

CNX Gas Company LLC

Sims Run Station

Camden, West Virginia

Permit Determination

SLR Ref: 116.00894.00071

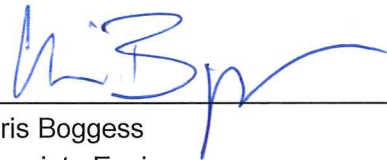
October 2017

## Sims Run Station Permit Determination

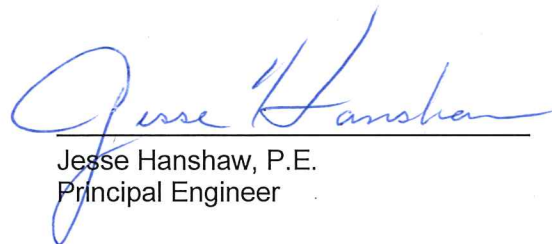
Prepared for:

**CNX Gas Company LLC**  
1000 Consol Energy Drive  
Canonsburg, PA 15317

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.



Chris Boggess  
Associate Engineer



Jesse Hanshaw, P.E.  
Principal Engineer



---

# CONTENTS

---

## Section

### Section 1. TECHNICAL SUPPORT DOCUMENT

#### 1.1 INTRODUCTION

#### 1.2 DESCRIPTION OF FACILITY

#### 1.3 FEDERAL AND STATE REQUIREMENTS

### Section 2. APPLICATION FOR PERMIT DETERMINATION

## ATTACHMENTS

ATTACHMENT A	.....	AREA MAP
ATTACHMENT B	.....	PROCESS FLOW DIAGRAM
ATTACHMENT C	.....	PROCESS DESCRIPTION
ATTACHMENT D	.....	SAFETY DATA SHEETS (SDS)(SEE NOTES)
ATTACHMENT E	.....	EMISSION CALCULATIONS

**SECTION 1.**  
**TECHNICAL SUPPORT DOCUMENT**

**Permit Determination**

**Sims Run Station  
Camden, West Virginia**

CNX Gas Company LLC  
1000 Consol Energy Drive  
Canonsburg, PA 15317

October 2017

## **1.1 INTRODUCTION**

Sims Run Station is used as a booster station for wells located within the surrounding area. It is currently a non-permitted site planning to operate with (1) 4SRB 145 hp Compressor Engine (Cat 3306 NA) and (1) 50 bbl pipeline liquids tank. There are also (3) wells located within ¼ mile of the site. The nearby wells make it necessary to evaluate the (1) 50 bbl tanks and (5) 100 bbl tanks associated with them. Emission calculations within this determination account for all of the tanks, as well as the reciprocating internal combustion engine (RICE).

The details of this evaluation are provided in section 2.0 with supporting calculations and ProMax Simulations conducted for worst case operating scenarios.

## **1.2 SITE HISTORY**

The site is being evaluated to identify any after the fact permitting obligations that may be triggered as a result of applicable engine standards under the Federal NSPS provisions of 40CFR60 Subpart JJJJ.

## **1.3 DESCRIPTION OF FACILITY**

CNX Gas Company LLC is submitting a permit determination to evaluate existing and future equipment at and around Sims Run Station. Emission sources included within the determination include: (1) 4SRB 145 hp Compressor Engine (Cat 3306 NA) manufactured in April, 2008, (2) 50 bbl produced liquids tank, and (5) 100 bbl produced liquids tanks.

### **Description of Emission Calculations**

The tanks were estimated to have a worst case throughput of 5 bbl/day. The tank emissions were estimated using ProMax with representative samples of gas and condensate taken from the Minnie Lee No.1 well pad. The Minnie Lee No.1 condensate composition is viewed as a worst case representation. This estimate predicts approximately 0.97 tpy of VOCs originating from the tanks, these emissions included flashing losses as well as working and breathing losses. The amount of condensate produced at the station is minimal and therefore all produced liquids are sent to the storage vessel (T-1) and hauled from the site via 100 bbl tank truck.

## 1.4 FEDERAL AND STATE REQUIREMENT

### APPLICABLE REGULATIONS

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

#### Federal and State:

**40 CFR 61** - This facility is subject to the asbestos inspection and notification requirements. However, there has been no demolition or renovation activity at this site.

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

The company is applying for a permit determination to assure all permitting thresholds are evaluated with respect to minor source permit requirements, as a result all commonly owned emissions sources are aggregated as one facility if located within ¼ miles from the booster station

#### **WV Code § 22-5-4 (a) (14)**

The Secretary can request any pertinent information such as annual emission inventory reporting. This station is not required to submit an annual air emission inventory.

**45 CSR 17** - Fugitive Particulate Emissions

The site shall minimize fugitive PM so that emissions do not travel offsite.

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

The compressor engine (CE-1) at the station was manufactured on 4-24-2008, which predates the July 1, 2008 applicability date for engines less than 500 hp. Therefore, the compressor engine is not subject to emissions limits according to 40 CFR§60.4230-(a)(4)(iii). Additionally, the compressor will be installed as a booster at the Sims Run location in 2017 and therefore evaluated for applicability to §60.4236 related to requirements for installing previous model year engines. This engine was found to be exempt as a relocated unit according to §60.4236(e).

**40 CFR 63, Subpart ZZZZ** – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

The natural gas compressor engine (CE-1) is a 4SRB Cat 3306 NA engine manufactured on 4-24-2008; therefore, per 40CFR63.6590(c)(1) the requirements of this regulation are to comply with new SI engines standards in accordance with 40CFR60, Subpart JJJJ.

## **NON-APPLICABILITY DETERMINATIONS**

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

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

No heat exchangers are in use at Sims Run Station or any of the surrounding wells.

### **45 CSR 10 - Emission of Sulfur Oxides**

No fuel burning units are in use at Sims Run Station or any of the surrounding wells.

### **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 thresholds to trigger a 45 CSR 30 Title V Operating Permit nor is it subject to any Federal Standards that require a Title V Permit.

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

The tanks onsite (T-1 through T-7) is below the size capacity threshold of 75 meters cubed (m<sup>3</sup>) [19,813 gallons] defined within the applicability section 60.110b(a) of this Federal standard.

### **40 CFR 60 Subpart OOOO - Storage Vessel NSPS Requirements**

The existing storage vessels predate the applicability date of this regulation, Aug 23, 2011.

### **40 CFR 60 Subpart OOOOa - Storage Vessel NSPS Requirements**

The existing storage vessels predate the applicability date of this regulation, Sept 18, 2015.

### **40 CFR 60 Subpart OOOOa – Fugitive Component Leak Monitoring**

The site is classified as a compressor facility, which will not be subject to the monitoring requirement of this section since the existing site predates the applicability date of September 18, 2015 as defined under this Federal regulation. However, the site was also evaluated to determine if the installation of the new 3306NA (145 Hp) would trigger a modification. The evaluation compared against the previous 3406NA (215 Hp) which resulted in a decrease in Hp at the facility, thus exempting the site from qualifying as a modification.

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

There is no 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.

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

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

**40 CFR 63 Subpart JJJJJ** - Boilers Located at Area Sources of HAPs

This subpart is not applicable because there are no boilers located at the station or at the surrounding well pads.

**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 nor any substitutes.

**Aggregation Discussion (Facility Determination)**

Sims Run Station is operated solely by CNX Gas Company LLC. All sites within a quarter mile of this facility have been evaluated for additional emissions. Sims Run Station is operated solely by CNX Gas Company LLC. All sites within a quarter mile of this facility have been evaluated for additional emissions. Three conventional wells were identified as having shared equipment within ¼ mile from the Sims Run booster station.



## **SECTION 2. APPLICATION FOR PERMIT DETERMINATION**

### **Permit Determination**

**Sims Run Station  
Camden, West Virginia**

CNX Gas Company LLC  
1000 Consol Energy Drive  
Canonsburg, PA 15317

October 2017



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

**PERMIT DETERMINATION FORM  
(PDF)**

FOR AGENCY USE ONLY: PLANT I.D. # \_\_\_\_\_  
 PDF # \_\_\_\_\_ PERMIT WRITER: \_\_\_\_\_

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):  
**CNX Gas Company LLC**

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):  
**Sims Run Station**

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE:  
**211111**

4A. MAILING ADDRESS:  
**1000 Consol Energy Drive Canonsburg, PA 15317**

4B. PHYSICAL ADDRESS:  
 Sims Run Rd. Camden, WV

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A):  
 From Weston, take Route 33-W/119-S (towards Glenville) for 10.3 miles. Turn left on Sims Run Rd. and travel 1.7 miles. The station will be located straight ahead.

5B. NEAREST ROAD:  
 Sims Run Rd.

5C. NEAREST CITY OR TOWN:  
 Camden

5D. COUNTY:  
 Lewis

5E. UTM NORTHING (KM):  
 4,321.843

5F. UTM EASTING (KM):  
 534.799

5G. UTM ZONE:  
 17

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:  
**Jerod Duelley**

6B. TITLE:  
**HSE Field – Conventional WV Gas Operations**

6C. TELEPHONE:  
**304-884-2219**

6D. FAX:

6E. E-MAIL:  
**JerodDuelley@consolenergy.com**

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):  
 \_\_\_\_\_

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH THIS PROCESS (FOR AN EXISTING FACILITY ONLY):  
**N/A**

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST: **No**

8A. TYPE OF EMISSION SOURCE (CHECK ONE):  
 **NEW SOURCE**     **ADMINISTRATIVE UPDATE**  
 **MODIFICATION**     **OTHER (PLEASE EXPLAIN IN 11B)**

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN?  
 **YES**     **NO**

9. IS *DEMOLITION* OR *PHYSICAL RENOVATION* AT AN EXISTING FACILITY INVOLVED?     **YES**     **NO**

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:  
**2017**

10B. DATE OF ANTICIPATED START-UP:  
**2018**

11A. PLEASE PROVIDE A **DETAILED PROCESS FLOW DIAGRAM** SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS **ATTACHMENT B**.

11B. PLEASE PROVIDE A **DETAILED PROCESS DESCRIPTION** AS **ATTACHMENT C**.

12. PLEASE PROVIDE **MATERIAL SAFETY DATA SHEETS (MSDS)** FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS **ATTACHMENT D**. FOR CHEMICAL PROCESSES, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.

**13A. REGULATED AIR POLLUTANT EMISSIONS:**

⇒ **FOR A NEW FACILITY**, PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ **FOR AN EXISTING FACILITY**, PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

*PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.*

POLLUTANT	HOURLY PTE (LB/HR)	YEARLY PTE (TON/YR) (HOURLY PTE MULTIPLIED BY 8760 HR/YR) DIVIDED BY 2000 LB/TON
PM	0.03	0.12
PM <sub>10</sub>	0.03	0.12
VOCs	0.79	3.44
CO	4.86	21.28
NO <sub>x</sub>	4.66	20.38
SO <sub>2</sub>	0.01	0.01
Pb	<0.01	<0.01
HAPs (AGGREGATE AMOUNT)	0.11	0.45
TAPs (INDIVIDUALLY)* Formaldehyde	0.09	0.38
Benzene	0.01	0.01
OTHER (INDIVIDUALLY)*		

\* ATTACH ADDITIONAL PAGES AS NEEDED

**13B. PLEASE PROVIDE ALL SUPPORTING CALCULATIONS AS ATTACHMENT E.**

*CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112[b] OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).*

**14. CERTIFICATION OF DATA**

I, CRAIG NEAL (TYPE NAME) ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A **RESPONSIBLE OFFICIAL**\*\* (PRESIDENT, VICE PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: \_\_\_\_\_



TITLE: VICE PRESIDENT GAS OPERATIONS

DATE: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_.

\*\* THE DEFINITION OF THE PHRASE 'RESPONSIBLE OFFICIAL' CAN BE FOUND AT 45CSR13, SECTION 2.23.

