of this material range from 3 to greater than 6, and therefore would be considered as having the potential to bioaccumulate.

Mobility: **Air:** Contains volatile components. Lighter components will volatilize in the air. In air, the volatile hydrocarbons undergo photodegradation by reaction with hydroxyl radicals with half lives varying from 0.5 days for n-dodecane to 6.5 days for benzene.
Water: Spreads on a film on the surface of water. Significant proportion of spill will remain after one day. Lower molecular weight aromatic hydrocarbons and some polar compounds have low but significant water solubility. Some higher molecular weight compounds are removed by emulsification and these also slowly biodegrade while others adsorb to sediment and sink. Heavier fractions agglomerate to form tars, some of which sink.
Soil: Some constituents may be mobile and contaminate groundwater.

Other Adverse Effects: Films form on water and may affect oxygen transfer and damage organisms.

13. DISPOSAL CONSIDERATIONS

Recover or recycle if possible. It is the responsibility of the generator to determine the toxicity and physical properties of the material generated so as to properly classify the waste and ensure disposal methods comply with applicable regulations.

This material, if discarded as produced, is not a RCRA "listed" hazardous waste. However, it should be fully characterized for ignitability (D001), reactivity (D003) and benzene (D018) prior to disposal (40 CFR 261). Use which results in chemical or physical change or contamination may subject it to regulation as a hazardous waste. Along with properly characterizing all waste materials, consult state and local regulations regarding the proper disposal of this material.

Do not dispose of tank water bottoms by draining onto the ground. This will result in soil and groundwater contamination. Waste arising from spillage or tank cleaning should be disposed of in accordance with applicable regulations.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a qualified drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

14. TRANSPORTATION INFORMATION

United States Department of Transportation (US DOT) **Transportation of Dangerous Goods (TDG) Canada**	**Shipping Description:** Petroleum Distillates, n.o.s., 3, UN1268, I or II **Shipping Name:** Petroleum Distillates, n.o.s (contains natural gas condensate) **Hazard Class and Division:** 3 **ID Number:** UN1268 **Packing Group:** I or II **Label:** Flammable Liquid **Placard:** Flammable **Reportable Quantity:** None established for this material **Emergency Response Guide:** 128
International Maritime Dangerous Goods Code (IMDG)	**Shipping Description:** Petroleum Distillates, n.o.s., 3, UN1268, I or II **Shipping Name:** Petroleum Distillates, n.o.s (contains natural gas condensate) **Hazard Class and Division:** 3 **UN Number:** 1268 **Label:** Flammable Liquid **EMS Guide:** F-E, S-E Not a DOT Marine Pollutant per 49 CFR 71.8
European Agreements Concerning the International Carriage by Rail (RID) and by Road (ADR)	**Shipping Name**: Petroleum Distillates, n.o.s (contains natural gas condensate) **Hazard Class:** 3 **Packing Group:** I or II **Label:** Flammable Liquid **Danger Number:** 33 **UN Number:** 1268
International Civil Aviation Organization / International Air Transport Association (ICAO/IATA)	**Shipping Name:** Petroleum Distillates, n.o.s (contains natural gas condensate) or Natural Gasoline **UN/ID Number:** UN1268 **Hazard Class/Division:** 3 **Packing Group:** I or II **Labels:** Flammable **Emergency Response Guide:** 3H

15. REGULATORY INFORMATION

United States Federal Regulatory Information

EPA TSCA Inventory	This product and/or its components are listed on the Toxic Substances Control Act (TSCA) Inventory
EPA SARA 302/304 Emergency Planning and Notification	This material contains the following chemicals subject to reporting under the Superfund Amendments and Reauthorization Act of 1986 (SARA): Material contains hydrogen sulfide, considered an extremely hazardous substance. TPQ– 500 lb, EPCRA RQ – 100 lb
EPA SARA 311/312 (Title III Hazard Categories)	Acute Health: Yes Chronic Health: Yes Fire Hazard: Yes Pressure Hazard: No Reactive Hazard: No

15. REGULATORY INFORMATION

EPA SARA Toxic Chemical Notification and Release Reporting (40 CFR 372) and CERCLA Reportable Quantities (40 CFR 302.4)

Component	CAS Number	Concentration	RQ
Benzene	71-43-2	< 5 %	10 lb
Cyclohexane	110-82-7	< 5 %	1000 lb
Ethyl Benzene	100-41-4	< 3 %	1000 lb
n-Hexane	110-54-3	< 50 %	5000 lb
Toluene	108-88-3	< 15 %	1000 lb
1,2,4 Trimethyl Benzene	95-63-6	< 4 %	not listed
Xylene, all isomers	1330-20-7	< 12 %	100 lb

CERCLA Section 101(14) excludes crude oil and crude oil fractions, including hazardous constituents of petroleum, from the definition of hazardous substances. The petroleum exclusion applies to this product.

EPA CWA and OPA

This product is classified as an oil under Section 311 of the Clean Water Act (CWA) and Oil Pollution Act of 1990 (OPA), subject to spill reporting requirements.

Canadian Regulatory Information

DSL/NDSL Inventory

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

Workplace Hazardous Materials Information System (WHMIS) Hazard Class

B2 - Flammable Liquid
D1A – Material Causing Immediate and Serious Toxic Effects - Very Toxic Material
D2A: Material Causing Other Toxic Effects Very Toxic
D2B - Material Causing Other Toxic Effects - Toxic Material

European Union Regulatory Information

Labeling

Product is dangerous as defined by the European Union Dangerous Substances / Preparations Directives
Contains: Low Boiling Point Naphtha

Symbol

F+ Extremely Flammable
T Toxic
N Dangerous for the Environment

Risk Phrases

R12-45-38-65-67-51/53
Extremely flammable. May cause cancer. Irritating to skin. Harmful: may cause lung damage if swallowed. Vapors may cause drowsiness and dizziness. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety Phrases

S16-53-45-2-23-24-29-43-62
Keep away from sources of ignition – No smoking. Avoid exposure – obtain special instructions before use. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Keep out of reach of children. Do not breathe vapor. Avoid contact with skin. Do not empty into drains. In case of fire use foam/dry powder/CO_2. If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

15. REGULATORY INFORMATION

California Proposition 65
This product may contain detectable quantities of the following chemicals, known to the State of California to cause cancer, birth defects, or other reproductive harm and which may be subject to the warning requirements of California Proposition 65. Chemicals known to the State of California to cause cancer, birth defects or other reproductive harm are created by the combustion of this product.
Carcinogens: Benzene, Ethyl Benzene
Developmental Toxicity: Benzene, Toluene
Male Reproductive Toxicity: Benzene

Carcinogen Identification by International Agency for Research on Cancer

	Group 1	Carcinogenic to Humans	Benzene
	Group 2A	Probably Carcinogenic to Humans	
	Group 2B	Possibly Carcinogenic to Humans	Ethyl Benzene, Gasoline, Gasoline Engine Exhaust
	Group 3	Not Classifiable	Toluene, Xylenes

16. OTHER INFORMATION

Prepared By

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

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Processed Natural Gas
Product Code: None
Synonyms: Dry Gas
Generic Name: Natural Gas
Chemical Family: Paraffin hydrocarbon

Responsible Party: Unocal Corporation
Union Oil Company of California
14141 Southwest Freeway
Sugar Land, Texas
77478

For further information contact MSDS Coordinator
8am - 4pm Central Time, Mon - Fri: 281-287-5310

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:

For Chemical Emergencies:
Spill, Leak, Fire or Accident
Call CHEMTREC
North America: (800)424-9300
Others: (703)527-3887(collect)

For Health Emergencies:
California Poison
Control System
(800)356-3129

Health Hazards: Use with adequate ventilation.

Physical Hazards: Flammable gas. Can cause flash fire. Gas displaces oxygen available for breathing. Keep away from heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, mechanical/electrical equipment). Do not enter storage areas or confined space unless adequately ventilated.

< Physical Form: Gas
< Appearance: Colorless
< Odor: Odorless in the absence of H2S or mercaptans

NFPA HAZARD CLASS: Health: 1 (Slight)
Flammability: 4 (Extreme)
Reactivity: 0 (Least)

2. COMPOSITION/INFORMATION ON INGREDIENTS

HAZARDOUS COMPONENTS	% Weight	EXPOSURE GUIDELINE		
		Limits	Agency	Type
Methane CAS# 74-82-8	98	1000 ppm	MSHA	TWA
Carbon Dioxide CAS# 124-38-9	0-5	5000 ppm	ACGIH	TWA
		30000 ppm	ACGIH	STEL
		5000 ppm	OSHA	TWA
		5000 ppm	MSHA	TWA
		5000 ppm	Cal.OSHA	TWA
		30000 ppm	Cal.OSHA	STEL
Nitrogen CAS# 7727-37-9	0-5	1000 ppm	MSHA	TWA
Ethane CAS# 74-84-0	1	1000 ppm	MSHA	TWA

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

3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

Eye: Not expected to be an eye irritant.

Skin: Skin contact is unlikely. Skin absorption is unlikely.

Inhalation (Breathing): Asphyxiant. High concentrations in confined spaces may limit oxygen available for breathing.

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

Signs and Symptoms: Light hydrocarbon gases are simple asphyxiants which, at high enough concentrations, can reduce the amount of oxygen available for breathing. Symptoms of overexposure can include shortness of breath, drowsiness, headaches, confusion,

decreased coordination, visual disturbances and vomiting, and are reversible if exposure is stopped. Continued exposure can lead to hypoxia (inadequate oxygen), cyanosis (bluish discoloration of the skin), numbness of the extremities, unconsciousness and death. High concentrations of carbon dioxide can increase heart rate and blood pressure.

Cancer: No data available.

Target Organs: No data available.

Developmental: Limited data - See Other Comments, below.

Other Comments: High concentrations may reduce the amount of oxygen available for breathing, especially in confined spaces. Hypoxia (inadequate oxygen) and respiratory acidosis (increased carbon dioxide in blood), during pregnancy may have adverse effects on the developing fetus. Exposure during pregnancy to high concentrations of carbon monoxide, which is produced during the combustion of hydrocarbon gases, can also cause harm to the developing fetus.

Pre-Existing Medical Conditions: None known.

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: First aid is not normally required. However, it is good practice to wash any chemical from the skin.

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

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

5. FIRE FIGHTING MEASURES

Flammable Properties: Flash Point: Not applicable (gas)
OSHA Flammability Class: Flammable gas
LEL / UEL: No data
Autoignition Temperature: 800-1000°F

Unusual Fire & Explosion Hazards: This material is flammable and may be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment). Vapors may travel considerable distances to a source of ignition where they can ignite, flashback, or explode. May create vapor/air explosion hazard indoors, outdoors, or in sewers. If container is not properly cooled, it can rupture in the heat of a fire. Closed containers exposed t extreme heat can rupture due to pressure buildup.

Extinguishing Media: Dry chemical or carbon dioxide is recommended. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate immediate hazard area, keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. If this cannot be done, allow fire to burn. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Stay away from ends of container. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk.

6. ACCIDENTAL RELEASE MEASURES

Flammable. Keep all sources of ignition and hot metal surfaces away from spill/release. The use of explosion-proof equipment is recommended. Stay upwind and away from spill/release. Notify persons down wind of spill/release, isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with

minimal risk. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8). Notify fire authorities and appropriate federal, state, and local agencies. Water spray may be useful in minimizing or dispersing vapors (see Section 5).

7. HANDLING AND STORAGE

Handling: The use of explosion-proof equipment is recommended and may be required (see appropriate fire codes). Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Section 2 and 8). Use good personal hygiene practice.

Storage: Keep container(s) tightly closed. Use and store this material in cool, dry, well-ventilated areas away from heat, direct sunlight, hot metal surfaces, and all sources of ignition. Post area "No Smoking or Open Flame." Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage. Outdoor or detached storage is preferred.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits (see Section 2), additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used (see appropriate electrical codes).

Personal Protective Equipment (PPE):

Respiratory: Wear a positive pressure air supplied respirator in oxygen deficient environments (oxygen content <19.5%). A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

Skin: Not required based on the hazards of the material. However, it is considered good practice to wear gloves when handling chemicals.

Eye/Face: While contact with this material is not expected to cause irritation, the use of approved eye protection to safeguard against potential eye contact is considered good practice.

Other Protective Equipment: A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed. Self-contained respirators should be available for non-routine and emergency situations.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

Flash Point: Not applicable (gas)
Flammable/Explosive Limits (%): No data
Autoignition Temperature: 800-1000°F
Appearance: Colorless
Physical State: Gas
Odor: Odorless in the absence of H2S or mercaptans
Vapor Pressure (mm Hg): No data
Vapor Density (air=1): <1
Boiling Point: -259°F
Freezing/Melting Point: No data
Solubility in Water: Slight
Specific Gravity: 0.30+ (Air=1)
Percent Volatile: 100 vol.%
Evaporation Rate (nBuAc=1): N/A (Gas)

10. STABILITY AND REACTIVITY

Chemical Stability: Stable under normal conditions of storage and handling.

Conditions To Avoid: Avoid all possible sources of ignition (see Sections 5 & 7).

Incompatible Materials: Avoid contact with strong oxidizing agents.

Hazardous Decomposition Products: Combustion can yield carbon dioxide and carbon monoxide.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

No definitive information available on carcinogenicity, mutagenicity, target organs or developmental toxicity.

12. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, would be a RCRA "characteristic" hazardous waste due to the characteristic(s) of ignitability (D001). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this material is subject to the land disposal restriction in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult state and local regulations to determine whether they are more stringent than the federal requirements.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

13. TRANSPORT INFORMATION

DOT Proper Shipping Name / Technical Name: Hydrocarbon Gas, Liquified N.O.S. (Methane)
Hazard Class or Division: 2.1
ID #: UN1965

14. REGULATORY INFORMATION

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

--None--

Warning: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or

other reproductive harm, and are subject to the requirements of **California Proposition 65** (CA Health & Safety Code Section 25249.5):

--None Known--

This material has not been identified as a carcinogen by NTP, IARC, or OSHA.

EPA (CERCLA) Reportable Quantity: --None--

15. DOCUMENTARY INFORMATION

Issue Date: 03/18/03
Previous Issue Date: 11/29/99
Product Code: None
Previous Product Code: None

16. DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information in this document is believed to be correct as of the date issued. **HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.** This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of the product for his particular purpose and on the condition that he assume the risk of his use thereof.

ATTACHMENT I

EMISSION UNITS TABLE

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

Attachment I

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]
GPU-1	1e	Gas Processing unit	2015	1.0 MMBtu/hr	New	None
GPU-2	2e	Gas Processing unit	2015	1.0 MMBtu/hr	New	None
VDU-1	3e	Vapor Destruction Unit	2015	9.1 MMBtu/hr	New	APCD
TL-1	Fugitives	Truck Loading	2015	255,500 BBL/yr	New	None
T01-T04	3e	Produced Water Tanks	2015	210 BBL each	New	VDU-1
T05-T06	3e	Condensate Tanks	2015	210 BBL each	New	VDU-1

[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 SHEET

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
1e	Vertical Stack	GPU-1	Gas Processing Unit	NA	NA	NA	NA	PM SO2 NO_x CO VOC CO_2e	0.01 0.01 0.10 0.09 0.01 117.01	0.04 0.01 0.43 0.37 0.03 512.22	0.01 0.01 0.10 0.09 0.01 117.01	0.04 0.01 0.43 0.37 0.03 512.22	Gas/ Vapor	EE	Can Supply Upon Request
2e	Vertical Stack	GPU-2	Gas Processing Unit	NA	NA	NA	NA	PM SO2 NO_x CO VOC CO_2e	0.01 0.01 0.10 0.09 0.01 117.01	0.04 0.01 0.43 0.37 0.03 512.22	0.01 0.01 0.10 0.09 0.01 117.01	0.04 0.01 0.43 0.37 0.03 512.22	Gas/ Vapor	EE	Can Supply Upon Request
3e	Vertical Stack	VDU-1 with pilot-1	Vapor Destruction Unit	NA	NA	NA	NA	CO NOx VOC SO2 CO_2e	3.38 0.63 1.28 0.18 1030.78	14.79 2.72 5.60 0.75 4646.21	3.38 0.63 1.95 0.18 1030.78	14.79 2.72 8.51 0.75 4646.21	Gas/ Vapor	EE	Can Supply Upon Request
3e	Vertical Stack	T01-T04	Produced Water Tanks	VDU-1	Vapor Destruction Unit	NA	NA	VOC	0.76	3.32	0.02	0.07	Gas/ Vapor	EE	Can Supply Upon Request
3e	Vertical Stack	T05-T06	Condensate Tanks	VDU-1	Vapor Destruction Unit	NA	NA	VOC	96.37	422.08	1.93	8.45	Gas/ Vapor	EE	Can Supply Upon Request
Fugitives	Loading Fugitives	TL-1	Truck Loading	VDU-1	NA	NA	NA	VOC	1.55	6.77	1.55	6.77	Gas/ Vapor	EE	Can Supply Upon Request
Fugitives	Fugitives	NA	Piping Fugitive	NA	NA	NA	NA	VOC CO2e	0.01 5.11	0.01 22.37	0.01 5.11	0.01 22.37	Gas/ Vapor	EE	Can Supply Upon Request

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

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

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

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, 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.

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

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

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

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

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	1.0	500	353.67	7.50	1250	12	4325.666	535.738
2e	1.0	500	353.67	7.50	1250	12	4325.666	535.738
3e	3	1650	1,604.76	3.78	1250	25	4325.666	535.738

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

ATTACHMENT K

FUGITIVE EMISSIONS DATA SHEET

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not 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? ☐ Yes ☒ No ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☒ Yes ☐ No ☒ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☒ Yes ☐ No ☒ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ 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 Paved Haul Roads		-	-	-	-	EE
Unpaved Haul Roads		-	-	-	-	EE
Storage Pile Emissions		-	-	-	-	EE
Loading/Unloading Operations	VOC	0.41	1.77	0.41	1.77	EE
Wastewater Treatment Evaporation & Operations		-	-	-	-	EE
Equipment Leaks	VOC CO_2e	0.01 5.11	0.01 22.38	0.01 5.11	0.01 22.38	EE
General Clean-up VOC Emissions		-	-	-	-	EE
Other		-	-	-	-	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 SHEET

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

NATURAL GAS WELL AFFECTED FACILITY DATA SHEET

Complete this data sheet if you are the owner or operator of a gas well affected facility for which construction, modification, or reconstruction commenced after August 23, 2011. This form must be completed for natural gas well affected facilities regardless of when flowback operations occur (or have occurred).

Please provide the API number(s) for each NG well at this facility:	
Camden 17 - A	047-041-05685
Camden 17 - B	047-041-05686

Note: This is the same API well number(s) provided in the well completion notification and as provided to the WVDEP, Office of Oil and Gas for the well permit. The API number may be provided on the application without the state code (047).

Every oil and gas well permitted in West Virginia since 1929 has been issued an API (American Petroleum Institute) number. This API is used by agencies to identify and track oil and gas wells.

The API number has the following format: 047-001-00001

Where,
047 = State code. The state code for WV is 047.
001 = County Code. County codes are odd numbers, beginning with 001 (Barbour) and continuing to 109 (Wyoming).
00001= Well number. Each well will have a unique well number.

STORAGE VESSEL EMISSION UNIT DATA SHEET

Provide the following information for each new or modified bulk liquid storage tank.

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Camden 17 Well Pad	2. Tank Name Produced Water Tank
3. Emission Unit ID number T01 - T04	4. Emission Point ID number VDU-1
5. Date Installed or Modified *(for existing tanks)* 2015	6. Type of change: ☒ New construction ☐ New stored material ☐ Other
7A. Description of Tank Modification *(if applicable) NA*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Provide any limitations on source operation affecting emissions. (production variation, etc.) None	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 210 BBl	
9A. Tank Internal Diameter (ft.) 10	9B. Tank Internal Height (ft.) 15
10A. Maximum Liquid Height (ft.) 15	10B. Average Liquid Height (ft.) 7.5
11A. Maximum Vapor Space Height (ft.) 15	11B. Average Vapor Space Height (ft.) 7.5
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume. 210 BBL	
13A. Maximum annual throughput (gal/yr) 5,518,800 per tank	13B. Maximum daily throughput (gal/day) 15,120 per tank
14. Number of tank turnovers per year 626 per tank	15. Maximum tank fill rate (gal/min) 50 per tank
16. Tank fill method ☒ Submerged ☐ Splash ☐ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	
18. Type of tank (check all that apply): ☒ Fixed Roof _x_ vertical ___ horizontal _x_ flat roof ___ cone roof ___ dome roof ___ other (describe) ☐ External Floating Roof ___ pontoon roof ___ double deck roof ☐ Domed External (or Covered) Floating Roof ☐ Internal Floating Roof ___ vertical column support ___ self-supporting ☐ Variable Vapor Space ___ lifter roof ___ diaphragm ☐ Pressurized ___ spherical ___ cylindrical ☐ Underground ☐ Other (describe)	

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 34 – 39 in section VII

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

☐ Does Not Apply
☐ Carbon Adsorption[1]
☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers)
☐ Condenser[1]
☐ Other[1] (describe)
☐ Rupture Disc (psig)
☐ Inert Gas Blanket of _____
☐ Conservation Vent (psig
Vacuum Setting Pressure Setting
☐ Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application). See Attachment I

Material Name and CAS No.	Flashing Loss		Breathing Loss		Working Loss		Total Emissions Loss		Estimation Method[1]
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	
See Calculations for details									Promax Simulation

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)
Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color:	20B. Roof Color:	20C. Year Last Painted:

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ Yes ☐ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?

