



June 10, 2016

William F. Durham
Director
WVDEP, Division of Air Quality
601 – 57th Street
Charleston, West Virginia 25304



**Re: Evaluation of Engine Permitting Status
Independence Compressor Station, Lizemores, West Virginia**

Dear Director,

Cranberry Pipeline Corporation (Cranberry) was issued a permit determination (PD98-039) on March 16, 1998 by the West Virginia Department of Environmental Protection Division Air Quality (WVDEP DAQ) for the Independence Compressor Station, Plant ID No. 03-54-813-0001 located in Lizemores, West Virginia. The determination identified that the facility did not require a permit per 45CSR13 for the proposed modification which was described as the removal of one (1) of the four (4) Ajax DPC 230 Compressor Engines.

The Ajax DPC 230 engines were calculated to potentially emit the following:

Single Unit

Pollutant	Gr/BHP-Hr.	Lb/hour	TPY
NOx	3.0	1.46	6.4
CO	2.2	1.07	4.69
VOC (NMNEHC)	1.9	.92	4.06

Total facility emissions from engines

Pollutant	Gr/BHP-Hr.	Lb/hour	TPY
NOx	3.0	5.84	25.6
CO	2.2	4.28	18.76
VOC (NMNEHC)	1.9	3.68	14.72

During a recent internal records review for Cranberry's West Virginia Operations, it was discovered that the facility had not removed engine No. 4 and therefore, an internal evaluation of the facility's potential to emit PTE was performed by SLR International Corporation (SLR).

June 10, 2016

Page 2

Using emission factors as specified for Ajax DPC 230s for these three pollutants, the following summarizes what SLR has calculated the PTE to be for the four engines that are currently in operation at this facility.

Single Unit

Pollutant	Gr/BHP-Hr.	Lb/hour	TPY
NOx	4.4	2.14	9.39
CO	2.4	1.17	5.12
VOC (NMNEHC)	1.8	0.88	3.84

Total facility emissions from engines

Pollutant	Gr/BHP-Hr.	Lb/hour	TPY
NOx	4.4	8.575	37.558
CO	2.4	4.677	20.486
VOC (NMNEHC)	1.8	3.508	15.365

Please see attached emission calculations for complete estimate of engine PTE.

Based off of these PTE estimates, and the understanding that these units are "Grandfathered" under 45CSR13, SLR believes that the Independence Compressor Station does not need to apply for a WV NSR Permit and that the source is not aggregated with any other emission sources nearby this facility and is thereby not subject to 45CSR30 (Title V) Major Source Permitting requirements since it falls below the 100TPY Criteria Pollutant thresholds. SLR Recommends submitting a WV NSR Permit Determination Form (PDF) Application to the WVDEP DAQ In order to update the records and ensure that no confusion of this matter is encountered in future records reviews.

SLR International Corporation appreciates the opportunity to provide air quality services to Cranberry Pipeline Corporation. If you have any questions, please contact me at (304) 932-3107.

Sincerely,
SLR International Corporation



Nathaniel L. Lanham
West Virginia Operations Manager



global environmental solutions

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation

Independence Compressor Station

Lizemores, West Virginia

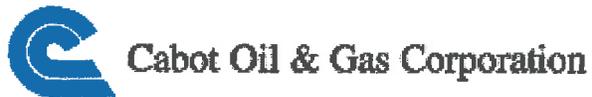
Permit Determination

SLR Ref: 116.00400.00148

June 2016



Cabot Oil & Gas Corporation



Cabot Oil & Gas Corporation



global environmental solutions

Permit Determination

Independence Compressor Station

Lizemores, West Virginia

Prepared for:

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street, East
Suite 1500
Charleston, West Virginia 25301

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.

A handwritten signature in blue ink that reads "Chris Boggess".

Chris Boggess
Associate Engineer

A handwritten signature in blue ink that reads "N. L. Lanham".

Nathaniel L. Lanham
WV Operations Manager

CONTENTS

APPLICATION FOR PERMIT DETERMINATION

ATTACHMENTS

- ATTACHMENT A AREA MAP
- ATTACHMENT B PROCESS FLOW DIAGRAM
- ATTACHMENT C PROCESS DESCRIPTION
- ATTACHMENT D SAFETY DATA SHEETS (SDS)
- ATTACHMENT E SUPPORTING CALCULATIONS
- ATTACHMENT F SUPPORTING DOCUMENTS

APPLICATION FOR PERMIT DETERMINATION

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301



WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th 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):

Cranberry Pipeline Corporation

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):

Independence Compressor Station

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

211111

4A. MAILING ADDRESS:

102 3rd Street
Glasgow, West Virginia 25086

4B. PHYSICAL ADDRESS:

~0.4 miles onto Independence Road Lizemores, WV

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A):

From US-60 E turn left onto Cannerton Hollow Road for ~8.8 miles. Merge onto Belle creek road then turn left onto WV-16 N for ~5.3 miles. Turn right onto Independence road. ~0.4 miles facility is on the left.

5B. NEAREST ROAD:
Independence Rd.

5C. NEAREST CITY OR TOWN:
Lizemores

5D. COUNTY:
Clay

5E. UTM NORTHING (KM):
4240179

5F. UTM EASTING (KM):
484852

5G. UTM ZONE:
17

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:
Nathaniel L. Lanham

6B. TITLE:
WV Operations Manager

6C. TELEPHONE:
304-932-3107

6D. FAX:
N/A

6E. E-MAIL:
nlanham@slrconsulting.com

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

03-54-813-0001

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:
N/A

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:

No Change

10B. DATE OF ANTICIPATED START-UP:

Existing Source

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 PROCESSE, 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	Existing	No Proposed Changes
PM₁₀	Existing	No Proposed Changes
VOCs	Existing	No Proposed Changes
CO	Existing	No Proposed Changes
NO_x	Existing	No Proposed Changes
SO₂	Existing	No Proposed Changes
Pb	Existing	No Proposed Changes
HAPs (AGGREGATE AMOUNT)	Existing	No Proposed Changes
TAPs (INDIVIDUALLY)*	Existing	No Proposed Changes
OTHER (INDIVIDUALLY)*	Existing	No Proposed Changes

* 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, (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: **BRODY WEBSTER** 

TITLE: EHS Manager Date: 05/06/2016.

**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

ATTACHMENT A

AREA MAP

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301



Grassy Fork

Truman Hollow Rd

Fitzwater Rd

Krik Rd

Big Hollow Rd

Coleman Dr

Riproe Rd

State Route

Lizemores

Adonijah

Independence Compressor Station

Coom Ridge

16

10

1112

1112



1 km

Google earth

© 2016 Google

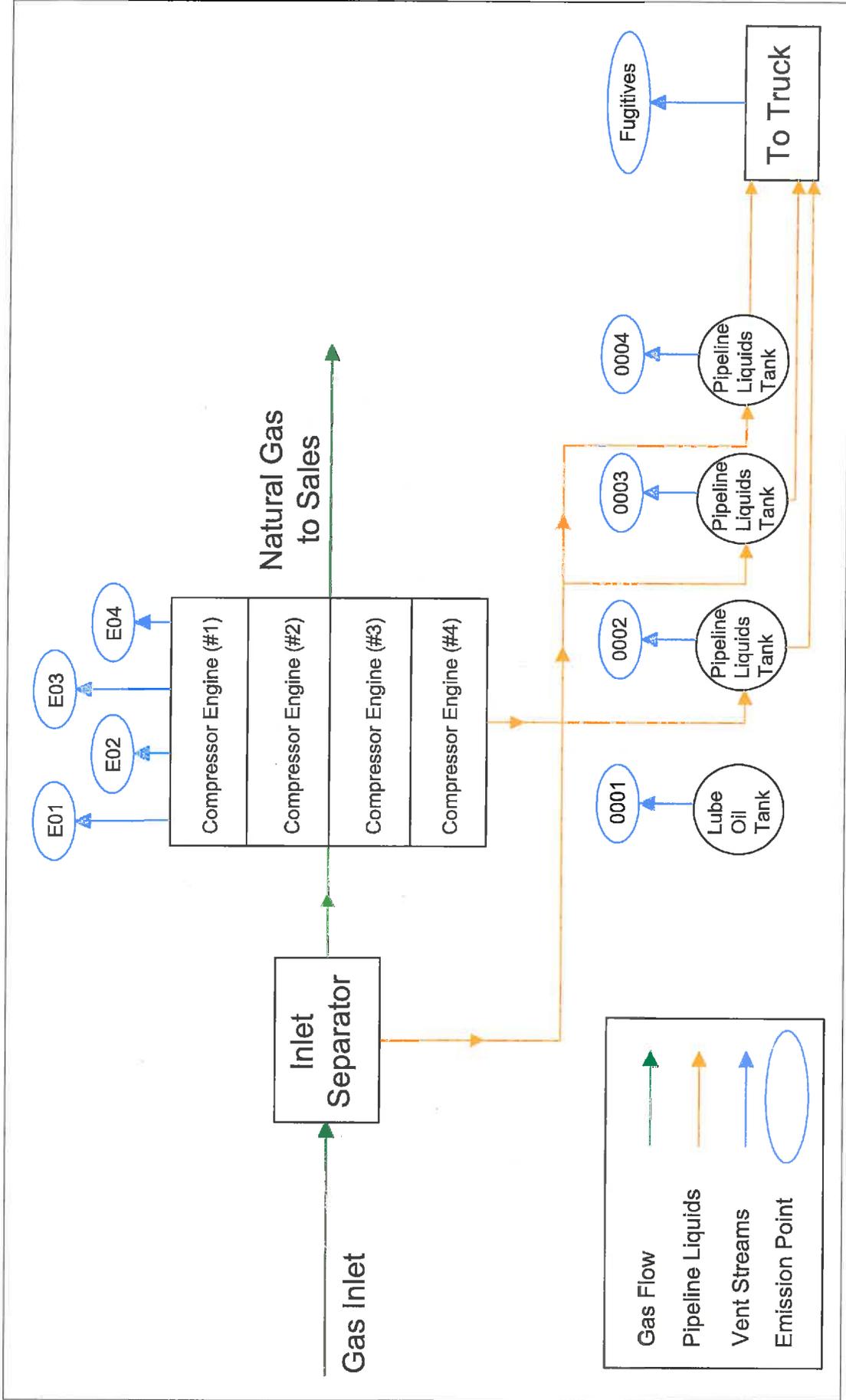
ATTACHMENT B

PROCESS FLOW DIAGRAM

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301



Process Flow Diagram
 Cranberry Pipeline Corporation
 Independence Compressor Station - ID # 03-54-813-0001
 Lizemores, West Virginia

ATTACHMENT C

PROCESS DESCRIPTION

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301

PROCESS DESCRIPTION

Cranberry Pipeline Corporation (Cranberry) is updating their records for the Independence Compressor Station. This station was constructed in the mid 1970's and at the time of construction no permits were required. In February 1998 a permit determination application (PD98-039) was submitted to West Virginia Department of Environmental Protection Division of Air Quality (WVDEP DAQ) for the removal of one compressor engine. The determination identified that the facility did not require a permit under 45CSR13 for the proposed modification which was described as the removal of one (1) of the four (4) Ajax DPC 230 compressor engine.

During a recent internal records review for Cranberry's West Virginia Operations, it was discovered that the facility had not removed engine No. 4 and therefore, an internal evaluation of the facility's potential to emit PTE was performed by SLR International Corporation (SLR).

The emissions from the engine were estimated using 2SLB factors from AP-42 and manufacturer emission factors for CO and NOx. Tank emissions were estimated to include flashing, working and breathing contributions (assuming 5 bbl/day maximum throughputs). The tank composition was assumed to be equivalent to that measured from a gas/liquid separator at a similar site and is considered to be a worst case representation with respect to gas composition and pressure for West Virginia Cranberry Operations (Please Refer to Attachment F for full Pressurized Separator Sampling and Emissions Estimation Report).

The PTE estimation demonstrates the facility wide emissions are below major source thresholds including the emissions from the 4th engine that remained on site. Additionally, there have been no modifications or changes at this site that would trigger minor source NSR permitting thresholds.

Additionally, to fully evaluate Title V applicability this site was screened to identify any other facilities located within a half mile radius. No other facilities operated by Cabot/Cranberry Pipelines were identified within a ½ mile radius from this site. Therefore with respect to the common sense notion of closely located sites there is no standalone facility to aggregate with the Independence Station.

ATTACHMENT D

SAFETY DATA SHEETS (SDS)

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301

SAFETY DATA SHEET

Cabot Oil & Gas Corporation

Date Issued : 10/26/2012
SDS No : CA201-006
Date Revised : 12/20/2012
Revision No : 1

Sweet Natural Gas

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Sweet Natural Gas
CHEMICAL FAMILY: Hydrocarbon Mixture; Aliphatic Hydrocarbon
ALTERNATE TRADE NAME(S): Well Head Gas, Casing Head Gas

DISTRIBUTOR

Cabot Oil & Gas Corporation
P.O. Box 4544
Houston, TX 77210-4544

24 HR. EMERGENCY TELEPHONE NUMBERS

(281) 589-4600

2. HAZARDS IDENTIFICATION

GHS CLASSIFICATIONS

Health	Physical
Carcinogenicity, Category 1 Hazard Not Otherwise Classified, Simple Asphyxiant	Gases Under Pressure, Liquefied gas Flammable Gases, Category 1

GHS LABEL

WARNING		 Flame
H000: May displace oxygen and cause rapid suffocation.		
DANGER		 Health hazard
 Gas cylinder	H220: Extremely flammable gas.	
WARNING		DANGER
H280: Contains gas under pressure; may explode if heated.		H350: May cause cancer.

PRECAUTIONARY STATEMENT(S)

Prevention:

P210: Keep away from heat/sparks/open flames/hot surfaces – no smoking.
P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P281: Use personal protective equipment as required.

Response:

P377: Leaking gas fire: Do not extinguish unless leak can be stopped safely.
P381: Eliminate all ignition sources if safe to do so.
P308+P313: IF exposed or concerned: Get medical advice/attention.

Storage:

P403: Store in a well-ventilated place.
P410+P403: Protect from sunlight. Store in a well-ventilated place.

Sweet Natural Gas

Disposal:

P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

EMERGENCY OVERVIEW

IMMEDIATE CONCERNS: HAZARD DESCRIPTION / WARNING INFORMATION SUMMARY - This material is a flammable gas. This product is toxic; inhalation of this material may cause severe injury or death. Please read entire contents of Section 2 of this Safety Data Sheet (SDS) for details.

POTENTIAL HEALTH EFFECTS

EYES: This product is unlikely to cause eye irritation.

SKIN: This product is unlikely to cause skin irritation or injury.