**NOTE:** PLEASE CHECK ENCLOSED ATTACHMENTS:

ATTACHMENT A     ATTACHMENT B     ATTACHMENT C     ATTACHMENT D     ATTACHMENT E

RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:

[www.dep.wv.gov/daq](http://www.dep.wv.gov/daq)

# **ATTACHMENT A**

## **AREA MAP**

### **Permit Determination**

**Sims Run Station  
Camden, West Virginia**


CNX Gas Company LLC  
1000 Consol Energy Drive  
Canonsburg, PA 15317

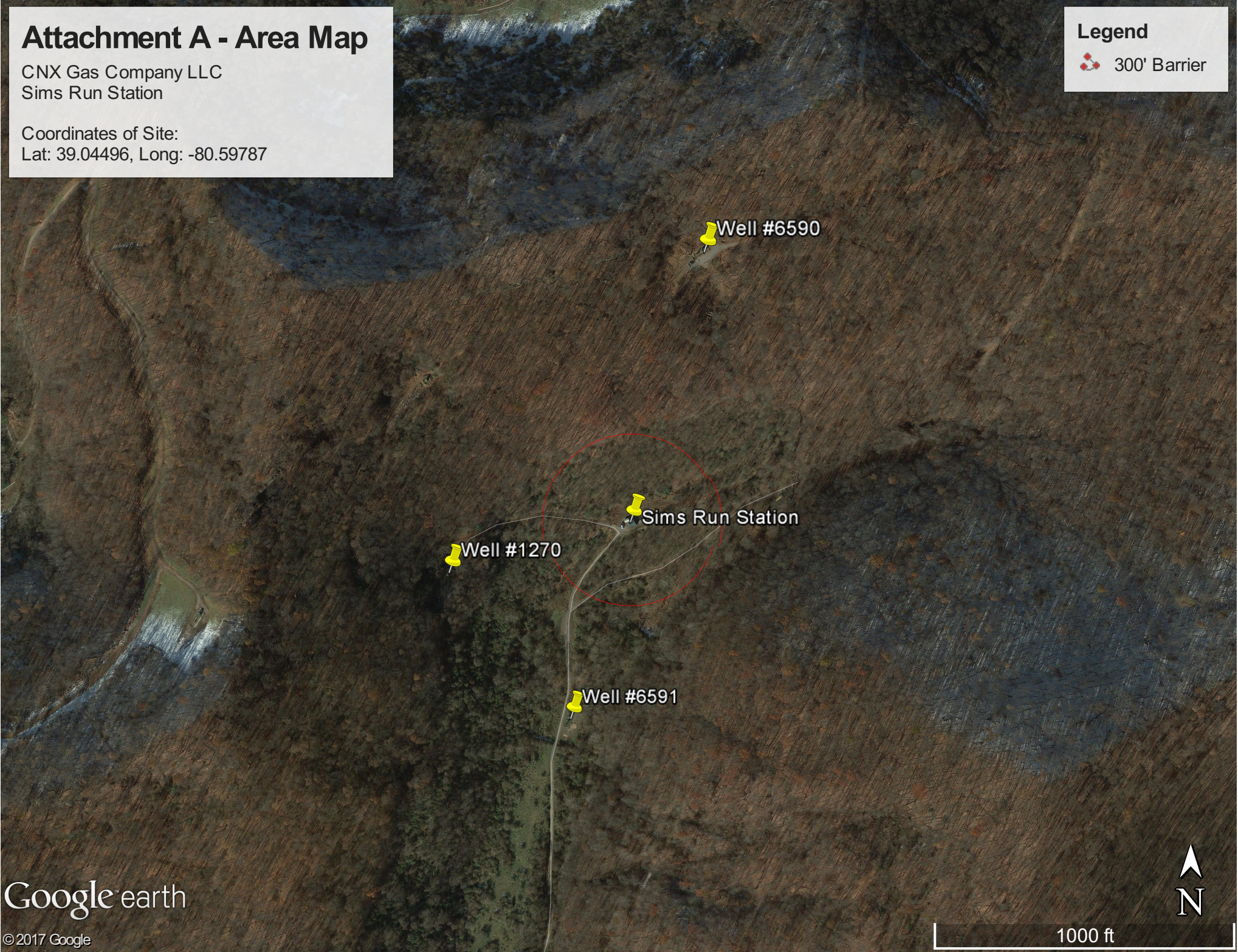
October 2017

# Attachment A - Area Map

CNX Gas Company LLC  
Sims Run Station

Coordinates of Site:  
Lat: 39.04496, Long: -80.59787

**Legend**  
 300' Barrier



**ATTACHMENT B**

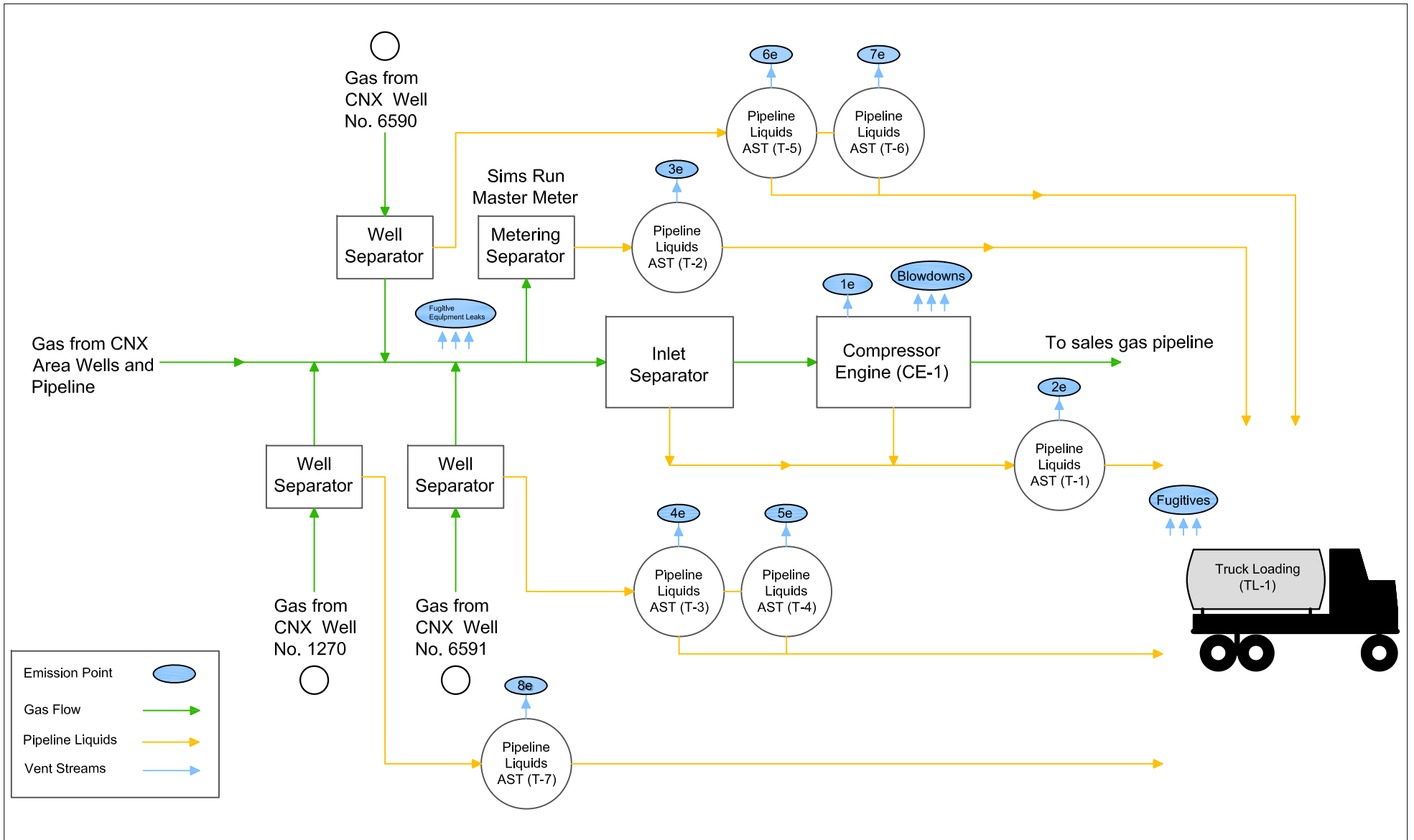
**PROCESS FLOW DIAGRAM**

**Permit Determination**

**Sims Run Station  
Camden, West Virginia**

CNX Gas Company LLC  
1000 Consol Energy Drive  
Canonsburg, PA 15317

October 2017



CNX Gas Company LLC

Attachment B - Process Flow Diagram

Sims Run Station

Sept 2017



**ATTACHMENT C**

**PROCESS DESCRIPTION**

**Permit Determination**

**Sims Run Station  
Camden, West Virginia**

CNX Gas Company LLC  
1000 Consol Energy Drive  
Canonsburg, PA 15317

October 2017

## PROCESS DESCRIPTION

---

The compressor site will consist of (1) 4SRB Cat 3306 NA compressor and (2) 50 bbl produced liquids tanks. The site also has De Minimis tanks for new/used lube oil. There are (3) conventional wells within a quarter of a mile of a facility, as well as a master metering run. The (3) well sites add an additional (1) 50 bbl produced liquid tanks and (5) 100 bbl produced liquid tanks.

Sims Run Station collects gas from unconventional wells and provides compression services. Any liquid removed in the inlet separator will be sent to the produced liquids tank prior to compression. All tank and engine emissions will be uncontrolled.

The source's potential to emit was modeled using ProMax equation of state (EOS) software based on gas sampling taken from the Minnie Lee No.1 well pad. In accordance with DAQ guidance, emission potentials were evaluated and reported for truck loading, fugitive equipment leaks, and compressor blowdowns. The emission calculations summarized within this application show the facility's potential to emit to be no more than 20.38 tpy NO<sub>x</sub>, 21.28 tpy CO, and 3.44 tpy VOC.

**ATTACHMENT D**  
**SAFETY DATA SHEETS**

**Permit Determination**

**Sims Run Station**  
**Camden, West Virginia**

CNX Gas Company LLC  
1000 Consol Energy Drive  
Canonsburg, PA 15317

October 2017

## Safety Data Sheet (SDS)

### Section 1 – Identification

**1(a) Product Identifier used on Label:** Condensate

**1(b) Other Means of Identification:** Natural Gas Condensate, Produced Hydrocarbons, Drip Gas, Natural Gasoline, Petroleum Crude Oil Condensates

**1(c) Recommended Use of the Chemical and Restrictions on Use:** Used as a petrochemical feedstock, home heating fuel and refinery blending.

**1(d) Name, Address, and Telephone Number:**

CONSOL Energy Inc.  
1000 CONSOL Energy Drive  
Canonsburg, PA 15317





General information: (724) 485-4000

**1(e) Emergency Phone Number:** Chemtrec (800) 424-9300

### Section 2 – Hazard(s) Identification

**2(a) Classification of the Chemical:** Condensate is considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006] and CLP [REGULATION (EC) No 1272/2008] and OSHA 29 CFR 1910.1200 Hazard Communication Standard. The categories of Health Hazards as defined in “GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3” United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

**2(b) Signal Word, Hazard Statement(s), Symbol(s) and Precautionary Statement(s):**

Hazard Symbol	Hazard Classification	Signal Word	Hazard Statement(s)
	Flammable Liquid - 2	<b>Danger</b>	<p style="text-align: center;">Highly Flammable liquid and vapor Toxic if inhaled Causes skin irritation and serious eye irritation May cause genetic defects, cancer and damage fertility or the unborn child May cause damage to central and peripheral nervous system, lungs, liver and red blood cells Causes damage to the blood, spleen, and liver through prolonged or repeat exposures May be fatal if swallowed and enters airways</p>
	Germ Cell Mutagenicity - 1B Carcinogenicity - 1A Toxic Reproduction - 1B Specific Target Organ Toxicity (STOT) Following Single Exposure - 2 STOT following Repeated Exposure - 1 Aspiration - 1		
	Acute Toxicity Hazard - 3		
	Skin Corrosion/Irritation - 2 Eye Damage/ Irritation - 2A		

**Precautionary Statement(s)**

Keep away from heat/sparks/open flames/hot surfaces. No smoking.  
Keep container tightly closed.  
Ground/Bond container and receiving equipment.  
Use explosion-proof electrical/ventilating/lighting/equipment.  
Use only non-sparking tools.  
Take precautionary measures against static discharge.  
Wear protective gloves/protective clothing/eye protection/face protection.  
Do not breathe dust/fume/gas/mist/ vapors/spray.  
If exposed, concerned or feel unwell: Get medical advice/attention.  
If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor.  
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.