23. Operating Pressure Range (psig):

24. Is the tank a **Vertical Fixed Roof Tank**? ☐ Yes ☐No	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):

25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☐

25A. Year Internal Floaters Installed:

25B. Primary Seal Type *(check one):* ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐No

25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No

25F. Describe deck fittings:

26. Complete the following section for **Internal Floating Roof Tanks** ☐ Does not apply

26A. Deck Type: ☐ Bolted ☐ Welded	26B. For bolted decks, provide deck construction:

26C. Deck seam. Continuous sheet construction:
☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)

26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:

SITE INFORMATION:

27. Provide the city and state on which the data in this section are based:

28. Daily Avg. Ambient Temperature (°F):	29. Annual Avg. Maximum Temperature (°F):
30. Annual Avg. Minimum Temperature (°F):	31. Avg. Wind Speed (mph):
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):	33. Atmospheric Pressure (psia):

LIQUID INFORMATION:

34. Avg. daily temperature range of bulk liquid (°F):	34A. Minimum (°F):	34B. Maximum (°F):

35. Avg. operating pressure range of tank (psig):	35A. Minimum (psig):	35B. Maximum (psig):

36A. Minimum liquid surface temperature (°F):	36B. Corresponding vapor pressure (psia):
37A. Avg. liquid surface temperature (°F):	37B. Corresponding vapor pressure (psia):
38A. Maximum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):

39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.

39A. Material name and composition:			
39B. CAS number:			
39C. Liquid density (lb/gal):			
39D. Liquid molecular weight (lb/lb-mole):			
39E. Vapor molecular weight (lb/lb-mole):			
39F. Maximum true vapor pressure (psia):			
39G. Maxim Reid vapor pressure (psia):			
39H. Months Storage per year. From: To:			

STORAGE VESSEL EMISSION UNIT DATA SHEET

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Camden 17 Well Pad	2. Tank Name Condensate
3. Emission Unit ID number T05 – T06	4. Emission Point ID number VDU-1
5. Date Installed or Modified *(for existing tanks)* 2015	6. Type of change: ☒ New construction ☐ New stored material ☐ Other
7A. Description of Tank Modification *(if applicable) NA*	
7B. Will more than one material be stored in this tank? *If so, a separate form must be completed for each material.* ☐ Yes ☒ No	
7C. Provide any limitations on source operation affecting emissions. (Production variation, etc.) None	

II. TANK INFORMATION (required)

8. Design Capacity *(specify barrels or gallons).* Use the internal cross-sectional area multiplied by internal height. 210 BBL	
9A. Tank Internal Diameter (ft.) 10	9B. Tank Internal Height (ft.) 15
10A. Maximum Liquid Height (ft.) 15	10B. Average Liquid Height (ft.) 7.5
11A. Maximum Vapor Space Height (ft.) 15	11B. Average Vapor Space Height (ft.) 7.5
12. Nominal Capacity *(specify barrels or gallons).* This is also known as "working volume. 210 BBL	
13A. Maximum annual throughput (gal/yr) 76,650 per tank	13B. Maximum daily throughput (gal/day) 210 per tank
14. Number of tank turnovers per year 9 per tank	15. Maximum tank fill rate (gal/min) 50 per tank
16. Tank fill method ☒ Submerged ☐ Splash ☐ Bottom Loading	
17. Is the tank system a variable vapor space system? ☐ Yes ☒ No If yes, (A) What is the volume expansion capacity of the system (gal)? (B) What are the number of transfers into the system per year?	

18. Type of tank (check all that apply):

☒ Fixed Roof _x_ vertical ___ horizontal _x_ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ___ vertical column support ___ self-supporting
☐ Variable Vapor Space ___ lifter roof ___ diaphragm
☐ Pressurized ___ spherical ___ cylindrical
☐ Underground
☐ Other (describe)

III. TANK CONSTRUCTION AND OPERATION INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 19 – 26 in section VII

IV. SITE INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 27 – 33 in section VII

V. LIQUID INFORMATION *(check which one applies)*

☒ Refer to enclosed TANKS Summary Sheets
☐ Refer to the responses to items 34 – 39 in section VII

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply):

☐ Does Not Apply
☐ Carbon Adsorption[1]
☒ Vent to Vapor Combustion Device[1] (vapor combustors, flares, thermal oxidizers)
☐ Condenser[1]
☐ Other[1] (describe)
☐ Rupture Disc (psig)
☐ Inert Gas Blanket of _____
☐ Conservation Vent (psig
Vacuum Setting Pressure Setting
☐ Emergency Relief Valve (psig)

[1] Complete appropriate Air Pollution Control Device Sheet

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application). See Attachment I

Material Name and CAS No.	**Flashing Loss**		**Breathing Loss**		**Working Loss**		**Total Emissions Loss**		**Estimation Method[1]**
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**	
Condensate: See Calculations for details									EE Promax Simulation

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

Remember to attach emissions calculations, including TANKS Summary Sheets and other modeling summary sheets if applicable.

SECTION VII (required if did not provide TANKS Summary Sheets)

TANK CONSTRUCTION AND OPERATION INFORMATION

19. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color:	20B. Roof Color:	20C. Year Last Painted:

21. Shell Condition (if metal and unlined):

☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ Yes ☐ No	22B. If yes, operating temperature:	22C. If yes, how is heat provided to tank?

23. Operating Pressure Range (psig):

24. Is the tank a **Vertical Fixed Roof Tank**?	24A. If yes, for dome roof provide radius (ft):	24B. If yes, for cone roof, provide slop (ft/ft):

☐ Yes ☐ No		
25. Complete item 25 for **Floating Roof Tanks** ☐ Does not apply ☐		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type *(check one):* ☐ Metallic (mechanical) shoe seal ☐ Liquid mounted resilient seal ☐ Vapor mounted resilient seal ☐ Other (describe):		
25C. Is the Floating Roof equipped with a secondary seal? ☐ Yes ☐ No		
25D. If yes, how is the secondary seal mounted? *(check one)* ☐ Shoe ☐ Rim ☐ Other (describe):		
25E. Is the floating roof equipped with a weather shield? ☐ Yes ☐ No		
25F. Describe deck fittings:		

26. Complete the following section for **Internal Floating Roof Tanks** ☐ Does not apply	
26A. Deck Type: ☐ Bolted ☐ Welded	26B. For bolted decks, provide deck construction:
26C. Deck seam. Continuous sheet construction: ☐ 5 ft. wide ☐ 6 ft. wide ☐ 7 ft. wide ☐ 5 x 7.5 ft. wide ☐ 5 x 12 ft. wide ☐ other (describe)	

26D. Deck seam length (ft.):	26E. Area of deck (ft^2):	26F. For column supported tanks, # of columns:	26G. For column supported tanks, diameter of column:

SITE INFORMATION:	
27. Provide the city and state on which the data in this section are based:	
28. Daily Avg. Ambient Temperature (°F):	29. Annual Avg. Maximum Temperature (°F):
30. Annual Avg. Minimum Temperature (°F):	31. Avg. Wind Speed (mph):
32. Annual Avg. Solar Insulation Factor (BTU/ft^2-day):	33. Atmospheric Pressure (psia):

LIQUID INFORMATION:		
34. Avg. daily temperature range of bulk liquid (°F):	34A. Minimum (°F):	34B. Maximum (°F):
35. Avg. operating pressure range of tank (psig):	35A. Minimum (psig):	35B. Maximum (psig):

36A. Minimum liquid surface temperature (°F):	36B. Corresponding vapor pressure (psia):
37A. Avg. liquid surface temperature (°F):	37B. Corresponding vapor pressure (psia):
38A. Maximum liquid surface temperature (°F):	38B. Corresponding vapor pressure (psia):

39. Provide the following for each liquid or gas to be stored in the tank. Add additional pages if necessary.			
39A. Material name and composition:			
39B. CAS number:			
39C. Liquid density (lb/gal):			
39D. Liquid molecular weight (lb/lb-mole):			
39E. Vapor molecular weight (lb/lb-mole):			
39F. Maximum true vapor pressure (psia):			
39G. Maxim Reid vapor pressure (psia):			
39H. Months Storage per year. From: To:			

NATURAL GAS FIRED FUEL BURNING UNITS
EMISSION DATA SHEET

Complete the information on this data for each Gas Producing Unit(s), Heater Treater(s), and in-line heater(s) at the production pad. Reboiler information should be entered on the Glycol Dehydration Emission Unit Data Sheet.

Emission Unit ID #[1]	Emission Point ID#[2]	Emission Unit Description (Manufacturer / Model #)	Year Installed/ Modified	Type[3] and Date of Change	Control Device[4]	Design Heat Input (mmBtu/hr)[5]	Fuel Heating Value (Btu/scf)[6]
GPU-1	1e	Cimarron	2015	New	NA	1.0 MMBtu/hr	1020
GPU-2	2e	Cimarron	2015	New	NA	1.0 MMBtu/hr	1020

[1] Enter the appropriate Emission Unit (or Sources) identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For sources, use 1S, 2S, 3S…or other appropriate designation. Enter glycol dehydration unit Reboiler Vent data on the *Glycol Dehydration Unit Data Sheet*.

[2] Enter the appropriate Emission Point identification numbers for each fuel burning unit located at the production pad. Gas Producing Unit Burners should be designated GPU-1, GPU-2, etc. Heater Treaters should be designated HT-1, HT-2, etc. Heaters or Line Heaters should be designated LH-1, LH-2, etc. For emission points, use 1E, 2E, 3E…or other appropriate designation.

[3] New, modification, removal

[4] Complete appropriate air pollution control device sheet for any control device.

[5] Enter design heat input capacity in mmBtu/hr.

[6] Enter the fuel heating value in Btu/standard cubic foot.

TANK TRUCK LOADING
EMISSION UNIT DATA SHEET

Furnish the following information for each new or modified bulk liquid transfer area or loading rack at the natural gas production pad. This form is to be used for bulk liquid transfer operations to tank trucks.

1. Emission Unit ID: TL-1	2. Emission Point ID: Loading Fugitives	3. Year Installed/ Modified: 2015
4. Emission Unit Description: Emissions are fugitive in nature from the trucks vacuum pump		
5. Loading Area Data: Adjacent to tanks		
5A. Number of pumps: 1 on truck	5B. Number of liquids loaded: 1	5C. Maximum number of tank trucks loading at one time: 1
6. Describe cleaning location, compounds and procedure for tank trucks: NA		
7. Are tank trucks pressure tested for leaks at this or any other location? ☐ Yes ☐ No If YES, describe: NA		

8. Projected Maximum Operating Schedule (for rack or transfer point as a whole):

Maximum	Jan. - Mar.	Apr. - June	July - Sept.	Oct. - Dec.
hours/day	24	24	24	24
days/week	7	7	7	7

9. Bulk Liquid Data *(add pages as necessary):*

Liquid Name	Produced Water	Condensate	
Max. daily throughput (1000 gal/day)	25.2	4.2	
Max. annual throughput (1000 gal/yr)	9,198	1,533	
Loading Method [1]	Sub	Sub	
Max. Fill Rate (gal/min)	-	-	
Average Fill Time (min/loading)	-	-	
Max. Bulk Liquid Temperature (^{o}F)	60.8	60.8	
True Vapor Pressure [2]	0.28	12.91	
Cargo Vessel Condition[3]	U	U	
Control Equipment or Method [4]	NA	NA	
Minimum collection efficiency (%)	0	0	
Minimum control efficiency (%)	0	0	

** Continued on next page*

Maximum Emission Rate	Loading (lb/hr)	0.08	1.47	
	Annual (ton/yr)	0.35	6.42	
Estimation Method [5]		EPA	EPA	

Notes: Although EPA AP-42 emission equations were used vapor pressures for each liquid came from Promax simulation data

[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 as Attachment "H"*):
CA = Carbon Adsorption
VB = Dedicated Vapor Balance (closed system)
ECD = Enclosed Combustion Device
F = Flare
TO = Thermal Oxidation or Incineration

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

10. **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 *Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment operation/air pollution control device.* The loadout operation will be visual monitored during the procedure.	RECORDKEEPING *Please describe the proposed recordkeeping that will accompany the monitoring.* Records will be kept of the amount of liquids transferred, as well as the frequency of the operation.
REPORTING *Please describe the proposed frequency of reporting of the recordkeeping.* Reporting of records will be performed as required by permit standards.	TESTING *Please describe any proposed emissions testing for this process equipment/air pollution control device.* Testing will be performed as required by permit standards

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

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components[1]	Number of Components Monitored by Frequency[2]	Average Time to Repair (days)[3]	Estimated Annual Emission Rate (lb/yr)[4]
Pumps[5]	light liquid VOC[6,7]				
	heavy liquid VOC[8]				
	Non-VOC[9]				
Valves[10]	Gas VOC	166	Quarterly	As soon as possible	0.22
	Light Liquid VOC		Quarterly	As soon as possible	
	Heavy Liquid VOC				
	Non-VOC-CO2e	166	Quarterly	As soon as possible	995.33
Safety Relief Valves[11]	Gas VOC	7	Quarterly	As soon as possible	0.09
	Non VOC-CO2e	7	Quarterly	As soon as possible	387.43
Open-ended Lines[12]	VOC	18	Quarterly	As soon as possible	0.22
	Non-VOC-CO2e	18	Quarterly	As soon as possible	968.87
Sampling Connections[13]	VOC				
	Non-VOC				
Compressor Seals	VOC		Quarterly	As soon as possible	
	Non-VOC		Quarterly	As soon as possible	
Flanges	VOC		Quarterly	As soon as possible	
	Non-VOC		Quarterly	As soon as possible	
Other - Connectors	VOC	766	Quarterly	As soon as possible	9.34
	Non-VOC-CO2e	766	Quarterly	As soon as possible	42,395.9

[1 - 13] See notes on the following page.

Notes for Leak Source Data Sheet

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

2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:

   Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)

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

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

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

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

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

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

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

9. LIST CO, H_2S, mineral acids, NO, NO_2, SO_3, etc. DO NOT LIST CO_2, H_2, H_2O, N_2, O_2, and Noble Gases.

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

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

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

13. Do not include closed-purge sampling connections.

ATTACHMENT M

AIR POLLUTION CONTROL DEVICE

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

AIR POLLUTION CONTROL DEVICE
Vapor Combustion Control Device Sheet

Complete this vapor combustion control device sheet for each enclosed combustion device, flare, thermal oxidizer, or completion combustion device that is located at the natural gas production pad for the purpose of thermally destructing waste gas to control emissions of regulated pollutants to the atmosphere.

IMPORTANT: READ THE INSTRUCTIONS ACCOMPANYING THIS FORM BEFORE COMPLETING.

General Information

1. Control Device ID#: VDU-1	2. Installation Date: 2015 ☒ New	
3. Maximum Rated Total Flow Capacity: 4,125 scfh 99,000 scfd	4. Maximum Design Heat Input: 9.1 MMBtu/hr	5. Design Heat Content: 2,200 BTU/scf

Control Device Information

6. Select the type of vapor combustion control device being used: ☒ Enclosed Combustion Device

☐ Elevated Flare ☐ Ground Flare ☐ Thermal Oxidizer ☐ Completion Combustion Device

7. Manufacturer: LEED Fabrication Model No.: L30-0018-00	8. Hours of operation per year: 8760

9. List the emission units whose emissions are controlled by this vapor combustion control device: (Emission Point ID#: 3e)

10. Emission Unit ID#	Emission Source Description:	Emission Unit ID#	Emission Source Description:
T01	Produced Water	T02	Produced Water
T03	Produced Water	T04	Produced Water
T05	Condensate Tank	T06	Condensate Tank

If this vapor combustor controls emissions from more than six emission units, please attach additional pages.

11. Assist Type	12. Flare Height	13. Tip Diameter	14. Was the design per §60.18?
☐ Steam - ☐ Air - ☐ Pressure - ☒ Non -	25 ft	Multi tip Burner	☒Yes ☐No

Waste Gas Information

15. Maximum waste gas flow rate (scfm):	16. Heat value of waste gas stream (BTU/ft3)	17. Temperature of the emissions stream (°F)	18. Exit Velocity of the emissions stream (ft/s)
69	2,200	1400	<60

19. Provide an attachment with the characteristics of the waste gas stream to be burned.

Pilot Information

20. Type/Grade of pilot fuel:	21. Number of pilot lights:	22. Fuel flow rate to pilot flame per pilot (scf/hr):	23. Heat input per pilot (BTU/hr):	24. Will automatic re-ignition be used?
Fuel Gas	1	50	50,000	☒ Yes ☐ No

25. If automatic re-ignition will be used, describe the method: Electronic re-ignition will be installed (additional details provided upon request)

26. Describe the method of controlling flame: Thermocouple

27. Is pilot flame equipped with a monitor to detect the presence of the flame? ☒ Yes ☐ No	28. If yes, what type? ☒ Thermocouple ☐ Infra-Red ☐ Ultra Violet ☐ Camera with monitoring control room ☐ Other, describe:

29. Pollutant(s) Controlled	30. % Capture Efficiency	31. Manufacturer's Guaranteed Control Efficiency (%)
VOC	99	98

32. Has the control device been tested by the manufacturer and certified? No

33. Describe all operating ranges and maintenance procedures required by the manufacturer to maintain warranty: Available Upon request

34. Additional Information Attached? ☒ **YES** ☐ **NO**

Please attach a copy of manufacturer's data sheet.
Please attach a copy of manufacturer's drawing.
Please attach a copy of the manufacturer's performance testing.

If any of the requested information is not available, please contact the manufacturer.

INSTRUCTIONS:
Vapor Combustion Control Device

This form assumes one vapor combustion control device emissions are being released from the emission point identification number (including the waste gas emissions and pilot emissions). If multiple vapor combustion control devices are being used at the oil and natural gas production facility, a vapor control device sheet must be completed for each device. The same form is being used for all types of vapor combustion control devices.

General Information

1. Enter the control device ID#(s) that has been assigned to this control device. A unique control device identification number should identify each control device located at the affected facility.
2. Enter the date that the control device was installed at the affected facility. Include the month, day, and year. If this is a new control device that has yet to be installed, check the "NEW" box.
3. Enter the maximum rated total flow rate of the vapor combustion device. This includes the flow rate of all materials to be burned including the pilot fuel and the waste gas.
4. Enter the maximum rated design heat input capacity of the vapor combustion device in terms of million British thermal units per hour (MMBtu/hr).
5. Enter the total design heat content of the pilot in terms of million British thermal units per hour (MMBtu/hr).

Control Device Information

6. Indicate the type of vapor combustion device that applies.
7. Enter the manufacturer and model number of the control device.
8. Enter the hours of operation that the control device is planned to be used. This should be the same basis as the emissions calculations.
9. Enter the emission point identification number.
10. Enter ALL of the emission units whose emissions will be controlled and then emitted from the control device.
11. Select whether the flare is steam-assisted, air-assisted, pressure-assisted, or non-assisted.
12. Enter the height of the stack in terms of feet.
13. Enter the tip diameter (in feet) of the top of the stack where the emissions are discharged.
14. Is the applicant having the combustion device designed per §60.18? Only flares required by an NSPS standard are required to be designed and operated in accordance with §60.18.

Waste Gas Information

The waste gas is the vapor emissions that are being controlled.

15. Enter the waste gas flow rate in cubic feet per minute that is being consumed.
16. Enter the heat content of the waste gas being combusted in units of BTU per cubic feet.
17. Enter the minimum temperature of the emissions stream (°F).
18. Enter the velocity in feet per second of the gas as it discharges from the top of the stack.
19. Provide the characterization of the waste gas stream that is being controlled. This could be a certificate of analysis of the natural gas from this facility or from a similar facility. This is the basis of the emissions calculations.

Pilot Information

20. Enter the type/grade(s) of fuel that will combusted in the combustion flare's pilot (examples: natural gas pipeline quality, propane, etc.).
21. How many pilot lights does the device have?
22. What is the fuel capacity for each pilot?
23. What is the heat input for each pilot?
24. Is the system designed with automatic re-ignition?
25. Describe the re-ignition method and system.
26. Describe the method of controlling the pilot flame.
27. Is the pilot flame equipped with a monitoring device?
28. What is the monitoring device for the pilot flame?

**continued next page*

Control Information

29. Enter the types of pollutants that the control equipment controls (i.e., reduces). If numerous pollutants are controlled, indicate the different pollutants controlled in line with their respective control efficiencies.
30. What is the % capture efficiency of the collection system to the control device? In other words, what is the percentage of the waste gas stream will be controlled?
31. Enter the control efficiency of the control equipment for each pollutant being controlled. The manufacturer typically provides a manufacturer's minimum guarantee control efficiency. Provide the manufacturer's data sheet that documents the minimum guarantee.
32. Please answer if the control device had a performance test conducted by the manufacturer and if it is certified.
33. Describe the manufacturer's operating and maintenance requirements that the guaranteed control efficiency is based upon.
34. Please include any additional information associated with the control device you feel should be submitted with this application. Please attach a copy of the manufacturer's data sheet. Please include the manufacturer's performance testing.