INGESTION: This product is a compressed gas; hence oral exposure and resulting acute toxicity are unlikely.

INHALATION: This product is a simple asphyxiant. Excessive exposure may cause central nervous system effects such as dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure and death.

SIGNS AND SYMPTOMS OF OVEREXPOSURE

CARCINOGENICITY: No component of this product present at levels greater than or equal to 0.1% is identified as a probable, possible, or confirmed carcinogen by IARC, NTP, OSHA or ACGIH.

MUTAGENICITY: Not Established.

REPRODUCTIVE TOXICITY

REPRODUCTIVE EFFECTS: Not Established.

TERATOGENIC EFFECTS: Not Established.

MEDICAL CONDITIONS AGGRAVATED: Persons with pre-existing central nervous system disorders should refrain from contact with this material.

ROUTES OF ENTRY: Inhalation, skin contact, eye contact.

TARGET ORGAN STATEMENT: May cause damage to lungs and central nervous system.

SENSITIZATION: Not Established.

COMMENTS: OTHER HAZARDS - Not Established.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Vol. %	CAS	EINECS	Classification
Methane	70 - 94	74-82-8	200-812-7	T+,N; R61, R26, R48/23, R50/53
Ethane	5 - 10	74-84-0	200-814-8	F+; R12
Propane	1 - 4	74-98-6	200-827-9	F+; R12
i-Butane	0.5 - 3	75-28-5	200-857-2	F+; R12
n-Butane	0.5 - 2	106-97-8	203-448-7	F+; R12
Carbon Dioxide	0.5 - 10	124-38-9	204-696-9	
Nitrogen	0.5 - 10	7727-37-9	231-783-9	
Benzene	may contain	71-43-2	200-753-7	F, T; R45, R46, R11, R36/38, R48/23/24/25, R65
Hydrogen Sulfide	may contain	7783-06-4	231-977-3	F+, T+, N; R12, R26, R50

COMMENTS: This may not be a complete list of components. Compositions given are typical values, not specifications.

(Full text of R-Phrases can be found under heading 16)

Sweet Natural Gas

4. FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water. Get medical attention, if irritation persists.

SKIN: Wash with soap and water. Get medical attention if irritation develops or persists.

INGESTION: This is not considered a major potential route of exposure.

INHALATION: Move victim to fresh air. Call 911, emergency medical service, or Emergency Phone Numbers(s) provided in Section 1 of this SDS. Give artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult.

ANTIDOTES: Not Established.

NOTES TO PHYSICIAN: CLINICAL TESTING & MEDICAL MONITORING FOR DELAYED EFFECTS - Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed. Provide general supportive measures and treat symptomatically.

5. FIRE FIGHTING MEASURES

FLASH POINT: -188 °C (-306.4 °F)

Notes: Based on methane.

FLAMMABLE LIMITS: 1.0 to 15.0

Notes: Flammable Limits given as percentage volume in air at normal atmospheric temperature and pressure.

AUTOIGNITION TEMPERATURE: 482 °C (900 °F) to 649 °C (1200 °F)

GENERAL HAZARD: DECOMPOSITION TEMPERATURE - Not Established.

EXTINGUISHING MEDIA:

SMALL FIRE - Class B fire extinguisher, carbon dioxide, multipurpose dry chemical, water fog or alcohol-resistant foam.

LARGE FIRE - Water fog or alcohol-resistant foam.

HAZARDOUS COMBUSTION PRODUCTS: Any combustion, including incomplete combustion, may form carbon monoxide and carbon dioxide. Burning produces noxious and toxic fumes. Downwind personnel must be evacuated.

OTHER CONSIDERATIONS: INAPPROPRIATE EXTINGUISHING MEDIA - Do not use water jet.

FIRE FIGHTING PROCEDURES:

PROTECTIVE ACTIONS TO TAKE DURING FIRE FIGHTING - DO NOT extinguish a leaking gas flame unless the leak can be stopped. In many cases it will be preferable to allow continued burning. Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal; do not scatter the material. Do not get water inside containers. Use water spray or fog; do not use straight streams. Note: Use of water spray when fighting fire may be inefficient or cause a chemical reaction. Persons involved in fire fighting response involving this product and its containers/packaging should refer to Section 8 of this SDS for the proper selection of exposure controls and personal protective equipment.

FIRE FIGHTING EQUIPMENT: PRECAUTIONS FOR FIRE INVOLVING TANKS OR CAR/TRAILER LOADS - Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. Isolate for 1600 meters (1 mile) in all directions; also consider initial evacuation for 1600 meters (1 mile) in all directions. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

FIRE EXPLOSION: HIGHLY FLAMMABLE. Will be easily ignited by heat, sparks or flames. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated.

COMMENTS:

SPECIFIC HAZARDS THAT MAY ARISE FROM THE PRODUCT - Vapors are flammable and heavier than air. Vapors may travel across the ground and reach remote ignition sources causing a flashback fire danger.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: For emergency information and procedures to follow in the case of an accidental release, call the Emergency Telephone Number(s) listed in Section 1 of this SDS. Remove any ignition sources and protect from ignition. Water spray may reduce vapor but may not prevent ignition in closed spaces. A vapor suppressing foam may be used to reduce vapors. Provide sufficient ventilation in the affected area(s) and wear appropriate personal protective equipment as indicated in Section 8 of this

Sweet Natural Gas

SDS when handling spill material. Isolate the area until gas has dispersed. Never discharge releases directly into sewers or surface waters.

LARGE SPILL: Use similar response procedures as indicated under Small Spill.

GENERAL PROCEDURES: MATERIALS & METHODS (EQUIPMENT & TECHNIQUES) FOR CONTAINMENT & CLEANUP -

Call Emergency Telephone Number(s) provided in Section 1 of this SDS. As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering.

RELEASE NOTES: ENVIRONMENTAL PRECAUTIONS - Prevent entry into waterways, sewers, basements or confined areas. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Avoid allowing water runoff to contact spilled material.

SPECIAL PROTECTIVE EQUIPMENT: EMERGENCY & NON-EMERGENCY RESPONDERS - Refer to Section 8 of this SDS for appropriate exposure controls and personal protective equipment (PPE).

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Handle in accordance with good industrial hygiene and safety practices. These practices include but are not limited to avoiding unnecessary exposure and prompt removal of material from eyes, skin and clothing. If needed, take first aid actions as indicated in Section 4 of this SDS.

HANDLING: Use only with adequate ventilation. Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8 of this SDS. Vent slowly to the atmosphere when opening. Avoid all contact with skin and eyes. Avoid breathing product dust or vapors. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Do not reuse container. Remove contaminated clothing immediately. Wash with soap and water after working with this product.

STORAGE: Keep in airtight container away from all heat sources. Store in a segregated and approved area. Store in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Keep container in a well-ventilated area. Ground all containers during transfer. Store away from incompatible materials. Cylinders should be separated from oxygen cylinders or other oxidizers by a minimum distance of 20 feet, or by a barrier of non-combustible material at least 5 feet high having a fire resistance rating of at least 1/2 hour. Store in the original container or an approved alternative made from compatible material. Do not store in unlabeled containers. Treat empty containers in a similar fashion as residual product may exist. Use appropriate containment to avoid environmental contamination.

STORAGE TEMPERATURE: Store containers in a room with ambient temperature.

STORAGE PRESSURE: Containers should be stored in room with ambient pressure.

SHELF LIFE:

HOW TO MAINTAIN THE INTEGRITY OF THE SUBSTANCE BY USE OF STABILIZERS OR ANTIOXIDANTS - Not Established.

ELECTROSTATIC ACCUMULATION HAZARD: To minimize the hazard of static electricity during transfer operations, bonding and grounding may be necessary, but may not by themselves be sufficient. For more information, refer to OSHA Standard 29 CFR 1910.106; National Fire Protection Standard (NFPA) 77 - "Recommended Practice on Static Electricity"; and/or the American Petroleum Institute (API) Recommended Practice 2003 - "Protection Against Ignitions Arising Out of Static, Lightning and Stray Currents."

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES

OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)					
		EXPOSURE LIMITS			
		OSHA PEL		ACGIH TLV	
Chemical Name		ppm	mg/m ³	ppm	mg/m ³
Ethane	TWA	N/E	N/E	1000	N/E
	STEL	N/E	N/E	N/E	N/E
Propane	TWA	1000	1800	1000	N/E
	STEL	N/E	N/E	N/E	N/E
i-Butane	TWA	N/E	N/E	1000	N/E
	STEL	N/E	N/E	N/E	N/E
n-Butane	TWA	N/E	N/E	1000	N/E
	STEL	N/E	N/E	N/E	N/E
Carbon Dioxide	TWA	5000	9000	5000	9000
	STEL	N/E	N/E	30000	54000

ENGINEERING CONTROLS: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Employees should be provided with and required to use splash-proof safety goggles and splash shields where there is any possibility of product coming in contact with eyes. Ensure that eye wash station is operable and nearby.

SKIN: GLOVES AND BOOTS - Any impervious gloves and boots including butyl rubber, nitrile rubber or neoprene rubber.

RESPIRATORY: Depending on airborne concentration a full-face supplied air respirator is recommended, because air purifying respirators can not provide adequate protection.

PROTECTIVE CLOTHING: Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn. Cotton clothing is recommended.

WORK HYGIENIC PRACTICES: Consider the potential hazards of this material, applicable exposure limits, job activities, environmental working conditions, and other substances in the workplace when designing engineering controls and selecting personal protective equipment (PPE). The user should read and understand all manufacturer instructions and limitations supplied with the personal protection equipment before use.

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR: Generally odorless (if no H₂S is present and no mercaptan added for odor).

APPEARANCE: Colorless gas.

pH: Not Applicable.

PERCENT VOLATILE: 100

VAPOR PRESSURE: Not Established.

VAPOR DENSITY: 0.6 to 0.8 (Air = 1)

BOILING POINT: -161 °C (-258 °F)

Notes: Based on methane.

FREEZING POINT: Not Applicable.

MELTING POINT: Not Applicable.

FLASH POINT: -188 °C (-306.4 °F)

Sweet Natural Gas

Notes: Based on methane.

EVAPORATION RATE: Not Established.

DENSITY: Not Established.

SPECIFIC GRAVITY: Not Established.

VISCOSITY: Not Applicable.

COEFF. OIL/WATER: Not Established.

ODOR THRESHOLD: Not Established.

COMMENTS: FLAMMABILITY - Refer to Section 2 and Section 5 of this SDS for classification and flammability characteristics.

10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

STABILITY: This product is anticipated to be stable under normal ambient storage and handling conditions of temperature and pressure.

POLYMERIZATION: This product is not anticipated to cause hazardous reactions or polymerizations under normal ambient storage and handling conditions of temperature and pressure.

CONDITIONS TO AVOID: Avoid contact with incompatible materials. Avoid exposure to excess heat, sparks, open flame, or other potential ignition sources. Prevent vapor accumulation.

HAZARDOUS DECOMPOSITION PRODUCTS: Products of thermal decomposition include carbon oxides and nitrogen oxides.

INCOMPATIBLE MATERIALS: Strong oxidizing agents, liquid oxygen, mineral acids and metal catalysts.

11. TOXICOLOGICAL INFORMATION

ACUTE

Chemical Name	ORAL LD ₅₀ (rat)	DERMAL LD ₅₀ (rabbit)	INHALATION LC ₅₀ (rat)
Ethane	Not Established.	Not Established.	> 800000 ppm (15 min)
Propane	Not Established.	Not Established.	658 mg/L (4 hours)
i-Butane	Not Established.	Not Established.	658 mg/L (4 hours)
n-Butane	Not Established.	Not Established.	658 g/m ³
Carbon Dioxide	Not Established.	Not Established.	30000 to 50000 ppm (30 min)
Benzene	930 mg/kg	> 9400 ug/kg	10000 ppm (7 hours)
Hydrogen Sulfide	Not Established.	Not Established.	444 ppm

NOTES: ACUTE TOXICITY & HEALTH EFFECTS - This product is a simple asphyxiant; higher concentrations may cause dizziness. Refer to Section 2 of this SDS for additional hazards identification.

EYE EFFECTS: Not expected to cause prolonged or significant eye irritation.

SKIN EFFECTS: Not expected to cause prolonged or significant skin irritation.

CHRONIC: TOXICITY & HEALTH EFFECTS - This product is not expected to be toxic. Refer to Section 2 of this SDS for additional hazards identification.

CARCINOGENICITY

Sweet Natural Gas

Chemical Name	NTP Status	IARC Status	OSHA Status
Benzene	1	1	Carcinogen.

Notes: No component of this product at levels greater than 0.1% is identified as a carcinogen by ACGIH, the International Agency for Research on Cancer (ARC), the U.S. National Toxicology Program (NTP) or the U.S. Occupational Safety and Health Act (OSHA).

SENSITIZATION: Not Established.

NEUROTOXICITY: Not Established.

GENETIC EFFECTS: Not Established.

REPRODUCTIVE EFFECTS: Not Established.

TARGET ORGANS: Contact may cause damage to the lungs and central nervous system.

TERATOGENIC EFFECTS: Not Established.

MUTAGENICITY: Not Established.

SYNERGISTIC MATERIALS: Not Established.

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA: MOBILITY IN SOIL POTENTIAL - Not Established.

ECOTOXICOLOGICAL INFORMATION: TERRESTRIAL/MICROORGANISM TOXICITY -

ACUTE: Ecological data does not exist for this mixture.

CHRONIC: Ecological data does not exist for this mixture.

BIOACCUMULATION/ACCUMULATION: Ecological data does not exist for this mixture.

AQUATIC TOXICITY (ACUTE): Ecological data does not exist for this mixture.

Notes: (CHRONIC) - Ecological data does not exist for this mixture.

CHEMICAL FATE INFORMATION: PERSISTENCE & DEGRADABILITY - Not Established.

GENERAL COMMENTS: Any other adverse environmental effects, such as environmental fate (exposure), ozone depletion potential, photochemical ozone creation potential, endocrine disrupting potential, and global warming potential are indicated in this section if data exists. Otherwise, this data has not been established.

COMMENTS: Data from laboratory studies and from scientific literature is noted in this section if available. Otherwise, data has not been established.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: It is recommended that this product, in any form, be incinerated in a suitable combustion chamber for disposal. Empty containers should be disposed of in a similar fashion due to presence of product residue. Follow applicable Federal, state, and local regulations.

PRODUCT DISPOSAL: Persons conducting disposal of this product and its containers/packaging should refer to Section 8 of this SDS for the proper selection of exposure controls and personal protective equipment.

EMPTY CONTAINER: Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death.

GENERAL COMMENTS: PHYSICAL & CHEMICAL PROPERTIES THAT MAY AFFECT DISPOSAL OPTIONS - Not Established.