If on skin: Wash with plenty of water If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.  
If swallowed: Immediately call a poison center/doctor/ Do NOT induce vomiting.  
Obtain special instructions before use.  
Do not handle until all safety precautions have been read and understood.  
Wash thoroughly after handling.  
Do not eat, drink or smoke when using this product.  
If exposed or concerned: Call a poison center or doctor. Get medical attention if you feel unwell.  
Store in well-ventilated place. Keep cool. Use only outdoors or in a well-ventilated area. Store locked up.  
Dispose of contents in accordance with federal, state and local regulations.

**Section 2 – Hazard(s) Identification (continued)**

**2(c) Hazards not Otherwise Classified:** None Known or Found  
**2(d) Unknown Acute Toxicity Statement (mixture):** None Known or Found

**Section 3 – Composition/Information on Ingredients**

**3(a-c) Chemical Name, Common Name (synonyms), CAS Number and Other Identifiers, and Concentration:**

Chemical Name	CAS Number	EC Number	% weight
Natural Gas Condensate	64741-47-5	265-047-3	100
Natural Gas Condensate is a petroleum substance comprised of a complex mixture of hydrocarbons. Major classes of hydrocarbons contained in the substance are listed below:			
Hydrocarbons Aromatic	Mixture	Mixture	~ 5
Hydrocarbons Naphthalenes	Mixture	Mixture	~ 8
Hydrocarbons (total Paraffin and isoparaffin)	Mixture	Mixture	~ 65
Benzene	71-43-2	200-753-7	~ 0.1

EC - European Community  
 CAS - Chemical Abstract Service

**Section 4 – First-aid Measures**

**4(a) Description of Necessary Measures:** If exposed, concerned or feel unwell: Get medical advice/attention.

- Inhalation:** If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor.
- Eye Contact:** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
- Skin Contact:** If on skin: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash it before reuse.
- Ingestion:** If swallowed: Immediately call a poison center/doctor/ DO NOT induce vomiting.

**4(b) Most Important Symptoms/Effects, Acute and Delayed (chronic):**

**Acute Effects:**

- Inhalation:** Aspiration hazard, May be fatal if enters airways. May cause CNS and peripheral depression and damage to liver lungs and red blood cells.
- Eye:** Causes irritation to eyes and mucous membranes.
- Skin:** Causes irritation to skin.
- Ingestion:** Aspiration hazard. May be fatal if swallowed.

**Delayed (chronic) Effects:**

- May cause genetic defects or cancer. May damage fertility or cause damage to the unborn child. Causes damage to the hematopoietic (blood) system, spleen, and liver through prolonged or repeat exposures.

**4(c) Immediate Medical Attention and Special Treatment:** If exposed, concerned or feel unwell: Get medical advice/attention.

**Additional Information:**

**Primary Entry Routes:** Inhalation, Ingestion, skin and eye contact.

**Target Organs:** Central nervous system, blood, eyes, skin lungs, and liver. Causes damage to the hematopoietic (blood) system, spleen, and liver.

**Carcinogenicity:** IARC, NTP, ACGIH and OSHA list benzene as a carcinogen.

**Section 5 – Fire-fighting Measures**

**5(a) Suitable (and unsuitable) Extinguishing Media:** In case of fire: Use foam, dry powder or carbon dioxide for extinction. Do not use a solid stream of water as it may scatter and spread the fire.

**5(b) Specific Hazards Arising from the Chemical:** Vapors are heavier than air and may accumulate in low areas. Fire will produce irritating, corrosive and toxic gasses.

**5(c) Special Protective Equipment and Precautions for Fire-Fighters:** Self-contained NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause formation of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used. Evacuate area. Remove pressurized gas cylinders from the immediate vicinity. Cool containers exposed to flames with water until well after the fire is out. Close the valve if no risk is involved. Fight fire from a protected location. Prevent buildup of vapors or gases to explosive concentrations.

**Section 6 - Accidental Release Measures**

**6(a) Personal Precautions, Protective Equipment and Emergency Procedures:** Spills of condensate will create a fire hazard and may form an explosive atmosphere. Stay up wind and away from the spill. Clean-up personnel should be protected against contact with eyes and skin. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations.

**6(b) Methods and Materials for Containment and Clean Up:** Collect with sand or oil absorbing materials. Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

**Section 7 - Handling and Storage**

**7(a) Precautions for Safe Handling:** Keep away from heat/sparks/open flames/hot surfaces. No smoking. Ground/Bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting/equipment. Use only non-sparking tools. Take precautionary measures against static discharge.

**7(b) Conditions for Safe Storage, Including Any Incompatibilities:** Store in well-ventilated place. Keep cool. Take precautions to avoid static discharges around stored condensate. Ground storage tanks and transfer piping. Use only outdoors or in a well-ventilated area. If feasible, store locked up.

**Section 8 - Exposure Controls / Personal Protection**

**8(a) Occupational Exposure Limits (OELs):** The following exposure limits are offered as reference, for an experience industrial hygienist to review.

Ingredients	OSHA PEL <sup>1</sup>	ACGIH TLV <sup>2</sup>	NIOSH REL <sup>3</sup>	IDLH <sup>4</sup>
Benzene	1.0 ppm "STEL" 5.0 ppm	0.5 ppm (1.6 mg/m <sup>3</sup> ), skin "STEL" 2.5 ppm (8 mg/m <sup>3</sup> )	0.1 ppm (0.32 mg/m <sup>3</sup> ) "STEL" 1.0 ppm (3.2 mg/m <sup>3</sup> )	500 ppm

1. OSHA PEL are 8-hour TWA concentrations unless otherwise noted. A Short Term Exposure Limit (STEL) is defined in the benzene standard as: The employer shall assure that no employee is exposed to an airborne concentration of benzene in excess of five (5) ppm as averaged over any 15 minute period.
2. TLVs established by the ACGIH are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. A Short Term Exposure Limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures.
3. The NIOSH-REL- Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
4. The IDLHs are used by NIOSH as part of the respirator selection criteria and were first developed in the mid 1970's by NIOSH. The Documentation for IDLHs is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994.

**8(b) Appropriate Engineering Controls:** Local exhaust ventilation should be used to control the emission of air contaminants. General dilution ventilation may assist with the reduction of air contaminant concentrations. Emergency eye wash stations and deluge safety showers should be available in the work area.

**8(c) Individual Protection Measures:**

- **Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-mask negative-pressure, air-purifying respirator equipped with organic vapor cartridge is acceptable for concentrations up to 10 times the exposure limit. Full-face negative-pressure air purifying respirator equipped with organic vapor cartridges is acceptable for concentrations up to 50 times the exposure limit. Protection by air purifying both negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (Immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

**Warning!** Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.

- **Eyes:** Employees should be required to wear chemical safety glasses to prevent eye contact. A face shield should be used when appropriate to prevent contact with splashed materials. Chemical goggles, face shields or glasses should be worn to prevent eye contact. Contact lenses should not be worn where industrial exposure to this material is likely.
- **Skin:** Persons handling this product should wear appropriate clothing to prevent skin contact. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reuse. Wear protective gloves. Chemical goggles, face shields or glasses should be worn to prevent eye contact. Contact lenses should not be worn where industrial exposure to this material is likely. Wash skin that has been exposed with soap and water.
- **Other Protective Equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

**Section 9 - Physical and Chemical Properties**

**9(a) Appearance (physical state, color, etc.):** Colorless to amber liquid

**9(j) Upper/lower Flammability or Explosive Limits:** 10% / 1%

**9(b) Odor:** gasoline - like

**9(k) Vapor Pressure:** 200-500 mmHg@68°F

**Section 9 - Physical and Chemical Properties (continued)**

**9(c) Odor Threshold:** NA  
**9(d) pH:** NA  
**9(e) Melting Point/Freezing Point:** NA  
**9(f) Initial Boiling Point and Boiling Range:** 96.8 - 258 °F (36-125.6 °C)  
**9(g) Flash Point:** <-50°F (<-45.6 °C)  
**9(h) Evaporation Rate:** NA  
**9(i) Flammability (liquid):** Highly Flammable  
 NA - Not Applicable  
 ND - Not Determined for product as a whole

**9(l) Vapor Density (Air = 1):** ND  
**9(m) Relative Density:** 6.25 lbs/gal ( Bulk Density)  
**9(n) Solubility(ies):** ND  
**9(o) Partition Coefficient n-octanol/water:** ND  
**9(p) Auto-ignition Temperature:** ND  
**9(q) Decomposition Temperature:** ND  
**9(r) Viscosity:** ND

**Section 10 - Stability and Reactivity**

**10(a) Reactivity:** Not Determined (ND) for product as a whole.  
**10(b) Chemical Stability:** Stable under normal storage and handling conditions.  
**10(c) Possibility of Hazardous Reaction:** No Data Found  
**10(d) Conditions to Avoid:** Storage with incompatible materials. Avoid heat, flame, or ignition sources.  
**10(e) Incompatible Materials:** Strong acids and oxidizing agents.  
**10(f) Hazardous Decomposition Products:** Can produce carbon dioxide and carbon monoxide.

**Section 11 - Toxicological Information**

**11(a-e) Information on Toxicological Effects:** The following toxicity data have been determined using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL:

Hazard Classification	Hazard Category		Hazard Symbols	Signal Word	Hazard Statement
	EU*	OSHA			
Acute Toxicity Hazard (covers Categories 1-5)	NA**	3 <sup>a</sup>		Danger	Toxic if inhaled
Skin Corrosion/Irritation (covers Categories 1A, 1B, 1C and 2)	2	2 <sup>b</sup>		Warning	Causes skin irritation
Eye Damage/ Irritation (covers Categories 1, 2A and 2B)	NA**	2A <sup>c</sup>		Warning	Causes serious eye irritation
Skin/Dermal Sensitization (covers Category 1)	NA**	NA**	NA**	NA**	NA**
Germ Cell Mutagenicity (covers Categories 1A, 1B and 2)	1B	1B <sup>d</sup>		Danger	May cause genetic defects
Carcinogenicity (covers Categories 1A, 1B and 2)	1B	1A <sup>e</sup>		Danger	May cause cancer
Toxic Reproduction (covers Categories 1A, 1B and 2)	NA**	1B <sup>f</sup>		Danger	May damage fertility or the unborn child
Specific Target Organ Toxicity (STOT) Following Single Exposure (covers Categories 1-3)	NA**	2 <sup>g</sup>		Warning	May cause CNS and Peripheral depression, and damage lung liver (vacuolated hepatocytes) and red blood cells
STOT following Repeated Exposure (covers Categories 1 and 2)	NA**	1 <sup>h</sup>		Warning	May cause damage to the Hematopoietic system, spleen, liver through prolonged or repeat exposures
Aspiration (covers category 1)	1	1		Danger	May be fatal if swallowed and enters the airway

\* Natural Gas Condensate has been harmonized as - Base classification: High Benzene Naphtha, flashpoint < 23°C and initial boiling point ≥ 35°C, benzene or 1,3-butadiene ≥ 0.1%, naphthalene < 25% .

\*\* Not Applicable - Many categories have conclusive but not sufficient for classification information.