ATTACHMENT N

SUPPORTING EMISSIONS CALCULATIONS

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

Table 1. Annual Potential To Emit (PTE)
CNX Gas LLC - Camden 17

Criteria PTE

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e
Tanks (ton/yr)	-	-	-	-	-	-	Included in VDU	-
Truck Loading (ton/yr)	-	-	-	-	-	-	6.764	-
Vapor Destruction Unit (ton/yr)	-	-	-	0.748	2.718	14.790	8.508	4646.202
GPU Heaters	0.065	0.000	0.000	0.005	0.859	0.721	0.047	1024.432
Fugitives (ton/yr)	-	-	-	-	-	-	0.005	22.374
Total Emissions (ton/yr)	0.065	0.000	0.000	0.753	3.577	15.511	15.324	5693.008
Total Emissions (lb/hr)	0.015	0.000	0.000	0.172	0.817	3.541	3.499	1299.773

Note: The VOC tank emissions are listed as 8.508 tpy under the Vapor Destruction Unit (VDU) source listing, which represents 98% contol of Promax predicted emissions.

HAP PTE

Source	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs Listed (tpy)
Tanks (ton/yr)	-	-	-	-	-	-	0.000
Truck Loading (ton/yr)	-	-	-	-	-	-	0.000
GPU Heaters	0.00002	0.00003	-	-	0.01546	0.00064	0.01615
Total Emissions (ton/yr)	0.000	0.000	0.000	0.000	0.015	0.001	0.016
Total Emissions (lb/hr)	0.000	0.000	0.000	0.000	0.004	0.000	0.004

Table 2. Tank Emissions
CNX Gas LLC - Camden 17

Emission Unit	Tank Contents	Control Devices	Tank Throughput (bbls/day)	Flashing and W&B Emissions (lb/hr)(a)	VOC Emissions (ton/yr)	98 %VOC Emissions Reduction (lb/hr)	98 %VOC Emissions Reduction (ton/yr)
T01-T04	Produced Water	None	600.00	0.756	3.312	0.015	0.066
T05-T06	Condensate	None	100.00	96.365	422.079	1.927	8.442
Total				**97.121**	**425.391**	**1.942**	**8.508**

(a) Emissions are taken from ProMax 3.2. and are the combination of the flash gas analysis and working & breathing analysis of representative inputs from Oxford 1

Notes:

Promax Results Summary (Complete results located in the back of attachment I)

Condensate Tanks Vented Emissions

Pollutant	lb/hr
Propane	51.2161
i-Butane	11.5425
n-Butane	20.1692
i-Pentane	5.03045
n-Pentane	4.35537
Hexane	1.52495
Isohexane	0.68402
Neohexane	0.82076
2,2,4-Trimethylpentane	0.00174763
Benzene	0.0375381
Heptane	0.621017
Toluene	0.0432709
Octane	0.247975
Ethylbenzene	0.00201755
o-Xylene	0.00223262
Nonane	0.0412352
Decane	0.0247324
VOCs	**96.37**

Water Tanks Vented Emissions

Pollutant	lb/hr
Propane	0.579367
i-Butane	0.027976
n-Butane	0.0954935
i-Pentane	0.0159928
n-Pentane	0.0138559
Hexane	0.00225351
Isohexane	0.00112636
Neohexane	0.000972163
2,2,4-Trimethylpentane	3.66E-07
Benzene	0.00655641
Heptane	0.00165934
Toluene	0.00906056
Octane	0.000432258
Ethylbenzene	0.000515129
o-Xylene	0.000642703
Nonane	0.000141745
Decane	6.42E-05
VOCs	**0.76**

Table 3. Gas Processing Unit (GPU) Rates and Emissions
CNX Gas LLC - Camden 17

Pollutant	Emission Factor			Emissions (lbs/hr)	Emissions (tons/yr)	Emissions x2 (lbs/hr)	Emissions x2 (tons/yr)
Criteria Pollutants							
PM/PM10/PM2.5	7.6	lb/MMcf	(1)	0.007	0.033	0.015	0.065
SO_2	0.6	lb/MMcf	(1)	0.001	0.003	0.001	0.005
NOx	100	lb/MMcf	(2)	0.098	0.429	0.196	0.859
CO	84	lb/MMcf	(2)	0.082	0.361	0.165	0.721
VOC	5.5	lb/MMcf	(1)	0.005	0.024	0.011	0.047
Hazardous Air Pollutants							
Arsenic	2.0E-04	lb/MMcf	(3)	1.96E-7	8.59E-7	3.92E-7	1.72E-6
Benzene	2.1E-03	lb/MMcf	(4)	2.06E-6	9.02E-6	4.12E-6	1.80E-5
Beryllium	1.2E-05	lb/MMcf	(3)	1.18E-8	5.15E-8	2.35E-8	1.03E-7
Cadmium	1.1E-03	lb/MMcf	(3)	1.08E-6	4.72E-6	2.16E-6	9.45E-6
Chromium	1.4E-03	lb/MMcf	(3)	1.37E-6	6.01E-6	2.75E-6	1.20E-5
Cobalt	8.4E-05	lb/MMcf	(3)	8.24E-8	3.61E-7	1.65E-7	7.21E-7
Dichlorobenzene	1.2E-03	lb/MMcf	(4)	1.18E-6	5.15E-6	2.35E-6	1.03E-5
Formaldehyde	7.5E-02	lb/MMcf	(4)	7.35E-5	3.22E-4	1.47E-4	6.44E-4
Hexane	1.8E+00	lb/MMcf	(4)	1.76E-3	7.73E-3	3.53E-3	1.55E-2
Lead	5.0E-04	lb/MMcf	(3)	4.90E-7	2.15E-6	9.80E-7	4.29E-6
Manganese	3.8E-04	lb/MMcf	(3)	3.73E-7	1.63E-6	7.45E-7	3.26E-6
Mercury	2.6E-04	lb/MMcf	(3)	2.55E-7	1.12E-6	5.10E-7	2.23E-6
Naphthalene	6.1E-04	lb/MMcf	(4)	5.98E-7	2.62E-6	1.20E-6	5.24E-6
Nickel	2.1E-03	lb/MMcf	(3)	2.06E-6	9.02E-6	4.12E-6	1.80E-5
PAH/POM	1.3E-03	lb/MMcf	(4)	1.26E-6	5.53E-6	2.53E-6	1.11E-5
Selenium	2.4E-05	lb/MMcf	(3)	2.35E-8	1.03E-7	4.71E-8	2.06E-7
Toluene	3.4E-03	lb/MMcf	(4)	3.33E-6	1.46E-5	6.67E-6	2.92E-5
						0.00E+0	0.00E+0
Total HAP	**1.9E+00**	**lb/MMCF**		1.85E-3	8.11E-3	3.71E-3	1.62E-2
Greenhouse Gas Emissions							
CO_2	116.89	lb/MMBtu	(5)	1.17E+2	5.12E+2	2.34E+2	1.02E+3
CH_4	2.2E-03	lb/MMBtu	(5)	2.20E-3	9.66E-3	4.41E-3	1.93E-2
N_2O	0.0	lb/MMBtu	(5)	2.20E-4	9.47E-7	4.41E-4	1.89E-6
CO_2e[(b)]	-	-		117.010	512.216	234.020	1024.432

Calculations:

(a) Annual emissions (tons/yr) = [Annual Usage (MMBtu/yr or MMCF/yr)]x [Number of Identical Heaters]x [Emission Factor (lb/MMBtu or lb/MMCF)] / [2,000 lb/ton]

Number of GPUs 2
Fuel Use (MMBtu/hr) = 1
Hours of Operation (hr/yr)= 8760
PTE Fuel Use (MMcf/yr) = 8.6 (7)

(b) CO_2 equivalent = [(CO_2 emissions)*(GWP_{CO2})]+[(CH_4 emissions)*(GWP_{CH4})]+[(N_2O emissions)*(GWP_{N2O})]

Global Warming Potential (GWP)

CO_2	1	(6)
CH_4	25	(6)
N_2O	298	(6)

Notes:

(1) AP-42, Chapter 1.4, Table 1.4-2. Emission Factors For Criteria Pollutants and Greenhouse Gases From Natural Gas Combustion, July 1998.
(2) AP-42, Chapter 1.4, Table 1.4-1. Emission Factors For Nitrogen Oxides (Nox) and Carbon Monoxide(CO) From Natural Gas Combustion, July 1998.
(3) AP-42, Chapter 1.4, Table 1.4-4. Emission Factors For Metals From Natural Gas Combustion, July 1998.
(4) AP-42, Chapter 1.4, Table 1.4-3. Emission Factors for Speciated Organic Compounds from Natural Gas Combustion, July 1998.
(5) Emission factors are from 40 CFR 98, Subpart C, Table C-1 and C-2.
(6) Global Warming Potentials obtained from 40 CFR 98, Subpart A, Table A-1
(7) MMBtu to MMcf conversion factor is 1020. AP-42, Chapter 1.4

Table 4. Vapor Destruction Unit (VDU-1) Emissions
CNX Gas LLC - Camden 17

Pollutant	Emission Factor (lb/MMBtu)	Volume (scf/hr)	Gas Heat Value (Btu/scf)	(MMBtu/ 1000000Btu)	Emissions (lbs/hr)	Emissions (ton/yr)
CO	0.37	4,125	2,200	(1/1,000,000)	3.36	14.71
NOx	0.07	4,125	2,200	(1/1,000,000)	0.62	2.70
VOC	0.14	4,125	2,200	(1/1,000,000)	1.27	5.56
CO2e	116.89	4,125	2,200	(1/1,000,000)	1,060.78	4,646.20

Example Formula:

$$\text{emissions}\left(\frac{\text{ton}}{\text{yr}}\right) = \text{emission factor}\left(\frac{\text{lb}}{\text{MMBtu}}\right) \times \text{Volume}\left(\frac{\text{scf}}{\text{hr}}\right) \times \text{gas heat value}\left(\frac{\text{Btu}}{\text{scf}}\right) \times \frac{\text{MMBtu}}{1{,}000{,}000\ \text{Btu}} \times \frac{8760\ \text{hrs}}{1\ \text{yr}} \times \frac{1\ \text{ton}}{2{,}000\ \text{lbs}}$$

Emission Factor = AP-42 Table 13.1 emission factor for specific pollutant
Volume = 4125 scf/hr
Gas Heat Value = 2200 Btu/scf

Pollutant	Volume (scf/hr)	grain H2S/ 100 scf	Mol Fraction	Mol weight (g/mol)	(lb-mol /scf)	Emissions (lbs/hr)	Emissions (ton/yr)
SO2	4,125	15.26	0.0002423	64.00	1/379.4	0.1686	0.7386

Example Formula:

$$\text{emissions}\left(\frac{\text{ton}}{\text{yr}}\right) = \text{Volume}\left(\frac{\text{scf}}{\text{hr}}\right) \times \text{mol fraction}\left(\frac{\text{H2S}}{100\ \text{scf}} \times 0.00001588\right) \times \text{molecular weight} \times \frac{\text{lb} \cdot \text{mol}}{\text{scf}} \times \frac{8760\ \text{hrs}}{1\ \text{yr}} \times \frac{1\ \text{ton}}{2{,}000\ \text{lbs}}$$

$$\frac{1\ grain\ H2S}{100\ scf} = 15.26\ ppm\ of\ H2S$$

H2S conversion taken from supporting Sulfur Measurement Handbook
grain H2S/100 scf = 15.26
Volume = 4125 scf/hr
1 lb mol = 379.4 cubic feet

For Pilot Light

Pollutant	Emission Factor (lb/MMBtu)	Volume (scf/hr)	Gas Heat Value (Btu/scf)	(MMBtu/ 1000000Btu)	Emissions (lbs/hr)	Emissions (ton/yr)
CO	0.37	50	1,020	(1/1,000,000)	0.0189	0.0827
NOx	0.07	50	1,020	(1/1,000,000)	0.0035	0.0152
VOC	0.14	50	1,020	(1/1,000,000)	0.0071	0.0313

Example Formula:

$$\text{emissions}\left(\frac{\text{ton}}{\text{yr}}\right) = \text{emission factor}\left(\frac{\text{lb}}{\text{MMBtu}}\right) \times \text{Volume}\left(\frac{\text{scf}}{\text{hr}}\right) \times \text{gas heat value}\left(\frac{\text{Btu}}{\text{scf}}\right) \times \frac{\text{MMBtu}}{1{,}000{,}000\ \text{Btu}} \times \frac{8760\ \text{hrs}}{1\ \text{yr}} \times \frac{1\ \text{ton}}{2{,}000\ \text{lbs}}$$

Emission Factor = AP-42 Table 13.1 emission factor for specific pollutant
Volume = 50 scf/hr
Gas Heat Value = 1020 Btu/scf

Pollutant	Volume (scf/hr)	grain H2S/ 100 scf	Mol Fraction	Mol weight (g/mol)	(lb-mol /scf)	Emissions (lbs/hr)	Emissions (ton/yr)
SO2	50.00	15.26	0.0002423	64.00	1/379.4	0.0020	0.0090

Example Formula:

$$\text{emissions}\left(\frac{\text{ton}}{\text{yr}}\right) = \text{Volume}\left(\frac{\text{scf}}{\text{hr}}\right) \times \text{mol fraction}\left(\frac{\text{H2S}}{100\ \text{scf}} \times 0.00001588\right) \times \text{molecular weight} \times \frac{\text{lb} \cdot \text{mol}}{\text{scf}} \times \frac{8760\ \text{hrs}}{1\ \text{yr}} \times \frac{1\ \text{ton}}{2{,}000\ \text{lbs}}$$

$$\frac{1\ grain\ H2S}{100\ scf} = 15.26\ ppm\ of\ H2S$$

H2S conversion taken from supporting Sulfur Measurement Handbook
grain H2S/100 scf = 15.26
Volume = 50 scf/hr
1 lb mol = 379.4 cubic feet

VDU and Pilot Combined		
Pollutant	lb/hr	ton/yr
CO	**3.377**	**14.790**
Nox	**0.621**	**2.718**
VOC	**1.942**	**8.508**
SO2	**0.171**	**0.748**

Note: VOC emissions were taken from 98% reduction of uncontrolled Tank VOC as predicted by Promax

Table 5. Truck Loading (TL) VOC Emissions
CNX Gas LLC - Camden 17

Contents	Volume Transferred	Loading Loss [(a)] (lb VOC/1000gal)	PTE VOC Emissions (lb/hr)	PTE VOC Emissions (ton/yr) [(b)]
Water	9,198,000 gal/yr	0.075	0.079	0.345
Condensate	1,533,000 gal/yr	8.375	1.466	6.419
Total			**1.544**	**6.764**

Calculations:

(a) Loading Loss (lbs/1000 gal) = 12.46x[Saturation Factor] x [True Vapor Pressure of Liquid Loaded (psia)] x[Molecular Weight of Vapors(lbs/lb-mole)]/ [Temperature of Bulk Liquid Loaded(°R)]

(b) Annual Emissions(tons/yr) = [Loading Loss (lb VOC/ 1000 gal)]*[Volume Transferred(gal/yr)]/1000/2000

	Water	Condensate	
Saturation factor	0.60	0.60	Note [(1)]
Condensate Pvap (psia)	0.28	12.91	Note [(2)]
Molecular Weight (lb/lb-mol)	18.38	45.19	Note [(2)]
Bulk Liquid Tempurature (F)	60.80	60.80	Note [(2)]

Notes:

(1) AP-42 Section 5.2

(2) ProMax Oxford 11 - 100 bbls of condensate/day and 600 bbls produced water/day

Table 6. Fugitive Leak Emissions
CNX Gas LLC - Camden 17

Fugitive emissions from valves and fittings are calculated using the major equipment default component count approach from 40 CFR Part 98 because site-specific component counts have not been collected.

Pollutant	Emission Factor Total Gas Losses			Annual emission losses[(a)] (tons/yr)
Valves	1.30E-05	kg/hr/source	(1)	0.0208
Pressure Relief Valves	1.20E-04	kg/hr/source	(1)	0.0081
Connector	1.20E-04	kg/hr/source	(1)	0.8874
Open-ended Lines	1.20E-04	kg/hr/source	(1)	0.0203
Total	-	-		0.9366

Calculations:

(a) Annual emission losses (tons/yr) = [Emission Factor (kg/hr/source)] x [Number of Sources] x [Hours of Operation per Year] x [0.001102 tons/ kg]

(b) Leak detection survey conducted on 12-29-2012 revealed no leaks at the facility.

Number of Components in Gas Service

Valves=	166	(2)
Pressure Relief Valves=	7	(2)
Connectors=	766	(2)
Open-ended lines	18	(2)

Maximum Hour of Operation = 8,760

Compound	Fraction[(3)]	Potential Annual Emissions (tons/yr)[(b)]
C6 +	0.00022	0.0002
Nitrogen	0.01138	0.0107
Methane	0.95532	0.8947
CO2	0.00601	0.0056
Ethane	0.02203	0.0206
Propane	0.0035	0.0033
i Butane	0.00039	0.0004
n Butane	0.0008	0.0007
i Pentane	0.0002	0.0002
n Pentane	0.00015	0.0001
Total VOC Emissions		**0.0049**
Total CO2e[(c)]		**22.37**

(b) Potential Annual Emissions (tons/yr) = Annual Emission Losses (TPY) X (compound **Weight** fraction)

(c) CO_2 equivalent = [(CO_2 emissions) x (GWP_{CO2})]+[(CH_4 emissions) x (GWP_{CH4})]+[(N_2O emissions) x (GWP_{N2O})]

Global Warming Potential (GWP)

CO_2	1	(4)
CH_4	25	(4)
N_2O	298	(4)

Notes:

(1) Emission factors from *Protocol for Equipment Leak Emission Estimates* Table 2-3 Marketing Terminal Average Emission Factors

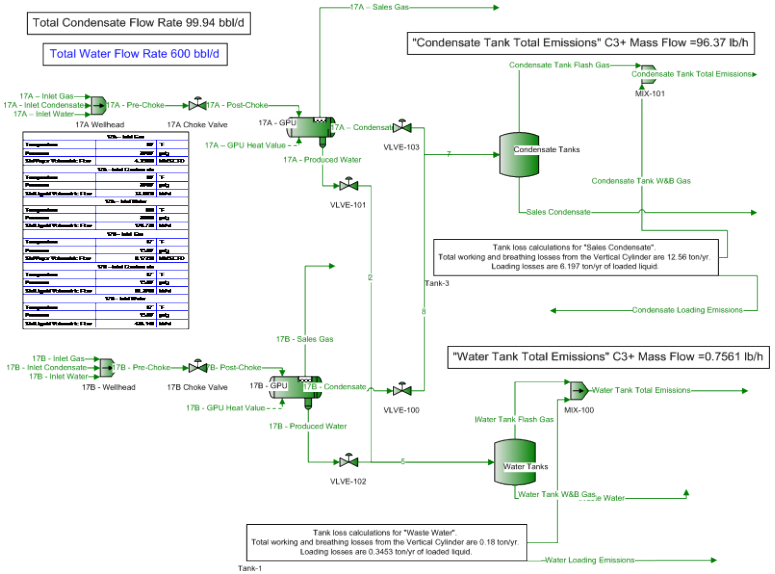
(2) *Default Average Component Counts for Major Onshore Natural Gas Production Equipment* from 40 CFR 98, Subpart W, Table W-1B

(3) Representative Gas Analysis Results from the Dangle Facility

(4) Global Warming Potentials obtained from 40 CFR 98, Subpart A, Table A-1

Flowsheet1
Plant Schematic

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	



* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Connections

	Condensate Loading Emissions	Condensate Tank Flash Gas	Condensate Tank Total Emissions	Condensate Tank W&B Gas	Sales Condensate
From Block	--	Condensate Tanks	MIX-101	--	Condensate Tanks
To Block	--	MIX-101	--	MIX-101	--

Stream Composition

Mole Fraction	Condensate Loading Emissions %	Condensate Tank Flash Gas %	Condensate Tank Total Emissions %	Condensate Tank W&B Gas %	Sales Condensate %
Methane	1.83699 *	44.3793	43.9828	1.83699 *	0.314381
Ethane	32.0569 *	28.0891	28.1261	32.0569 *	1.81024
Propane	34.6227 *	16.8972	17.0624	34.6227 *	5.28298
i-Butane	7.69401 *	2.8724	2.91733	7.69401 *	2.77646
n-Butane	14.7559 *	5.00685	5.09771	14.7559 *	7.54829
i-Pentane	3.64357 *	0.99961	1.02425	3.64357 *	4.87712
n-Pentane	3.38314 *	0.863314	0.886799	3.38314 *	6.12302
Nitrogen	0.00018115 *	0.0736044	0.0729201	0.00018115 *	0.000129363
CO2	0.0371353 *	0.0952473	0.0947057	0.0371353 *	0.00239364
Oxygen	0.000119885 *	0.0109633	0.0108622	0.000119885 *	3.50837E-05
Hexane	0.0964724 *	0.261495	0.259957	0.0964724 *	8.38455
Isohexane	0.529476 *	0.11272	0.116604	0.529476 *	2.37944
Neohexane	0.572244 *	0.135847	0.139914	0.572244 *	1.66867
2,2,4-Trimethylpentane	0.00114279 *	0.000216116	0.000224752	0.00114279 *	0.0232504
Benzene	0.00202388 *	0.00710704	0.00705966	0.00202388 *	0.217836
Heptane	0.494566 *	0.0872488	0.091045	0.494566 *	11.115
Toluene	0.00539035 *	0.00691315	0.00689896	0.00539035 *	0.997754
Octane	0.207742 *	0.0302362	0.0318906	0.207742 *	16.0441
Ethylbenzene	0.000557343 *	0.000276555	0.000279172	0.000557343 *	0.166799
o-Xylene	0.000726944 *	0.000304999	0.000308932	0.000726944 *	0.261347
Nonane	0.0364106 *	0.00442494	0.00472305	0.0364106 *	9.65959
Decane	0.0225256 *	0.00236567	0.00255356	0.0225256 *	20.3452
Water	7.82247E-06 *	0.0632768	0.0626871	7.82247E-06 *	0.00146101