COMMENTS: Dispose of material in accordance with national, state, regional, and local regulations. Never discharge directly into sewers or surface waters. Consult with environmental regulatory agencies for guidance on acceptable disposal practices for the product, in any form, and its containers/packaging.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: Compressed gas, flammable, n.o.s.

PRIMARY HAZARD CLASS/DIVISION: 2.1

UN/NA NUMBER: 1954

NAERG: 115

LABEL: 2.1: Flammable Gas

MARINE POLLUTANT #1: Not Listed.

Sweet Natural Gas

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES: Fire Hazard. Immediate (Acute) Health Hazard.

FIRE: Yes **PRESSURE GENERATING:** No **REACTIVITY:** No **ACUTE:** Yes **CHRONIC:** Yes

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

Chemical Name	Wt.%	CERCLA RQ
Benzene	may contain	10
Hydrogen Sulfide	may contain	100

TSCA (TOXIC SUBSTANCE CONTROL ACT)

Chemical Name	CAS
Methane	74-82-8
Ethane	74-84-0
Propane	74-98-6
i-Butane	75-28-5
n-Butane	106-97-8
Carbon Dioxide	124-38-9
Nitrogen	7727-37-9

CLEAN AIR ACT

Chemical Name	Vol. %	CAS
Ethane	5 - 10	74-84-0
Propane	1 - 4	74-98-6
i-Butane	0.5 - 3	75-28-5
n-Butane	0.5 - 2	106-97-8

STATES WITH SPECIAL REQUIREMENTS

Chemical Name	Requirements
Ethane	Delaware Air Quality Management Massachusetts Hazardous Substance Minnesota Hazardous Substance New Jersey RTK Hazardous Substance New Jersey TCPA EHS Pennsylvania Hazardous Substance Washington PELs for Air Contaminants
Propane	Delaware Air Quality Management Massachusetts Hazardous Substance Minnesota Hazardous Substance New Jersey RTK Hazardous Substance Pennsylvania Hazardous Substance Washington PELs for Air Contaminants
	CA Hazardous Substance Delaware Air Quality Management Massachusetts Hazardous Substance

Sweet Natural Gas

n-Butane	Minnesota Hazardous Substance New Jersey RTK Hazardous Substance Pennsylvania Hazardous Substance Pennsylvania Hazardous Substance Washington PELs for Air Contaminants
Carbon Dioxide	CA Hazardous Substance Maine Hazardous Air Pollutant Massachusetts Hazardous Substance Minnesota Hazardous Substance Pennsylvania Hazardous Substance Washington PELs for Air Contaminants
Benzene	CA Hazardous Substance Delaware Air Quality Management Illinois Toxic Air Contaminant Maine Hazardous Air Pollutant Massachusetts Hazardous Substance Michigan Critical Material Minnesota Hazardous Substance New Jersey RTK Hazardous Substance New York Hazardous Substance North Carolina Toxic Air Contaminant Pennsylvania Hazardous Substance Washington PELs for Air Contaminants West Virginia Toxic Air Pollutant Wisconsin Hazardous Air Containment
Hydrogen Sulfide	CA Hazardous Substance Delaware Air Quality Management Idaho Air Pollutant Massachusetts Hazardous Substance Maine Hazardous Air Pollutant Minnesota Hazardous Substance New Jersey RTK Hazardous Substance New Jersey TCPA EHS New York Hazardous Substance North Carolina Toxic Air Contaminant Pennsylvania Hazardous Substance Washington PELs for Air Contaminants Wisconsin Hazardous Air Containment

16. OTHER INFORMATION

RELEVANT R-PHRASES:R61: May cause harm to the unborn child.

R26: Very toxic by inhalation.

R48/23: Toxic : danger of serious damage to health by prolonged exposure through inhalation.

R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R12: Extremely flammable.

R45: May cause cancer.

R46: May cause heritable genetic damage.

R11: Highly flammable.

R36/38: Irritating to eyes and skin.

R65: Harmful: may cause lung damage if swallowed.

PREPARED BY: Total Safety d/b/a EHS Services

REVISION SUMMARY: This MSDS replaces the 10/26/2012 MSDS.

Sweet Natural Gas

HMIS RATING	
HEALTH	1
FLAMMABILITY	4
PHYSICAL HAZARD	0
PERSONAL PROTECTION	H



HMIS RATINGS NOTES: Please refer to Section 8 of this SDS for recommended personal protective equipment.

DATA SOURCES:

REFERENCES

- ACGIH. 2012 Guide to Occupational Exposure Values. Cincinnati, OH. Signature Publications, 2012.
- Forsberg, K.; Mansdorf, S.Z. Quick Selection Guide to Chemical Protective Clothing. Fifth Edition. Hoboken, NJ. John Wiley & Sons, 2007.
- Lide, D.R. CRC Handbook of Chemistry and Physics. 88th Edition. Boca Raton, FL. CRC Press, 2008.
- UNECE. Globally Harmonized System of Classification and Labelling of Chemicals (GHS). Third Revised Edition. New York and Geneva. United Nations, 2009.
- US DOT; Pipeline and Hazardous Materials Safety Administration. 2008 Emergency Response Guidebook. Neenah, WI. J.J. Keller & Associates, Inc. 2008.
- US EPA. Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-To-Know Act (EPCRA) and Section 112(r) of the Clean Air Act. [Available] Online: <http://www.epa.gov/ceppo/pubs/title3.pdf>. Retrieved 02/02/2011.

ADDITIONAL MSDS INFORMATION:

KEY / LEGEND

- ACGIH - American Conference of Governmental Industrial Hygienists
- ADR - Agreement on Dangerous Goods by Road
- CAA - Clean Air Act
- CAS - Chemical Abstracts Service Registry Number
- CDG - Carriage of Dangerous Goods By Road and Rail Manual
- CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
- CFR - Code of Federal Regulations
- EINECS - European Inventory of Existing Chemical Substances Registry Number
- ERG - Emergency Response Guidebook
- EPCRA - Emergency Planning and Community Right-to-Know Act
- GHS - Globally Harmonized System of Classification and Labelling of Chemicals
- IARC - International Agency for Research on Cancer
- IATA - International Air Transport Association
- ICAO - International Civil Aviation Organization
- IMDG - international Maritime Dangerous Goods Code
- IMO - International Maritime Organization
- N/E - Not Established
- NTP - National Toxicology Program
- OSHA - Occupational Safety and Health Administration
- PEL - Permissible Exposure Limit
- PPE - Personal Protective Equipment
- RCRA - Resource Conservation and Recovery Act
- RID - Regulations Concerning the International Transport of Dangerous Goods by Rail
- RQ - Reportable Quantities
- SARA - Superfund Amendments and Reauthorization Act of 1986
- SDS - Safety Data Sheet
- TCC - Tag Closed Cup
- TDG - Transportation of Dangerous Goods
- TLV - Threshold Limit Value
- TSCA - Toxic Substance Control Act
- UN/NA - United Nations / North American Number
- UNECE - United Nations Economic Commission for Europe

Sweet Natural Gas

US DOT - United States Department of Transportation
US EPA - United States Environmental Protection Agency
Vol. - Volume
WHMIS - Workplace Hazardous Materials Information System

GENERAL STATEMENTS: Other information not included anywhere else in this SDS is included in this section if, in fact, such data exists.

MANUFACTURER DISCLAIMER: This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability or completeness. NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION HEREIN PROVIDED. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

SAFETY DATA SHEET

Cabot Oil & Gas Corporation

Date Issued : 9-6-2013

SDS No : 0002WV

Date Revised : 9-6-2013

Revision No : 01

Sweet Produced Water (West Virginia)

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Sweet Produced Water (West Virginia)

GENERAL USE: Water extracted from natural gas well production.

DISTRIBUTOR

Cabot Oil & Gas Corporation

P.O. Box 4544

Houston, TX 77210-4544

24 HR. EMERGENCY TELEPHONE NUMBERS

1-800-642-0300

2. HAZARDS IDENTIFICATION

This material is not considered hazardous according to OSHA criteria.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Vol. %	CAS
Water	>90	7732-18-5
Sodium Chloride	<10	7647-14-5

COMMENTS: Compositions given are typical values, not specifications. Composition may vary with geographic location, geologic formation, temperature and pressure.

4. FIRST AID MEASURES

EYES: Immediately flush with large amounts of water, holding eyelids open, for at least 20 minutes. Repeat if necessary. Remove contact lenses, if present and easy to do. If pain or redness persists, seek medical attention. If eye is exposed to hot liquid, cover eyes with cloth and seek medical attention immediately.

SKIN: In case of hot liquid exposure, do not remove clothing or treat, wash only unburned area and seek medical attention immediately.

INGESTION: Do not induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into the lungs. Have exposed individual rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person. Obtain medical assistance immediately and treat as directed by a medical professional.

INHALATION: Move victim to fresh air. Call 911, emergency medical service,

NOTES: Contact poison treatment center immediately if large quantities have been ingested or inhaled.

5. FIRE FIGHTING MEASURES

FLASH POINT: N/A

FLAMMABLE LIMITS: 0

FIRE FIGHTING PROCEDURES: PROTECTIVE ACTIONS TO TAKE DURING FIRE FIGHTING - Move containers from fire area if you can do it without risk. Dike fire-control water for later disposal; do not scatter the material. Do not get water inside containers.

FIRE FIGHTING EQUIPMENT: PRECAUTIONS FOR FIRE INVOLVING TANKS OR CAR/TRAILER LOADS - Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

Sweet Produced Water

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL: For emergency information and procedures to follow in the case of an accidental release, call the Emergency Telephone Number(s) listed in Section 1 of this SDS. As an immediate precautionary measure, isolate spill or leak area 50 meters (160 feet) in all directions. Keep unauthorized personnel away. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, dikes far ahead of liquid for later disposal. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.

LARGE SPILL: Use similar response procedures as indicated under Small Spill. Large releases may require the notification of local emergency response agencies.

7. HANDLING AND STORAGE

GENERAL PROCEDURES: Handle in accordance with good industrial hygiene and safety practices. These practices include but are not limited to avoiding unnecessary exposure and prompt removal of material from eyes, skin and clothing. Wash exposed skin and clothing frequently. If needed, take first aid actions as indicated in Section 4 of this SDS.

HANDLING: Wear appropriate personal protective equipment and use exposure controls as indicated in Section 8. Avoid all contact with skin and eyes. Avoid breathing product dust or vapors. Wash with soap and water after working with this product.

STORAGE: Keep in airtight container away from all heat sources. Store in a segregated and approved area. Store in a cool, dry location, away from direct sunlight, sources of intense heat, or where freezing is possible. Keep container in a well-ventilated area. Ground all containers during transfer. Store in the original container or an approved alternative made from compatible material. Do not store in unlabeled containers. Treat empty containers in a similar fashion as residual product may exist. Use appropriate containment to avoid environmental contamination.

STORAGE TEMPERATURE: Store containers of product in cool well ventilated location.

STORAGE PRESSURE: Store in a room with ambient pressure.

ELECTROSTATIC ACCUMULATION HAZARD: Not Established.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES

OSHA HAZARDOUS COMPONENTS (29 CFR1910.1200)			
		EXPOSURE LIMITS	
		OSHA PEL	ACGIH TLV
Chemical Name		ppm	ppm
Sodium Chloride	TWA	N/E	N/E
	STEL	N/E	N/E

ENGINEERING CONTROLS: Provide adequate general and local ventilation to maintain airborne chemical concentrations below applicable exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Employees should be provided with and required to use splash-proof safety goggles and full face splash shields where there is any possibility of product coming in contact with eyes. Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of contact lenses. Ensure that eye wash station is operable and nearby.

SKIN: Consider wearing long-sleeve, FRC, otherwise normal working clothes should be worn. Wash contaminated clothing prior to reuse. If gloves are required for job operations involving this product, wear nitrile rubber or butyl rubber gloves.

RESPIRATORY: Respiratory protection is normally not required except in emergencies or when conditions cause excessive airborne levels of mists or vapors. Select NIOSH-approved organic vapor air-purifying respirator, SCBA or air-supplied respirator where there may be potential for overexposure.

PROTECTIVE CLOTHING: Long sleeve shirt and long pants or coveralls. Consider wearing butyl rubber apron or outerwear where splashing may occur. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire.

WORK HYGIENIC PRACTICES: Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove contaminated clothing and launder before reuse. Shower after work using plenty of soap and water.

COMMENTS: EXPOSURE LIMITS & SOURCES - Refer to Section 16 Table 1 for additional exposure limits and sources for this product or its components, whichever applies.

Sweet Produced Water

9. PHYSICAL AND CHEMICAL PROPERTIES

ODOR: Salty.

APPEARANCE: Clear or opaque liquid.

pH: 7.26 to 7.75

PERCENT VOLATILE: Negligible.

VAPOR PRESSURE: Not Established.

VAPOR DENSITY: >1.0 (Air = 1)

BOILING POINT: 212° F/100° C

FREEZING POINT: < 0°C (<32°F)

POUR POINT: Not Established.

FLASH POINT: Not Applicable

LOWER EXPLOSIVE LIMITS: Not Applicable

SOLUBILITY IN WATER: Not Established.

EVAPORATION RATE: Not Established.

SPECIFIC GRAVITY: > 1.000 at 0°C (32°F)

VISCOSITY: Not Established.

COEFF. OIL/WATER: Not Established.

ODOR THRESHOLD: Not Established.

10. STABILITY AND REACTIVITY

STABLE: Yes

HAZARDOUS POLYMERIZATION: No

STABILITY: CHEMICAL STABILITY - This product is anticipated to be stable under normal ambient storage and handling conditions of temperature and pressure.

POLYMERIZATION: This product is not anticipated to cause hazardous reactions or polymerizations under normal ambient storage and handling conditions of temperature and pressure.

CONDITIONS TO AVOID: Avoid contact with incompatible materials such as heat.

11. TOXICOLOGICAL INFORMATION

ACUTE

Chemical Name	ORAL LD ₅₀ (rat)	DERMAL LD ₅₀ (rabbit)	INHALATION LC ₅₀ (rat)
Sodium Chloride	3000 mg/kg	N/E	N/E

EYE EFFECTS: May cause moderate to severe eye irritation.

SKIN EFFECTS: May cause mild skin irritation. Prolonged or repeated contact may result in mild irritation.

CHRONIC: Not Established.

CARCINOGENICITY: Not expected to cause cancer. This substance is not listed as a carcinogen by IARC, NTP, or OSHA.

SENSITIZATION: This product is not expected to be a skin sensitizer.

NEUROTOXICITY: Not Established.

GENETIC EFFECTS: Not Established.

REPRODUCTIVE EFFECTS: Not Established.