**Section 11 - Toxicological Information (continued)**

**11(a-e) Information on toxicological effects (continued):**

a. The following LC<sub>50</sub> or LD<sub>50</sub> has been established for **Condensate** as a mixture:

- Rat (4 hr) LC<sub>50</sub> >5.2 mg/L
- Rat (4 hr) LC<sub>50</sub> >5.81 mg/L
- Rat (4 hr) LC<sub>50</sub> >5.2 mg/L

b. The following **Skin Corrosion/Irritation** information was found for **Condensate** as a mixture:

- Rabbit – Slightly irritating.
- Rabbit - Irritating but not corrosive.

c. The following **Eye Damage/Irritation** information was found for **Condensate** as a mixture:

- Rabbit – Slightly irritating.

d. No **Germ Cell Mutagenicity** data available for **Condensate** as a mixture. The following **Germ Cell Mutagenicity** information was found for the components:

- Benzene - Positive with activation. Positive In vitro Clastogenicity.

e. No **Carcinogenicity** data available for **Condensate** as a mixture. The following **Carcinogenicity** information was found for the components:

- Benzene - Listed as class 1 carcinogen by the NTP, IARC, EPA and ACGIH.

f. No **Reproductive Toxicity** data available for **Condensate** as a mixture. The following **Reproductive Toxicity** information was found for the components:

- Benzene - NOAEC for both adult and offspring toxicity and female fertility. 300ppm (960 mg/m<sup>3</sup>). NOAEC for maternal toxicity and teratogenicity was 100 ppm (320 mg/m<sup>3</sup>). The NOAEC for slight fetotoxicity was 40 ppm (128 mg/m<sup>3</sup>).

g. No **Specific Target Organ Toxicity (STOT) following Single Exposure** data available for **Condensate** as a mixture. The following STOT following Single Exposure information was found for the components:

- Benzene - CNS and peripheral Depression, lung liver (vacuolated hepatocytes) and red blood cells may be effected.

h. No **Specific Target Organ Toxicity (STOT) following Repeated Exposure** data available for **Condensate** as a mixture. The following STOT following Repeated Exposure data is available for the components:

- Benzene - Spleen hematopoiesis, Liver, lung kidney effects are specific to male Rat. Early signs and symptoms of chronic overexposure include effects on CNS & the GI tract (headache, loss of appetite, drowsiness, nervousness, & pallor) but the major manifestation of toxicity is aplastic anemia. Bone marrow depression may occur resulting in leucopenia, anemia, or thrombocytopenia (leukemogenic action). With continued exposure the disease states may progress to pancytopenia resulting from bone marrow aplasia. Evidence has linked benzene in the etiology of leukemia.

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2009, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS).

**Section 12 - Ecological Information**

**12(a) Ecotoxicity (aquatic & terrestrial):** No Data Found

**12(b) Persistence & Degradability:** Loss due to volatility. Not readily biodegradable but is inherently biodegradable by microorganisms.

**12(c) Bioaccumulative Potential:** No Data Found

**12(d) Mobility (in soil):** Will float on water and will volatilize in air.

**12(e) Other adverse effects:** No Data Found

**Additional Information:**

<b>Hazard Category:</b> Not Reported	<b>Signal Word:</b> No Signal Word
<b>Hazard Symbol:</b> No Symbol	
<b>Hazard Statement:</b> No Statement	

**Section 13 - Disposal Considerations**

**Disposal:** Waste code D001: Waste Flammable material with a flash point <140°F. This material and its container must be disposed of as hazardous waste. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste. **European Waste Catalogue (EWC):** 05-01-99 (waste from petroleum refining).

**Container Cleaning and Disposal:** Containers should be completely empty prior to discarding. Dispose of contents in accordance with federal, state and local regulations. Observe safe handling precautions.

**Please note this information is for Condensate in its original form. Any alterations can void this information.**



**Section 14 - Transportation Information**

**14(a-g) Transportation Information:**

US DOT under 49 CFR 172.101 regulates **Condensate** as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

<b>Shipping Name:</b> RQ, UN3295, Hydrocarbon, Liquid, N.O.S. PGIII ( Benzene) <b>Shipping Symbols:</b> Flammable Liquid <b>Hazard Class:</b> 3 <b>UN No.:</b> UN3295 <b>Packing Group:</b> III <b>DOT/IMO Label:</b> 3 <b>Special Provisions (172.102):</b> 144,B1,IB3,T4,TP1,TP29	<b>Packaging Authorizations</b> a) <b>Exceptions:</b> 150 b) <b>Non-Bulk:</b> 203 c) <b>Bulk:</b> 242	<b>Quantity Limitations</b> a) <b>Passenger, Aircraft, or Railcar:</b> 60L b) <b>Cargo Aircraft Only:</b> 220L <b>Vessel Stowage Requirements</b> a) <b>Vessel Stowage:</b> A b) <b>Other:</b> NA <b>DOT Reportable Quantities:</b> 10 lbs.
--	--	---

**IMDG and RID** classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

**ADR** regulates **Condensate** as a hazardous material.

<b>Shipping Name:</b> Hydrocarbons, Liquid, N.O.S. <b>Classification Code:</b> 3 <b>UN No.:</b> 3295 <b>Packing Group:</b> III <b>ADR Label:</b> Flammable Liquid <b>Special Provisions:</b> 223 <b>Limited Quantities:</b> 5L <b>Excepted Quantities (EQ):</b> E1	<b>Packaging</b> a) <b>Packing Instructions:</b> P001, LP01 b) <b>Special Packing Provisions:</b> NA c) <b>Mixed Packing Provisions:</b> NA	<b>Portable Tanks &amp; Bulk Containers</b> a) <b>Instructions:</b> T4 b) <b>Special Provisions:</b> TP1, TP29
---	--	--

**IATA** regulates **Condensate** as a hazardous material.

<b>Shipping Name:</b> Hydrocarbons, Liquid, N.O.S. <b>Class/Division:</b> 3 <b>Hazard Label (s):</b> Flammable Liquid <b>UN No.:</b> 3295 <b>Packing Group:</b> 1 <b>Excepted Quantities (EQ):</b> E3	<b>Passenger &amp; Cargo Aircraft Limited Quantity (EQ)</b>		<b>Cargo Aircraft Only</b> <b>Pkg Inst:</b> 303 <b>Max Net Qty/Pkg:</b> 30 L	<b>Special Provisions:</b> A3 <b>ERG Code:</b> 3H
	<b>Pkg Inst:</b> Forbidden <b>Max Net Qty/Pkg:</b> Forbidden	<b>Pkg Inst:</b> 302 <b>Max Net Qty/Pkg:</b> 1L		

Pkg Inst – Packing Instructions

Max Net Qty/Pkg – Maximum Net Quantity per Package

ERG – Emergency Response Drill Code

**TDG Classification:** **Condensate** does have a TDG classification.

**Section 15 - Regulatory Information**

**Regulatory Information:** *The following listing of regulations relating to a CONSOL Energy Inc. product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.*

This product and/or its constituents are subject to the following regulations:

**OSHA Regulations:** Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-2, Z-3): The product, **Condensate** as a whole is not listed. However, individual components of the product are listed: Refer to Section 8, Exposure Controls and Personal Protection

**EPA Regulations:** **Condensate** is not listed as a whole. However, individual components of the product are listed:

Components	Regulations
Benzene	SARA 313, CERCLA, RCRA, SDWA, CWA, CAA

**SARA Potential Hazard Categories:** Immediate Acute Health Hazard, Delayed Chronic Health Hazard, Fire Hazard

**Regulations Key:**

- CAA Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06])
- CERCLA Comprehensive Environmental Response, Compensation and Liability Act (42 USC Secs. 9601(14), 9603(a); 40 CFR Sec. 302.4, Table 302.4, Table 302.4 and App. A)
- CWA Clean Water Act (33 USC Secs. 1311; 1314(b), (c), (e), (g); 136(b), (c); 137(b), (c) [as of 8/2/06])
- RCRA Resource Conservation Recovery Act (42 USC Sec. 6921; 40 CFR Part 261 App VIII)
- SARA Superfund Amendments and Reauthorization Act of 1986 Title III Section 302 Extremely Hazardous Substances (42 USC Secs. 11023, 13106; 40 CFR Sec. 372.65) and Section 313 Toxic Chemicals (42 USC Secs. 11023, 13106; 40 CFR Sec. 372.65 [as of 6/30/05])
- TSCA Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976])
- SDWA Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. [1974])

**Section 313 Supplier Notification:** This product, **Condensate** contains the following toxic chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372:

CAS #	Chemical Name	Percent by Weight
71-43-2	Benzene	0.1

**Section 15 - Regulatory Information (continued)**

**Regulatory Information (continued):**

**State Regulations:** The product, **Condensate** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

Pennsylvania Right to Know: Contains regulated material in the following categories:

- Environmental Hazards: Benzene
- Special Hazardous Substance: Benzene

California Prop. 65: This product contains materials known to the State of California to cause cancer. Benzene

New Jersey: Contains regulated material in the following categories: Hazardous Substance: Benzene

Minnesota: Benzene

Massachusetts: Benzene

**Other Regulations:**

**WHMIS Classification (Canadian):** **Condensate** is not listed as a whole. However individual components are listed.

Ingredients	WHMIS Classification
Benzene	D-2A, D-2B, B-2

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

**Section 16 - Other Information**

**Prepared By:** CONSOL Energy Inc.

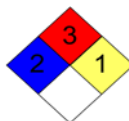
**Issue Date:** 8/12/2013

**Additional Information:**

**HMIS Classification**

Health Hazard	2
Fire Hazard	3
Physical Hazard	1

**NFPA**



HEALTH = 2, Temporary or minor injury may occur.

FIRE = 3, Materials capable of ignition under almost all normal temperature conditions. Includes flammable liquids with flash points below 73 °F and boiling points above 100 °F, as well as liquids with flash points between 73 °F and 100 °F. (Classes IB & IC).

PHYSICAL HAZARD = 1, Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.

HEALTH = 2, Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

FIRE = 3, Liquids and solids that can be ignited under almost all ambient conditions.

INSTABILITY = 1, Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.

**ABBREVIATIONS/ACRONYMS:**

<b>ACGIH</b>	American Conference of Governmental Industrial Hygienists
<b>ADR</b>	Regulations Concerning the International Carriage of Dangerous Goods by Road
<b>CAS</b>	Chemical Abstracts Service
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act
<b>CFR</b>	Code of Federal Regulations
<b>CNS</b>	Central Nervous System
<b>CPL</b>	Classification, Labeling and Packaging
<b>DOT</b>	Department of Transportation
<b>EC</b>	European Community
<b>EU</b>	European Union
<b>EWC</b>	European Waste Catalogue
<b>GI, GIT</b>	Gastro-Intestinal, Gastro-Intestinal Tract
<b>GHS</b>	Globally Harmonized System
<b>HMIS</b>	Hazardous Materials Identification System
<b>IARC</b>	International Agency for Research on Cancer
<b>IATA</b>	International Air Transport Association
<b>IDLH</b>	Immediately Dangerous to Life or Health
<b>IMDG</b>	International Maritime Dangerous Goods
<b>LC50</b>	Median Lethal Concentration

<b>mg/m<sup>3</sup></b>	milligram per cubic meter of air
<b>NFPA</b>	National Fire Protection Association
<b>NIOSH</b>	National Institute for Occupational Safety and Health
<b>NOAEC</b>	No Observed Adverse Effect Concentration
<b>NTP</b>	National Toxicology Program
<b>OSHA</b>	Occupational Safety and Health Administration
<b>PEL</b>	Permissible Exposure Limit
<b>ppm</b>	parts per million
<b>RCRA</b>	Resource Conservation and Recovery Act
<b>REACH</b>	Registration, Evaluation, Authorization and Restriction of Chemical substances.
<b>RID</b>	Regulations Concerning the International Carriage of Dangerous Goods by Rail
<b>REL</b>	Recommended Exposure Limits
<b>SDS</b>	Safety Data Sheet
<b>SARA</b>	Superfund Amendment and Reauthorization Act
<b>SCBA</b>	Self-contained Breathing Apparatus
<b>STEL</b>	Short Term Exposure Limit
<b>TDG</b>	Transport Dangerous Goods
<b>TLV</b>	Threshold Limit Value
<b>TWA</b>	Time-weighted Average

**Section 16 - Other Information (continued)**

**ABBREVIATIONS/ACRONYMS (continued):**

<b>MSHA</b>	Mine Safety and Health Administration
<b>mg/L</b>	milligram per liter

<b>WHMIS</b>	Workplace Hazardous Materials Information System
--------------	--

**Disclaimer:** This information is taken from sources or based upon data believed to be reliable. Our objective in sending this information is to help you protect the health and safety of your personnel and to comply with the OSHA Hazard Communication Standard and Title III of the Superfund Amendment and Reauthorization Act of 1986. CONSOL Energy Inc. makes no warranty as to the absolute correctness, completeness, or sufficiency of any of the foregoing, or any additional, or other measures that may be required under particular conditions. CONSOL Energy Inc. MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY, OR ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTIES OTHERWISE ARISING FROM COURSE OF DEALING OR TRADE.