Molar Flow	Condensate Loading Emissions lbmol/h	Condensate Tank Flash Gas lbmol/h	Condensate Tank Total Emissions lbmol/h	Condensate Tank W&B Gas lbmol/h	Sales Condensate lbmol/h
Methane	0.000575142 *	2.99285	2.99401	0.00116545 *	0.0314036
Ethane	0.0100367 *	1.89427	1.91461	0.020338 *	0.180825
Propane	0.01084 *	1.13951	1.16148	0.0219659 *	0.527718
i-Butane	0.00240892 *	0.193709	0.19859	0.00488135 *	0.277341
n-Butane	0.00461994 *	0.337652	0.347013	0.00936168 *	0.754
i-Pentane	0.00114077 *	0.0674117	0.0697233	0.00231161 *	0.487176
n-Pentane	0.00105923 *	0.0582201	0.0603665	0.00214638 *	0.61163
Nitrogen	5.67161E-08 *	0.00496373	0.00496385	1.14928E-07 *	1.29221E-05
CO2	1.16267E-05 *	0.00642329	0.00644685	2.35599E-05 *	0.000239102
Oxygen	3.75349E-08 *	0.00073934	0.000739416	7.60594E-08 *	3.50452E-06
Hexane	3.02046E-05 *	0.0176347	0.0176959	6.12054E-05 *	0.837534
Isohexane	0.000165774 *	0.00760162	0.00793754	0.000335918 *	0.237683
Neohexane	0.000179164 *	0.00916124	0.0095243	0.000363051 *	0.166684
2,2,4-Trimethylpentane	3.57798E-07 *	1.45744E-05	1.52994E-05	7.25029E-07 *	0.00232249
Benzene	6.33657E-07 *	0.000479284	0.000480568	1.28402E-06 *	0.0217597
Heptane	0.000154844 *	0.00588388	0.00619765	0.00031377 *	1.11028
Toluene	1.68767E-06 *	0.000466209	0.000469629	3.41983E-06 *	0.0996658
Octane	6.5042E-05 *	0.00203907	0.00217087	0.000131799 *	1.60265
Ethylbenzene	1.74499E-07 *	1.86503E-05	1.90039E-05	3.53598E-07 *	0.0166615
o-Xylene	2.27599E-07 *	2.05685E-05	2.10297E-05	4.61199E-07 *	0.026106

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Molar Flow	Condensate Loading Emissions lbmol/h	Condensate Tank Flash Gas lbmol/h	Condensate Tank Total Emissions lbmol/h	Condensate Tank W&B Gas lbmol/h	Sales Condensate lbmol/h
Nonane	1.13998E-05 *	0.000298409	0.000321509	2.31002E-05 *	0.964898
Decane	7.05255E-06 *	0.000159536	0.000173827	1.4291E-05 *	2.03228
Water	2.44914E-09 *	0.00426726	0.00426726	4.96285E-09 *	0.000145941

Mass Fraction	Condensate Loading Emissions %	Condensate Tank Flash Gas %	Condensate Tank Total Emissions %	Condensate Tank W&B Gas %	Sales Condensate %
Methane	0.652146 *	24.0516	23.7203	0.652146 *	0.0504605
Ethane	21.3309 *	28.5333	28.4313	21.3309 *	0.544604
Propane	33.7851 *	25.1711	25.2931	33.7851 *	2.33077
i-Butane	9.89608 *	5.64001	5.70027	9.89608 *	1.61458
n-Butane	18.9792 *	9.83104	9.96057	18.9792 *	4.3895
i-Pentane	5.81734 *	2.43642	2.48429	5.81734 *	3.5206
n-Pentane	5.40154 *	2.10422	2.1509	5.40154 *	4.41997
Nitrogen	0.000112298 *	0.0696567	0.0686721	0.000112298 *	3.62576E-05
CO2	0.0361661 *	0.14161	0.140117	0.0361661 *	0.00105398
Oxygen	8.48922E-05 *	0.0118513	0.0116847	8.48922E-05 *	1.12322E-05
Hexane	0.183973 *	0.761272	0.753098	0.183973 *	7.22915
Isohexane	1.00971 *	0.328154	0.337804	1.00971 *	2.05155
Neohexane	1.09127 *	0.395482	0.405333	1.09127 *	1.43873
2,2,4-Trimethylpentane	0.00288876 *	0.000833977	0.00086307	0.00288876 *	0.0265724
Benzene	0.0034984 *	0.0187542	0.0185382	0.0034984 *	0.170244
Heptane	1.09665 *	0.295345	0.30669	1.09665 *	11.1432
Toluene	0.0109907 *	0.0215184	0.0213694	0.0109907 *	0.91979
Octane	0.525131 *	0.11668	0.122463	0.525131 *	18.3365
Ethylbenzene	0.0013094 *	0.000991873	0.000996369	0.0013094 *	0.177173
o-Xylene	0.00170785 *	0.00109389	0.00110258	0.00170785 *	0.277602
Nonane	0.103341 *	0.0191723	0.020364	0.103341 *	12.3953
Decane	0.0709241 *	0.0113709	0.0122141	0.0709241 *	28.9624
Water	3.11855E-06 *	0.0385104	0.0379652	3.11855E-06 *	0.000263342

Mass Flow	Condensate Loading Emissions lb/h	Condensate Tank Flash Gas lb/h	Condensate Tank Total Emissions lb/h	Condensate Tank W&B Gas lb/h	Sales Condensate lb/h
Methane	0.0092267 *	48.0126	48.0313	0.0186967 *	0.50379
Ethane	0.301794 *	56.959	57.5706	0.611545 *	5.43724
Propane	0.477998 *	50.2475	51.2161	0.968598 *	23.27
i-Butane	0.140012 *	11.2588	11.5425	0.283715 *	16.1197
n-Butane	0.268521 *	19.6251	20.1692	0.544121 *	43.8242
i-Pentane	0.0823049 *	4.86367	5.03045	0.16678 *	35.1491
n-Pentane	0.0764221 *	4.20051	4.35537	0.154859 *	44.1283
Nitrogen	1.58881E-06 *	0.139051	0.139054	3.21951E-06 *	0.000361991
CO2	0.000511685 *	0.282686	0.283723	0.00103686 *	0.0105227
Oxygen	1.20107E-06 *	0.023658	0.0236604	2.43381E-06 *	0.00011214
Hexane	0.00260289 *	1.51968	1.52495	0.0052744 *	72.1748
Isohexane	0.0142856 *	0.655072	0.68402	0.0289479 *	20.4824
Neohexane	0.0154395 *	0.789474	0.82076	0.0312861 *	14.364
2,2,4-Trimethylpentane	4.08707E-05 *	0.00166481	0.00174763	8.2819E-05 *	0.265295
Benzene	4.94961E-05 *	0.0374378	0.0375381	0.000100297 *	1.69969
Heptane	0.0155157 *	0.589577	0.621017	0.0314404 *	111.252
Toluene	0.000155499 *	0.0429558	0.0432709	0.000315097 *	9.18305
Octane	0.00742966 *	0.23292	0.247975	0.0150552 *	183.069
Ethylbenzene	1.85256E-05 *	0.00198001	0.00201755	3.75397E-05 *	1.76887
o-Xylene	2.41631E-05 *	0.00218366	0.00223262	4.89632E-05 *	2.77154
Nonane	0.00146208 *	0.0382725	0.0412352	0.00296272 *	123.753
Decane	0.00100345 *	0.0226991	0.0247324	0.00203335 *	289.156

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Mass Flow	Condensate Loading Emissions lb/h	Condensate Tank Flash Gas lb/h	Condensate Tank Total Emissions lb/h	Condensate Tank W&B Gas lb/h	Sales Condensate lb/h
Water	4.41219E-08 *	0.0768758	0.0768759	8.94071E-08 *	0.00262917

Stream Properties

Property	Units	Condensate Loading Emissions	Condensate Tank Flash Gas	Condensate Tank Total Emissions	Condensate Tank W&B Gas	Sales Condensate
Temperature	°F	68.9101 *	9.42583	10.2142	68.9101 *	9.42583
Pressure	psig	6.0389	0	0	6.0389	0
Mole Fraction Vapor	%	100 *	100	99.9994	100 *	0
Mole Fraction Light Liquid	%	0	0	0.00063466	0	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Molecular Weight	lb/lbmol	45.1889	29.601	29.7463	45.1889	99.9483
Mass Density	lb/ft^3	0.169506	0.0873792	0.0876657	0.169506	44.7461
Mass Flow	lb/h	1.41482 *	199.623	202.49	2.86694 *	998.385
Std Vapor Volumetric Flow	MMSCFD	0.000285151	0.06142	0.0619978	0.00057782	0.0909763
Std Liquid Volumetric Flow	sgpm	0.00573369	0.986684	0.998302	0.0116186	2.91504
Specific Gravity		1.56025	1.02204		1.56025	0.717442
Net Ideal Gas Heating Value	Btu/ft^3	2366.82	1585.1	1592.39	2366.82	5079.26
Gross Ideal Gas Heating Value	Btu/ft^3	2571.75	1733.88	1741.69	2571.75	5477.91

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Connections

	Waste Water	Water Loading Emissions	Water Tank Flash Gas	Water Tank Total Emissions	Water Tank W&B Gas
From Block	Water Tanks	--	Water Tanks	MIX-100	--
To Block	--	--	MIX-100	--	MIX-100

Stream Composition

Mole Fraction	Waste Water %	Water Loading Emissions %	Water Tank Flash Gas %	Water Tank Total Emissions %	Water Tank W&B Gas %
Methane	0.00220051	5.15364 *	82.7942	82.4257	5.15364 *
Ethane	0.000345765	0.608812 *	10.7375	10.6894	0.608812 *
Propane	0.00011059	0.0424433 *	2.80333	2.79022	0.0424433 *
i-Butane	1.36269E-06	0.000186437 *	0.102704	0.102217	0.000186437 *
n-Butane	9.92736E-06	0.000923554 *	0.350569	0.348909	0.000923554 *
i-Pentane	9.7468E-07	3.2802E-05 *	0.0472977	0.0470733	3.2802E-05 *
n-Pentane	7.96745E-07	1.96584E-05 *	0.0409781	0.0407837	1.96584E-05 *
Nitrogen	2.88808E-06	0.00500174 *	0.223194	0.222159	0.00500174 *
CO2	0.000550085	1.46528 *	0.956764	0.959178	1.46528 *
Oxygen	1.107E-06	0.00284713 *	0.0410231	0.0408419	0.00284713 *
Hexane	4.10029E-08	2.06911E-08 *	0.00557987	0.00555338	2.06911E-08 *
Isohexane	2.54538E-08	2.4914E-07 *	0.00278895	0.00277571	2.4914E-07 *
Neohexane	1.70285E-08	2.58251E-07 *	0.00240715	0.00239572	2.58251E-07 *
2,2,4-Trimethylpentane	6.53698E-13	1.40242E-12 *	6.84137E-07	6.80889E-07	1.40242E-12 *
Benzene	7.61306E-05	3.10217E-05 *	0.0179099	0.017825	3.10217E-05 *
Heptane	3.89427E-08	7.56151E-08 *	0.00353351	0.00351674	7.56151E-08 *
Toluene	7.37044E-05	1.73706E-05 *	0.0209826	0.0208831	1.73706E-05 *
Octane	4.70596E-09	2.6547E-09 *	0.000807449	0.000803616	2.6547E-09 *
Ethylbenzene	3.57738E-06	5.20727E-07 *	0.00103533	0.00103042	5.20727E-07 *
o-Xylene	6.01352E-06	7.28551E-07 *	0.00129174	0.00128561	7.28551E-07 *
Nonane	2.29574E-09	3.76821E-10 *	0.00023582	0.0002347	3.76821E-10 *
Decane	5.80667E-10	2.7991E-11 *	9.62896E-05	9.58326E-05	2.7991E-11 *
Water	99.9966	92.7208 *	1.84576	2.27713	92.7208 *

Molar Flow	Waste Water lbmol/h	Water Loading Emissions lbmol/h	Water Tank Flash Gas lbmol/h	Water Tank Total Emissions lbmol/h	Water Tank W&B Gas lbmol/h
Methane	0.010692	0.000221077 *	0.388019	0.388134	0.000115198 *
Ethane	0.00168002	2.61163E-05 *	0.0503218	0.0503355	1.36086E-05 *
Propane	0.000537341	1.8207E-06 *	0.0131379	0.0131389	9.48721E-07 *
i-Butane	6.62113E-06	7.99763E-09 *	0.000481326	0.00048133	4.16737E-09 *
n-Butane	4.82357E-05	3.96179E-08 *	0.00164296	0.00164298	2.06439E-08 *
i-Pentane	4.73583E-06	1.40711E-09 *	0.000221663	0.000221664	7.33213E-10 *
n-Pentane	3.87127E-06	8.43291E-10 *	0.000192046	0.000192047	4.39418E-10 *
Nitrogen	1.40328E-05	2.14561E-07 *	0.00104601	0.00104612	1.11802E-07 *
CO2	0.00267279	6.28564E-05 *	0.00448392	0.00451668	3.27529E-05 *
Oxygen	5.37876E-06	1.22134E-07 *	0.000192257	0.00019232	6.36409E-08 *
Hexane	1.99227E-07	8.8759E-13 *	2.61503E-05	2.61503E-05	4.62501E-13 *
Isohexane	1.23676E-07	1.06874E-11 *	1.30705E-05	1.30705E-05	5.56894E-12 *
Neohexane	8.27389E-08	1.10782E-11 *	1.12812E-05	1.12812E-05	5.77259E-12 *
2,2,4-Trimethylpentane	3.17623E-12	6.01598E-17 *	3.20624E-09	3.20624E-09	3.13478E-17 *
Benzene	0.000369908	1.33074E-09 *	8.39355E-05	8.39362E-05	6.93417E-10 *
Heptane	1.89217E-07	3.24367E-12 *	1.656E-05	1.656E-05	1.6902E-12 *
Toluene	0.000358119	7.45149E-10 *	9.8336E-05	9.83364E-05	3.88279E-10 *
Octane	2.28656E-08	1.13879E-13 *	3.78415E-06	3.78415E-06	5.93396E-14 *
Ethylbenzene	1.7382E-05	2.23377E-11 *	4.85214E-06	4.85215E-06	1.16396E-11 *
o-Xylene	2.92189E-05	3.12528E-11 *	6.0538E-06	6.05382E-06	1.62851E-11 *
Nonane	1.11547E-08	1.61645E-14 *	1.10518E-06	1.10518E-06	8.42295E-15 *

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Molar Flow	Waste Water lbmol/h	Water Loading Emissions lbmol/h	Water Tank Flash Gas lbmol/h	Water Tank Total Emissions lbmol/h	Water Tank W&B Gas lbmol/h
Decane	2.82138E-09	1.20074E-15 *	4.51266E-07	4.51266E-07	6.25674E-16 *
Water	485.87	0.00397746 *	0.00865025	0.0107228	0.00207256 *

Mass Fraction	Waste Water %	Water Loading Emissions %	Water Tank Flash Gas %	Water Tank Total Emissions %	Water Tank W&B Gas %
Methane	0.00195951	4.49812 *	70.0783	69.7764	4.49812 *
Ethane	0.000577102	0.995975 *	17.0347	16.9609	0.995975 *
Propane	0.000270684	0.101824 *	6.52202	6.49246	0.101824 *
i-Butane	4.39635E-06	0.00058955 *	0.31495	0.313502	0.00058955 *
n-Butane	3.20279E-05	0.00292045 *	1.07505	1.07011	0.00292045 *
i-Pentane	3.9034E-06	0.000128758 *	0.180045	0.179217	0.000128758 *
n-Pentane	3.19081E-06	7.71656E-05 *	0.155989	0.155271	7.71656E-05 *
Nitrogen	4.49083E-06	0.00762312 *	0.329885	0.328401	0.00762312 *
CO2	0.00134378	3.50843 *	2.22159	2.22752	3.50843 *
Oxygen	1.96623E-06	0.00495663 *	0.0692588	0.0689627	0.00495663 *
Hexane	1.96132E-07	9.70092E-08 *	0.02537	0.0252532	9.70092E-08 *
Isohexane	1.21755E-07	1.16808E-06 *	0.0126805	0.0126221	1.16808E-06 *
Neohexane	8.14537E-08	1.21079E-06 *	0.0109446	0.0108942	1.21079E-06 *
2,2,4-Trimethylpentane	4.1448E-12	8.71561E-12 *	4.12316E-06	4.10418E-06	8.71561E-12 *
Benzene	0.000330087	0.000131834 *	0.0738112	0.073472	0.000131834 *
Heptane	2.16598E-07	4.12221E-07 *	0.0186808	0.0185948	4.12221E-07 *
Toluene	0.000376952	8.70765E-05 *	0.102003	0.101534	8.70765E-05 *
Octane	2.98383E-08	1.64982E-08 *	0.00486634	0.00484394	1.64982E-08 *
Ethylbenzene	2.10814E-05	3.00772E-06 *	0.00579929	0.0057726	3.00772E-06 *
o-Xylene	3.54374E-05	4.20811E-06 *	0.00723551	0.00720222	4.20811E-06 *
Nonane	1.63437E-08	2.62939E-09 *	0.00159576	0.00158841	2.62939E-09 *
Decane	4.58594E-09	2.16677E-10 *	0.000722839	0.000719511	2.16677E-10 *
Water	99.995	90.8791 *	1.7544	2.16474	90.8791 *

Mass Flow	Waste Water lb/h	Water Loading Emissions lb/h	Water Tank Flash Gas lb/h	Water Tank Total Emissions lb/h	Water Tank W&B Gas lb/h
Methane	0.171526	0.00354662 *	6.22478	6.22663	0.00184805 *
Ethane	0.0505167	0.000785292 *	1.51313	1.51354	0.000409197 *
Propane	0.0236944	8.02848E-05 *	0.579325	0.579367	4.18344E-05 *
i-Butane	0.000384835	4.6484E-07 *	0.0279757	0.027976	2.42217E-07 *
n-Butane	0.00280356	2.30268E-06 *	0.0954923	0.0954935	1.19987E-06 *
i-Pentane	0.000341685	1.01522E-07 *	0.0159927	0.0159928	5.29004E-08 *
n-Pentane	0.000279307	6.08424E-08 *	0.0138559	0.0138559	3.17035E-08 *
Nitrogen	0.000393106	6.01057E-06 *	0.0293024	0.0293055	3.13196E-06 *
CO2	0.117628	0.00276628 *	0.197335	0.198777	0.00144144 *
Oxygen	0.000172114	3.90813E-06 *	0.00615199	0.00615402	2.03643E-06 *
Hexane	1.71685E-05	7.64884E-11 *	0.00225351	0.00225351	3.98562E-11 *
Isohexane	1.06579E-05	9.20991E-10 *	0.00112636	0.00112636	4.79906E-10 *
Neohexane	7.13006E-06	9.5467E-10 *	0.000972163	0.000972163	4.97455E-10 *
2,2,4-Trimethylpentane	3.62816E-10	6.87196E-15 *	3.66244E-07	3.66244E-07	3.58081E-15 *
Benzene	0.0288942	1.03947E-07 *	0.00655636	0.00655641	5.41641E-08 *
Heptane	1.89599E-05	3.25022E-10 *	0.00165934	0.00165934	1.69361E-10 *
Toluene	0.0329966	6.86568E-08 *	0.00906052	0.00906056	3.57754E-08 *
Octane	2.6119E-06	1.30082E-11 *	0.000432258	0.000432258	6.77828E-12 *
Ethylbenzene	0.00184536	2.37148E-09 *	0.000515128	0.000515129	1.23572E-09 *
o-Xylene	0.00310202	3.31795E-09 *	0.000642702	0.000642703	1.7289E-09 *
Nonane	1.43064E-06	2.07319E-12 *	0.000141745	0.000141745	1.08029E-12 *
Decane	4.0143E-07	1.70843E-13 *	6.42069E-05	6.42069E-05	8.9022E-14 *
Water	8753.08	0.0716551 *	0.155837	0.193174	0.0373377 *

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	Waste Water	Water Loading Emissions	Water Tank Flash Gas	Water Tank Total Emissions	Water Tank W&B Gas
Temperature	°F	61.484	68.9101 *	61.484	60.3386	68.9101 *
Pressure	psig	0	-14.3188	0 *	-14.3188	-14.3188
Mole Fraction Vapor	%	0	100 *	100	100	100 *
Mole Fraction Light Liquid	%	100	0	0	0	0
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Molecular Weight	lb/lbmol	18.0156	18.3804	18.9534	18.9507	18.3804
Mass Density	lb/ft^3	62.3497	0.00122261	0.0499679	0.00128097	0.00122261
Mass Flow	lb/h	8753.51	0.0788466 *	8.88261	8.92369	0.041085 *
Std Vapor Volumetric Flow	MMSCFD	4.42527	3.90692E-05	0.00426834	0.00428869	2.0358E-05
Std Liquid Volumetric Flow	sgpm	17.5	0.00017841	0.0537289	0.0538218	9.2965E-05
Specific Gravity		0.99969	0.634624	0.654409	0.654315	0.634624
Net Ideal Gas Heating Value	Btu/ft^3	0.0349407	57.7437	1010.95	1006.43	57.7437
Gross Ideal Gas Heating Value	Btu/ft^3	50.3465	110.582	1118.53	1113.74	110.582

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Connections

	2	5	7	8	17A - Inlet Condensate
From Block	VLVE-101	VLVE-102	VLVE-103	VLVE-100	--
To Block	Water Tanks	Water Tanks	Condensate Tanks	Condensate Tanks	17A Wellhead