TERATOGENIC EFFECTS: Not Established.

MUTAGENICITY: Not Established.

Sweet Produced Water

12. ECOLOGICAL INFORMATION

ENVIRONMENTAL DATA: MOBILITY IN SOIL POTENTIAL - Not Established.

BIOACCUMULATION/ACCUMULATION: Not Established.

DISTRIBUTION: Do not discharge into or allow runoff to flow into sewers and natural waterways. Contain spill material and dike for proper disposal.

AQUATIC TOXICITY (ACUTE): This product is not expected to be harmful to aquatic life.

96-HOUR LC₅₀: 3930 - 5360 mg/L *Pimephales promelas* for calcium chloride.

48-HOUR EC₅₀: 52 mg/L for *Daphnia magna* for calcium chloride.

CHEMICAL FATE INFORMATION: PERSISTENCE & DEGRADABILITY - Not Established.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: This product is not a listed hazardous waste.

EMPTY CONTAINER: Offer rinsed packaging material to local recycling facilities.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

Not Regulated

15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES: Fire hazard. Immediate (acute) health hazard. Delayed (chronic) health hazard.

FIRE: No PRESSURE GENERATING: No REACTIVITY: No ACUTE: No CHRONIC: No

EPCRA SECTION 313 SUPPLIER NOTIFICATION

This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

CERCLA (COMPREHENSIVE RESPONSE, COMPENSATION, AND LIABILITY ACT)

This material does not contain any chemicals with CERCLA Reportable Quantities.

TSCA (TOXIC SUBSTANCE CONTROL ACT)

All components are either listed on the TSCA Inventory, or are not regulated under TSCA.

CALIFORNIA PROPOSITION 65

This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects, or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

Sweet Produced Water

16. OTHER INFORMATION

RELEVANT R-PHRASES:

R36/37/38: Irritating to eyes, respiratory system and skin.

R36/38: Irritating to eyes and skin.

R65: Harmful: may cause lung damage if swallowed.

PREPARED BY: SLR International Corporation

REVISION SUMMARY:

NATIONAL FIRE PROTECTION ASSOCIATION®HAZARD RATING

HEALTH: 0-Hazard No greater than Ordinary Material

FIRE: 0-Will Not Burn

REACTIVITY: 0- Stable

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM®HAZARD RATING

HEALTH: 0- Minimal Hazard

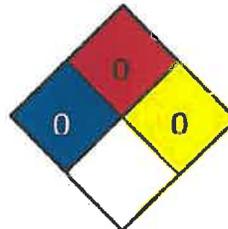
FIRE: 0- Minimal Hazard

PHYSICAL: 0- Minimal Hazard

HMIS RATING

HEALTH	0
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	B

NFPA CODE



Sweet Produced Water

ADDITIONAL MSDS INFORMATION:

KEY / LEGEND

ACGIH - American Conference of Governmental Industrial Hygienists
ADR - Agreement on Dangerous Goods by Road
CAA - Clean Air Act
CAS - Chemical Abstracts Service Registry Number
CDG - Carriage of Dangerous Goods by Road and Rail Manual
CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
CFR - Code of Federal Regulations
EINECS - European Inventory of Existing Chemical Substances Registry Number
NAERG - Emergency Response Guidebook
EPCRA - Emergency Planning and Community Right-to-Know Act
GHS - Globally Harmonized System of Classification and Labeling of Chemicals
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
ICAO - International Civil Aviation Organization
IMDG - International Maritime Dangerous Goods Code
IMO - International Maritime Organization
MSDS - Material Safety Data Sheet
N/E - Not Established
NOV - National Oil well Varco
NTP - National Toxicology Program
OSHA - Occupational Safety and Health Administration
PEL - Permissible Exposure Limit
PPE - Personal Protective Equipment
RCRA - Resource Conservation and Recovery Act
RID - Regulations Concerning the International Transport of Dangerous Goods by Rail
RQ - Reportable Quantities
SARA - Superfund Amendments and Reauthorization Act of 1986
SDS - Safety Data Sheet
TCC - Tag Closed Cup
TDG - Transportation of Dangerous Goods
TLV - Threshold Limit Value
TSCA - Toxic Substance Control Act
UN/NA - United Nations / North American Number
UNECE - United Nations Economic Commission for Europe
US DOT - United States Department of Transportation
US EPA - United States Environmental Protection Agency
Vol. - Volume
WHMIS - Workplace Hazardous Materials Information System

GENERAL STATEMENTS: Other information not included anywhere else in this SDS is included in this section if, in fact, such data exists.

MANUFACTURER DISCLAIMER: This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability or completeness. **NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, IS MADE CONCERNING THE INFORMATION HEREIN PROVIDED.** It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

ATTACHMENT E

SUPPORTING CALCULATIONS

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301

**Table 1. Annual Potential To Emit (PTE) Summary
Cranberry Pipeline Corporation - Independence Compressor Station**

Criteria Pollutants

Proposed PTE - Criteria Pollutants		PM	PM10	PM2.5	SO2	NOx	CO	VOC	CO2e
Engines (ton/yr)		1.294	1.294	1.294	0.494	37.558	20.486	15.365	3941.561
Tanks (ton/yr)		-	-	-	-	-	-	2.425	-
Fugitives (ton/yr)		-	-	-	-	-	-	0.393	9.140
Truck Loading (ton/yr)		-	-	-	-	-	-	0.421	-
Total Emissions (ton/yr)		1.294	1.294	1.294	0.494	37.558	20.486	18.603	3950.701
Total Emissions (lb/hr)		0.295	0.295	0.295	0.113	8.575	4.677	4.247	901.987

Hazardous Air Pollutants (HAPs)

Proposed PTE - HAPs		Acetaldehyde	Benzene	Toluene	Ethylbenzene	Xylene	n-Hexane	Formaldehyde	Total HAPs
Engines (ton/yr)		0.2614	0.0654	0.0324	0.0036	0.0090	0.0150	1.859	2.679
Tanks (ton/yr)		-	-	-	-	-	-	-	-
Fugitives (ton/yr)		-	0.0001	0.0002	0.0001	0.0002	-	-	0.001
Truck Loading (ton/yr)		-	-	-	-	-	-	-	-
Total Emissions (ton/yr)		0.261	0.065	0.033	0.004	0.009	0.015	1.859	2.679
Total Emissions (lb/hr)		0.060	0.015	0.007	0.001	0.002	0.003	0.425	0.612

Table 3. Reciprocating Engine / Integral Compressor Emissions
Ajax DPC-230, 2SLB
Cranberry Pipeline Corporation - Independence Compressor Station

Pollutant	Maximum Hourly Emissions		Annual Emissions	
	Emission Factor	PTE per Engine (lb/hr)	Emission Factor	PTE per Engine (tons/yr)
Criteria Pollutants				
PM/PM10/PM2.5	3.84E-02 lb/MMBtu (1)	0.07 (a)	3.84E-02 lb/MMBtu (1)	0.323 (c)
SO ₂	0.25 grains S / 100 ft ³ (2)	0.11 (a)	0.25 grains S / 100 ft ³ (3)	0.12 (d)
NO _x	4.40E+00 g/hp-hr (3)	2.14 (b)	4.40E+00 g/hp-hr (3)	9.39 (d)
CO	2.40E+00 g/hp-hr (3)	1.17 (b)	2.40E+00 g/hp-hr (3)	5.12 (d)
VOC	1.80E+00 g/hp-hr (3)	0.88 (b)	1.80E+00 g/hp-hr (3)	3.84 (d)
Hazardous Air Pollutants				
1,1,2,2-Tetrachloroethane	6.63E-05 lb/MMBtu (1)	0.000 (a)	6.63E-05 lb/MMBtu (1)	0.001 (c)
1,1,2-Trichloroethane	5.27E-05 lb/MMBtu (1)	0.000 (a)	5.27E-05 lb/MMBtu (1)	0.000 (c)
1,3-Butadiene	8.20E-04 lb/MMBtu (1)	0.002 (a)	8.20E-04 lb/MMBtu (1)	0.007 (c)
1,3-Dichloropropene	4.38E-05 lb/MMBtu (1)	0.000 (a)	4.38E-05 lb/MMBtu (1)	0.000 (c)
2-Methylnaphthalene	2.14E-05 lb/MMBtu (1)	0.000 (a)	2.14E-05 lb/MMBtu (1)	0.000 (c)
2,2,4-Trimethylpentane	8.46E-04 lb/MMBtu (1)	0.002 (a)	8.46E-04 lb/MMBtu (1)	0.007 (c)
Acetaldehyde	7.78E-03 lb/MMBtu (1)	0.015 (a)	7.78E-03 lb/MMBtu (1)	0.065 (c)
Acrolein	7.78E-03 lb/MMBtu (1)	0.015 (a)	7.78E-03 lb/MMBtu (1)	0.068 (c)
Benzene	1.94E-03 lb/MMBtu (1)	0.004 (a)	1.94E-03 lb/MMBtu (1)	0.016 (c)
Biphenyl	3.95E-06 lb/MMBtu (1)	0.000 (a)	3.95E-06 lb/MMBtu (1)	0.000 (c)
Carbon Tetrachloride	6.07E-05 lb/MMBtu (1)	0.000 (a)	6.07E-05 lb/MMBtu (1)	0.001 (c)
Chlorobenzene	4.44E-05 lb/MMBtu (1)	0.000 (a)	4.44E-05 lb/MMBtu (1)	0.000 (c)
Chloroform	4.71E-05 lb/MMBtu (1)	0.000 (a)	4.71E-05 lb/MMBtu (1)	0.000 (c)
Ethylbenzene	1.08E-04 lb/MMBtu (1)	0.000 (a)	1.08E-04 lb/MMBtu (1)	0.001 (c)
Ethylene Dibromide	7.34E-05 lb/MMBtu (1)	0.000 (a)	7.34E-05 lb/MMBtu (1)	0.001 (c)
Formaldehyde	5.52E-02 lb/MMBtu (1)	0.108 (a)	5.52E-02 lb/MMBtu (1)	0.485 (c)
Methanol	2.48E-03 lb/MMBtu (1)	0.005 (a)	2.48E-03 lb/MMBtu (1)	0.021 (c)
Methylene Chloride	1.47E-04 lb/MMBtu (1)	0.000 (a)	1.47E-04 lb/MMBtu (1)	0.001 (c)
n-Hexane	4.45E-04 lb/MMBtu (1)	0.001 (a)	4.45E-04 lb/MMBtu (1)	0.004 (c)
Naphthalene	9.63E-05 lb/MMBtu (1)	0.000 (a)	9.63E-05 lb/MMBtu (1)	0.001 (c)
PAH (POM)	1.34E-04 lb/MMBtu (1)	0.000 (a)	1.34E-04 lb/MMBtu (1)	0.001 (c)
Phenol	4.21E-05 lb/MMBtu (1)	0.000 (a)	4.21E-05 lb/MMBtu (1)	0.000 (c)
Styrene	5.48E-05 lb/MMBtu (1)	0.000 (a)	5.48E-05 lb/MMBtu (1)	0.000 (c)
Toluene	9.63E-04 lb/MMBtu (1)	0.002 (a)	9.63E-04 lb/MMBtu (1)	0.008 (c)
Vinyl Chloride	2.47E-05 lb/MMBtu (1)	0.000 (a)	2.47E-05 lb/MMBtu (1)	0.000 (c)
Xylenes	2.88E-04 lb/MMBtu (1)	0.001 (a)	2.88E-04 lb/MMBtu (1)	0.002 (c)
Total HAP		0.163		0.670
Greenhouse Gas Emissions				
CO ₂	118.89 lb/MMBtu (4)	224.74 (a)	118.89 lb/MMBtu (4)	984.37 (c)
CH ₄	2.2E-03 lb/MMBtu (4)	0.00 (a)	2.2E-03 lb/MMBtu (4)	0.02 (c)
N ₂ O	2.2E-04 lb/MMBtu (4)	0.00 (a)	2.2E-04 lb/MMBtu (4)	0.00 (c)
CO ₂ e ⁽⁶⁾	-	224.97	-	985.39

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) * (1 MMBtu/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) * (1/453.6g)
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) * (1 MMBtu/1000000 Btu) * 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) * (1/453.6) * Annual Hours of operation (hr/yr) * (1ton/2000lbs)
SO₂ Emissions - If emission factor note 2 is used, use calculations (e) and (f) for hourly and annual emissions, respectively.
 (e) Maximum Hourly Emissions SO₂ Calculation (lb/hr) = (0.25 grain S/100ft³) * Fuel throughput (ft³/hr) * (1lb/7000 grains) * (lbmol S/32.06 lb S) * (lbmol SO₂/lbmol S) * (64.07 lb SO₂/lbmol SO₂)
 (f) Annual Emissions SO₂ Calculation (tons/yr) = (0.25 grain S/100ft³) * Fuel throughput (ft³/hr) * (1lb/7000 grains) * (lbmol S/32.06 lb S) * (lbmol SO₂/lbmol S) * (64.07 lb SO₂/lbmol SO₂) * Annual hours of operation (hr/yr) * (1ton/2000lbs)

MAXIMUM HOURLY EMISSION INPUTS	
Engine Power Output (kW) =	165
Engine Power Output (hp) =	221
Number of Engines =	4
Average BSFC (BTU/HP-hr) =	8,700 (5)
Heat Content Natural Gas(Btu/scf) =	1,020.0 (6)
Fuel Throughput (ft ³ /hr) =	1,885.0 (7)
PTE Hours of Operation =	1

ANNUAL EMISSION INPUTS	
Engine Power Output (kW) =	165
Engine Power Output (hp) =	221
Number of Engines =	4
Average BSFC (BTU/HP-hr) =	8,700 (5)
Heat Content Natural Gas(Btu/scf) =	1,020.0 (6)
Fuel Throughput (ft ³ /hr) =	1,885.0 (7)
PTE Hours of Operation =	8,760

(g) CO₂ equivalent = [(CO₂ emissions)*(GWP_{CO2})] + [(CH₄ emissions)*(GWP_{CH4})] + [(N₂O emissions)*(GWP_{N2O})]
 Global Warming Potential (GWP)

CO ₂	1	(8)
CH ₄	25	(8)
N ₂ O	298	(8)

Notes:

- AP-42, Chapter 3.2, Table 3.2-1, *Natural Gas-fired Reciprocating Engines* (700), Uncontrolled Emission Factors for 2-Stroke Lean-Burn Engines.
- AP-42, Chapter 5.3, Section 5.3.1
- Emission factors supplied from manufacturer's specification sheet
- Emission factors are from 40 CFR 98, Subpart C, Table C-1 and C-2.
- Fuel consumption from manufacturer's specification sheet.
- Value obtained from AP-42, Chapter 3.2, Table 3.2-1, footnote b
- Fuel throughput = BSFC (BTU/HP-hr) x Power (HP) / Heat Content (BTU/scf)
- Global Warming Potentials obtained from 40 CFR 98, Subpart A, Table A-1