**UNOCAL MATERIAL SAFETY DATA SHEET**

Product Name: Processed Natural Gas  
Product Code: None

Page 1 of 8

**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 H<sub>2</sub>S or mercaptans

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

Issue Date: 03/18/03

Revised Sections: 1, 3

Status: Final Revised

## UNOCAL

Product Name: Processed Natural Gas  
 Product Code: None

Page 2 of 8

## 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,

Issue Date: 03/18/03  
 Revised Sections: 1, 3

Status: Final Revised

UNOCAL

Product Name: Processed Natural Gas  
Product Code: None

Page 3 of 8

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.

Issue Date: 03/18/03  
Revised Sections: 1, 3

Status: Final Revised

UNOCAL

Product Name: Processed Natural Gas  
Product Code: None

Page 4 of 8

**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 to 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

Issue Date: 03/18/03  
Revised Sections: 1, 3

Status: Final Revised

## UNOCAL

Product Name: Processed Natural Gas

Product Code: None

Page 5 of 8

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.

Issue Date: 03/18/03

Status: Final Revised

Revised Sections: 1, 3



UNOCAL

Product Name: Processed Natural Gas

Product Code: None

Page 6 of 8

**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 H<sub>2</sub>S 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.

Issue Date: 03/18/03

Status: Final Revised

Revised Sections: 1, 3

UNOCAL

Product Name: Processed Natural Gas

Product Code: None

Page 7 of 8

**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

Issue Date: 03/18/03

Status: Final Revised

Revised Sections: 1, 3

UNOCAL

Product Name: Processed Natural Gas  
Product Code: None

Page 8 of 8

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.

Issue Date: 03/18/03  
Revised Sections: 1, 3

Status: Final Revised

**ATTACHMENT E**

**EMISSION CALCULATIONS**

**Permit Determination**

**Sims Run Station  
Camden, West Virginia**

CNX Gas Company LLC  
1000 Consol Energy Drive  
Canonsburg, PA 15317

October 2017

**Table 1. Annual Potential To Emit (PTE) Summary  
CNX Gas Company - Sims Run Station**

**Criteria Pollutants**

**Proposed Facility Wide PTE - Criteria Pollutants**

Source	PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e
Engines (ton/yr)	0.111	0.111	0.111	0.004	20.372	21.273	0.700	662.285
Tanks (ton/yr)	-	-	-	-	-	-	0.966	-
Truck Loading (ton/yr)	-	-	-	-	-	-	0.290	-
Compressor Blowdowns (ton/yr)	-	-	-	-	-	-	0.231	-
Fugitives (ton/yr)	-	-	-	-	-	-	1.246	28.978
<b>Total Emissions (ton/yr)</b>	<b>0.111</b>	<b>0.111</b>	<b>0.111</b>	<b>0.004</b>	<b>20.372</b>	<b>21.273</b>	<b>3.434</b>	<b>691.263</b>
<b>Total Emissions (lb/hr)</b>	<b>0.025</b>	<b>0.025</b>	<b>0.025</b>	<b>0.001</b>	<b>4.651</b>	<b>4.857</b>	<b>0.784</b>	<b>157.823</b>

**Hazardous Air Pollutants (HAPs)**

**Proposed Facility Wide PTE - HAPs**

Source	Acetaldehyde	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
Engines (ton/yr)	0.0160	0.0090	0.0032	0.0001	0.0011	-	0.378	0.446
Tanks (ton/yr)	-	-	-	-	-	-	-	-
Truck Loading (ton/yr)	-	-	-	-	-	-	-	-
Compressor Blowdowns (ton/yr)	-	-	-	-	-	-	-	-
Fugitives (ton/yr)	-	-	-	-	-	-	-	-
<b>Total Emissions (ton/yr)</b>	<b>0.016</b>	<b>0.009</b>	<b>0.003</b>	<b>0.000</b>	<b>0.001</b>	<b>0.000</b>	<b>0.378</b>	<b>0.446</b>
<b>Total Emissions (lb/hr)</b>	<b>0.004</b>	<b>0.002</b>	<b>0.001</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.086</b>	<b>0.102</b>

**Table 2. Reciprocating Engine / Integral Compressor Emissions (CE-1)**  
**Caterpillar 3306 NA**  
**CNX Gas Company - Sims Run Station**

Pollutant	Maximum Hourly Emissions		Annual Emissions	
	Emission Factor	PTE per Engine (lb/hr)	Emission Factor	PTE per Engine (tons/yr)
<b>Criteria Pollutants</b>				
PM/PM10/PM2.5**	1.94E-02 lb/MMBtu (1)	0.025 (a)	1.94E-02 lb/MMBtu (1)	0.111 (c)
SO <sub>2</sub>	0.25 grains S / 100 ft <sup>3</sup> (2)	0.001 (e)	0.25 grains S / 100 ft <sup>3</sup> (2)	0.004 (f)
NOx	1.46E+01 g/hp-hr (3)	4.651 (b)	1.46E+01 g/hp-hr (3)	20.372 (d)
CO	3.72E+00 lb/MMBtu (1)	4.857 (a)	3.72E+00 lb/MMBtu (1)	21.273 (c)
VOC*	5.00E-01 g/hp-hr (3)	0.160 (b)	5.00E-01 g/hp-hr (3)	0.700 (d)
*VOCs do not include formaldehyde				
<b>Hazardous Air Pollutants</b>				
1,1,2-Tetrachloroethane	2.53E-05 lb/MMBtu (1)	0.000 (a)	2.53E-05 lb/MMBtu (1)	0.000 (c)
1,1,2-Trichloroethane	1.53E-05 lb/MMBtu (1)	0.000 (a)	1.53E-05 lb/MMBtu (1)	0.000 (c)
1,3-Butadiene	6.63E-04 lb/MMBtu (1)	0.001 (a)	6.63E-04 lb/MMBtu (1)	0.004 (c)
1,3-Dichloropropene	1.27E-05 lb/MMBtu (1)	0.000 (a)	1.27E-05 lb/MMBtu (1)	0.000 (c)
Acetaldehyde	2.79E-03 lb/MMBtu (1)	0.004 (a)	2.79E-03 lb/MMBtu (1)	0.016 (c)
Acrolein	2.63E-03 lb/MMBtu (1)	0.003 (a)	2.63E-03 lb/MMBtu (1)	0.015 (c)
Benzene	1.58E-03 lb/MMBtu (1)	0.002 (a)	1.58E-03 lb/MMBtu (1)	0.009 (c)
Carbon Tetrachloride	1.77E-05 lb/MMBtu (1)	0.000 (a)	1.77E-05 lb/MMBtu (1)	0.000 (c)
Chlorobenzene	1.29E-05 lb/MMBtu (1)	0.000 (a)	1.29E-05 lb/MMBtu (1)	0.000 (c)
Chloroform	1.37E-05 lb/MMBtu (1)	0.000 (a)	1.37E-05 lb/MMBtu (1)	0.000 (c)
Ethylbenzene	2.48E-05 lb/MMBtu (1)	0.000 (a)	2.48E-05 lb/MMBtu (1)	0.000 (c)
Ethylene Dibromide	2.13E-05 lb/MMBtu (1)	0.000 (a)	2.13E-05 lb/MMBtu (1)	0.000 (c)
Formaldehyde	2.70E-01 g/hp-hr (3)	0.086 (b)	2.70E-01 g/hp-hr (3)	0.378 (d)
Methanol	3.06E-03 lb/MMBtu (1)	0.004 (a)	3.06E-03 lb/MMBtu (1)	0.017 (c)
Methylene Chloride	4.12E-05 lb/MMBtu (1)	0.000 (a)	4.12E-05 lb/MMBtu (1)	0.000 (c)
Naphthalene	9.71E-05 lb/MMBtu (1)	0.000 (a)	9.71E-05 lb/MMBtu (1)	0.001 (c)
PAH (POM)	1.41E-04 lb/MMBtu (1)	0.000 (a)	1.41E-04 lb/MMBtu (1)	0.001 (c)
Styrene	1.19E-05 lb/MMBtu (1)	0.000 (a)	1.19E-05 lb/MMBtu (1)	0.000 (c)
Toluene	5.58E-04 lb/MMBtu (1)	0.001 (a)	5.58E-04 lb/MMBtu (1)	0.003 (c)
Vinyl Chloride	7.16E-06 lb/MMBtu (1)	0.000 (a)	7.16E-06 lb/MMBtu (1)	0.000 (c)
Xylenes	1.95E-04 lb/MMBtu (1)	0.000 (a)	1.95E-04 lb/MMBtu (1)	0.001 (c)
<b>Total HAP</b>		<b>0.102</b>		<b>0.446</b>
<b>Greenhouse Gas Emissions</b>				
CO <sub>2</sub>	110.00 lb/MMBtu (1)	143.61 (a)	110.00 lb/MMBtu (1)	629.03 (c)
CH <sub>4</sub>	2.3E-01 lb/MMBtu (1)	0.30 (a)	2.3E-01 lb/MMBtu (1)	1.32 (c)
N <sub>2</sub> O	2.2E-04 lb/MMBtu (4)	0.00 (a)	2.2E-04 lb/MMBtu (4)	0.00 (c)
CO <sub>2</sub> e <sup>(g)</sup>	-	151.21	-	662.29

\*\* PM emission factor includes condensables and filterables

**Calculations:**

**Maximum Hourly Emissions - If emission factor note 1 or 4 is used, use calculation (a). If emission factor note 3 is used, use calculation (b).**

(a) Maximum Hourly Emissions (lb/hr) = Emission factor (lb/MMBtu) \* (1MMBtu/1000000 Btu) \* Engine Power Output (hp) \* Average BSFC (Btu/hp-hr)

(b) Maximum Hourly Emissions (lb/hr) = Emission factor (g/hp-hr) \* Engine Power Output (hp) \* (1 lb/453.6 g)

**Annual Emissions - If emission factor note 1 or 4 is used, use calculation (c). If emission factor note 3 is used, use calculation (d).**

(c) Annual emissions (tons/yr) = Emission factor (lb/MMBtu) \* (1MMBtu/1000000Btu) \* Engine Power Output (hp) \* Average BSFC (Btu/hp-hr) \* Annual Hours of operation (hr/yr) \* (1ton/2000lbs)

(d) Annual emissions (tons/yr) = Emission factor (g/hp-hr) \* Engine Power Output (hp) \* (1 lb/453.6 g) \* Annual Hours of operation (hr/yr) \* (1ton/2000lbs)

**SO<sub>2</sub> Emissions - If emission factor note 2 is used, use calculations (e) and (f) for hourly and annual emissions, respectively.**

(e) Maximum Hourly Emissions SO<sub>2</sub> Calculation (lb/hr) = (0.25 grain S/100ft<sup>3</sup>) \* Fuel throughput (ft<sup>3</sup>/hr) \* (1lb/7000 grains) \* (lbmol S/32.06 lb S) \* (64.07 lb SO<sub>2</sub>/lbmol SO<sub>2</sub>)

(f) Annual Emissions SO<sub>2</sub> Calculation (ton/yr) = (0.25 grain S/100ft<sup>3</sup>) \* Fuel throughput (ft<sup>3</sup>/hr) \* (1lb/7000 grains) \* (lbmol S/32.06 lb S) \* (lbmol SO<sub>2</sub>/lbmol S) \* (64.07 lb SO<sub>2</sub>/lbmol SO<sub>2</sub>) \* Annual hours of operation (hr/yr) \* (1ton/2000lbs)

MAXIMUM HOURLY EMISSION INPUTS	
Engine Power Output (kW) =	108
Engine Power Output (hp) =	145
Number of Engines =	1
Average BSFC (BTU/HP-hr) =	9,004 (5)
Heat Content Natural Gas(Btu/scf) =	1,116.0 (6)
Fuel Throughput (ft <sup>3</sup> /hr) =	1,169.9 (7)
PTE Hours of Operation =	8,760

(g) CO<sub>2</sub> equivalent = [(CO<sub>2</sub> emissions)\*(GWP<sub>CO2</sub>)]+[(CH<sub>4</sub> emissions)\*(GWP<sub>CH4</sub>)]+[(N<sub>2</sub>O emissions)\*(GWP<sub>N2O</sub>)]  
 Global Warming Potential (GWP)

CO <sub>2</sub>	1	(8)
CH <sub>4</sub>	25	(8)
N <sub>2</sub> O	298	(8)

**Notes:**

(1) AP-42, Chapter 3.2, Table 3.2-3. *Natural Gas-fired Reciprocating Engines (7/00)*. Uncontrolled Emission Factors for 4-Stroke Rich-Burn Engines.