Stream Composition

Mole Fraction	2 %	5 %	7 %	8 %	17A - Inlet Condensate %
Methane	0.0816072	0.0821347	17.9593	18.1186	6.058
Ethane	0.0111179	0.0105148	12.886	12.2117	6.04
Propane	0.00272567	0.00284767	9.65336	10.0854	6.616
i-Butane	9.59783E-05	0.000102139	2.68917	2.86443	2.147
n-Butane	0.00030114	0.000367137	5.62637	6.87541	5.927
i-Pentane	5.3426E-05	4.36858E-05	3.81108	3.11993	3.831
n-Pentane	3.12454E-05	4.40477E-05	3.09345	4.35934	4.687
Nitrogen	0.000245176	0.000206618	0.0334255	0.0282999	0
CO2	0.00261849	0.000993678	0.0718674	0.0272697	0.061
Oxygen	6.82953E-05	2.91137E-05	0.0075243	0.00323186	0
Hexane	5.88758E-06	5.22205E-06	5.5587	4.93537	0
Isohexane	2.61229E-06	2.75478E-06	1.40961	1.48792	4.844
Neohexane	2.22364E-06	2.3836E-06	0.998432	1.07144	4.365
2,2,4-Trimethylpentane	6.59479E-10	6.60065E-10	0.0139587	0.0139702	0.028
Benzene	9.08259E-05	9.43525E-05	0.129572	0.134212	0.369
Heptane	3.44798E-06	3.4421E-06	6.68972	6.66295	12.966
Toluene	9.45292E-05	9.35704E-05	0.603725	0.596339	1.1
Octane	8.01697E-07	7.74879E-07	9.83447	9.49441	15.2
Ethylbenzene	4.68842E-06	4.52292E-06	0.102587	0.0985497	0.154
o-Xylene	7.45999E-06	7.166E-06	0.161212	0.154154	0.235
Nonane	2.38265E-07	2.25893E-07	5.98293	5.68426	8.354
Decane	9.70604E-08	9.18263E-08	12.6571	11.9465	17.018
Water	99.9009	99.9025	0.0264266	0.0263541	0

Molar Flow	2 lbmol/h	5 lbmol/h	7 lbmol/h	8 lbmol/h	17A - Inlet Condensate lbmol/h
Methane	0.116719	0.281992	0.84542	2.17883	0.217894
Ethane	0.0159015	0.0361003	0.606596	1.4685	0.217246
Propane	0.00389842	0.00977686	0.454423	1.21281	0.237964
i-Butane	0.000137274	0.000350674	0.12659	0.344459	0.0772232
n-Butane	0.000430708	0.00126049	0.264856	0.826796	0.213182
i-Pentane	7.6413E-05	0.000149986	0.179403	0.375184	0.137793
n-Pentane	4.46891E-05	0.000151228	0.145621	0.524229	0.168582
Nitrogen	0.000350666	0.000709379	0.00157348	0.00340318	0
CO2	0.00374513	0.00341158	0.0033831	0.00327929	0.00219404
Oxygen	9.768E-05	9.99555E-05	0.0003542	0.000388645	0
Hexane	8.42077E-06	1.79288E-05	0.261671	0.593498	0
Isohexane	3.73625E-06	9.45796E-06	0.0663563	0.178928	0.174229
Neohexane	3.18038E-06	8.18357E-06	0.0470003	0.128845	0.157
2,2,4-Trimethylpentane	9.43227E-10	2.26619E-09	0.000657096	0.00167997	0.0010071
Benzene	0.000129905	0.000323939	0.0060995	0.0161395	0.0132722
Heptane	4.9315E-06	1.18177E-05	0.314913	0.801246	0.46636
Toluene	0.000135201	0.000321254	0.0284198	0.0717122	0.0395647
Octane	1.14663E-06	2.66038E-06	0.462949	1.14174	0.546713
Ethylbenzene	6.70565E-06	1.55285E-05	0.00482919	0.011851	0.00553906
o-Xylene	1.06697E-05	2.46029E-05	0.00758893	0.0185376	0.00845246
Nonane	3.40781E-07	7.75554E-07	0.281641	0.683555	0.300476
Decane	1.38822E-07	3.15266E-07	0.595821	1.43662	0.612102
Water	142.884	342.994	0.00124401	0.00316919	0

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Mass Fraction	2 %	5 %	7 %	8 %	17A - Inlet Condensate %
Methane	0.0726644	0.073136	3.98421	4.07577	1.06171
Ethane	0.0185552	0.0175491	5.35819	5.14885	1.9841
Propane	0.00667101	0.00696977	5.88647	6.23594	3.18712
i-Butane	0.000309626	0.00032951	2.16143	2.33451	1.36327
n-Butane	0.000971477	0.00118441	4.52222	5.60345	3.76344
i-Pentane	0.000213946	0.000174945	3.8024	3.15638	3.01959
n-Pentane	0.000125123	0.000176395	3.08641	4.41027	3.69429
Nitrogen	0.000381212	0.000321268	0.0129487	0.0111164	0
CO2	0.00639618	0.00242731	0.0437381	0.0168284	0.0293281
Oxygen	0.000121296	5.17088E-05	0.00332952	0.00145011	0
Hexane	2.81606E-05	2.4978E-05	6.62427	5.96372	0
Isohexane	1.24947E-05	1.31766E-05	1.67983	1.79795	4.56031
Neohexane	1.06358E-05	1.14012E-05	1.18982	1.29469	4.10937
2,2,4-Trimethylpentane	4.18117E-09	4.18499E-09	0.0220497	0.0223764	0.0349414
Benzene	0.000393776	0.000409076	0.139962	0.147002	0.314884
Heptane	1.91762E-05	1.9144E-05	9.2697	9.36176	14.1935
Toluene	0.000483425	0.000478534	0.769239	0.770458	1.10724
Octane	5.08285E-06	4.91295E-06	15.5348	15.2075	18.9682
Ethylbenzene	2.76268E-05	2.66522E-05	0.15061	0.146707	0.178612
o-Xylene	4.39585E-05	4.22271E-05	0.23668	0.229483	0.272557
Nonane	1.69613E-06	1.60809E-06	10.6113	10.2227	11.7051
Decane	7.66503E-07	7.25186E-07	24.9037	23.8345	26.4524
Water	99.8926	99.8966	0.00658359	0.0066574	0

Mass Flow	2 lb/h	5 lb/h	7 lb/h	8 lb/h	17A - Inlet Condensate lb/h
Methane	1.87247	4.52384	13.5626	34.9538	3.49555
Ethane	0.478144	1.0855	18.2398	44.1565	6.53239
Propane	0.171903	0.431117	20.0381	53.4794	10.4932
i-Butane	0.00797866	0.0203819	7.35771	20.0207	4.48838
n-Butane	0.0250337	0.0732622	15.394	48.0552	12.3906
i-Pentane	0.00551311	0.0108213	12.9437	27.0691	9.94161
n-Pentane	0.00322426	0.0109109	10.5064	37.8225	12.163
Nitrogen	0.00982334	0.0198721	0.0440784	0.0953347	0
CO2	0.164821	0.150142	0.148888	0.14432	0.0965588
Oxygen	0.00312564	0.00319846	0.011334	0.0124362	0
Hexane	0.000725663	0.00154502	22.5496	51.1449	0
Isohexane	0.000321973	0.000815043	5.71828	15.4192	15.0142
Neohexane	0.000274071	0.000705222	4.05027	11.1032	13.5295
2,2,4-Trimethylpentane	1.07743E-07	2.58864E-07	0.0750591	0.1919	0.11504
Benzene	0.0101471	0.0253035	0.476443	1.26069	1.03671
Heptane	0.000494146	0.00118416	31.5549	80.2864	46.7302
Toluene	0.0124572	0.0295998	2.61856	6.60745	3.64543
Octane	0.000130978	0.000303891	52.882	130.419	62.4502
Ethylbenzene	0.000711906	0.00164858	0.512691	1.25816	0.588055
o-Xylene	0.00113275	0.00261197	0.805678	1.96805	0.897356
Nonane	4.37069E-05	9.94688E-05	36.1219	87.6695	38.5376
Decane	1.97518E-05	4.48566E-05	84.7745	204.405	87.0909
Water	2574.1	6179.13	0.0224111	0.0570939	0

Stream Properties

Property	Units	2	5	7	8	17A - Inlet Condensate
Temperature	°F	61.4811	61.4852	10.4416	9.03224	80 *
Pressure	psig	0 *	0 *	0 *	0 *	2000 *
Mole Fraction Vapor	%	0.0970857	0.0960599	40.2105	40.3357	0

* User Specified Values
? Extrapolated or Approximate Values

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	2	5	7	8	17A - Inlet Condensate
Mole Fraction Light Liquid	%	99.9029	99.9039	59.7895	59.6643	100
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Molecular Weight	lb/lbmol	18.0168	18.0163	72.3134	71.3157	91.5361
Mass Density	lb/ft^3	27.4264	27.5886	0.524416	0.517364	42.9076
Mass Flow	lb/h	2576.87	6185.52	340.409	857.6	329.236
Std Vapor Volumetric Flow	MMSCFD	1.30263	3.12691	0.0428734	0.109523	0.0327583
Std Liquid Volumetric Flow	sgpm	5.16229	12.3914	1.10567	2.79605	0.987728 *
Specific Gravity						0.687964
Net Ideal Gas Heating Value	Btu/ft^3	1.00894	1.00912	3705.73	3657.43	4658.08
Gross Ideal Gas Heating Value	Btu/ft^3	51.3751	51.3761	4006.15	3954.4	5026.1

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Connections

	17A - Post-Choke	17A - Pre-Choke	17A - Produced Water	17A – Condensate	17A – Inlet Gas
From Block	17A Choke Valve	17A Wellhead	17A - GPU	17A - GPU	--
To Block	17A - GPU	17A Choke Valve	VLVE-101	VLVE-103	17A Wellhead

Stream Composition

Mole Fraction	17A - Post-Choke %	17A - Pre-Choke %	17A - Produced Water %	17A – Condensate %	17A – Inlet Gas %
Methane	63.4075	63.4075	0.0816072	17.9593	82.7989 *
Ethane	9.34168	9.34168	0.0111179	12.886	12.1599 *
Propane	2.34743	2.34743	0.00272567	9.65336	3.0173 *
i-Butane	0.309239	0.309239	9.59783E-05	2.68917	0.3879 *
n-Butane	0.482985	0.482985	0.00030114	5.62637	0.5865 *
i-Pentane	0.163553	0.163553	5.3426E-05	3.81108	0.1849 *
n-Pentane	0.106557	0.106557	3.12454E-05	3.09345	0.104 *
Nitrogen	0.337762	0.337762	0.000245176	0.0334255	0.4413 *
CO2	0.104825	0.104825	0.00261849	0.0718674	0.1365 *
Oxygen	0.0470709	0.0470709	6.82953E-05	0.0075243	0.0615 *
Hexane	0.0928406	0.0928406	5.88758E-06	5.5587	0.1213 *
Isohexane	0.0278606	0.0278606	2.61229E-06	1.40961	0 *
Neohexane	0.0251056	0.0251056	2.22364E-06	0.998432	0 *
2,2,4-Trimethylpentane	0.000161044	0.000161044	6.59479E-10	0.0139587	0 *
Benzene	0.00212233	0.00212233	9.08259E-05	0.129572	0 *
Heptane	0.0745749	0.0745749	3.44798E-06	6.68972	0 *
Toluene	0.00632673	0.00632673	9.45292E-05	0.603725	0 *
Octane	0.0874239	0.0874239	8.01697E-07	9.83447	0 *
Ethylbenzene	0.000885742	0.000885742	4.68842E-06	0.102587	0 *
o-Xylene	0.00135162	0.00135162	7.45999E-06	0.161212	0 *
Nonane	0.0480486	0.0480486	2.38265E-07	5.98293	0 *
Decane	0.0978802	0.0978802	9.70604E-08	12.6571	0 *
Water	22.8869	22.8869	99.9009	0.0264266	0 *

Molar Flow	17A - Post-Choke lbmol/h	17A - Pre-Choke lbmol/h	17A - Produced Water lbmol/h	17A – Condensate lbmol/h	17A – Inlet Gas lbmol/h
Methane	396.524	396.524	0.116719	0.84542	396.306 *
Ethane	58.419	58.419	0.0159015	0.606596	58.2017 *
Propane	14.6799	14.6799	0.00389842	0.454423	14.4419 *
i-Butane	1.93386	1.93386	0.000137274	0.12659	1.85663 *
n-Butane	3.02039	3.02039	0.000430708	0.264856	2.8072 *
i-Pentane	1.02279	1.02279	7.6413E-05	0.179403	0.884999 *
n-Pentane	0.666364	0.666364	4.46891E-05	0.145621	0.497782 *
Nitrogen	2.11222	2.11222	0.000350666	0.00157348	2.11222 *
CO2	0.655533	0.655533	0.00374513	0.0033831	0.653339 *
Oxygen	0.294362	0.294362	9.768E-05	0.0003542	0.294362 *
Hexane	0.580586	0.580586	8.42077E-06	0.261671	0.580586 *
Isohexane	0.174229	0.174229	3.73625E-06	0.0663563	0 *
Neohexane	0.157	0.157	3.18038E-06	0.0470003	0 *
2,2,4-Trimethylpentane	0.0010071	0.0010071	9.43227E-10	0.000657096	0 *
Benzene	0.0132722	0.0132722	0.000129905	0.0060995	0 *
Heptane	0.46636	0.46636	4.9315E-06	0.314913	0 *
Toluene	0.0395647	0.0395647	0.000135201	0.0284198	0 *
Octane	0.546713	0.546713	1.14663E-06	0.462949	0 *
Ethylbenzene	0.00553906	0.00553906	6.70565E-06	0.00482919	0 *

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Molar Flow	17A - Post-Choke lbmol/h	17A - Pre-Choke lbmol/h	17A - Produced Water lbmol/h	17A – Condensate lbmol/h	17A – Inlet Gas lbmol/h
o-Xylene	0.00845246	0.00845246	1.06697E-05	0.00758893	0 *
Nonane	0.300476	0.300476	3.40781E-07	0.281641	0 *
Decane	0.612102	0.612102	1.38822E-07	0.595821	0 *
Water	143.125	143.125	142.884	0.00124401	0 *

Mass Fraction	17A - Post-Choke %	17A - Pre-Choke %	17A - Produced Water %	17A – Condensate %	17A – Inlet Gas %
Methane	52.2675	52.2675	0.0726644	3.98421	68.6369 *
Ethane	14.4333	14.4333	0.0185552	5.35819	18.8935 *
Propane	5.31874	5.31874	0.00667101	5.88647	6.87506 *
i-Butane	0.923544	0.923544	0.000309626	2.16143	1.165 *
n-Butane	1.44243	1.44243	0.000971477	4.52222	1.76146 *
i-Pentane	0.606329	0.606329	0.000213946	3.8024	0.689332 *
n-Pentane	0.395032	0.395032	0.000125123	3.08641	0.387726 *
Nitrogen	0.48618	0.48618	0.000381212	0.0129487	0.638796 *
CO2	0.237046	0.237046	0.00639618	0.0437381	0.310414 *
Oxygen	0.0773938	0.0773938	0.000121296	0.00332952	0.101688 *
Hexane	0.411094	0.411094	2.81606E-05	6.62427	0.54014 *
Isohexane	0.123366	0.123366	1.24947E-05	1.67983	0 *
Neohexane	0.111167	0.111167	1.06358E-05	1.18982	0 *
2,2,4-Trimethylpentane	0.000945235	0.000945235	4.18117E-09	0.0220497	0 *
Benzene	0.00851825	0.00851825	0.000393776	0.139962	0 *
Heptane	0.383963	0.383963	1.91762E-05	9.2697	0 *
Toluene	0.029953	0.029953	0.000483425	0.769239	0 *
Octane	0.513127	0.513127	5.08285E-06	15.5348	0 *
Ethylbenzene	0.0048318	0.0048318	2.76268E-05	0.15061	0 *
o-Xylene	0.0073732	0.0073732	4.39585E-05	0.23668	0 *
Nonane	0.316648	0.316648	1.69613E-06	10.6113	0 *
Decane	0.71559	0.71559	7.66503E-07	24.9037	0 *
Water	21.1859	21.1859	99.8926	0.00658359	0 *

Mass Flow	17A - Post-Choke lb/h	17A - Pre-Choke lb/h	17A - Produced Water lb/h	17A – Condensate lb/h	17A – Inlet Gas lb/h
Methane	6361.22	6361.22	1.87247	13.5626	6357.72 *
Ethane	1756.6	1756.6	0.478144	18.2398	1750.07 *
Propane	647.318	647.318	0.171903	20.0381	636.825 *
i-Butane	112.4	112.4	0.00797866	7.35771	107.912 *
n-Butane	175.552	175.552	0.0250337	15.394	163.161 *
i-Pentane	73.7932	73.7932	0.00551311	12.9437	63.8516 *
n-Pentane	48.0773	48.0773	0.00322426	10.5064	35.9144 *
Nitrogen	59.1706	59.1706	0.00982334	0.0440784	59.1706 *
CO2	28.8497	28.8497	0.164821	0.148888	28.7531 *
Oxygen	9.41922	9.41922	0.00312564	0.011334	9.41922 *
Hexane	50.0322	50.0322	0.000725663	22.5496	50.0322 *
Isohexane	15.0142	15.0142	0.000321973	5.71828	0 *
Neohexane	13.5295	13.5295	0.000274071	4.05027	0 *
2,2,4-Trimethylpentane	0.11504	0.11504	1.07743E-07	0.0750591	0 *
Benzene	1.03671	1.03671	0.0101471	0.476443	0 *
Heptane	46.7302	46.7302	0.000494146	31.5549	0 *
Toluene	3.64543	3.64543	0.0124572	2.61856	0 *
Octane	62.4502	62.4502	0.000130978	52.882	0 *
Ethylbenzene	0.588055	0.588055	0.000711906	0.512691	0 *
o-Xylene	0.897356	0.897356	0.00113275	0.805678	0 *
Nonane	38.5376	38.5376	4.37069E-05	36.1219	0 *

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Mass Flow	17A - Post-Choke lb/h	17A - Pre-Choke lb/h	17A - Produced Water lb/h	17A – Condensate lb/h	17A – Inlet Gas lb/h
Decane	87.0909	87.0909	1.97518E-05	84.7745	0 *
Water	2578.43	2578.43	2574.1	0.0224111	0 *

Stream Properties

Property	Units	17A - Post-Choke	17A - Pre-Choke	17A - Produced Water	17A – Condensate	17A – Inlet Gas
Temperature	°F	23.7428	79.5841	60	60	80 *
Pressure	psig	600 *	2000	600	600	2000 *
Mole Fraction Vapor	%	75.5492	77.1001	0	0	100
Mole Fraction Light Liquid	%	1.54254	22.8999	100	100	0
Mole Fraction Heavy Liquid	%	22.9082	0	0	0	0
Molecular Weight	lb/lbmol	19.4616	19.4616	18.0168	72.3134	19.3525
Mass Density	lb/ft^3	3.66351	11.9621	62.3225	40.1051	9.34875
Mass Flow	lb/h	12170.5	12170.5	2576.87	340.409	9262.83
Std Vapor Volumetric Flow	MMSCFD	5.69553	5.69553	1.30263	0.0428734	4.35925 *
Std Liquid Volumetric Flow	sgpm	62.5002	62.5002	5.16229	1.10567	56.358
Specific Gravity				0.999255	0.643029	0.66819
Net Ideal Gas Heating Value	Btu/ft^3	841.941	841.941	1.00894	3705.73	1065.03
Gross Ideal Gas Heating Value	Btu/ft^3	940.864	940.864	51.3751	4006.15	1176.46

Warnings

ProMax: ProMax!Project!Flowsheets!Flowsheet1!PStreams!17A - Post-Choke
Warning: The temperature of 23.7428 °F is below ice formation.
Warning: The temperature of 23.7428 °F is below hydrate formation.
ProMax: ProMax!Project!Flowsheets!Flowsheet1!PStreams!17A - Pre-Choke
Warning: The temperature of 79.5841 °F is within 10 °F of hydrate formation.
ProMax: ProMax!Project!Flowsheets!Flowsheet1!PStreams!17A - Produced Water
Warning: The temperature of 60 °F is within 10 °F of hydrate formation.
ProMax: ProMax!Project!Flowsheets!Flowsheet1!PStreams!17A – Condensate
Warning: The temperature of 60 °F is within 10 °F of hydrate formation.