**Table 3. Tank Emissions
Cranberry Pipeline Corporation - Independence Compressor Station**

Emission Point	Tank Capacity (gal)	Tank Contents	Control Devices	Tank Throughput (bbls/day)	VOC Emission Factor (lb/bbls)	VOC Emissions (lbs/yr) ^(a)	VOC Emissions (lb/hr) ^(b)	VOC Emissions (tons/yr) ^(c)
0001	1000	Lube Oil	None	0.13	1.03E-02 (1)	0.49	0.000	0.000
0002	500	Pipeline Liquids	None	5.00	5.47E-01 (2)	998.28	0.114	0.499
0003	4200	Pipeline Liquids	None	5.00	1.07E+00 (2)	1951.95	0.223	0.976
0004	2100	Pipeline Liquids	None	5.00	1.04E+00 (2)	1898.91	0.217	0.949
Totals						4849.62	0.55	2.42

Calculations:

(a) VOC Emissions (lb/day) = Tank Throughput (bbls/day) * VOC Emission Factor (lb/bbls)

(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 Working/Breathing losses as calculated from TANKS 4.0.9.d

(2) VOC emission factor includes Flashing/Working/Breathing losses calculated from pressurized liquid sample (GOR= 0.35 lb VOC/bbl) direct flash measurement added to working and breathing losses calculated using EPA Tanks 4.09. The pressurized liquid sample was taken from the Putnam B6 site on 4/25/2013 and is considered to be worst case representative with respect to gas composition and pressure at the Station

**Table 4. Fugitive Leak Emissions
Cranberry Pipeline Corporation - Independence Compressor Station**

Pollutant	Emission Factor	PTE ^(a) Gas Service (tons/yr)
Valves	9.9E-03 lb/hr/source (1)	3.08
Low Bleed Pneumatic Valves	9.9E-03 lb/hr/source (1)	1.56
Flanges	8.6E-04 lb/hr/source (1)	1.13
Connector	4.4E-04 lb/hr/source (1)	0.58
Other Points in Gas Service	1.9E-02 lb/hr/source (1)	1.50
Total Gas Released	-	7.86
Total VOC Released (gas service)		(b) 0.39
Total Benzene Released (gas service)		(2) 0.00
Total Toluene Released (gas service)		(2) 0.00
Total Ethylbenzene Released (gas service)		(2) 0.00
Total Xylene Released (gas service)		(2) 0.00
Calculations:		CO2e 9.14

(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 similar station's gas analysis assumed to be worst case at 5 wt % VOC

Number of Components in Gas Service

Valves=	71	(3)
Low Bleed Pneumatic Valves=	36	(3)
Connectors=	301	(3)
Other Points in Gas Service =	8	(3)

Maximum Hour of Operation = 8,760

Global Warming Potential (GWP)

CO ₂	1	(4)
CH ₄	25	(4)
N ₂ O	298	(4)

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

(2) Wt % for individual HAP taken from similar station gas analysis

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

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

**Table 5. Truck Loading (TL) VOC Emissions
Cranberry Pipeline Corporation - Independence Compressor Station**

Contents	Volume Transferred ³	Loading Loss ^(a) (lb VOC/1000gal)	PTE VOC Emissions (lb/hr)	PTE VOC Emissions (ton/yr) ^(b)
Pipeline Liquids	229,950 gal/yr	3.659	0.096	0.421
Total			0.096	0.421

Calculations:

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

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

	<u>Pipeline liquids</u>	
Saturation factor	0.60	Note ⁽¹⁾
Pvap (psia)	7.70	Note ⁽²⁾
Molecular Weight Vap (lb/lbmol)	33.37	Note ⁽²⁾
Bulk Liquid Temperature (F)	65.00	Note ⁽²⁾

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) Putnam B6 Compressor Station Pressurized Separator Sampling and Emission Estimation Report, August 2013

(3) Annual rates based on maximum throughput of 1 bbls/d

ATTACHMENT F

SUPPORTING DOCUMENTS

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301

E&P Tank Simulation and Supporting Analysis

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301



global environmental solutions

Putnam B6 Compressor Station

Cranberry Pipeline Corporation

Glasgow District, West Virginia

Pressurized Separator Sampling and Emissions Estimation
Report

SLR Ref: 116.00400.00064

August 2013



Pressurized Separator Sampling and Emissions Estimation Report

Prepared for:

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East
Suite 1500
Charleston, West Virginia 25301

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

Nathaniel Lanham
Senior Environmental Specialist

Fuad Wadud, P.E.
Senior Engineer

CONTENTS

1. INTRODUCTION.....	1
1.1 Applicability and Designation of Affected Source.....	1
1.2 Sample Collection & Analysis Frequency.....	1
2. PARAMETERS.....	3
3. CALCULATION OF EMISSIONS.....	4
4. COMPARISON TO EMISSION LIMIT AND THRESHOLD.....	5

TABLES

Table 3.1	Actual Emissions for Drip Tank T-01
Table 4.1	VOC Comparison

Appendix A	GPA Method 2286 Laboratory Results
Appendix B	Operational data and Supporting documents
Appendix C	E&P TANK Version 3.0 Emission Estimate

1. INTRODUCTION

On April 25, 2013 SLR International Corporation (SLR) oversaw Fesco Petroleum Engineers (Fesco) perform pressurized tank sampling per GPA-2186 methodology at Putnam B6 to collect samples which could be analyzed to estimate emissions for Volatile Organic Compounds (VOCs) and Hazardous Air Pollutants (HAPs) being emitted from liquid hydrocarbon storage vessels. The analysis of information gathered was performed by Fesco per GPA Method 2286-95. Liquid hydrocarbon samples are taken from the last pressurized vessel prior to atmospheric storage vessels to determine the concentrations of dissolved volatile gases which will flash off the liquid and be emitted from the hydrocarbon storage vessel. The storage vessel's emissions are estimated using the American Petroleum Institute model E&P TANK 3.0, which incorporates specific input parameters for storage vessels and pressurized liquid analysis results. This report provides a summary that demonstrates compliance or applicability with 40 CFR 60 Subpart OOOO.

1.1 APPLICABILITY AND DESIGNATION OF AFFECTED SOURCE

A pressurized liquid sample was taken from the Pre-Dehy Separator (SP-1) to model flash emissions from Drip Tank (T-01) at Putnam B6 Compressor Station for determination of emissions under 40 CFR 60 Subpart OOOO.

40 CFR 60 Subpart OOOO

New, re-constructed, and/or modified hydrocarbon storage vessels installed after August 23, 2011 at oil and natural gas production, natural gas processing, or natural gas transmission and storage facilities, with actual emissions of 6 tons per year (tpy) or greater of VOC emissions, are subject to the Subpart OOOO, *Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution*.

Drip Tank T-01 was installed before the applicability date of this regulation. However, this tank was pre-selected to evaluate the VOC emissions and compare the emissions with the applicability threshold. The standard of storage vessel applicable to this subpart is provided below.

40CFR§6.5395(a)(1) and (2)

For each storage vessel affected facility emitting more than 6 tpy VOC, you must reduce emissions by 95 percent or greater.

1.2 SAMPLE COLLECTION & ANALYSIS FREQUENCY

The pressurized hydrocarbon liquid sample was taken from Pre-Dehy Separator (SP-1) on April 25, 2013 by Fesco. Nathaniel Lanham from SLR oversaw the sample collection. The sample lab analysis report provided by Fesco is included in Appendix A.

The West Virginia Department of Environment Protection (WVDEP) – Division of Air Quality (DAQ) defines a representative pressurized separator sample to be one that is characteristic of the average liquid composition found in the annual throughput. If an isolated sample is not indicative of the annual average composition, then a company may opt to produce a weighted average based on throughput between multiple sampling events, which can be used to define a more representative average annual liquid composition profile.

For Drip Tank (T-01) at Putnam B6 Compressor Station, a one-time sample collection and modeling determination is sufficient for the tank emission modeling because the hydrocarbon production stream parameters do not vary greatly on a short-term basis. Re-analysis would be recommended should there be a major event which may change the characterization of the production stream.

2. PARAMETERS

The following input parameters were obtained from the Fesco laboratory report and used in the E&P TANK model run:

1. Days of operation per year; 365
2. Separator temperature; 60.00 °F
3. Separator pressure; 28.00 PSIG
4. Ambient temperature; 70.00 °F
5. Ambient pressure; 14.65 PSIG
6. API Gravity of Sample; 33.29
7. Bulk Tank Temperature; 60.00 °F
8. No control device

The following input parameters were provided by Cabot Oil & Gas Corporation:

- Worst Case Production Rate of Tank Volume/Throughput; 5.0 Barrels per day

Supporting documentation provided by Cabot Oil & Gas Corporation is included in Appendix B.

The following default assumptions were made:

- Reid Vapor Pressure is 7.70 psia

3. CALCULATION OF EMISSIONS

Emissions from the Putnam B6 Compressor Station were derived using a software based program called E&P TANK 3.0. The parameters outlined in Section 2 along with laboratory results from the separator sample taken on April 25, 2013 are entered into the program and the software calculates the estimated flash gas emission rates. The E&P TANK output file for the Drip Tank (T0-1) is included in Appendix C.

Listed below, in Table 3.1, are actual emissions as calculated by E&P TANK 3.0.

Table 3.1. Actual Emissions for Drip Tank T0-1

POLLUTANT	EMISSION RATE (LB/HR)	EMISSION RATE (TPY)
VOC	0.194	0.852
Benzene	0.000	0.000
Hexane	0.001	0.004
Toluene	0.000	0.000
Xylenes	0.000	0.000
Ethylbenzene	0.000	0.000
Total HAPs	0.000	0.000

4. COMPARISON TO EMISSION LIMIT AND THRESHOLD

The attached E&P TANK 3.0 Report was calculated using recorded and client-supplied operating parameters. Tank T-01 does not emit VOCs equal to or in excess of 6TPY; therefore, 40CFR 60 Subpart OOOO does not apply to this hydrocarbon liquid vessel. The following table, Table 4.1, shows the comparison of generated VOCs to the VOC threshold as defined in 40 CFR 60.5415. The generated rate falls within the designated threshold.

Table 4.1. VOC Emissions Comparison

POLLUTANT	EMISSION RATE (TPY)	EMISSION THRESHOLD (TPY)
VOC	0.852	6.0

APPENDIX A

GPA METHOD 2286 LABORATORY RESULTS

Pressurized Separator Sampling and Emissions Estimation Report

**Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East
Suite 1500
Charleston, West Virginia 25301**

August 2013

May 22, 2013

FESCO, Ltd.
1100 FESCO Avenue - Alice, Texas 78332

For: SLR International Corporation
900 Lee Street, Suite 200
Charleston, West Virginia 25301

Sample: Cabot Oil & Gas - Puttman B6
Separator Hydrocarbon Liquid
Sampled @ 28 psig & 60 °F

Date Sampled: 04/25/13

Job Number: 33213.002

CHROMATOGRAPH EXTENDED ANALYSIS - GPA 2186-M

COMPONENT	MOL %	LIQ VOL %	WT %
Nitrogen	0.019	0.002	0.002
Carbon Dioxide	0.044	0.007	0.007
Methane	1.228	0.194	0.068
Ethane	1.343	0.335	0.139
Propane	1.724	0.443	0.262
Isobutane	0.292	0.089	0.058
n-Butane	1.395	0.410	0.279
2,2 Dimethylpropane	0.048	0.017	0.012
Isopentane	0.610	0.208	0.151
n-Pentane	0.932	0.315	0.231
2,2 Dimethylbutane	0.012	0.005	0.003
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.120	0.046	0.036
2 Methylpentane	0.457	0.177	0.136
3 Methylpentane	0.283	0.108	0.084
n-Hexane	0.940	0.360	0.279
Heptanes Plus	<u>90.554</u>	<u>97.285</u>	<u>98.254</u>
Totals:	100.000	100.000	100.000

Characteristics of Heptanes Plus:

Specific Gravity ----- 0.8672 (Water=1)
°API Gravity ----- 31.66 @ 60°F
Molecular Weight ----- 315.3
Vapor Volume ----- 8.73 CF/Gal
Weight ----- 7.23 Lbs/Gal

Characteristics of Total Sample:

Specific Gravity ----- 0.8587 (Water=1)
°API Gravity ----- 33.29 @ 60°F
Molecular Weight ----- 290.6
Vapor Volume ----- 9.38 CF/Gal
Weight ----- 7.15 Lbs/Gal

Base Conditions: 14.650 PSI & 60 °F

Certified: FESCO, Ltd. - Alice, Texas

Analyst: JCM
Processor: Aldjv
Cylinder ID: W-1109

David Dannhaus 361-661-7015

TOTAL EXTENDED REPORT

COMPONENT	Mol %	LiqVol %	Wt %
Nitrogen	0.019	0.002	0.002
Carbon Dioxide	0.044	0.007	0.007
Methane	1.228	0.194	0.068
Ethane	1.343	0.335	0.139
Propane	1.724	0.443	0.262
Isobutane	0.292	0.089	0.058
n-Butane	1.395	0.410	0.279
2,2 Dimethylpropane	0.048	0.017	0.012
Isopentane	0.610	0.208	0.151
n-Pentane	0.932	0.315	0.231
2,2 Dimethylbutane	0.012	0.005	0.003
Cyclopentane	0.000	0.000	0.000
2,3 Dimethylbutane	0.120	0.046	0.036
2 Methylpentane	0.457	0.177	0.136
3 Methylpentane	0.283	0.108	0.084
n-Hexane	0.940	0.360	0.279
Methylcyclopentane	0.528	0.174	0.153
Benzene	0.054	0.014	0.015
Cyclohexane	0.519	0.165	0.150
2-Methylhexane	0.418	0.181	0.144
3-Methylhexane	0.379	0.162	0.131
2,2,4 Trimethylpentane	0.000	0.000	0.000
Other C-7's	0.550	0.226	0.188
n-Heptane	1.093	0.470	0.377
Methylcyclohexane	1.528	0.573	0.516
Toluene	0.251	0.079	0.080
Other C-8's	2.887	1.279	1.095
n-Octane	1.425	0.681	0.560
E-Benzene	0.220	0.079	0.080
M & P Xylenes	0.586	0.212	0.214
O-Xylene	0.471	0.167	0.172
Other C-9's	2.953	1.461	1.283
n-Nonane	1.635	0.858	0.722
Other C-10's	4.741	2.578	2.305
n-decane	1.254	0.718	0.614
Undecanes(11)	5.356	2.989	2.710
Dodecanes(12)	5.045	3.041	2.795
Tridecanes(13)	4.918	3.178	2.962
Tetradecanes(14)	4.334	3.000	2.834
Pentadecanes(15)	3.784	2.806	2.682
Hexadecanes(16)	3.075	2.437	2.350
Heptadecanes(17)	2.764	2.316	2.254
Octadecanes(18)	2.683	2.367	2.317
Nonadecanes(19)	2.474	2.274	2.239
Eicosanes(20)	2.166	2.069	2.050
Heneicosanes(21)	1.881	1.891	1.884
Docosanes(22)	1.954	2.047	2.051
Tricosanes(23)	1.593	1.729	1.743
Tetracosanes(24)	1.905	2.143	2.170
Pentacosanes(25)	1.406	1.641	1.669
Hexacosanes(26)	1.487	1.799	1.838
Heptacosanes(27)	1.631	2.046	2.099
Octacosanes(28)	1.481	1.920	1.977
Nonacosanes(29)	1.181	1.581	1.634
Triacontanes(30)	1.004	1.386	1.437
Hentriacontanes Plus(31+)	<u>16.940</u>	<u>42.546</u>	<u>45.761</u>
Total	100.000	100.000	100.000

Cabot Oil & Gas - Poca Coal No. 6 Condensate Tank -T-001.