(2) AP-42, Chapter 5.3, Section 5.3.1

(3) Emission Limits from manufacture specification sheet

(4) Emission factors are from 40 CFR 98, Subpart C, Table C-1 and C-2.

(5) Fuel consumption from manufacturer's specification sheet.

(6) Value supplied from client based on gas composition in area field

(7) Fuel throughput = BSFC (BTU/HP-hr) x Power (HP) / Heat Content (BTU/scf)

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

**Table 3. Tank Emissions**  
**CNX Gas Company - Sims Run Station**

Emission Unit ID	Tank Capacity (gal)	Tank Contents	Control Devices	Tank Throughput (bbls/day)	VOC Emission Factor (lbs/bbls)		VOC Emissions (lbs/yr) <sup>(a)</sup>	VOC Emissions (lb/hr) <sup>(b)</sup>	VOC Emissions (tons/yr) <sup>(c)</sup>
T-1	2100	Produced Liquids	None	5.00	1.36E-01	(1)	247.78	0.028	0.124
T-2	2100	Produced Liquids	None	5.00	1.36E-01	(1)	247.78	0.028	0.124
T-3	4200	Produced Liquids	None	5.00	1.57E-01	(1)	287.41	0.033	0.144
T-4	4200	Produced Liquids	None	5.00	1.57E-01	(1)	287.41	0.033	0.144
T-5	4200	Produced Liquids	None	5.00	1.57E-01	(1)	287.41	0.033	0.144
T-6	4200	Produced Liquids	None	5.00	1.57E-01	(1)	287.41	0.033	0.144
T-7	4200	Produced Liquids	None	5.00	1.57E-01	(1)	287.41	0.033	0.144
<b>Totals</b>							<b>1932.59</b>	<b>0.22</b>	<b>0.97</b>

**Calculations:**

(a) VOC Emissions (lb/yr) = Tank Throughput (bbls/day) \* VOC Emission Factor (lbs/bbls) \* (365days/yr)

(b) VOC Emissions (lb/hr) = VOC Emissions (lbs/yr) \* (yr/8760hr)

(c) VOC Emissions (ton/yr) = VOC Emissions (lbs/yr) \* (1ton/2000lbs)

**Notes:**

(1) VOC emission factor includes Flashing/Working/Breathing losses as calculated from the Promax Model Simulation report

**Table 4. Truck Loading (TL-1) VOC Emissions  
CNX Gas Company - Sims Run Station**

Contents	Volume Transferred <sup>3</sup>	PTE VOC Emissions (lb/hr)	PTE VOC Emissions (ton/yr) <sup>(a)</sup>
Pipeline Liquids	536,550 gal/yr	0.066	0.290
<b>Total</b>		<b>0.066</b>	<b>0.290</b>

**Calculations:**

(a) PTE VOC Emissions (ton/yr) given as calculated in the Promax Model simulation report

	<u>Pipeline liquids</u>	
Saturation factor	0.60	Note <sup>(1)</sup>
Pvap (psia)	6.77	Note <sup>(2)</sup>
Molecular Weight Vap (lb/lbmol)	25.35	Note <sup>(2)</sup>
Bulk Liquid Temperature (F)	49.08	Note <sup>(2)</sup>

**Notes:**

(1) AP-42 Section 5.2, Table 5.2-1 Saturation Factors for Calculating Petroleum Liquid Loading Losses, Submerged loading - dedicated normal service

(2) Input parameters as defined by the Promax Model simulation report

(3) Annual rates based on maximum throughput of 5 bbls/day per tank



**Table 5. Fugitive Leak Emissions  
CNX Gas Company - Sims Run Station**

Pollutant	Emission Factor			PTE <sup>(a)</sup> Gas Service
				(tons/yr)
Valves	9.9E-03	lb/hr/source	(1)	4.30
Connectors	8.6E-04	lb/hr/source	(1)	1.60
Open-Ended Lines	4.4E-03	lb/hr/source	(1)	0.03
Pressure Relief Valves	1.9E-02	lb/hr/source	(1)	0.00
Compressors	1.9E-02	lb/hr/source	(1)	0.08
<b>Total Gas Released</b>	-	-		5.94
<b>Total VOC Released (gas service)</b>			(b)	<b>1.25</b>
<b>Calculations:</b>			<b>CO2e</b>	<b>28.98</b>

(a) Annual emissions (tons/yr) = [Emission Factor (lb/hr/source)] x [Number of Sources] x [Hours of Operation per Year] x [0.0005 tons/ lb]

(b) Gas sample from station's gas analysis assumed to be worst case at **21 wt %** VOC from 2012 fractional gas analysis measurements

Number of Components in Gas Service

Valves=	99	(2)
Pressure Relief Valves=	0	(2)
Connectors=	426	(2)
Open-Ended Lines=	2	(2)
Compressors=	1.000	(2)

Maximum Hour of Operation = 8,760

Global Warming Potential (GWP)

CO <sub>2</sub>	1	(3)
CH <sub>4</sub>	25	(3)
N <sub>2</sub> O	298	(3)

(1) Emission factors from 1995 EPA Protocol for Equipment Leak Emission Estimates, Table 2-4 Oil and Gas Production

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

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

**Table 8. Reciprocating Engine / Integral Compressor Emissions (CE-1) Blowdown Venting**  
**Caterpillar 3306 NA**  
**CNX Gas Company - Sims Run Station**

Pollutant	Maximum Hourly Emissions		Annual Emissions	
	Emission Factor	PTE per Engine Event (lb/hr)	Emission Factor	Annual PTE (tons/yr)
<b>Criteria Pollutants</b>				
VOC	7.70E+00 lb/Event (1)	7.70 (a)	7.70E+00 lb/Event (1)	0.23 (a)

(1) - 7.7 lbs VOC/ Engine blowdown event; based on 717 scf/event of 20.45 MW gas with 20.2 wt % VOC

(a) - Worst case blowdowns per year equal normal rate 6 times 10 = 60 Events/yr

## Caterpillar G3306NA Engine Emissions

Date of Manufacture	April 28, 2008	Engine Serial Number	G6X04525	Date Modified/Reconstructed	N/A
Driver Rated HP	145	Rated Speed in RPM	1800	Combustion Type	Spark Ignited 4 Stroke
Number of Cylinders	6	Compression Ratio	10.5:1	Combustion Setting	Rich Burn
Displacement, in <sup>3</sup>	640	Fuel Delivery Method	Carburetor	Combustion Air Treatment	Naturally Aspirated

### Raw Engine Emissions

*Fuel Consumption*            8180 LHV BTU/bhp-hr    or            9004 HHV BTU/bhp-hr  
*Altitude*                            1200 ft  
*Maximum Air Inlet Temp*        90 F

	<u>g/bhp-hr<sup>1</sup></u>	<u>lb/MMBTU<sup>2</sup></u>	<u>lb/hr</u>	<u>TPY</u>
Nitrogen Oxides (NOx)	14.55		4.651	20.372
Carbon Monoxide (CO)	14.55		4.651	20.372
Volatile Organic Compounds (VOC or NMNEHC)	0.5		0.160	0.700
Formaldehyde (CH2O)	0.27		0.086	0.378
Particulate Matter (PM) <small>Filterable+Condensable</small>		1.94E-02	0.025	0.111
Sulfur Dioxide (SO2)		5.88E-04	0.001	0.003
	<u>g/bhp-hr<sup>1</sup></u>	<u>lb/MMBTU<sup>2</sup></u>	<u>lb/hr</u>	<u>Metric Tonne/yr</u>
Carbon Dioxide (CO2)	552	110.0	144	571
Methane (CH4)	0.9	0.23	0.300	1.193

<sup>1</sup> g/bhp-hr are based on Caterpillar Specifications. Note that g/bhp-hr values are based on 100% Load Operation.

It is recommended to add a safety margin to emissions to allow for operational flexibility and fuel gas composition variability.

<sup>2</sup> Emission Factor obtained from EPA's AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources (Section 3.2 Natural Gas-Fired Reciprocating Engines, Table 3.2-3).



Bryan Research & Engineering, Inc.

ProMax<sup>®</sup> 4.0

Copyright © 2002-2016 BRE Group, Ltd. All Rights Reserved.

## Simulation Report

Project: Sims Run Tank Run.pmx

Licensed to SLR International Corporation and Affiliates

Client Name: CNX Gas

Location: Sims Run Station

Job: Tank Emission Estimate

ProMax Filename: N:\West Virginia\CNX Gas\Projects\2017\Engine Determinations\Sims Run\ProMax\Sims Run Tank Run.pmx

ProMax Version: 4.0.16071.0

Simulation Initiated: 9/22/2017 4:14:12 PM

### Bryan Research & Engineering, Inc.

Chemical Engineering Consultants

P.O. Box 4747 Bryan, Texas 77805

Office: (979) 776-5220

FAX: (979) 776-4818

<mailto:sales@bre.com>

<http://www.bre.com/>

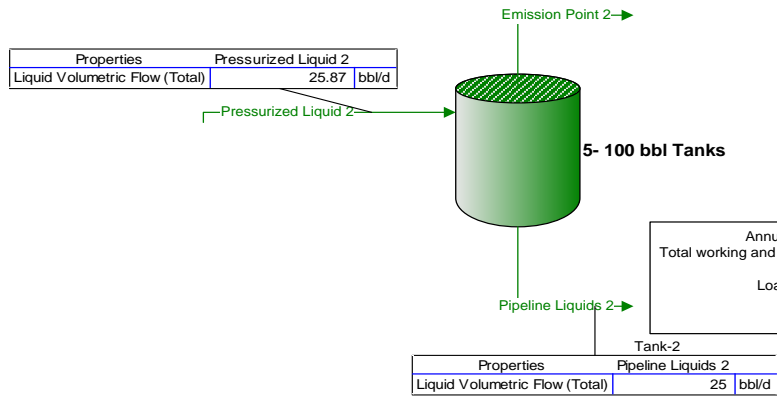
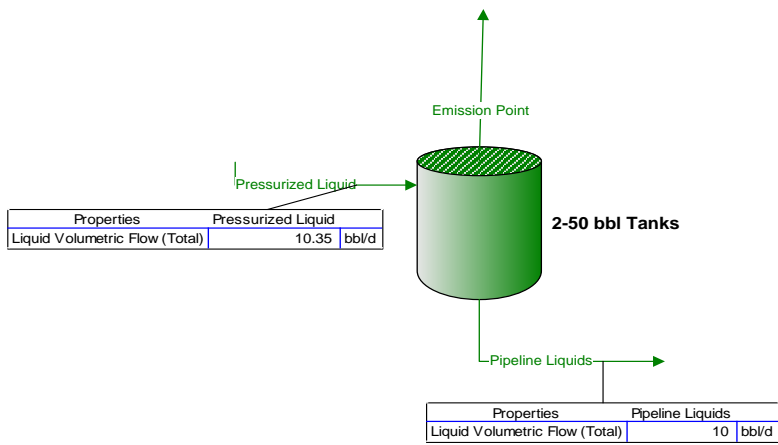
Report Navigator can be activated via the ProMax Navigator Toolbar.

An asterisk (\*), throughout the report, denotes a user specified value.

A question mark (?) after a value, throughout the report, denotes an extrapolated or approximate value.