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Connections

	17A – Inlet Water	17A – Sales Gas	17B - Condensate	17B - Inlet Condensate	17B - Inlet Gas
From Block	--	17A - GPU	17B - GPU	--	--
To Block	17A Wellhead	--	VLVE-100	17B - Wellhead	17B - Wellhead

Stream Composition

Mole Fraction	17A – Inlet Water %	17A – Sales Gas %	17B - Condensate %	17B - Inlet Condensate %	17B - Inlet Gas %
Methane	0 *	82.8185	18.1186	6.058	83.2926 *
Ethane	0 *	12.1008	12.2117	6.04	11.5091 *
Propane	0 *	2.97756	10.0854	6.616	3.167 *
i-Butane	0 *	0.378357	2.86443	2.147	0.4174 *
n-Butane	0 *	0.576833	6.87541	5.927	0.7329 *
i-Pentane	0 *	0.176564	3.11993	3.831	0.1485 *
n-Pentane	0 *	0.109018	4.35934	4.687	0.1652 *
Nitrogen	0 *	0.441832	0.0282999	0	0.3716 *
CO2	0 *	0.135756	0.0272697	0.061	0.0515 *
Oxygen	0 *	0.0615357	0.00323186	0	0.0262 *
Hexane	0 *	0.0667693	4.93537	0	0.118 *
Isohexane	0 *	0.0225844	1.48792	4.844	0 *
Neohexane	0 *	0.0230299	1.07144	4.365	0 *
2,2,4-Trimethylpentane	0 *	7.32804E-05	0.0139702	0.028	0 *
Benzene	0 *	0.00147454	0.134212	0.369	0 *
Heptane	0 *	0.0317074	6.66295	12.966	0 *
Toluene	0 *	0.00230509	0.596339	1.1	0 *
Octane	0 *	0.0175373	9.49441	15.2	0 *
Ethylbenzene	0 *	0.000147222	0.0985497	0.154	0 *
o-Xylene	0 *	0.000178565	0.154154	0.235	0 *
Nonane	0 *	0.00394338	5.68426	8.354	0 *
Decane	0 *	0.00340871	11.9465	17.018	0 *
Water	100 *	0.0501066	0.0263541	0	0 *

Molar Flow	17A – Inlet Water lbmol/h	17A – Sales Gas lbmol/h	17B - Condensate lbmol/h	17B - Inlet Condensate lbmol/h	17B - Inlet Gas lbmol/h
Methane	0 *	395.562	2.17883	0.522945	838.823 *
Ethane	0 *	57.7965	1.4685	0.521391	115.906 *
Propane	0 *	14.2215	1.21281	0.571113	31.8942 *
i-Butane	0 *	1.80713	0.344459	0.185336	4.20355 *
n-Butane	0 *	2.7551	0.826796	0.511637	7.38089 *
i-Pentane	0 *	0.843313	0.375184	0.330704	1.49551 *
n-Pentane	0 *	0.520698	0.524229	0.404596	1.6637 *
Nitrogen	0 *	2.1103	0.00340318	0	3.74231 *
CO2	0 *	0.648405	0.00327929	0.00526571	0.518646 *
Oxygen	0 *	0.29391	0.000388645	0	0.263855 *
Hexane	0 *	0.318907	0.593498	0	1.18835 *
Isohexane	0 *	0.107869	0.178928	0.418149	0 *
Neohexane	0 *	0.109997	0.128845	0.3768	0 *
2,2,4-Trimethylpentane	0 *	0.000350006	0.00167997	0.00241705	0 *
Benzene	0 *	0.00704277	0.0161395	0.0318532	0 *
Heptane	0 *	0.151443	0.801246	1.11926	0 *
Toluene	0 *	0.0110097	0.0717122	0.0949553	0 *
Octane	0 *	0.0837625	1.14174	1.31211	0 *
Ethylbenzene	0 *	0.000703169	0.011851	0.0132937	0 *
o-Xylene	0 *	0.000852869	0.0185376	0.0202859	0 *
Nonane	0 *	0.0188346	0.683555	0.721143	0 *
Decane	0 *	0.0162809	1.43662	1.46905	0 *
Water	143.125 *	0.239322	0.00316919	0	0 *

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Mass Fraction	17A – Inlet Water %	17A – Sales Gas %	17B - Condensate %	17B - Inlet Condensate %	17B - Inlet Gas %
Methane	0 *	68.5792	4.07577	1.06171	69.0512 *
Ethane	0 *	18.7814	5.14885	1.9841	17.8836 *
Propane	0 *	6.77718	6.23594	3.18712	7.21668 *
i-Butane	0 *	1.13511	2.33451	1.36327	1.25369 *
n-Butane	0 *	1.73056	5.60345	3.76344	2.20131 *
i-Pentane	0 *	0.657544	3.15638	3.01959	0.553668 *
n-Pentane	0 *	0.405996	4.41027	3.69429	0.615933 *
Nitrogen	0 *	0.638876	0.0111164	0	0.537942 *
CO2	0 *	0.30839	0.0168284	0.0293281	0.117125 *
Oxygen	0 *	0.101638	0.00145011	0	0.0433241 *
Hexane	0 *	0.296998	5.96372	0	0.525484 *
Isohexane	0 *	0.100458	1.79795	4.56031	0 *
Neohexane	0 *	0.10244	1.29469	4.10937	0 *
2,2,4-Trimethylpentane	0 *	0.000432072	0.0223764	0.0349414	0 *
Benzene	0 *	0.00594521	0.147002	0.314884	0 *
Heptane	0 *	0.163995	9.36176	14.1935	0 *
Toluene	0 *	0.0109628	0.770458	1.10724	0 *
Octane	0 *	0.103403	15.2075	18.9682	0 *
Ethylbenzene	0 *	0.000806767	0.146707	0.178612	0 *
o-Xylene	0 *	0.000978522	0.229483	0.272557	0 *
Nonane	0 *	0.0261058	10.2227	11.7051	0 *
Decane	0 *	0.0250342	23.8345	26.4524	0 *
Water	100 *	0.046594	0.0066574	0	0 *

Mass Flow	17A – Inlet Water lb/h	17A – Sales Gas lb/h	17B - Condensate lb/h	17B - Inlet Condensate lb/h	17B - Inlet Gas lb/h
Methane	0 *	6345.78	34.9538	8.38932	13456.8 *
Ethane	0 *	1737.89	44.1565	15.6777	3485.18 *
Propane	0 *	627.108	53.4794	25.1836	1406.39 *
i-Butane	0 *	105.034	20.0207	10.7721	244.32 *
n-Butane	0 *	160.132	48.0552	29.7374	428.993 *
i-Pentane	0 *	60.844	27.0691	23.8599	107.899 *
n-Pentane	0 *	37.5677	37.8225	29.1911	120.034 *
Nitrogen	0 *	59.1167	0.0953347	0	104.835 *
CO2	0 *	28.536	0.14432	0.231741	22.8253 *
Oxygen	0 *	9.40476	0.0124362	0	8.44304 *
Hexane	0 *	27.4819	51.1449	0	102.407 *
Isohexane	0 *	9.29562	15.4192	36.0341	0 *
Neohexane	0 *	9.47899	11.1032	32.4709	0 *
2,2,4-Trimethylpentane	0 *	0.0399806	0.1919	0.276095	0 *
Benzene	0 *	0.550124	1.26069	2.48811	0 *
Heptane	0 *	15.1748	80.2864	112.152	0 *
Toluene	0 *	1.01442	6.60745	8.74904	0 *
Octane	0 *	9.56807	130.419	149.88	0 *
Ethylbenzene	0 *	0.074652	1.25816	1.41133	0 *
o-Xylene	0 *	0.0905448	1.96805	2.15365	0 *
Nonane	0 *	2.41563	87.6695	92.4902	0 *
Decane	0 *	2.31647	204.405	209.018	0 *
Water	2578.43 *	4.31145	0.0570939	0	0 *

Stream Properties

Property	Units	17A – Inlet Water	17A – Sales Gas	17B - Condensate	17B - Inlet Condensate	17B - Inlet Gas
Temperature	°F	80 *	60 *	60	87 *	87 *
Pressure	psig	2000 *	600	600	1500 *	1500 *
Mole Fraction Vapor	%	0	100	0	0	100
Mole Fraction Light Liquid	%	100	0	100	100	0

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Stream Properties

Property	Units	17A – Inlet Water	17A – Sales Gas	17B - Condensate	17B - Inlet Condensate	17B - Inlet Gas
Mole Fraction Heavy Liquid	%	0	0	0	0	0
Molecular Weight	lb/lbmol	18.0153	19.3734	71.3157	91.5361	19.3511
Mass Density	lb/ft^3	62.2882	2.48986	39.8992	42.4426	6.57835
Mass Flow	lb/h	2578.43	9253.22	857.6	790.168	19488.1
Std Vapor Volumetric Flow	MMSCFD	1.30353	4.35003	0.109523	0.0786198	9.17211 *
Std Liquid Volumetric Flow	sgpm	5.15448 *	56.2323	2.79605	2.37055 *	118.51
Specific Gravity		0.998704	0.668911	0.639729	0.680508	0.668141
Net Ideal Gas Heating Value	Btu/ft^3	0	1065.53	3657.43	4658.08	1068.51
Gross Ideal Gas Heating Value	Btu/ft^3	50.31	1177.01	3954.4	5026.1	1180.28

Warnings

ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!17A – Sales Gas
Warning: The temperature of 60 °F is within 10 °F of hydrate formation.
ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!17B - Condensate
Warning: The temperature of 60 °F is within 10 °F of hydrate formation.

Remarks

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Connections

	17B - Inlet Water	17B - Pre-Choke	17B - Produced Water	17B - Sales Gas	17B- Post-Choke
From Block	--	17B - Wellhead	17B - GPU	17B - GPU	17B Choke Valve
To Block	17B - Wellhead	17B Choke Valve	VLVE-102	--	17B - GPU

Stream Composition

Mole Fraction	17B - Inlet Water %	17B - Pre-Choke %	17B - Produced Water %	17B - Sales Gas %	17B- Post-Choke %
Methane	0 *	61.7524	0.0821347	83.3669	61.7524
Ethane	0 *	8.56579	0.0105148	11.4481	8.56579
Propane	0 *	2.38854	0.00284767	3.11227	2.38854
i-Butane	0 *	0.322899	0.000102139	0.402854	0.322899
n-Butane	0 *	0.580669	0.000367137	0.703732	0.580669
i-Pentane	0 *	0.134359	4.36858E-05	0.144531	0.134359
n-Pentane	0 *	0.152168	4.40477E-05	0.153798	0.152168
Nitrogen	0 *	0.275329	0.000206618	0.372383	0.275329
CO2	0 *	0.0385453	0.000993678	0.0515233	0.0385453
Oxygen	0 *	0.0194123	2.91137E-05	0.0262354	0.0194123
Hexane	0 *	0.0874296	5.22205E-06	0.0592552	0.0874296
Isohexane	0 *	0.0307641	2.75478E-06	0.0238292	0.0307641
Neohexane	0 *	0.027722	2.3836E-06	0.0246994	0.027722
2,2,4-Trimethylpentane	0 *	0.000177827	6.60065E-10	7.34242E-05	0.000177827
Benzene	0 *	0.00234351	9.43525E-05	0.00153306	0.00234351
Heptane	0 *	0.0823466	3.4421E-06	0.0316784	0.0823466
Toluene	0 *	0.00698606	9.35704E-05	0.00228338	0.00698606
Octane	0 *	0.0965347	7.74879E-07	0.0169711	0.0965347
Ethylbenzene	0 *	0.000978049	4.52292E-06	0.000142174	0.000978049
o-Xylene	0 *	0.00149248	7.166E-06	0.000171708	0.00149248
Nonane	0 *	0.053056	2.25893E-07	0.00374421	0.053056
Decane	0 *	0.108081	9.18263E-08	0.00323016	0.108081
Water	100 *	25.272	99.9025	0.0500709	25.272

Molar Flow	17B - Inlet Water lbmol/h	17B - Pre-Choke lbmol/h	17B - Produced Water lbmol/h	17B - Sales Gas lbmol/h	17B- Post-Choke lbmol/h
Methane	0 *	839.346	0.281992	836.885	839.346
Ethane	0 *	116.427	0.0361003	114.923	116.427
Propane	0 *	32.4653	0.00977686	31.2427	32.4653
i-Butane	0 *	4.38889	0.000350674	4.04408	4.38889
n-Butane	0 *	7.89252	0.00126049	7.06447	7.89252
i-Pentane	0 *	1.82622	0.000149986	1.45088	1.82622
n-Pentane	0 *	2.06829	0.000151228	1.54391	2.06829
Nitrogen	0 *	3.74231	0.000709379	3.73819	3.74231
CO2	0 *	0.523912	0.00341158	0.517221	0.523912
Oxygen	0 *	0.263855	9.99555E-05	0.263366	0.263855
Hexane	0 *	1.18835	1.79288E-05	0.594838	1.18835
Isohexane	0 *	0.418149	9.45796E-06	0.239211	0.418149
Neohexane	0 *	0.3768	8.18357E-06	0.247947	0.3768
2,2,4-Trimethylpentane	0 *	0.00241705	2.26619E-09	0.000737075	0.00241705
Benzene	0 *	0.0318532	0.000323939	0.0153898	0.0318532
Heptane	0 *	1.11926	1.18177E-05	0.318006	1.11926
Toluene	0 *	0.0949553	0.000321254	0.0229219	0.0949553
Octane	0 *	1.31211	2.66038E-06	0.170366	1.31211
Ethylbenzene	0 *	0.0132937	1.55285E-05	0.00142723	0.0132937

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Molar Flow	17B - Inlet Water lbmol/h	17B - Pre-Choke lbmol/h	17B - Produced Water lbmol/h	17B - Sales Gas lbmol/h	17B- Post-Choke lbmol/h
o-Xylene	0 *	0.0202859	2.46029E-05	0.0017237	0.0202859
Nonane	0 *	0.721143	7.75554E-07	0.0375865	0.721143
Decane	0 *	1.46905	3.15266E-07	0.0324262	1.46905
Water	343.5 *	343.5	342.994	0.502641	343.5

Mass Fraction	17B - Inlet Water %	17B - Pre-Choke %	17B - Produced Water %	17B - Sales Gas %	17B- Post-Choke %
Methane	0 *	50.8762	0.073136	69.1212	50.8762
Ethane	0 *	13.2275	0.0175491	17.791	13.2275
Propane	0 *	5.40902	0.00696977	7.09283	5.40902
i-Butane	0 *	0.963828	0.00032951	1.21014	0.963828
n-Butane	0 *	1.73325	0.00118441	2.11396	1.73325
i-Pentane	0 *	0.497834	0.000174945	0.538935	0.497834
n-Pentane	0 *	0.563825	0.000176395	0.573491	0.563825
Nitrogen	0 *	0.396103	0.000321268	0.539141	0.396103
CO2	0 *	0.087118	0.00242731	0.117192	0.087118
Oxygen	0 *	0.0319008	5.17088E-05	0.0433879	0.0319008
Hexane	0 *	0.38693	2.4978E-05	0.263911	0.38693
Isohexane	0 *	0.13615	1.31766E-05	0.10613	0.13615
Neohexane	0 *	0.122687	1.14012E-05	0.110006	0.122687
2,2,4-Trimethylpentane	0 *	0.00104319	4.18499E-09	0.000433472	0.00104319
Benzene	0 *	0.00940098	0.000409076	0.00618905	0.00940098
Heptane	0 *	0.423752	1.9144E-05	0.164054	0.423752
Toluene	0 *	0.033057	0.000478534	0.0108734	0.033057
Octane	0 *	0.566302	4.91295E-06	0.100192	0.566302
Ethylbenzene	0 *	0.00533251	2.66522E-05	0.000780097	0.00533251
o-Xylene	0 *	0.00813728	4.22271E-05	0.000942148	0.00813728
Nonane	0 *	0.349461	1.60809E-06	0.0248189	0.349461
Decane	0 *	0.789746	7.25186E-07	0.0237531	0.789746
Water	100 *	23.3814	99.8966	0.0466201	23.3814

Mass Flow	17B - Inlet Water lb/h	17B - Pre-Choke lb/h	17B - Produced Water lb/h	17B - Sales Gas lb/h	17B- Post-Choke lb/h
Methane	0 *	13465.2	4.52384	13425.7	13465.2
Ethane	0 *	3500.85	1.0855	3455.61	3500.85
Propane	0 *	1431.58	0.431117	1377.67	1431.58
i-Butane	0 *	255.092	0.0203819	235.051	255.092
n-Butane	0 *	458.731	0.0732622	410.602	458.731
i-Pentane	0 *	131.759	0.0108213	104.679	131.759
n-Pentane	0 *	149.225	0.0109109	111.391	149.225
Nitrogen	0 *	104.835	0.0198721	104.72	104.835
CO2	0 *	23.0571	0.150142	22.7626	23.0571
Oxygen	0 *	8.44304	0.00319846	8.4274	8.44304
Hexane	0 *	102.407	0.00154502	51.2604	102.407
Isohexane	0 *	36.0341	0.000815043	20.6141	36.0341
Neohexane	0 *	32.4709	0.000705222	21.3669	32.4709
2,2,4-Trimethylpentane	0 *	0.276095	2.58864E-07	0.0841949	0.276095
Benzene	0 *	2.48811	0.0253035	1.20212	2.48811
Heptane	0 *	112.152	0.00118416	31.8649	112.152
Toluene	0 *	8.74904	0.0295998	2.11199	8.74904
Octane	0 *	149.88	0.000303891	19.4607	149.88
Ethylbenzene	0 *	1.41133	0.00164858	0.151521	1.41133
o-Xylene	0 *	2.15365	0.00261197	0.182997	2.15365
Nonane	0 *	92.4902	9.94688E-05	4.82066	92.4902

Process Streams Report
All Streams
Tabulated by Total Phase

Client Name:	Consol Energy	Job: Water and Condensate Tank Emissions Estimate
Location:	Camden 17 Natural Gas Production Facility	
Flowsheet:	Flowsheet1	

Mass Flow	17B - Inlet Water lb/h	17B - Pre-Choke lb/h	17B - Produced Water lb/h	17B - Sales Gas lb/h	17B- Post-Choke lb/h
Decane	0 *	209.018	4.48566E-05	4.61366	209.018
Water	6188.24 *	6188.24	6179.13	9.05521	6188.24

Stream Properties

Property	Units	17B - Inlet Water	17B - Pre-Choke	17B - Produced Water	17B - Sales Gas	17B- Post-Choke
Temperature	°F	87 *	85.9991	60	60 *	50.0411
Pressure	psig	1500 *	1500	600	600	600 *
Mole Fraction Vapor	%	0	74.203	0	100	73.6715
Mole Fraction Light Liquid	%	100	0.529401	100	0	1.05602
Mole Fraction Heavy Liquid	%	0	25.2676	0	0	25.2725
Molecular Weight	lb/lbmol	18.0153	19.472	18.0163	19.3488	19.472
Mass Density	lb/ft^3	62.1859	8.7338	62.3219	2.48672	3.44555
Mass Flow	lb/h	6188.24	26466.5	6185.52	19423.4	26466.5
Std Vapor Volumetric Flow	MMSCFD	3.12847	12.3792	3.12691	9.14276	12.3792
Std Liquid Volumetric Flow	sgpm	12.3707 *	133.251	12.3914	118.064	133.251
Specific Gravity		0.997063		0.999244	0.66806	
Net Ideal Gas Heating Value	Btu/ft^3	0	821.277	1.00912	1067.84	821.277
Gross Ideal Gas Heating Value	Btu/ft^3	50.31	919.135	51.3761	1179.56	919.135

Warnings

ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!17B - Produced Water
Warning: The temperature of 60 °F is within 10 °F of hydrate formation.
ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!17B - Sales Gas
Warning: The temperature of 60 °F is within 10 °F of hydrate formation.
ProMax:ProMax!Project!Flowsheets!Flowsheet1!PStreams!17B- Post-Choke
Warning: The temperature of 50.0411 °F is below hydrate formation.