Component	Carbon Numer	Results (Mol%)	Inputs to E&P Tanks
CO2		0.0440	0.0440
O2		0.0000	0.0000
H2S		0.0000	0.0000
Nitrogen		0.0190	0.0190
Methane	C1	1.2280	1.2280
Ethane	C2	1.3430	1.3430
Propane	C3	1.7240	1.7240
iso-Butane	C4H10	0.2920	0.2920
n-Butane	C4H10	1.3950	1.3950
Iso-Pentane	C5H12	0.6100	0.6100
n-Pentane	C5H12	0.9320	0.9320
n-Hexane	C6H14	0.9400	0.9400
Cyclohexane	C6H12	0.5190	1.9190
Hexanes	C6H14	1.4000	
Heptanes	C7H16	2.4400	3.9680
Methylcyclohexane	C7H14	1.5280	
2,2,4- Trimethylpentane	C8H18	0.0000	0.0000
Benzene	C6H6	0.0540	0.0540
Toluene	C7H8	0.2510	0.2510
Ethylbenzene	C8H10	0.2200	0.2200
Xylenes (listed below)	C8H10	1.0570	1.0570
m/p- Xylene	C8H10	0.5860	
o- Xylene	C8H10	0.4710	
C8 Heavies (listed below)		4.3120	4.3120
Octanes	C8H18	1.4250	
Other C-8's	C8	2.8870	
C9 Heavies (listed below)		4.5880	4.5880
Nonanes		1.6350	
Other C-9's	C9	2.9530	
Sum Total (C1 through C9)		24.8960	
All Other components	C+10	75.1040	75.1040
TOTAL		100.0000	100.0000

Hexanes	Liq. Vol/ %
2, 2 Dimethylbutane	0.012
2, 3 Dimethylbutane	0.12
2 Methylpentane	0.457
3 Methylpentane	0.283
Methylcyclopentane	0.528

Heptanes	Liq. Vol/ %
2-methylhexane	0.418
3-methylhexane	0.379
n-Heptane	1.093
Other C-7's	0.55

APPENDIX B

OPERATIONAL DATA AND SUPPORTING DOCUMENTS

(Tank throughput not provided)

Pressurized Separator Sampling and Emissions Estimation Report

**Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East
Suite 1500
Charleston, West Virginia 25301**

August 2013

APPENDIX C

E&P TANKS VERSION 3.0 EMISSION ESTIMATE

Pressurized Separator Sampling and Emissions Estimation Report

**Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East
Suite 1500
Charleston, West Virginia 25301**

August 2013

Report

* Project Setup Information

*

Project File : N:\West Virginia\Cabot\Projects\2013\Testing
Sampling\Tank Sampling\April 2013\Poca Coal No. 6 4-25-13 - Tanks Sampling\APPENDIX
C - Poca Coal 6.ept
Flowsheet Selection : Oil Tank with Separator
Calculation Method : AP42
Control Efficiency : 100.0%
Known Separator Stream : Low Pressure Oil
Entering Air Composition : No

Date : 2013.07.23

* Data Input

*

Separator Pressure : 28.00[psig]
Separator Temperature : 60.00[F]
Ambient Pressure : 14.70[psia]
Ambient Temperature : 70.00[F]
C10+ SG : 0.8672
C10+ MW : 315.30

-- Low Pressure Oil

No.	Component	mol %
1	H2S	0.0000
2	O2	0.0000
3	CO2	0.0440
4	N2	0.0190
5	C1	1.2280
6	C2	1.3430
7	C3	1.7240
8	i-C4	0.2920
9	n-C4	1.3950
10	i-C5	0.6100
11	n-C5	0.9800
12	C6	1.9190
13	C7	3.9680
14	C8	4.3120
15	C9	4.5880
16	C10+	75.0560
17	Benzene	0.0540
18	Toluene	0.2510
19	E-Benzene	0.2200
20	Xylenes	1.0570
21	n-C6	0.9400
22	224Trimethylp	0.0000

-- sales oil

Production Rate : 5[bb]/day
Days of Annual Operation : 365 [days/year]

Report

API Gravity : 33.29
Reid Vapor Pressure : 7.70[psia]
Bulk Temperature : 60.00[F]

-- Tank and Shell Data

Diameter : 6.00[ft]
Shell Height : 11.50[ft]
Cone Roof Slope : 0.06
Average Liquid Height : 8.00[ft]
Vent Pressure Range : 0.06[psi]
Solar Absorbance : 0.17

-- Meteorological Data

City : Charleston, WV
Page 1-----

E&P TANK

Ambient Pressure : 14.70[psia]
Ambient Temperature : 70.00[F]
Min Ambient Temperature : 44.00[F]
Max Ambient Temperature : 65.50[F]
Total Solar Insolation : 1123.00[Btu/ft^2*day]

* Calculation Results
*

-- Emission Summary

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
Total HAPs	0.000	0.000
Total HC	0.717	0.164
VOCs, C2+	0.536	0.122
VOCs, C3+	0.316	0.072

Uncontrolled Recovery Info.

Vapor	52.5300	x1E-3	[MSCFD]
HC Vapor	51.5000	x1E-3	[MSCFD]
GOR	10.51		[SCF/bbl]

-- Emission Composition

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
1	H2S	0.000	0.000
2	O2	0.000	0.000
3	CO2	0.014	0.003
4	N2	0.005	0.001
5	C1	0.181	0.041
6	C2	0.220	0.050
7	C3	0.182	0.042
8	i-C4	0.018	0.004
9	n-C4	0.062	0.014
10	i-C5	0.013	0.003
11	n-C5	0.015	0.003
12	C6	0.009	0.002

Report			
13	C7	0.007	0.002
14	C8	0.003	0.001
15	C9	0.001	0.000
16	C10+	0.000	0.000
17	Benzene	0.000	0.000
18	Toluene	0.000	0.000
19	E-Benzene	0.000	0.000
20	Xylenes	0.000	0.000
21	n-C6	0.004	0.001
22	224Trimethylp	0.000	0.000
	Total	0.734	0.168

-- Stream Data

No. Component	MW	LP oil	Flash Oil	Sale Oil	Flash Gas	W&S Gas
Total Emissions		mol %	mol %	mol %	mol %	mol %
mol %						
1 H2S	34.80	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000						
2 O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000						
3 CO2	44.01	0.0440	0.0187	0.0123	1.1961	1.3910
1.2143						
4 N2	28.01	0.0190	0.0014	0.0000	0.8212	0.0005
0.7447						
5 C1	16.04	1.2280	0.2362	0.0545	46.3174	29.1183
44.7149						
6 C2	30.07	1.3430	0.7543	0.5963	28.1077	36.5488
28.8942						
7 C3	44.10	1.7240	1.4153	1.3282	15.7583	22.1847
16.3571						
8 i-C4	58.12	0.2920	0.2727	0.2671	1.1707	1.6499
1.2154						
9 n-C4	58.12	1.3950	1.3365	1.3192	4.0547	5.6824
4.2063						
10 i-C5	72.15	0.6100	0.6084	0.6075	0.6818	0.9360
0.7054						
11 n-C5	72.15	0.9800	0.9835	0.9837	0.8200	1.1143
0.8474						
12 C6	86.16	1.9190	1.9517	1.9589	0.4339	0.5689
0.4464						
13 C7	100.20	3.9680	4.0488	4.0671	0.2966	0.3757
0.3040						
14 C8	114.23	4.3120	4.4046	4.4258	0.1008	0.1231
0.1029						

Page 2

E&P TANK

15 C9	128.28	4.5880	4.6881	4.7110	0.0367	0.0433
0.0373						
16 C10+	315.30	75.0560	76.7069	77.0841	0.0000	0.0000
0.0000						
17 Benzene	78.11	0.0540	0.0550	0.0552	0.0091	0.0119
0.0094						
18 Toluene	92.13	0.2510	0.2563	0.2575	0.0118	0.0149
0.0121						
19 E-Benzene	106.17	0.2200	0.2248	0.2259	0.0034	0.0041
0.0034						
20 Xylenes	106.17	1.0570	1.0799	1.0852	0.0141	0.0170
0.0143						
21 n-C6	86.18	0.9400	0.9570	0.9608	0.1658	0.2153
0.1704						
22 224Trimethylp	114.24	0.0000	0.0000	0.0000	0.0000	0.0000

Page 3

		Report				
0.0000						
	MW	258.27	263.32	263.94	28.70	33.06
29.10	Stream Mole Ratio	1.0000	0.9785	0.9763	0.0215	0.0022
0.0237	Heating Value				1647.41	1890.56
1670.06	Gas Gravity				0.99	1.14
1.00	Bubble Pt. @ 100F	[psia] 57.57	18.33	10.94		
	RVP @ 100F	[psia] 65.45	37.28	30.77		
	Spec. Gravity @ 100F	0.721	0.722	0.722		

EPA Tanks – 4.0 Supporting Analysis

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Independence - 0001 - Lube Oil Tank
City:	Lizemores
State:	West Virginia
Company:	Cranberry Pipeline Corporation
Type of Tank:	Horizontal Tank
Description:	Cranberry Pipeline Corporation

Tank Dimensions

Shell Length (ft):	10.00
Diameter (ft):	4.25
Volume (gallons):	1,000.00
Turnovers:	0.00
Net Throughput(gal/yr):	4,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Finish:	Gray/Medium
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Independence - 0001 - Lube Oil Tank - Horizontal Tank
Lizemores, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Distillate fuel oil no. 2	All	63.43	53.60	73.25	58.06	0.0074	0.0062	0.0100	130.0000			188.00	Option 1: VP90 = .0065 VP70 = .009

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Independence - 0001 - Lube Oil Tank - Horizontal Tank
Lizemores, West Virginia

Annual Emission Calculations	
Standing Losses (lb):	0.4002
Vapor Space Volume (cu ft):	90.3583
Vapor Density (lb/cu ft):	0.0002
Vapor Space Expansion Factor:	0.0713
Vented Vapor Saturation Factor:	0.9892
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	90.3583
Tank Diameter (ft):	4.2500
Effective Diameter (ft):	7.3580
Vapor Space Outage (ft):	2.1250
Tank Shell Length (ft):	10.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0002
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0074
Daily Avg. Liquid Surface Temp. (deg. R):	523.0662
Daily Average Ambient Temp. (deg. F):	54.9833
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	517.7333
Tank Paint Solar Absorptance (Shell):	0.9800
Daily Total Solar Insulation Factor (lbtu/sqft day):	1,250.5728
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0713
Daily Vapor Temperature Range (deg. R):	39.3149
Daily Vapor Pressure Range (psia):	0.0048
Breather Vent Press. Setting Range (psia):	0.0800
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0074
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0052
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0100
Daily Avg. Liquid Surface Temp. (deg. R):	523.0662
Daily Min. Liquid Surface Temp. (deg. R):	513.2875
Daily Max. Liquid Surface Temp. (deg. R):	532.8249
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9892
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0074
Vapor Space Outage (ft):	2.1250
Working Losses (lb):	
Vapor Molecular Weight (lb/lb-mole):	0.0911
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	130.0000
Annual Net Throughput (gal/yr.):	0.0074
Annual Turnovers:	4,000.0000
Turnover Factor:	0.0000
Tank Diameter (ft):	1.0000
Working Loss Product Factor:	4.2500
	1.0000
Total Losses (lb):	0.4913

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Independence - 0001 - Lube Oil Tank - Horizontal Tank
Lizemores, West Virginia

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Distillate fuel oil no. 2	0.09	0.40	0.49

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Independence - 0002 - Pipeline Liquids Tank
City:	Lizemores
State:	West Virginia
Company:	Cranberry Pipeline Corporation
Type of Tank:	Vertical Fixed Roof Tank
Description:	Cranberry Pipeline Corporation Independence Station

Tank Dimensions

Shell Height (ft):	6.00
Diameter (ft):	3.75
Liquid Height (ft) :	6.00
Avg. Liquid Height (ft):	4.00
Volume (gallons):	500.00
Turnovers:	153.30
Net Throughput(gal/yr):	76,650.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition:	Good
Roof Color/Shade:	Gray/Medium
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	1.00
Radius (ft) (Dome Roof)	3.75

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Independence - 0002 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Gasoline (RVP 10)	All	63.43	53.60	73.25	58.06	5.5386	4.5731	6.6630	66.0000			62.00	Option 4: RVP=10, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Independence - 0002 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

Annual Emission Calculations	
Standing Losses (lb):	117.8031
Vapor Space Volume (cu ft):	28.1353
Vapor Density (lb/cu ft):	0.0881
Vapor Space Expansion Factor:	0.3081
Vented Vapor Saturation Factor:	0.5721
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	28.1353
Tank Diameter (ft):	3.7500
Vapor Space Outage (ft):	2.5474
Tank Shell Height (ft):	6.0000
Average Liquid Height (ft):	4.0000
Roof Outage (ft):	0.5474
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.5474
Dome Radius (ft):	3.7500
Shell Radius (ft):	1.8750
Vapor Density	
Vapor Density (lb/cu ft):	0.0881
Vapor Molecular Weight (lb/lb-mole):	66.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.5396
Daily Avg. Liquid Surface Temp. (deg. R):	523.0962
Daily Average Ambient Temp. (deg. F):	64.8833
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	517.7333
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250.5728
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.3081
Daily Vapor Temperature Range (deg. R):	39.3149
Daily Vapor Pressure Range (psia):	2.0896
Breather Vent Press. Setting Range (psia):	0.0500
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.5396
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	4.5731
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	6.8830
Daily Avg. Liquid Surface Temp. (deg R):	523.0962
Daily Min. Liquid Surface Temp. (deg R):	513.2675
Daily Max. Liquid Surface Temp. (deg R):	532.9249
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.5721
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.5396
Vapor Space Outage (ft):	2.5474
Working Losses (lb):	
Working Losses (lb):	241.7833
Vapor Molecular Weight (lb/lb-mole):	66.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.5396
Annual Net Throughput (gal/yr.):	76,650.0000
Annual Turnovers:	153.3000
Turnover Factor:	0.3624
Maximum Liquid Volume (gal):	500.0000
Maximum Liquid Height (ft):	6.0000
Tank Diameter (ft):	3.7500
Working Loss Product Factor:	1.0000
Total Losses (lb):	359.8984