Annual tank loss calculations for "Pipeline Liquids".  
 Total working and breathing losses from the Vertical Cylinder are 0.239 ton/yr.  
 Flashing losses are 0.008777 ton/yr.  
 Loading losses are 0.08272 ton/yr of loaded liquid.  
 \* Only Non-Exempt VOCs are reported.  
 Vapor adjusted to ensure mass balance

Tank-1



Annual tank loss calculations for "Pipeline Liquids 2".  
 Total working and breathing losses from the Vertical Cylinder are 0.6696 ton/yr.  
 Flashing losses are 0.04892 ton/yr.  
 Loading losses are 0.2076 ton/yr of loaded liquid.  
 \* Only Non-Exempt VOCs are reported.  
 Vapor adjusted to ensure mass balance



Process Streams		Emission Point	Emission Point 2	Pipeline Liquids	Pipeline Liquids 2	Pressurized Liquid	Pressurized Liquid 2
Properties		Status: Solved		Solved		Solved	
Phase: Total	Status:	Solved	Solved	Solved	Solved	Solved	Solved
	From Block:	2-50 bbl Tanks	5- 100 bbl Tanks	2-50 bbl Tanks	5- 100 bbl Tanks	--	--
	To Block:	--	--	--	--	2-50 bbl Tanks	5- 100 bbl Tanks
Property	Units						
Temperature	°F	57.7653	57.7930	57.7653	57.7930	58*	58*
Pressure	psig	0	1	0	1	21*	21*
Molecular Weight	lb/lbmol	25.3450	24.9274	227.932	227.778	225.494	225.494
Mass Density	lb/ft <sup>3</sup>	0.0674859	0.0709004	51.4304	51.4275	49.7590	49.7590
Molar Flow	lbmol/h	0.00642925	0.0150379	0.527863	1.32047	0.534292	1.33551
Mass Flow	lb/h	0.162950	0.374854	120.317	300.775	120.480	301.150
Vapor Volumetric Flow	ft <sup>3</sup> /h	2.41457	5.28705	2.33941	5.84852	2.42127	6.05217
Liquid Volumetric Flow	gpm	0.301037	0.659165	0.291667	0.729167	0.301872	0.754556
API Gravity				40.2833	40.2909		
Net Ideal Gas Heating Value	Btu/ft <sup>3</sup>	1358.11	1336.39	11167.2	11159.7	11049.1	11049.1
Net Liquid Heating Value	Btu/lb	20239.2	20251.8	18439.8	18439.9	18442.2	18442.2

## Environments Report

<b>Client Name:</b>	Tank Emission Estimate	<b>Job:</b>	N:\West Virginia\CNX Gas\Projects\2017\Engine Determinations\Sims Run\ProMax\Sims Run Tank Run.pmx
<b>Location:</b>	0		
<b>Flowsheet:</b>	tanks		

### Project-Wide Constants

Atmospheric Pressure	14.6959 psia	Ideal Gas Reference Volume	379.484 ft <sup>3</sup> /lbmol
Ideal Gas Reference Pressure	14.6959 psia	Liquid Reference Temperature	60 °F
Ideal Gas Reference Temperature	60 °F		

### Environment1

#### Environment Settings

Number of Poynting Intervals	0	Phase Tolerance	1 %
Gibbs Excess Model Evaluation Temperature	77 °F	Emulsion Enabled	FALSE
Freeze Out Temperature Threshold Difference	10 °F		

### Components

Component	Henry's Law Comp.	Phase Initiator	Component	Henry's Law Comp.	Phase Initiator
Carbon Dioxide	FALSE	FALSE	Nitrogen	FALSE	FALSE
Methane	FALSE	FALSE	Ethane	FALSE	FALSE
Propane	FALSE	FALSE	Isobutane	FALSE	FALSE
n-Butane	FALSE	FALSE	Isopentane	FALSE	FALSE
n-Pentane	FALSE	FALSE	Benzene	FALSE	FALSE
Toluene	FALSE	FALSE	Ethylbenzene	FALSE	FALSE
p-Xylene	FALSE	FALSE	n-Hexane	FALSE	FALSE
2,2,4-Trimethylpentane	FALSE	FALSE	Other C6's	FALSE	FALSE
Heptanes	FALSE	FALSE	Octanes	FALSE	FALSE
Nonanes	FALSE	FALSE	Decanes +	FALSE	FALSE

### Physical Property Method Sets

Liquid Molar Volume	COSTALD	Vapor Package	Peng-Robinson
Overall Package	Peng-Robinson	Light Liquid Package	Peng-Robinson
Stability Calculation	Peng-Robinson	Heavy Liquid Package	Peng-Robinson

**Notes:**



**Single Oil Report  
Decanes +**

<b>Client Name:</b>	Tank Emission Estimate	<b>Job:</b>	N:\West Virginia\CNX Gas\Projects\2017\Engine Determinations\Sims Run\ProMax\Sims Run Tank Run.pmx
<b>Location:</b>	0		
<b>Flowsheet:</b>	tanks		

**Properties**

Volume Average Boiling Point	661.659 °F	Low Temperature Viscosity	6.79714 cP
Molecular Weight	284.2* lb/lbmol	Temperature of High T Viscosity	210 °F
Specific Gravity	0.8465*	High Temperature Viscosity	1.82072 cP
API Gravity	35.6589	Watson K	12.2730
Critical Temperature	951.235 °F	ASTM D86 10-90% Slope	0 °F/%
Critical Pressure	170.611 psig	ASTM D93 Flash Point	338.345 °F
Critical Volume	17.6652 ft <sup>3</sup> /lbmol	Pour Point	61.4934 °F
Acentric Factor	0.880769	Paraffinic Fraction	71.7542 %
Carbon to Hydrogen Ratio	6.33114?	Naphthenic Fraction	22.5066 %
Refractive Index	1.46817	Aromatic Fraction	5.73929 %
Temperature of Low T Viscosity	100 °F	Ideal Gas Heat Capacity	103.423 Btu/(lbmol*°F)

Notes:

**Single Oil Report  
Heptanes**

<b>Client Name:</b>	Tank Emission Estimate	<b>Job:</b>	N:\West Virginia\CNX Gas\Projects\2017\Engine Determinations\Sims Run\ProMax\Sims Run Tank Run.pmx
<b>Location:</b>	0		
<b>Flowsheet:</b>	tanks		

**Properties**

Volume Average Boiling Point	204.170 °F	Low Temperature Viscosity	0.347616 cP
Molecular Weight	100.21* lb/lbmol	Temperature of High T Viscosity	210 °F
Specific Gravity	0.7016*	High Temperature Viscosity	0.211224 cP
API Gravity	70.1819	Watson K	12.4336
Critical Temperature	512.987 °F	ASTM D86 10-90% Slope	0 °F/%
Critical Pressure	396.167 psig	ASTM D93 Flash Point	22.6774 °F
Critical Volume	6.61841 ft <sup>3</sup> /lbmol	Pour Point	-5.66945? °F
Acentric Factor	0.328178	Paraffinic Fraction	72.8431 %
Carbon to Hydrogen Ratio	5.34609	Naphthenic Fraction	21.4149 %
Refractive Index	1.39189	Aromatic Fraction	5.74200 %
Temperature of Low T Viscosity	100 °F	Ideal Gas Heat Capacity	37.1664 Btu/(lbmol*°F)

Notes:

**Single Oil Report  
Nonanes**

<b>Client Name:</b>	Tank Emission Estimate	<b>Job:</b>	N:\West Virginia\CNX Gas\Projects\2017\Engine Determinations\Sims Run\ProMax\Sims Run Tank Run.pmx
<b>Location:</b>	0		
<b>Flowsheet:</b>	tanks		

**Properties**

Volume Average Boiling Point	296.600 °F	Low Temperature Viscosity	0.569789 cP
Molecular Weight	128* lb/lbmol	Temperature of High T Viscosity	210 °F
Specific Gravity	0.7424*	High Temperature Viscosity	0.313911 cP
API Gravity	59.0981	Watson K	12.2722
Critical Temperature	612.483 °F	ASTM D86 10-90% Slope	0 °F/%
Critical Pressure	339.966 psig	ASTM D93 Flash Point	86.4541 °F
Critical Volume	8.28440 ft <sup>3</sup> /lbmol	Pour Point	-11.0241? °F
Acentric Factor	0.420394	Paraffinic Fraction	62.4060 %
Carbon to Hydrogen Ratio	5.62062	Naphthenic Fraction	24.7656 %
Refractive Index	1.41424	Aromatic Fraction	12.8284 %
Temperature of Low T Viscosity	100 °F	Ideal Gas Heat Capacity	46.6471 Btu/(lbmol*°F)

Notes:

**Single Oil Report  
Octanes**

<b>Client Name:</b>	Tank Emission Estimate	<b>Job:</b>	N:\West Virginia\CNX Gas\Projects\2017\Engine Determinations\Sims Run\ProMax\Sims Run Tank Run.pmx
<b>Location:</b>	0		
<b>Flowsheet:</b>	tanks		

**Properties**

Volume Average Boiling Point	251.542 °F	Low Temperature Viscosity	0.446533 cP
Molecular Weight	114* lb/lbmol	Temperature of High T Viscosity	210 °F
Specific Gravity	0.724*	High Temperature Viscosity	0.258447 cP
API Gravity	63.9420	Watson K	12.3290
Critical Temperature	565.037 °F	ASTM D86 10-90% Slope	0 °F/%
Critical Pressure	367.393 psig	ASTM D93 Flash Point	55.3642 °F
Critical Volume	7.43719 ft <sup>3</sup> /lbmol	Pour Point	-9.58266? °F
Acentric Factor	0.374061	Paraffinic Fraction	66.6140 %
Carbon to Hydrogen Ratio	5.49569	Naphthenic Fraction	23.6971 %
Refractive Index	1.40406	Aromatic Fraction	9.68898 %
Temperature of Low T Viscosity	100 °F	Ideal Gas Heat Capacity	41.8093 Btu/(lbmol**F)

Notes:

**Single Oil Report  
Other C6's**

<b>Client Name:</b>	Tank Emission Estimate	<b>Job:</b>	N:\West Virginia\CNX Gas\Projects\2017\Engine Determinations\Sims Run\ProMax\Sims Run Tank Run.pmx
<b>Location:</b>	0		
<b>Flowsheet:</b>	tanks		

**Properties**

Volume Average Boiling Point	147.291 °F	Low Temperature Viscosity	0.256680 cP
Molecular Weight	85* lb/lbmol	Temperature of High T Viscosity	210 °F
Specific Gravity	0.664*	High Temperature Viscosity	0.164743 cP
API Gravity	81.6024	Watson K	12.7512
Critical Temperature	445.480 °F	ASTM D86 10-90% Slope	0 °F/%
Critical Pressure	420.214 psig	ASTM D93 Flash Point	-16.5692? °F
Critical Volume	5.75172 ft <sup>3</sup> /lbmol	Pour Point	5.82321? °F
Acentric Factor	0.277116	Paraffinic Fraction	86.4939? %
Carbon to Hydrogen Ratio	5.07336	Naphthenic Fraction	13.5061? %
Refractive Index	1.37271	Aromatic Fraction	0? %
Temperature of Low T Viscosity	100 °F	Ideal Gas Heat Capacity	32.5709 Btu/(lbmol**F)

Notes:

## Calculators Report

<b>Client Name:</b>	Tank Emission Estimate	<b>Job:</b>	N:W
<b>Location:</b>	0		
<b>Flowsheet:</b>	tanks		

### Simple Solver 1

#### Source Code

Residual Error (for CV1) = PipelineLiquids-10

#### Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!tanks!PStreams!Pressurized Liquid!Phases!Total!Properties!Std Liquid Volumetric Flow		
Value	0.292507		
Units	sgpm		

#### Measured Variable [PipelineLiquids]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!tanks!PStreams!Pipeline Liquids!Phases!Total!Properties!Liquid Volumetric Flow		
Value	10.0000		
Units	bbl/d		

#### Solver Properties

Status: **Solved**

Error	1.49925E-12	Iterations	2
Calculated Value	0.292507 sgpm	Max Iterations	20
Lower Bound	sgpm	Weighting	1
Upper Bound	sgpm	Priority	0
Step Size	sgpm	Solver Active	Active
Is Minimizer	FALSE	Group	
Algorithm	Default	Skip Dependency Check	FALSE

Notes:

### Simple Solver 2

#### Source Code

Residual Error (for CV1) = Pipeline\_Liquids\_2-25

#### Calculated Variable [CV1]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!tanks!PStreams!Pressurized Liquid 2!Phases!Total!Properties!Std Liquid Volumetric Flow		
Value	25.0679		
Units	bbl/d		

#### Measured Variable [Pipeline\_Liquids\_2]

SourceMoniker	ProMax:ProMax!Project!Flowsheets!tanks!PStreams!Pipeline Liquids 2!Phases!Total!Properties!Liquid Volumetric Flow		
Value	25.0000		
Units	bbl/d		