Remarks

Condensate Tank Working and Breathing Loss Inputs

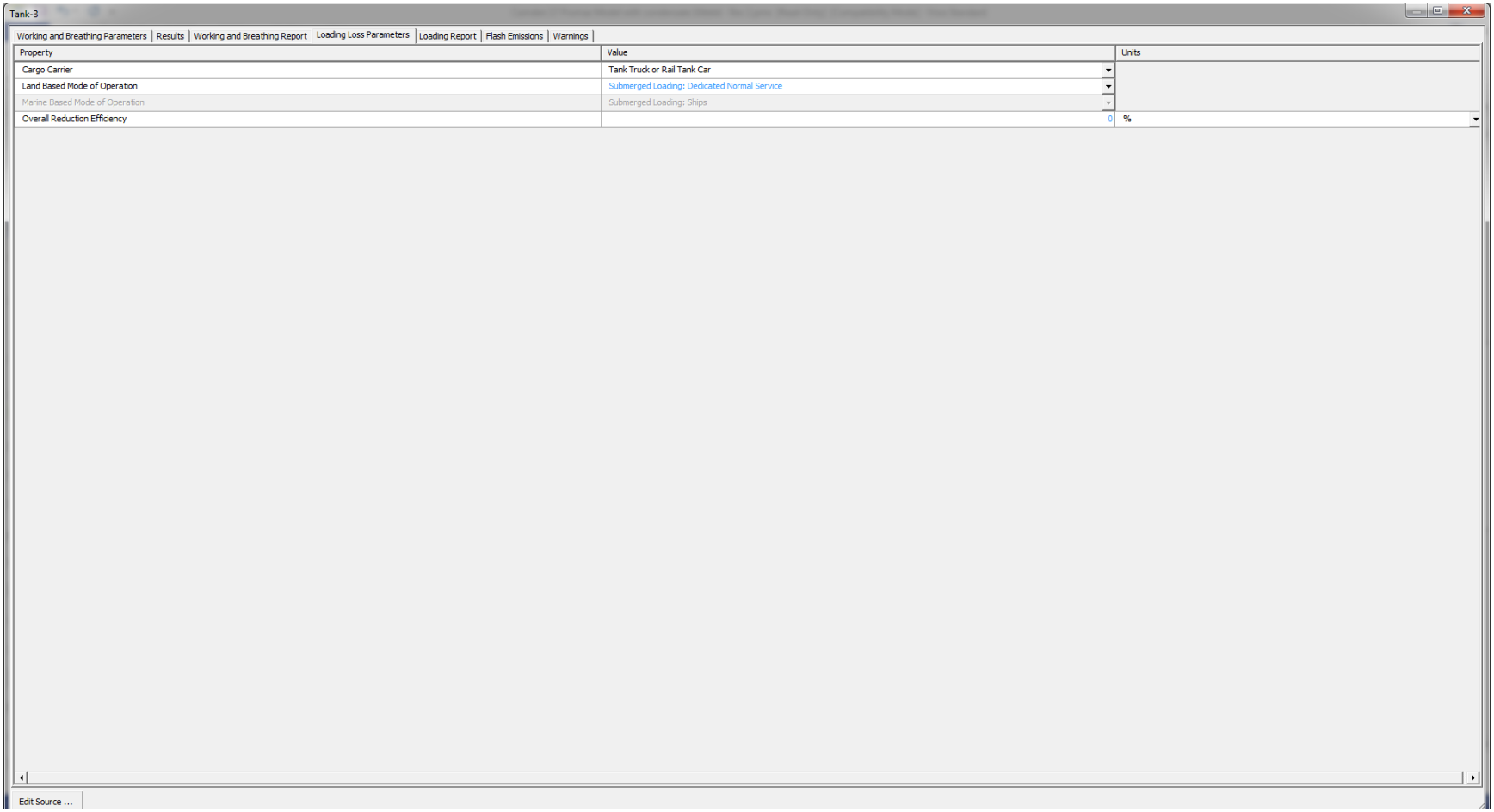
Tank-3

Working and Breathing Parameters | Results | Working and Breathing Report | Loading Loss Parameters | Loading Report | Flash Emissions | Warnings

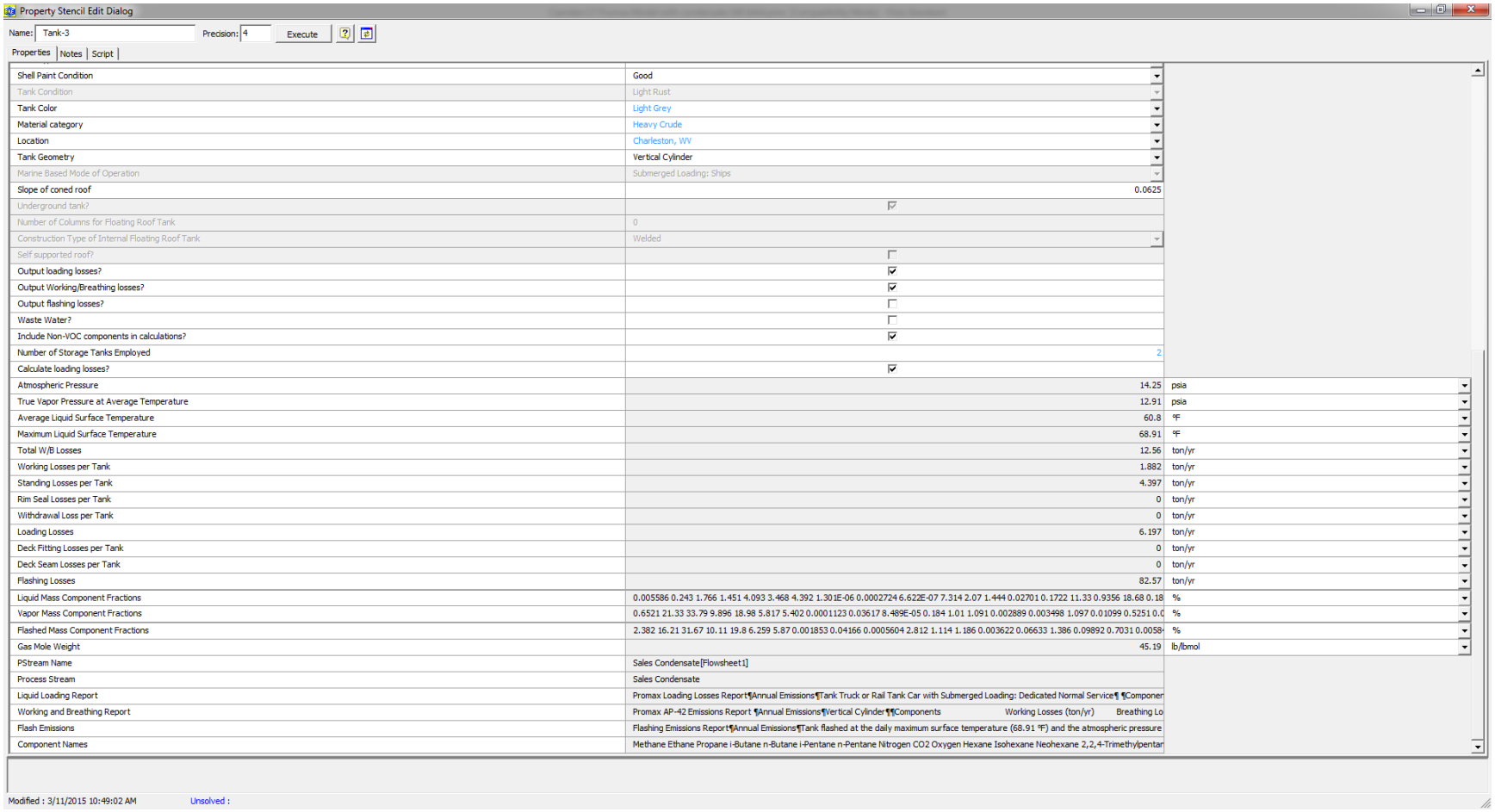
Property	Value	Units
Process Stream	Sales Condensate	
Tank Geometry	Vertical Cylinder	
Shell Length	15	ft
Shell Diameter	10	ft
Number of Storage Tanks Employed	2	
Location	Charleston, WV	
Annual Net Throughput	96.47	bbl/day
Include Non-VOC components in calculations?	☑	
Maximum fraction fill of tank	90	%
Average fraction fill of tank	50	%
Material category	Heavy Crude	
Tank Color	Light Grey	
Tank Condition	Light Rust	
Shell Paint Condition	Good	
Operating Pressure	0	psig
Breather Vent Pressure	0.03	psig
Breather Vacuum Pressure	-0.03	psig
Roof Type	Cone	
Radius of domed roof		ft
Slope of coned roof	0.0625	
Roof Color	Light Grey	
Roof Paint Condition	Good	
Maximum Average Temperature	65.5	°F
Minimum Average Temperature	44	°F
Average Absolute Pressure	14.25	psia
Daily Solar Insolation	1,123	Btu/ft^2/day
Average Wind Speed	6.3	mi/h
Underground tank?	☑	
Floating Roof Type	Pontoon	
Tank Construction	Welded	
Primary Seal	Mechanical Shoe	
Secondary Seal type #1	None	
Secondary Seal type #2	None	
Self supported roof?	☐	
Deck Construction	Sheet	
Contruction Type for Continuous Sheet Style Deck	5 feet wide	
Contruction Type for Panel Style Deck	5 x 7.5 feet	
Number of Columns for Floating Roof Tank	0	
Effective Column Diameter	Default	
Construction Type of Internal Floating Roof Tank	Welded	
Calculate loading losses?	☑	
Output loading losses?	☑	
Output flashing losses?	☐	
Output Working/Breathing losses?	☑	

Edit Source ...

Condensate Truck Loading Loss Inputs



Condensate True Vapor Pressure and Vapor Molecular Weight



Property Stencil Edit Dialog

Name: Tank-3 Precision: 4 Execute

Properties | Notes | Script

Shell Paint Condition	Good	
Tank Condition	Light Rust	
Tank Color	Light Grey	
Material category	Heavy Crude	
Location	Charleston, WV	
Tank Geometry	Vertical Cylinder	
Marine Based Mode of Operation	Submerged Loading: Ships	
Slope of coned roof	0.0625	
Underground tank?	☑	
Number of Columns for Floating Roof Tank	0	
Construction Type of Internal Floating Roof Tank	Welded	
Self supported roof?	☐	
Output loading losses?	☑	
Output Working/Breathing losses?	☑	
Output flashing losses?	☐	
Waste Water?	☐	
Include Non-VOC components in calculations?	☑	
Number of Storage Tanks Employed	2	
Calculate loading losses?	☑	
Atmospheric Pressure	14.25	psia
True Vapor Pressure at Average Temperature	12.91	psia
Average Liquid Surface Temperature	60.8	°F
Maximum Liquid Surface Temperature	68.91	°F
Total W/B Losses	12.56	ton/yr
Working Losses per Tank	1.882	ton/yr
Standing Losses per Tank	4.397	ton/yr
Rim Seal Losses per Tank	0	ton/yr
Withdrawal Loss per Tank	0	ton/yr
Loading Losses	6.197	ton/yr
Deck Fitting Losses per Tank	0	ton/yr
Deck Seam Losses per Tank	0	ton/yr
Flashing Losses	82.57	ton/yr
Liquid Mass Component Fractions	0.005586 0.243 1.766 1.451 4.093 3.468 4.392 1.301E-06 0.0002724 6.622E-07 7.314 2.07 1.444 0.02701 0.1722 11.33 0.9356 18.68 0.18	%
Vapor Mass Component Fractions	0.6521 21.33 33.79 9.896 18.98 5.817 5.402 0.0001123 0.03617 8.489E-05 0.184 1.01 1.091 0.002889 0.003498 1.097 0.01099 0.5251 0.0	%
Flashed Mass Component Fractions	2.382 16.21 31.67 10.11 19.8 6.259 5.87 0.001853 0.04166 0.0005604 2.812 1.114 1.186 0.003622 0.06633 1.386 0.09892 0.7031 0.0058	%
Gas Mole Weight	45.19	lb/lbmol
PStream Name	Sales Condensate[Flowsheet1]	
Process Stream	Sales Condensate	
Liquid Loading Report	Promax Loading Losses Report¶Annual Emissions¶Tank Truck or Rail Tank Car with Submerged Loading: Dedicated Normal Service¶ ¶Componer	
Working and Breathing Report	Promax AP-42 Emissions Report ¶Annual Emissions¶Vertical Cylinder¶¶Components Working Losses (ton/yr) Breathing Lo	
Flash Emissions	Flashing Emissions Report¶Annual Emissions¶Tank flashed at the daily maximum surface temperature (68.91 °F) and the atmospheric pressure	
Component Names	Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Nitrogen CO2 Oxygen Hexane Isohexane Neohexane 2,2,4-Trimethylpentan	

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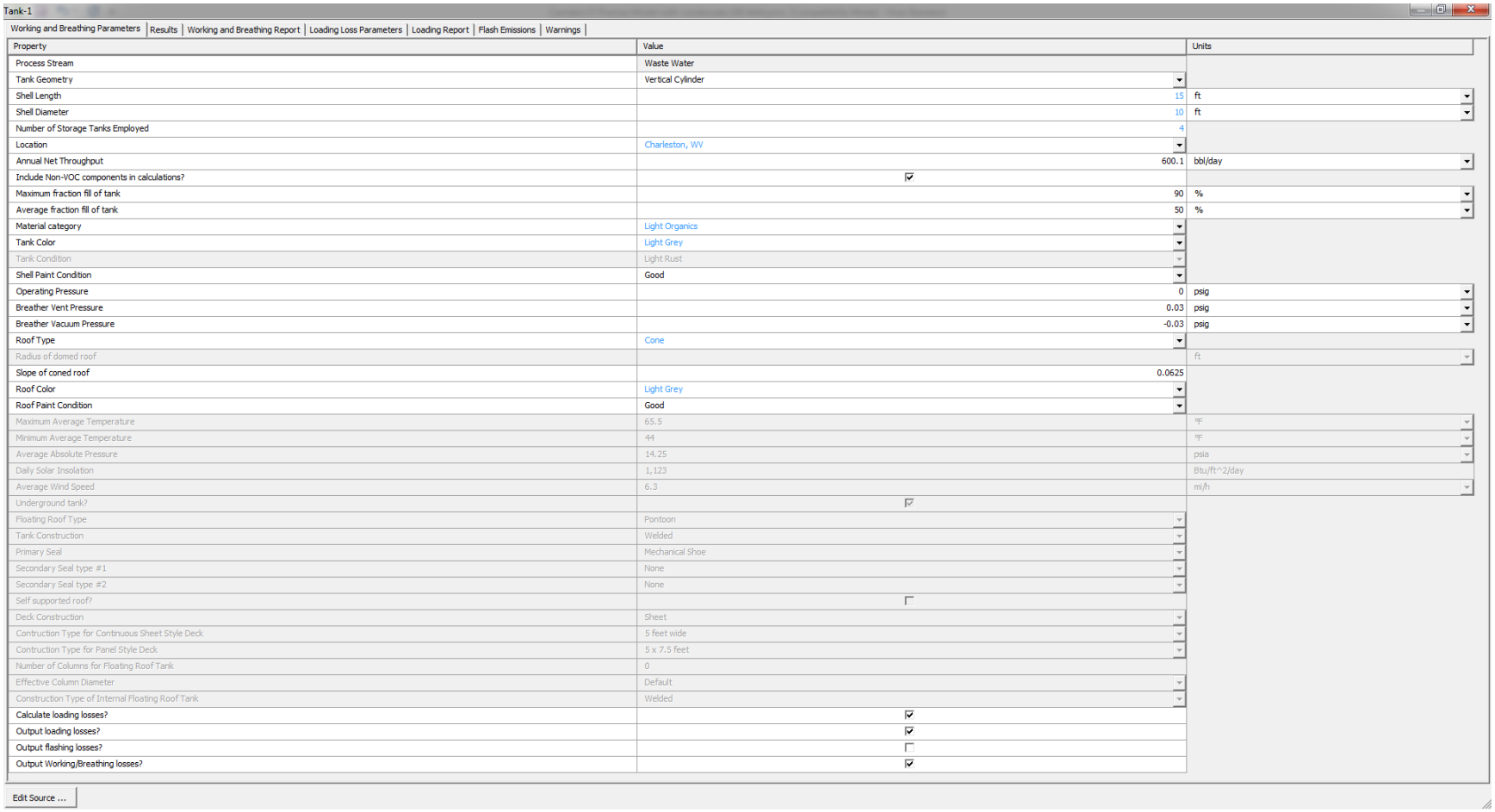
* User Specified Values
? Extrapolated or Approximate Values

Produced Water Tank Working and Breathing Loss Inputs



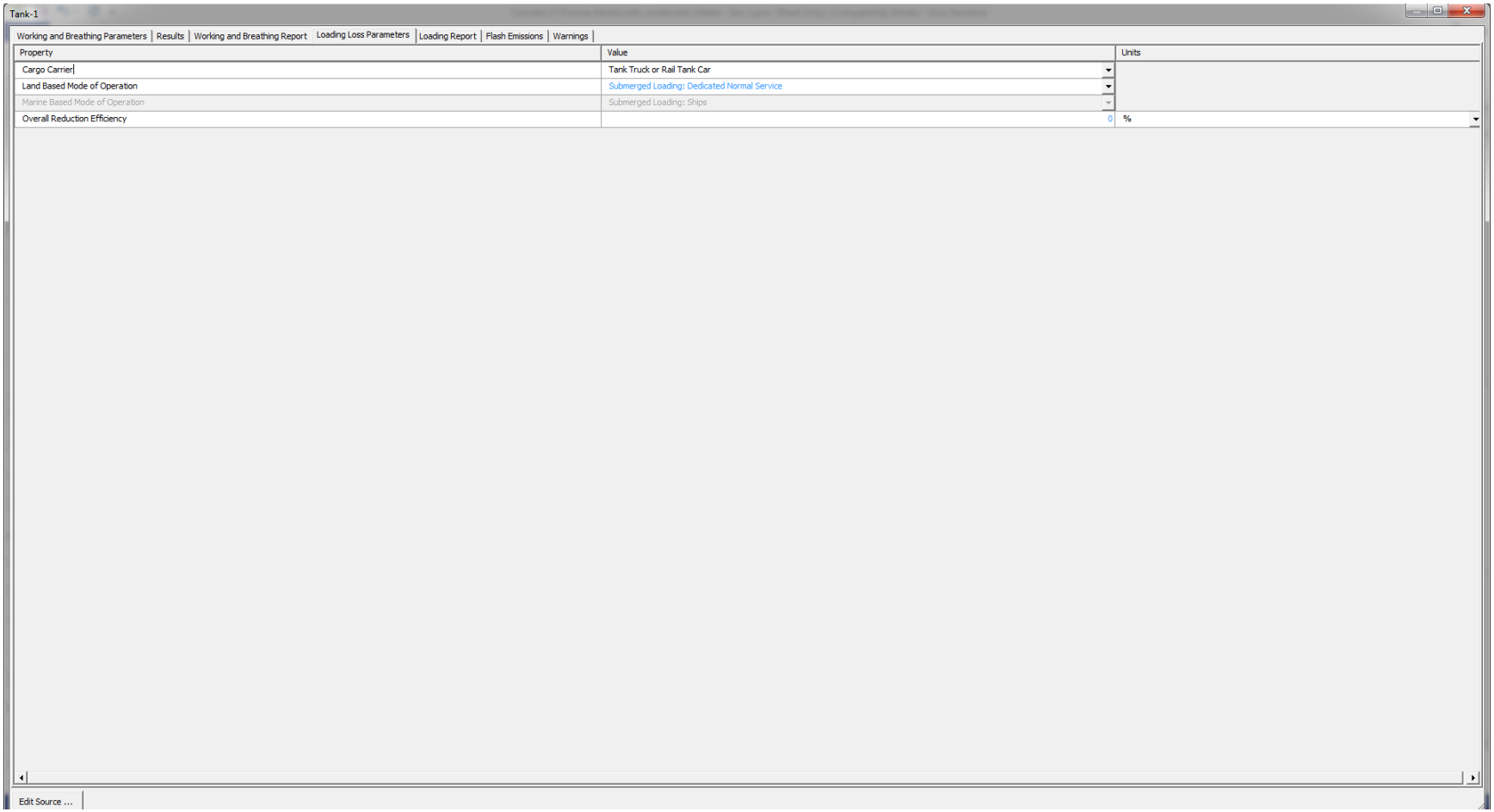
Tank-1

Working and Breathing Parameters | Results | Working and Breathing Report | Loading Loss Parameters | Loading Report | Flash Emissions | Warnings

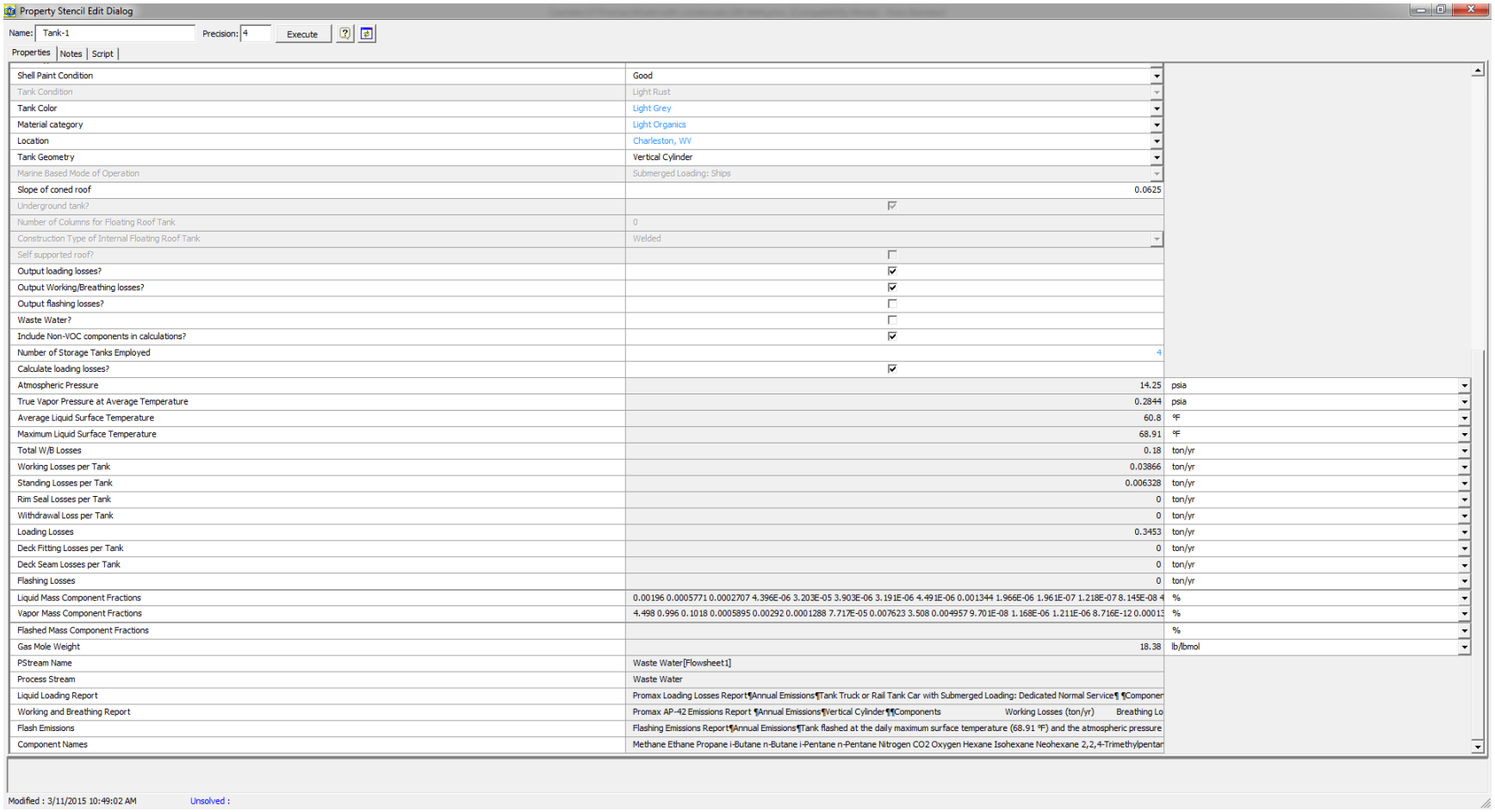
Property	Value	Units
Process Stream	Waste Water	
Tank Geometry	Vertical Cylinder	
Shell Length	15	ft
Shell Diameter	10	ft
Number of Storage Tanks Employed	4	
Location	Charleston, WV	
Annual Net Throughput	600.1	bbl/day
Include Non-VOC components in calculations?	☑	
Maximum fraction fill of tank	90	%
Average fraction fill of tank	50	%
Material category	Light Organics	
Tank Color	Light Grey	
Tank Condition	Light Rust	
Shell Paint Condition	Good	
Operating Pressure	0	psig
Breather Vent Pressure	0.03	psig
Breather Vacuum Pressure	-0.03	psig
Roof Type	Cone	
Radius of domed roof		ft
Slope of coned roof	0.0625	
Roof Color	Light Grey	
Roof Paint Condition	Good	
Maximum Average Temperature	65.5	°F
Minimum Average Temperature	44	°F
Average Absolute Pressure	14.25	psia
Daily Solar Insolation	1,123	Btu/ft^2/day
Average Wind Speed	6.3	mi/h
Underground tank?	☑	
Floating Roof Type	Pontoon	
Tank Construction	Welded	
Primary Seal	Mechanical Shoe	
Secondary Seal type #1	None	
Secondary Seal type #2	None	
Self supported roof?	☐	
Deck Construction	Sheet	
Contruction Type for Continuous Sheet Style Deck	5 feet wide	
Contruction Type for Panel Style Deck	5 x 7.5 feet	
Number of Columns for Floating Roof Tank	0	
Effective Column Diameter	Default	
Construction Type of Internal Floating Roof Tank	Welded	
Calculate loading losses?	☑	
Output loading losses?	☑	
Output flashing losses?	☐	
Output Working/Breathing losses?	☑	

Edit Source ...