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Independence - 0002 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Gasoline (RVP 10)	241.78	117.90	359.68

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Independence - 0003 - Pipeline Liquids Tank
City:	Lizemores
State:	West Virginia
Company:	Cranberry Pipeline Corporation
Type of Tank:	Vertical Fixed Roof Tank
Description:	Independence Station

Tank Dimensions

Shell Height (ft):	10.00
Diameter (ft):	8.50
Liquid Height (ft) :	10.00
Avg. Liquid Height (ft):	6.00
Volume (gallons):	4,200.00
Turnovers:	18.25
Net Throughput(gal/yr):	76,650.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition:	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	1.00
Radius (ft) (Dome Roof)	8.50

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Independence - 0003 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

Mixture/Component	Month	Daily Liquid Surf Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Gasoline (RVP 10)	All	61.67	52.97	70.18	57.22	5.3458	4.5163	6.2932	88.0000			92.00	Option 4: RVP=10, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Independence - 0003 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

Annual Emission Calculations	
Standing Losses (lb):	689.2987
Vapor Space Volume (cu ft):	255.6762
Vapor Density (lb/cu ft):	0.0631
Vapor Space Expansion Factor:	0.2588
Vented Vapor Saturation Factor:	0.4391
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	255.6762
Tank Diameter (ft):	8.5000
Vapor Space Outage (ft):	4.5092
Tank Shell Height (ft):	10.0000
Average Liquid Height (ft):	6.0000
Roof Outage (ft):	0.5092
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.5092
Dome Radius (ft):	8.5000
Shell Radius (ft):	4.2500
Vapor Density	
Vapor Density (lb/cu ft):	0.0631
Vapor Molecular Weight (lb/lb-mole):	68.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.3458
Daily Avg. Liquid Surface Temp. (deg. R):	521.2427
Daily Average Ambient Temp. (deg. F):	54.8683
Ideal Gas Constant R (psia cu ft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	516.8933
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insolation Factor (Rbt/sqft day):	1.250.5728
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.2588
Daily Vapor Temperature Range (deg. R):	34.4127
Breather Vent Press. Setting Range (psia):	1.7768
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.3458
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	4.5163
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	6.2932
Daily Avg. Liquid Surface Temp. (deg R):	521.2427
Daily Min. Liquid Surface Temp. (deg R):	512.6395
Daily Max. Liquid Surface Temp. (deg R):	529.8458
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.4391
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.3458
Vapor Space Outage (ft):	4.5092
Working Losses (lb):	
Working Losses (lb):	643.9058
Vapor Molecular Weight (lb/lb-mole):	68.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.3458
Annual Net Throughput (gallyr.):	76,850.0000
Actual Turnover:	18.2500
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	4,200.0000
Maximum Liquid Height (ft):	10.0000
Tank Diameter (ft):	8.5000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1,313.2025

**TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals**

Emissions Report for: Annual

Independence - 0003 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Gasoline (RVP 10)	643.91	669.30	1,313.20

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Independence - 0004 - Pipeline Liquids Tank
City:	Lizemores
State:	West Virginia
Company:	Cranberry Pipeline Corporation
Type of Tank:	Vertical Fixed Roof Tank
Description:	Independence Station

Tank Dimensions

Shell Height (ft):	5.00
Diameter (ft):	8.50
Liquid Height (ft) :	5.00
Avg. Liquid Height (ft):	3.00
Volume (gallons):	2,100.00
Turnovers:	36.50
Net Throughput(gal/yr):	76,650.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good
Roof Color/Shade:	Gray/Medium
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	1.00
Radius (ft) (Dome Roof)	8.50

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Independence - 0004 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Gasoline (RVP 10)	All	63.43	63.80	73.25	58.06	5.5396	4.5731	6.6630	88.0000			92.00	Option 4: RVP=10, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Independence - 0004 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

<u>Annual Emission Calculations</u>	
Standing Losses (lb):	800.5320
Vapor Space Volume (cu ft):	142.3661
Vapor Density (lb/cu ft):	0.0651
Vapor Space Expansion Factor:	0.3081
Vented Vapor Saturation Factor:	0.5758
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	142.3661
Tank Diameter (ft):	8.5000
Vapor Space Outage (ft):	2.5092
Tank Shell Height (ft):	5.0000
Average Liquid Height (ft):	3.0000
Roof Outage (ft):	0.5092
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.5092
Dome Radius (ft):	8.5000
Shell Radius (ft):	4.2500
Vapor Density	
Vapor Density (lb/cu ft):	0.0651
Vapor Molecular Weight (lb/lb-mole):	66.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.5396
Daily Avg. Liquid Surface Temp. (deg. R):	523.0962
Daily Average Ambient Temp. (deg. F):	54.9833
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	517.7339
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insolation Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.3081
Daily Vapor Temperature Range (deg. R):	39.3149
Daily Vapor Pressure Range (psia):	2.0899
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.5396
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	4.5731
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	6.8630
Daily Avg. Liquid Surface Temp. (deg R):	523.0962
Daily Min. Liquid Surface Temp. (deg R):	513.2575
Daily Max. Liquid Surface Temp. (deg R):	532.9249
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.5758
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.5396
Vapor Space Outage (ft):	2.5092
Working Losses (lb):	
Working Losses (lb):	659.6296
Vapor Molecular Weight (lb/lb-mole):	66.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	5.5396
Annual Net Throughput (gal/yr.):	76,650.0000
Annual Turnovers:	36.5000
Turnover Factor:	0.8866
Maximum Liquid Volume (gal):	2,100.0000
Maximum Liquid Height (ft):	5.0000
Tank Diameter (ft):	8.5000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1,380.1587

**TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals**

Emissions Report for: Annual

Independence - 0004 - Pipeline Liquids Tank - Vertical Fixed Roof Tank
Lizemores, West Virginia

Components	Losses(lbs)		Total Emissions
	Working Loss	Breathing Loss	
Gasoline (RVP 10)	659.63	600.53	1,260.16

2003 Air Permit and Facility Audit (Potesta)

Permit Determination

**Independence Compressor Station
Lizemores, West Virginia**

Cranberry Pipeline Corporation
c/o Cabot Oil & Gas Corporation
900 Lee Street East, Suite 1500
Charleston, West Virginia 25301

5.0 Independence Compressor Station

On July 10, 2003 POTESTA performed a site inventory for the Independence Compressor Station. The emission units associated with air issues were listed with readily available specifications. This facility does not require a Title V Operating Permit since emission rates do not trip the permit applicability threshold. The compressor engines operate under grandfathered status; therefore, no Regulation 13 Permits are associated with this facility.

On February 16, 1998, a permit determination was submitted to DAQ for removal of one compressor engine. From the equipment inventory it appears that this unit was not removed.

5.1 Applicable Air Quality Regulation Requirements

Regulation 10 (45CSR10) "To Prevent and Control Air Pollution From The Emission of Sulfur Oxides"

Applicable Section: 5.1

The limit for hydrogen sulfide (50 grains per 100 cubic feet) in the gas stream is applicable to compressor engines; however, they are exempt from testing, monitoring, recordkeeping, and recording due to the engines having a design heat input of under ten million BTU's per hour per section 10.1 of the regulation.

Note: This station is not subject to the sulfur dioxide limit set in this regulation (Section 4.1) due to the potential to emit being less than 500 pounds per year of sulfur oxides per Section 4.1.e.

5.2 Corrective Actions

Notification to DAQ regarding the status of the compressor engine identified in the permit determination form for removal.

Independence Compressor Station
Site Visit 07/10/03

Equipment on Site	Title V	Reg 13	Corrective Action
Engines			
Ajax DPC-230 (230 Hp) Unit 1		Grandfathered	no corrective action required
Ajax DPC-230 (230 Hp) Unit 2		Grandfathered	no corrective action required
Ajax DPC-230 (230 Hp) Unit 3		Grandfathered	no corrective action required
Ajax DPC-230 (230 Hp) Unit 4			This engine was removed through a PDF on 03/16/98. If the removal never took place a notification to DAQ is required of the status. If the engine was removed, a Reg 13 may be required depending on emissions.
Tanks			
Lube Oil Tank (approx. 1000 gal)			no air permit required
Pipeline Drip Tank (approx. 500 gal)			no air permit required
Drip and Brine Tank (4200 gal)			no air permit required
Drip and Brine Tank (2100 gal)			no air permit required



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**DIVISION OF ENVIRONMENTAL PROTECTION
OFFICE OF AIR QUALITY**

CECIL H. UNDERWOOD
GOVERNOR

JOHN E. CAFFREY
DIRECTOR

JOHN H. JOHNSTON, CHIEF

March 16, 1998

Mr. Alan Haggerty
Safety and Compliance Supervisor
Cranberry Pipeline Corporation
P.O. Box 1473
Charleston, WV 25325

Re: Permit Applicability Determination
Cranberry Pipeline Corporation
Independence Compressor Station
Determination No. PD98-039
Plant ID No. 03-54-813-0001

Dear Mr. Haggerty:

It has been determined that a permit will not be required under 45CSR13 for your proposed modification of a natural gas compressor station. This determination is based on information included with your letter and permit determination form dated March 5, 1998, which indicates that the increase in emissions will not exceed two (2) pounds per hour and five (5) tons per year of any regulated pollutant.

Please bear in mind, however, that any additional changes to the proposed facility may require a permit under 45CSR13.

Should you have any questions, please contact the undersigned engineer at (304) 558-0885.

Sincerely,

Carla M. Adduci
Permit Engineer

FILE:
COMPANY Cranberry Pipeline Corp.
FACILITY Independence Station
REGION VIII REG. 13 (PD98-039)

Beverly D. McKeone
New Source Review Coordinator
Terry L. Polen, P.E., Q.E.P.
Assistant Chief of Permitting

PLANNING & PERMITTING



Cabot Oil & Gas Corporation

FEB 16 1998 A 11:30

WV DIV OF ENVIR PROTECT
OFFICE OF AIR QUALITY AIRX

FEB 16 1998 A 8:50

RECEIVED

February 16, 1998

John Johnson, Chief
Division of Environmental Protection
Office of Air Quality
1558 Washington Street East
Charleston, WV 25311

RE: Independence Compressor Station

Dear Mr. Johnson,

Enclosed please find the completed Permit Determination for the Independence Compressor Station. Cranberry proposes to modify this station by removing one (1) of the compressor engines. If you have any questions, please contact me at (304) 623-9851.

Sincerely,

Alan Haggerty
Safety & Compliance Supervisor

FILE:

COMPANY Cranberry Pipeline Corp.

FACILITY Independence Station

REGION VIII

REG. 13 (PD98-039)

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Permit Determination
Independence Compressor Station

NON-CONFIDENTIAL

Cranberry Pipeline Corporation
Charleston, WV

Table of Contents

	Page
I. Introduction	I
II. Location of Facility	I
III. Narrative Description of Facility	I

Attachment A

Manufacturer's Emission Data

Attachment B

Topographic Map

Attachment C

Flow Diagram

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I. Introduction

Cranberry Pipeline Corporation, herein referred to as Cranberry, is a West Virginia corporation formed under the laws of West Virginia. Cranberry proposes to remove one (1) of the existing compressor engines from the Independence Compressor Station.

Currently the Independence consists of four (4) AJAX 230 hp compressor engines. Cranberry is proposing to remove one (1) of these engines.

The Independence Compressor Station was originally constructed in the mid 1970's. At the time of construction no permits were obtained.

II. Location of Facility

The location of this facility is near the town of Lizeimore, Clay County, WV. Attachment B is a vicinity map which depicts the location of the Independence Compressor Station on the U. S. Geological Survey 7-1/2 minute topographic quadrangle map (scale 1" = 2000'). Attachment C consists of a flow diagram which indicates the layout of the station after one (1) of the engines is removed.

III. Narrative Description of Source

As mentioned, the Independence Compressor Station currently consists of four (4) compressor engines, all of which are 230 hp AJAXs. Cranberry proposes to remove one (1) of these engines.

Below is a summary of emissions from this station.

Existing Units #1 - #4

	G/hp.hr	lbs/hr	TPY
NOX	3.0	1.46	6.40
CO	2.2	1.07	4.69
NMHC	1.9	.92	4.06
SO2	0.0002	0.001	0.004

Total Station

	lbs/hr	TPY
NOX	5.84	25.6
CO	4.28	18.76
NMHC	3.68	14.72
SO2	0.004	0.016

Emissions After Removal of One Engine

	lbs/hr	TPY
NOX	4.38	19.20
CO	3.21	14.07
NMHC	2.76	2.76
SO2	0.003	0.012

The manufacturer's emission data for these four (4) engines is contained in Attachment A.

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GENERAL INFORMATION (GI)

1. Name of Applicant¹:

- (a) Use the exact name as it is registered with the Secretary of State's Office, Corporate Registration Division:

Cranberry Pipeline Corporation

- (b) Is the applicant a:

Corporation: Yes No Ltd. Partnership: Yes No
Partnership: Yes No Proprietorship: Yes No
Federal Agency: Yes No State Agency: Yes No

- (c) If the applicant is not registered with the Secretary of State's Office, please explain:

- (d) Individual to contact if additional information is required:

Name: Alan Haggerty

Title: Safety & Compliance Supervisor

Telephone No.: (304) 623-9851 Fax No.: (304) 623-9883

2. Applicant's Mailing Address:

Cranberry Pipeline Corporation

P. O. Box 1473

Charleston, WV 25325

3. **Alias of Applicant:** List all names under which the Applicant, referenced in GI-1(a) above, has operated in WV during the last five (5) calendar years.