#### Solver Properties

Status: **Solved**

Error	-7.59925E-12	Iterations	2
Calculated Value	0.731147 sgpm	Max Iterations	20
Lower Bound	sgpm	Weighting	1
Upper Bound	sgpm	Priority	0
Step Size	sgpm	Solver Active	Active
Is Minimizer	FALSE	Group	
Algorithm	Default	Skip Dependency Check	FALSE

Notes:

## User Value Sets Report

<b>Client Name:</b>	Tank Emission Estimate	<b>Job:</b>	N:\West Virginia\
<b>Location:</b>	0		
<b>Flowsheet:</b>	tanks		

### Tank-1

#### User Value [BlockReady]

Parameter	1*	Upper Boun	
Lower Bound		Enforce Bot	FALSE

#### User Value [ShellLength]

Parameter	5* ft	Upper Boun	ft
Lower Bound	0* ft	Enforce Bot	FALSE

#### User Value [ShellDiam]

Parameter	8.45* ft	Upper Boun	ft
Lower Bound	0* ft	Enforce Bot	FALSE

#### User Value [BreatherVP]

Parameter	0.0300000* psig	Upper Boun	psig
Lower Bound	psig	Enforce Bot	FALSE

#### User Value [BreatherVacP]

Parameter	-0.0300000* psig	Upper Boun	psig
Lower Bound	psig	Enforce Bot	FALSE

#### User Value [DomeRadius]

Parameter	4.23* ft	Upper Boun	ft
Lower Bound	ft	Enforce Bot	FALSE

#### User Value [OpPress]

Parameter	0* psig	Upper Boun	psig
Lower Bound	psig	Enforce Bot	FALSE

#### User Value [AvgPercentLiq]

Parameter	50* %	Upper Boun	%
Lower Bound	%	Enforce Bot	FALSE

#### User Value [MaxPercentLiq]

Parameter	90* %	Upper Boun	%
Lower Bound	%	Enforce Bot	FALSE

#### User Value [AnnNetTP]

Parameter	9.96470* bbl/day	Upper Boun	bbl/day
Lower Bound	0* bbl/day	Enforce Bot	FALSE

#### User Value [OREff]

Parameter	0* %	Upper Boun	%
Lower Bound	%	Enforce Bot	FALSE

#### User Value [MaxAvgT]

Parameter	61.15* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE

#### User Value [MinAvgT]

Parameter	36.9667* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE

User Value [BulkLiqT]			
Parameter	49.0783* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE
User Value [AvgP]			
Parameter	13.7315* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
User Value [ThermI]			
Parameter	1193.89* Btu/ft^2/day	Upper Boun	Btu/ft^2/day
Lower Bound	Btu/ft^2/day	Enforce Bot	FALSE
User Value [AvgWindSpeed]			
Parameter	6.16667* mi/h	Upper Boun	mi/h
Lower Bound	mi/h	Enforce Bot	FALSE
User Value [MaxHourlyLoadingRate]			
Parameter	0.415196* bbl/hr	Upper Boun	bbl/hr
Lower Bound	0* bbl/hr	Enforce Bot	FALSE
User Value [EntrainedOilFrac]			
Parameter	1* %	Upper Boun	%
Lower Bound	%	Enforce Bot	FALSE
User Value [TurnoverRate]			
Parameter	40.4561*	Upper Boun	
Lower Bound		Enforce Bot	FALSE
User Value [LLossSatFactor]			
Parameter	0.5*	Upper Boun	
Lower Bound		Enforce Bot	FALSE
User Value [AtmPressure]			
Parameter	13.7315* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
User Value [TVP]			
Parameter	6.77054* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
User Value [MaxVP]			
Parameter	7.19440* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
User Value [MinVP]			
Parameter	6.37364* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
User Value [AvgLiqSurfaceT]			
Parameter	50.6729* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE
User Value [MaxLiqSurfaceT]			
Parameter	56.4466* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE
User Value [TotalLosses]			
Parameter	0.238990* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

<b>User Value [WorkingLosses]</b>			
Parameter	0.0732604* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [StandingLosses]</b>			
Parameter	0.0462348* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [RimSealLosses]</b>			
Parameter	0* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [WithdrawalLoss]</b>			
Parameter	0* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [LoadingLosses]</b>			
Parameter	0.0827156* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [MaxHourlyLoadingLoss]</b>			
Parameter	0.0188848* lb/hr	Upper Boun	lb/hr
Lower Bound	lb/hr	Enforce Bot	FALSE
<b>User Value [PStar]</b>			
Parameter		Upper Boun	
Lower Bound		Enforce Bot	FALSE
<b>User Value [AICTotalLosses]</b>			
Parameter	0.578286* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [AICLoadingLosses]</b>			
Parameter	0.200147* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [AICMaxHLoadingLoss]</b>			
Parameter	0.0456957* lb/hr	Upper Boun	lb/hr
Lower Bound	lb/hr	Enforce Bot	FALSE
<b>User Value [AICFlashingLosses]</b>			
Parameter	0.0263771* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [DeckFittingLosses]</b>			
Parameter	0* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [DeckSeamLosses]</b>			
Parameter	0* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [FlashingLosses]</b>			
Parameter	0.00877691* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [TotalResidual]</b>			
Parameter	526.383* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE
<b>User Value [GasMoleWeight]</b>			

Parameter	0.0318968*	kg/mol	Upper Boun	kg/mol
Lower Bound		kg/mol	Enforce Bot	FALSE
<b>User Value [VapReportableFrac]</b>				
Parameter	41.3274*	%	Upper Boun	%
Lower Bound		%	Enforce Bot	FALSE
<b>User Value [LiqReportableFrac]</b>				
Parameter	99.8835*	%	Upper Boun	%
Lower Bound		%	Enforce Bot	FALSE
<b>User Value [FlashReportableFrac]</b>				
Parameter	33.2747*	%	Upper Boun	%
Lower Bound		%	Enforce Bot	FALSE
<b>Notes:</b>				
This User Value Set was programmatically generated. GUID={0658807B-16DE-46C9-972E-43AD43311EF6}				
<b>Tank-2</b>				
<b>User Value [BlockReady]</b>				
Parameter	1*		Upper Boun	
Lower Bound			Enforce Bot	FALSE
<b>User Value [ShellLength]</b>				
Parameter	10*	ft	Upper Boun	ft
Lower Bound	0*	ft	Enforce Bot	FALSE
<b>User Value [ShellDiam]</b>				
Parameter	8.45*	ft	Upper Boun	ft
Lower Bound	0*	ft	Enforce Bot	FALSE
<b>User Value [BreatherVP]</b>				
Parameter	0.0300000*	psig	Upper Boun	psig
Lower Bound		psig	Enforce Bot	FALSE
<b>User Value [BreatherVacP]</b>				
Parameter	-0.0300000*	psig	Upper Boun	psig
Lower Bound		psig	Enforce Bot	FALSE
<b>User Value [DomeRadius]</b>				
Parameter	4.23*	ft	Upper Boun	ft
Lower Bound		ft	Enforce Bot	FALSE
<b>User Value [OpPress]</b>				
Parameter	0*	psig	Upper Boun	psig
Lower Bound		psig	Enforce Bot	FALSE
<b>User Value [AvgPercentLiq]</b>				
Parameter	50*	%	Upper Boun	%
Lower Bound		%	Enforce Bot	FALSE
<b>User Value [MaxPercentLiq]</b>				
Parameter	90*	%	Upper Boun	%
Lower Bound		%	Enforce Bot	FALSE
<b>User Value [AnnNetTP]</b>				
Parameter	24.9092*	bbl/day	Upper Boun	bbl/day
Lower Bound	0*	bbl/day	Enforce Bot	FALSE
<b>User Value [OREff]</b>				
Parameter	0*	%	Upper Boun	%

Lower Bound	%	Enforce Bot	FALSE
<b>User Value [MaxAvgT]</b>			
Parameter	61.15* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE
<b>User Value [MinAvgT]</b>			
Parameter	36.9667* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE
<b>User Value [BulkLiqT]</b>			
Parameter	49.0783* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE
<b>User Value [AvgP]</b>			
Parameter	13.7315* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
<b>User Value [ThermI]</b>			
Parameter	1193.89* Btu/ft^2/day	Upper Boun	Btu/ft^2/day
Lower Bound	Btu/ft^2/day	Enforce Bot	FALSE
<b>User Value [AvgWindSpeed]</b>			
Parameter	6.16667* mi/h	Upper Boun	mi/h
Lower Bound	mi/h	Enforce Bot	FALSE
<b>User Value [MaxHourlyLoadingRate]</b>			
Parameter	1.03788* bbl/hr	Upper Boun	bbl/hr
Lower Bound	0* bbl/hr	Enforce Bot	FALSE
<b>User Value [EntrainedOilFrac]</b>			
Parameter	1* %	Upper Boun	%
Lower Bound	%	Enforce Bot	FALSE
<b>User Value [TurnoverRate]</b>			
Parameter	20.2260*	Upper Boun	
Lower Bound		Enforce Bot	FALSE
<b>User Value [LLossSatFactor]</b>			
Parameter	0.5*	Upper Boun	
Lower Bound		Enforce Bot	FALSE
<b>User Value [AtmPressure]</b>			
Parameter	13.7315* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
<b>User Value [TVP]</b>			
Parameter	6.82125* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
<b>User Value [MaxVP]</b>			
Parameter	7.25012* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
<b>User Value [MinVP]</b>			
Parameter	6.41960* psia	Upper Boun	psia
Lower Bound	psia	Enforce Bot	FALSE
<b>User Value [AvgLiqSurfaceT]</b>			
Parameter	50.6729* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE



**User Value [MaxLiqSurfaceT]**

Parameter	56.4466* °F	Upper Boun	°F
Lower Bound	°F	Enforce Bot	FALSE

**User Value [TotalLosses]**

Parameter	0.669613* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [WorkingLosses]**

Parameter	0.0809753* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [StandingLosses]**

Parameter	0.0529473* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [RimSealLosses]**

Parameter	0* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [WithdrawalLoss]**

Parameter	0* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [LoadingLosses]**

Parameter	0.207586* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [MaxHourlyLoadingLoss]**

Parameter	0.0473940* lb/hr	Upper Boun	lb/hr
Lower Bound	lb/hr	Enforce Bot	FALSE

**User Value [PStar]**

Parameter		Upper Boun	
Lower Bound		Enforce Bot	FALSE

**User Value [AllCTotalLosses]**

Parameter	1.61121* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [AllCLoadingLosses]**

Parameter	0.499490* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [AllCMaxHLoadingLoss]**

Parameter	0.114039* lb/hr	Upper Boun	lb/hr
Lower Bound	lb/hr	Enforce Bot	FALSE

**User Value [AllCFlashingLosses]**

Parameter	0.146857* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [DeckFittingLosses]**

Parameter	0* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [DeckSeamLosses]**

Parameter	0* ton/yr	Upper Boun	ton/yr
Lower Bound	ton/yr	Enforce Bot	FALSE

**User Value [FlashingLosses]**

Parameter	0.0489183*	ton/yr	Upper Boun	ton/yr
Lower Bound		ton/yr	Enforce Bot	FALSE
<b>User Value [TotalResidual]</b>				
Parameter	1315.64*	ton/yr	Upper Boun	ton/yr
Lower Bound		ton/yr	Enforce Bot	FALSE
<b>User Value [GasMoleWeight]</b>				
Parameter	0.0319284*	kg/mol	Upper Boun	kg/mol
Lower Bound		kg/mol	Enforce Bot	FALSE
<b>User Value [VapReportableFrac]</b>				
Parameter	41.5595*	%	Upper Boun	%
Lower Bound		%	Enforce Bot	FALSE
<b>User Value [LiqReportableFrac]</b>				
Parameter	99.8819*	%	Upper Boun	%
Lower Bound		%	Enforce Bot	FALSE
<b>User Value [FlashReportableFrac]</b>				
Parameter	33.3102*	%	Upper Boun	%
Lower Bound		%	Enforce Bot	FALSE
<b>Notes:</b>				
This User Value Set was programmatically generated. GUID={F5CF85E9-4310-4AEB-9008-EEC20CB8B39F}				