Produced Water Truck Loading Loss Inputs



Produced Water True Vapor Pressure and Vapor Molecular Weight



Property Stencil Edit Dialog

Name: Tank-1 Precision: 4 Execute

Properties | Notes | Script

Shell Paint Condition	Good	
Tank Condition	Light Rust	
Tank Color	Light Grey	
Material category	Light Organics	
Location	Charleston, WV	
Tank Geometry	Vertical Cylinder	
Marine Based Mode of Operation	Submerged Loading: Ships	
Slope of coned roof	0.0625	
Underground tank?	☑	
Number of Columns for Floating Roof Tank	0	
Construction Type of Internal Floating Roof Tank	Welded	
Self supported roof?	☐	
Output loading losses?	☑	
Output Working/Breathing losses?	☑	
Output flashing losses?	☐	
Waste Water?	☐	
Include Non-VOC components in calculations?	☑	
Number of Storage Tanks Employed	4	
Calculate loading losses?	☑	
Atmospheric Pressure	14.25	psia
True Vapor Pressure at Average Temperature	0.2844	psia
Average Liquid Surface Temperature	60.8	°F
Maximum Liquid Surface Temperature	68.91	°F
Total W/B Losses	0.18	ton/yr
Working Losses per Tank	0.03866	ton/yr
Standing Losses per Tank	0.006328	ton/yr
Rim Seal Losses per Tank	0	ton/yr
Withdrawal Loss per Tank	0	ton/yr
Loading Losses	0.3453	ton/yr
Deck Fitting Losses per Tank	0	ton/yr
Deck Seam Losses per Tank	0	ton/yr
Flashing Losses	0	ton/yr
Liquid Mass Component Fractions	0.00196 0.0005771 0.0002707 4.396E-06 3.203E-05 3.903E-06 3.191E-06 4.491E-06 0.001344 1.966E-06 1.961E-07 1.218E-07 8.145E-08 4	%
Vapor Mass Component Fractions	4.498 0.996 0.1018 0.0005895 0.00292 0.0001288 7.717E-05 0.007623 3.508 0.004957 9.701E-08 1.168E-06 1.211E-06 8.716E-12 0.00013	%
Flashed Mass Component Fractions		%
Gas Mole Weight	18.38	lb/lbmol
PStream Name	Waste Water[Flowsheet1]	
Process Stream	Waste Water	
Liquid Loading Report	Promax Loading Losses Report¶Annual Emissions¶Tank Truck or Rail Tank Car with Submerged Loading: Dedicated Normal Service¶ ¶Componer	
Working and Breathing Report	Promax AP-42 Emissions Report ¶Annual Emissions¶Vertical Cylinder¶¶Components Working Losses (ton/yr) Breathing Lo	
Flash Emissions	Flashing Emissions Report¶Annual Emissions¶Tank flashed at the daily maximum surface temperature (68.91 °F) and the atmospheric pressure	
Component Names	Methane Ethane Propane i-Butane n-Butane i-Pentane n-Pentane Nitrogen CO2 Oxygen Hexane Isohexane Neohexane 2,2,4-Trimethylpentan	

Modified : 3/11/2015 10:49:02 AM Unsolved :

Enviromental Control Equipment
Data Sheet

Item/Tag No.:		Page	1	of	3
Project No.:		Revision:	B		
Project:		Date:	27 February 2014		
P.O. No.:	-	By:	JS		
RFQ No.:	-	Checked:	SG		
Ref. P&ID:	-	Approved:	MS		
Remarks:	-	Supplier:	LEED FABRICATION		
		Model No.:	L30-0018-00		

Client:
Site:
Unit/Lease:

GENERAL

1	Design Code:	NDE:	LEED Fabrication Standards
2	Service:	Customer Specs:	☐ Yes
3	Description: Standard Single Stage 36 High Efficiency Combustor		☑ No

PROCESS DATA

	Gas Composition:	mol %
4	Methane	
5	Ethane	
6	Propane	
7	I-Butane	
8	n-Butane	
9	I-Pentane	
10	n-Pentane	
11	n-Hexane	
12	CO2	
13	N2	
14	Helium	
15	H_2O	
16	C7	
17	C8	
18	C9	
19	C10	
20	C11+	
21	TOTAL	

Process Conditions:		
Variable	Value	Units
Flow Rate	Up to 99	Mscfd
Pressure	Up to 12	oz/in2
Temperature		°F
Molecular Weight		
Process/Waste Stream	☑ Gas	☐ Liquid

Detailed Process Description / Process Notes:

1. Turndown 10:1. Based on an expected normal operating rate indicated above.
2. DRE: 98 % operating at design conditions
3. Burner Pressure Drop: Min. 0.10 oz/in2

	Other Components:	PPMV
22	H2S	
23	Benzene	
24	Toluene	
25	E-Benzene	
26	Xylene	

Available Utilities:	
Fuel / Pilot Gas	Min. 30psig Natural Gas /Propane 40-50 SCFH
Instrument Air	NA
Power	120 V / 60 Hz or Solar Power
Steam	NA
Purge Gas	

DESIGN DATA

27	Ambient Temperatures:		Noise Performance Requirements:	Under 85 dBA
28	Low, °F	-20	Structural Design Code:	
29	High, °F	120	Wind Design Code:	ASCE
30	Design Conditions: Pressure/Temperature			
31	Max. Relative Humidity, %	90	Pressure/Speed	100 mph
32	Elevation (ASL), ft		Category	
33	Area Classification:	Class I Div 2	Seismic Design Code:	
34	Electrical Design Code:	NEC	Location	

EQUIPMENT SPECIFICATION

35	Type:	☐ Elevated	☑ Enclosed	Equipment Design:	
36		☐ Above Ground		Component	Material / Size / Rating / Other
37		☑ Stack	☐ Multiple Stack	Burner	
38		☐ Portable / Trailer		Burner Tip / Assist Gas Burner	304 SS
39				Burner Body	Carbon Steel
40	Smokeless By:	☐ Steam	☐ Assist Air	Pilot	
41		☐ Gas Assist	☑ Staging	Pilot Tip	304 SS
42				Pilot Line(s)	Carbon Steel
43	Stack:	☑ Self Supporting		Firebox / Stack	
44	Flare Burner:	☐ Non-Smokeless	☑ Smokeless ☐ Gas Assist	Shell	Carbon Steel
45	Pilot:	☑ Intermittent	☐ Continuous	Piping	Carbon Steel
46	Pilot Air Inspirator:	☑ Local	☐ Remote	Nozzles	Carbon Steel
47	Pilot Flame Control:	☐ No	☑ Yes (Thermocouple)	Flanges	Carbon Steel
48				Insulation	Blanket
49	Pilot Ignition:	☐ Flamefront Generator	☑ Inspirating Ignitor	Insulation Pins	304 SS
50		☐ Electronic	☑ Automatic ☐ Manual	Refractory	NA
51		☐ With Pilot Flame Control		Refractory Anchors	NA
52		☐ With Auto Pilot Re-Ignition		Ladders and Platforms	NA
53				Stack Sample Connections	Per EPA requirements
54	Pilot Ignition Backup:	☐ Manual	Specify: i.e Piezo-Electric	Sight Glass	2
55		☐ Battery Pack		Other	

Environmental Control Equipment
Data Sheet

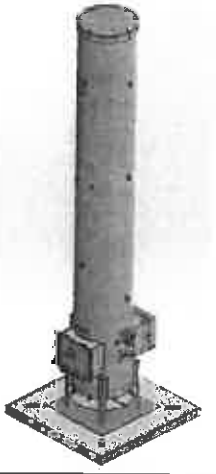
Item/Tag No.:		Page	2	of	3
Project No.:		Revision:	B		
Project:		Date:	27 February 2014		
		By:	JS		
P.O. No.:	-	Checked:	SG		
RFQ No.:	-	Approved:	MS		
Ref. P&ID:	-	Supplier:	LEED FABRICATION		
Remarks:	-	Model No.:	L30-0018-00		

Client:	
Site:	
Unit/Lease:	

EQUIPMENT SPECIFICATION

Flame Detection: ☐ Thermocouple ☑ Ionization Rod ☐ UV Scanner

General Configuration:



Auxiliary Equipment	
Valves	NA
Blowers	NA
Dampers	NA
Inlet KO / Liquid Seal	NA
Flame / Detonation Arrestor	Yes
Instrumentation & Controls	
Solenoids / Shut-Off Valves	Check with Sales for available config.
Flow Meters	NA
Calorimeter	NA
Pressure Switches/Transmitters	NA
Thermocouples	Check with Sales for available config.
Temperature Switches/Transmitters	NA
BMS	Check with Sales for available config.
CEMS	NA
Other	NA

FABRICATION AND INSPECTION

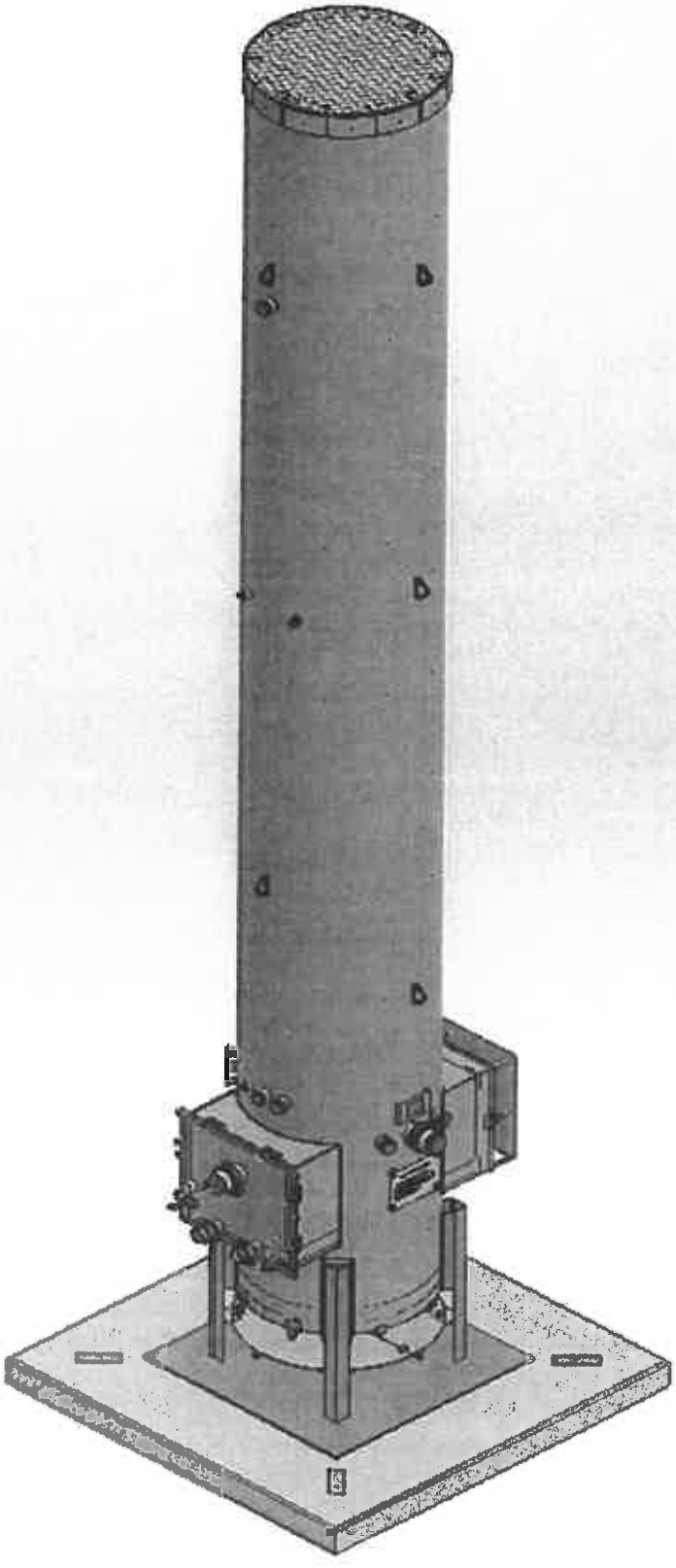
Special requirements	☐ Skid Mounted ☑ Concrete Pad ☐ Other
Inspection	☑ Vendor Standard ☐ Other. Specify:
Material Certification	☑ Vendor Standard ☐ MTR ☐ Certificate of Compliance ☐ Other (Specify):
NDE	☑ Vendor Standard ☐ Radiography. Specify: ☐ Ultrasonic. Specify: ☐ Liquid Penetrant. ☐ Magnetic Particles. ☐ PMI. Specify: ☐ Other. Specify:
Surface Preparation	☑ Vendor Standard ☐ Other. Specify:
Paint System	☑ Vendor Standard ☐ Other. Specify:
Finished Color	☑ Vendor Standard ☐ Other. Specify:

Equipment Info	
Component	**Weight / Dimensions**
Burner	
Burner Assembly	
Stack	
Stack Assembly	36 " OD x 25 ' H
Pilot Tip	
Pilot Line(s)	
Stack Assembly	
Auxiliary Equipment	
Blowers	
Inlet KO / Liquid Seal	
Flame / Detonation Arrestor	
Skid	
Instrumentation & Controls	
BMS	
Control Panel	

Additional Notes:

	Item/Tag No.:		Page	3 of 3	
	Project No.:		Revision:	B	
	Project:		Date:	27 February 2014	
			By:	JS	
Environmental Control Equipment	P.O. No.:	-	Checked:	SG	
Data Sheet	RFQ No.:	-	Approved:	MS	
Client:	Ref. P&ID:	-			
Site:			Supplier:	LEED FABRICATION	
Unit/Lease:	Remarks:	-	Model No.:	L30-0018-00	

GENERAL ARRANGEMENT



Sulfur Concentration Conversion Factors

Galvanic

1 Grain	= 0.0648 grams	
1cu ft.	= 28.316 liters	= 0.28316m^3
Molecular wt. H_2S	= 34.08	
Molecular wt. S	= 32.064	
1 gram mole gas	= 22.414 litres	@0°C & 14.75 PSI @-STP
1 gram mole gas	= 23.718 litres	@60° & 14.73 ST(commonSTP)
1 grain H_2S/100 SCF	= 22.88 mg/m^3	
1 grain H_2S/100 SCF	= 15.05 ppmv H_2S	@0°C & 14.75 PSI @ STP
1 grain H_2S/100 SCF	= 15.26 ppmv H_2S	@ 60°F & 14.73 PSI @STP
1 grain Sulf/100 SCF	= 15.99 ppmv/Sulfur	@ 0°C & 14.75 PSI @STP
1 grain Sulf/100 SCF	= 16.92 ppmv/ Sulfur	@ 60°F & 14.73 PSI @ STP
1 grain H_2S/100 SCF(Methane)	= 32 ppm wt./wt.	@ 0°C & 14.75 PSI @STP
1 grain H_2S/100 SCF(Methane)	= 33.9 ppm wt./wt.	@ 60°F & 14.73 PSI @ STP

Dow Gas Conditioning Fact Book

Multiply U.S.	By	To Obtain
Grains per Gallon	17.1	Parts per Million by weight
Grains H_2S per 100 SCF	0.001588	Mole percent H_2S
Grains H_2S per 100 SCF	1588 X 10 -8	Mole Fraction
Grains H_2S per 100 SCF	15	ppm (w/v)
Mole Percent H_2S	615	Grains H_2S per 100 SCF

Conversion Factors Commonly used by pipeline transmission companies for H_2S in Natural Gas

ppm to mg/m_3	multiply by 1.4331
mg/m_3 to grains/100SCF	multiply by 0.0437
ppm to grains/100 SCF	multiply by 0.0626285
grains/100 SCF to mg/m^3	multiply by 22.88277
mg/m^3 to ppm	multiply by 0.69778
grains/100SCF to ppm	multiply by 15.967

Specification for Sulfur Levels

Tariff Limits - H_2S

TCPL	23mg/m^3 OR 1 grain/100 SCF/100 SCF OR 16 ppm
NOVA	23mg/m^3 OR 1 grain/100 SCF/100 SCF OR 16 ppm
TRANS GAS	6mg/m^3 OR .26grain/100 SCF OR 4.2 ppm

Tariff Limits - Total Sulfur

TCPL	460 mg/m^3 OR 20.1 grains or 321 ppm
NOVA	115 mg/m^3 OR 5.03 grains OR 80 ppm
TRANS GAS	23mg/m^3 OR 1.00 grains OR 16 ppm

Total Sulfur Limits by Environment Canada

Gasoline	360 ppm,	Recommended interim measure as of January 1, 1997
	30 ppm by 2005	Canadian Environmental Protection Act, Registration SOR/97-110
Diesel	0.05 wt%	

Total Sulfur Limits by United States Environmental Protection Agency
Code of Federal Regulations, Title 40, Part 79, Section 79.55

Methane Base Fuel Specification	16 ppmv
Propane Base Fuel Specification	123 ppmw
Methanol Base Fuel Properties	40 ppmw
Ethanol Base Fuel Properties	40 ppmw
Gasoline Base Fuel Properties	339 ppmw
Diesel Base Fuel Properties	0.05 wt%

ATTACHMENT O

MONITORING/RECORDKEEPING/REPORTING/ TESTING PLANS

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

Monitoring

The company will at a minimum monitor hours of operation, visual emissions, site production throughputs, and planned and unplanned maintenance of permitted equipment comprising the facility.

Recordkeeping

The company will retain records for five (5) years, two (2) years on site, certified by a company official at such time that the DAQ may request said records.

The company will keep records of the items monitored, such as station throughput, hours of operation, planned maintenance activities, unplanned maintenance activities, and complaints regarding the facility.

Reporting

The company will report any control equipment malfunctions, emission limit or opacity deviations.

Testing

Visual Emission (VE) testing will be conducted periodically.

ATTACHMENT P

PUBLIC NOTICE

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that CNX Gas Company, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Regulation 13 construction permit for a well pad facility located at the Camden 17 site, off Kemper Run Road near Camden, Lewis County, WV. The site' latitude and longitude coordinates are: 39.07937 and -80.58682.

The applicant estimates the site will have a maximum potential to discharge of the following Regulated Air Pollutants:

Pollutant	Tons/yr
NOx	3.58
CO	15.52
VOC	15.33
SO_2	0.76
PM_{10}	0.07
$PM_{2.5}$	0.07
CO_2e	5693.0
Benzene	<0.01
Toluene	<0.01
Ethylbenzene	<0.01
Xylenes	<0.01
n-Hexane	0.02
Formaldehyde	<0.01
Total HAPs	0.02

Startup of operation is planned to begin on or about the 1st day of May, 2015. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

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

Dated this the __th Day of March, 2015.

By: CNX Gas Company, LLC
David Morris
Air Quality Manager-env
1000 Consol Energy Drive
Canonsburg, PA 15317

ATTACHMENT Q

NOT APPLICABLE (SEE NOTE)

Note: No information contained within this application is claimed confidential.

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

ATTACHMENT R

NOT APPLICABLE (SEE NOTE)

Note: No delegation of authority.

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

ATTACHMENT S

NOT APPLICABLE (SEE NOTE)

Note: Not a Title V Permit Revision.

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015

ATTACHMENT T

PERMIT APPLICATION FEE

Rule 13 Permit Application

Camden 17 Well Pad, New Facility
Camden, West Virginia

CNX Gas Company, LLC
PO Box 1248
Jane Lew, West Virginia

March 2015