Cabot Oil & Gas Corporation

P. O. Box 1473

Charleston, WV 25325

PLANT OR FACILITY INFORMATION (PFI)

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1. **Type of process for which this ADF/NF is being submitted** (e.g. the construction of a new coal preparation plant (construction permit applicability); the modification of an existing boiler by the addition of low-NO_x burners (modification permit applicability); or the relocation of an asphalt plant (relocation permit applicability); a chemical process change to determine the

¹ The Applicant is the name of the entity which will own or operate the stationary source.

feasibility of a new design (temporary permit applicability); and a request for inclusion of a proposed process under a general permit (general permit applicability).

The modification of an existing natural gas compressor station

2. Location of Proposed Activities:

- (a) Nearest Town: Lizemore
- (b) County: Clay
- (c) UTM Coordinates²: Northing: _____ Easting: _____ Zone: _____

3. Plant I.D. No.:

- (a) If this is an existing plant or facility, and currently operating, provide the Plant I.D. No. previously assigned to it by the Office of Air Quality. The Plant I.D. No. is a seven (7) digit number such as 0390015:

Plant ID: N/A

- (b) If the plant or facility is idle, or permanently closed, list the name of the last company which previously operated at this site:
-

4. Permit Number(s):

- (a) List all Office of Air Quality permits associated with the Plant I.D. No. noted in PFI 3(a) above and issued to the **Applicant**. Also state the year of issue of each:

COMPANY	PERMIT NO.	YEAR OF ISSUE

- (b) List all Office of Air Quality permits associated with the Plant I.D. No. noted in PFI 3(a) above and originally issued to another entity which is now controlled by the **Applicant**. Also state the year of issue of each:

Not-Compliant

² Please note UTM's are requested as easting and northing values relative to Zones 17 and 18, **NOT** latitude and longitude. UTM coordinates may be obtained from US Geological Survey topographical maps.

COMPANY	PERMIT NO.	YEAR OF ISSUE

(c) Has the Office of Air Quality previously issued a permit covering all or any part of the process which is the subject of this Applicability Determination / Notification Form at the location defined by the Plant I.D. No. Noted in PFI 3(a) above?

Yes No

(d) If the answer to 4(c) is yes, state the permit number(s), and also describe the pollutants, hourly and annual emission limits, annual hours of operation, and any other operating limitations placed thereon by the permit conditions, as an ADDENDUM to this AD/NF.

5. Plant Operational Milestones:

(a) When did the plant or facility described in PFI 3(a) and PFI 3(b) become operational?

Month: June Year: 1975

(b) Has any part of the plant, facility, or process, which is located at the site identified in PFI 2(a) been modified, i.e., equipment and/or process changes which resulted in an increase in the hourly emissions (lb/hr) of any regulated pollutant, on or after June 1, 1974?

Yes No

If yes, please provide a brief description of the modification; list the pollutants whose emissions were effected by the modification and indicate the before and after hourly emission rate (lb/hr) for each pollutant, before and after controls; and the date construction of the modification commenced:

(c) What is the proposed start-up date of the process described in PFI 6 below?

May 1, 1998

(d) When did the Applicant become associated with the plant or facility identified in PFI 2(a):

June 1975

6. Process Description:

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Provide a detailed description of the proposed plant, facility, and/or process for which this AD/NF is being submitted. Include information on all sources or operations from which emissions can potentially occur; the associated or proposed air pollution control devices; and all associated emission points including emergency relief vents. Material handling processes shall include

hourly (lb/hr) and yearly throughputs (ton/yr), material moisture content at all transfer points, drop heights of transfer points, and a plan to minimize the generation and emission of fugitive emissions to the air.

7. **Process Flow Diagram:**

Include a process flow diagram to supplement the description of the proposed plant, facility, and/or process for which this AD/NF is requested. For a modification, clearly identify the areas and/or equipment that will be modified, and specify the nature and extent of the modification. For a relocation, specifically describe what area of the plant or facility will be affected by the relocation, and what equipment will be involved.

8. **Material Safety Data Sheets:**

Provide MSDSs for all materials processed, used, or produced.

9. **Criteria Emissions:**

- (a) As requested in TABLE 1: EMISSION POINTS DATA SHEET FOR CRITERIA POLLUTANTS, identify and quantify, via emission point ID number and source, the hourly emission rate (lb/hr) for any one or more of the six (6) Criteria Pollutants³ that may be emitted.

For **new construction**, calculate the maximum potential emission rate based upon the maximum design capacity of the equipment **before air pollution control device capture efficiencies are applied**.

In the case of a **modification** to an existing piece of process equipment, calculate the maximum potential emission rate based upon the maximum design capacity of the equipment **after air pollution control device capture efficiencies are applied**. Submit a rationale for assuming the control efficiency you applied/credited toward an emission point.

- (b) Attach a copy of all emissions calculations, including stack test data and material balances, etc. used in determining the hourly emission rates for the six (6) Criteria Pollutants listed in TABLE 1. Also submit a list of references used in determining emission factors, emission rate equations, or guidance.

10. **All Other Regulated Pollutants:**

- (a) As requested in TABLE 2: EMISSION POINTS DATA SHEET FOR NON-CRITERIA REGULATED POLLUTANTS, identify and quantify, via emission point ID number and source, the hourly emission rate for all regulated pollutants.

For **new construction**, calculate the maximum potential emission rate based upon the maximum design capacity of the equipment **before air pollution control device capture efficiencies are applied**.

In the case of a **modification** to an existing piece of process equipment, calculate the maximum potential emission rate based upon the maximum design capacity of the equipment **after air pollution control device capture efficiencies are applied**.

³ As listed in Table 1.

Submit a rationale for assuming the control efficiency you applied/credited toward an emission point.

- (b) Attach a copy of all emissions calculations, including stack test data and material balances, etc. used in determining the hourly emission rates for all pollutants listed in TABLE 2. Also submit a list of references used in determining emission factors, emission rate equations, or guidance.

11. **CERTIFICATION OF DATA:**

The information provided herein must be certified by a **Responsible Official*** of the Applicant. The certification statement is as follows:

I, the undersigned, a **Responsible Official** for the Applicant, for whom this APPLICABILITY DETERMINATION / NOTIFICATION FORM is being requested, hereby certifies that all of the information contained herein, or appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry.

Applicant's Name: _____

Signature: H. Baird Whitehead

Title: V. P. Regional Manager Date: 02/20/98

- * The definition of the phrase 'Responsible Official' can be found at 45CSR13, Section 2.23. For your ease of reference, it is reproduced here.

"Responsible official" means one of the following:

- (a) For a corporation: a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities applying for or subject to a permit and either (i) the facilities employ more than two hundred fifty (250) persons or have gross annual sales or expenditures exceeding twenty five (\$25) million (in second quarter 1990 dollars), or (ii) a representative delegated with such authority and approved in advance by the Chief.
- (b) For a partnership or a sole proprietorship: a general partner or the proprietor, respectively.
- (c) For a municipality, State, Federal, or other public entity: either a principal executive officer or ranking elected official. For the purpose of this part, a principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of the U.S. EPA); or
- (d) The designated representative delegated with such authority and approved in advance by the Chief.

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TABLE 1: EMISSION POINTS DATA SHEET FOR CRITERIA POLLUTANTS

Emission Point ID No.	Source(s) Vented Through This Point	Maximum Potential Emissions (lb/hr)						Maximum Actual Emissions With Control Device Applied (lb/hr)					
		PM	SO ₂	CO	NO _x	VOC(1)	Pb	PM	SO ₂	CO	NO _x	VOC(1)	Pb
001	Engine #1	N/A	.001	1.07	1.46	0.92	N/A						
002	Engine #2	N/A	.001	1.07	1.46	0.92	N/A						
003	Engine #3	N/A	.001	1.07	1.46	0.92	N/A						

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Attachment A
Manufacturer's Emission Data

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ENGINE DATA				TYPICAL EMISSIONS DATA											
Model	Horse Power	RPM	Fuel Consumption BTU/Hr	NOx		CO		NMHC		NOx		CO		NMHC	
				Gm/Hr	Tons/Year	Gm/Hr	Tons/Year	Gm/Hr	Tons/Year	Gm/Hr	Tons/Year	Gm/Hr	Tons/Year	Gm/Hr	Tons/Year
DPC-115E	110		8,100	2.00	2.12	2.00	2.12	1.30	1.30	2.02	2.12	2.00	2.12	1.30	1.30
DPC-115	110		9,000	3.00	3.19	3.00	3.19	1.90	1.90	2.02	2.34	2.20	2.34	1.90	2.02
DPC-140E	134		7,800	2.00	2.59	2.00	2.59	1.30	1.30	1.67	1.67	1.30	1.67	1.10	1.40
DPC-140	134		8,100	9.50	12.29	9.50	12.29	1.20	1.20	1.50	1.50	1.20	1.50	1.10	1.40
DPC-160E	173		7,800	2.00	3.34	2.00	3.34	1.00	1.00	1.67	1.67	1.00	1.67	1.20	2.01
DPC-180	173		8,400	5.00	8.35	5.00	8.35	1.00	1.00	1.67	1.67	1.00	1.67	1.60	2.67
DPC-230E	221		8,100	2.00	4.27	2.00	4.27	2.00	2.00	4.27	4.27	2.00	4.27	1.30	2.77
DPC-230	221		9,000	3.00	6.40	3.00	6.40	2.20	2.20	4.70	4.70	2.20	4.70	1.90	4.06
DPC-260E	260		7,800	2.00	3.20	2.00	3.20	1.30	1.30	3.30	3.30	1.30	3.30	1.10	2.86
DPC-280	260		8,100	9.50	24.68	9.50	24.68	1.20	1.20	3.07	3.07	1.20	3.07	1.15	2.96
DPC-360E	346		7,800	2.00	6.68	2.00	6.68	1.80	1.80	3.34	3.34	1.80	3.34	1.20	4.01
DPC-360	346		8,400	5.00	16.71	5.00	16.71	1.00	1.00	3.34	3.34	1.00	3.34	1.60	3.75
DPC-540E	540		7,800	2.00	10.43	2.00	10.43	0.90	0.90	4.69	4.69	0.90	4.69	1.10	5.74
DPC-540	540		8,300	8.60	44.83	8.60	44.83	1.10	1.10	5.74	5.74	1.10	5.74	1.90	5.22
DPC-720E	720		7,800	2.00	13.91	2.00	13.91	0.90	0.90	6.26	6.26	0.90	6.26	1.40	7.65
DPC-720	720		8,300	8.60	59.80	8.60	59.80	1.10	1.10	7.65	7.65	1.10	7.65	1.60	6.95

CONDITIONS

- ◆ PIPELINE QUALITY GAS FUEL, SEE ATTACHED DESCRIPTION.
- ◆ EMISSIONS DATA BASED ON 65-deg F AND < 1500 ft. ELEVATION.
- ◆ SITE HORSEPOWER RATING BASED ON 100-deg F AND < 1500 ft. ELEVATION.
- ◆ ECONOMIC CALCULATIONS BASED ON 100% LOAD FACTORS.
- ◆ GUARANTEES REQUIRE: FUEL ANALYSIS, VOC DEFINITION, ENGINEERING APPROVAL.

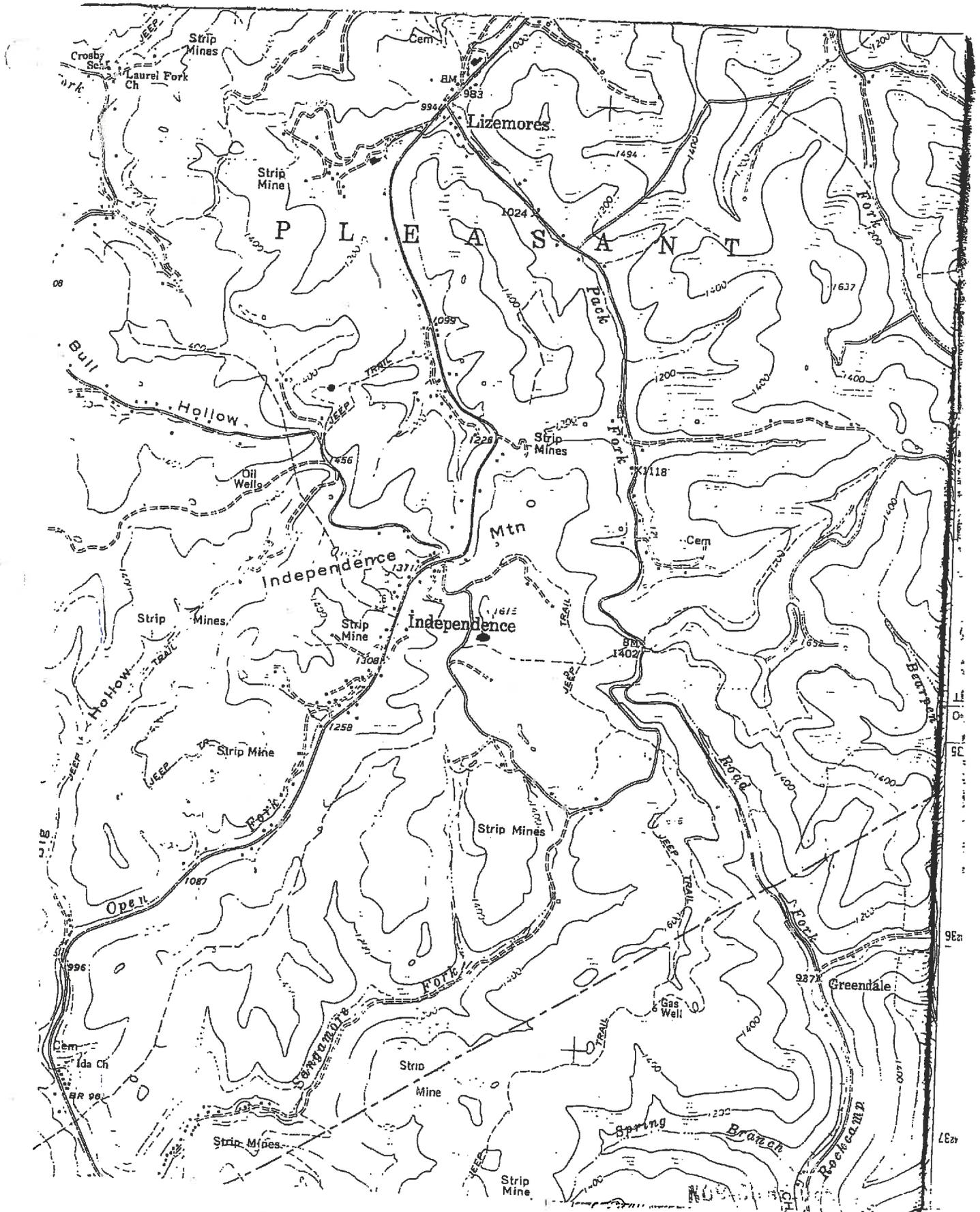
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Attachment B
Topographic Map

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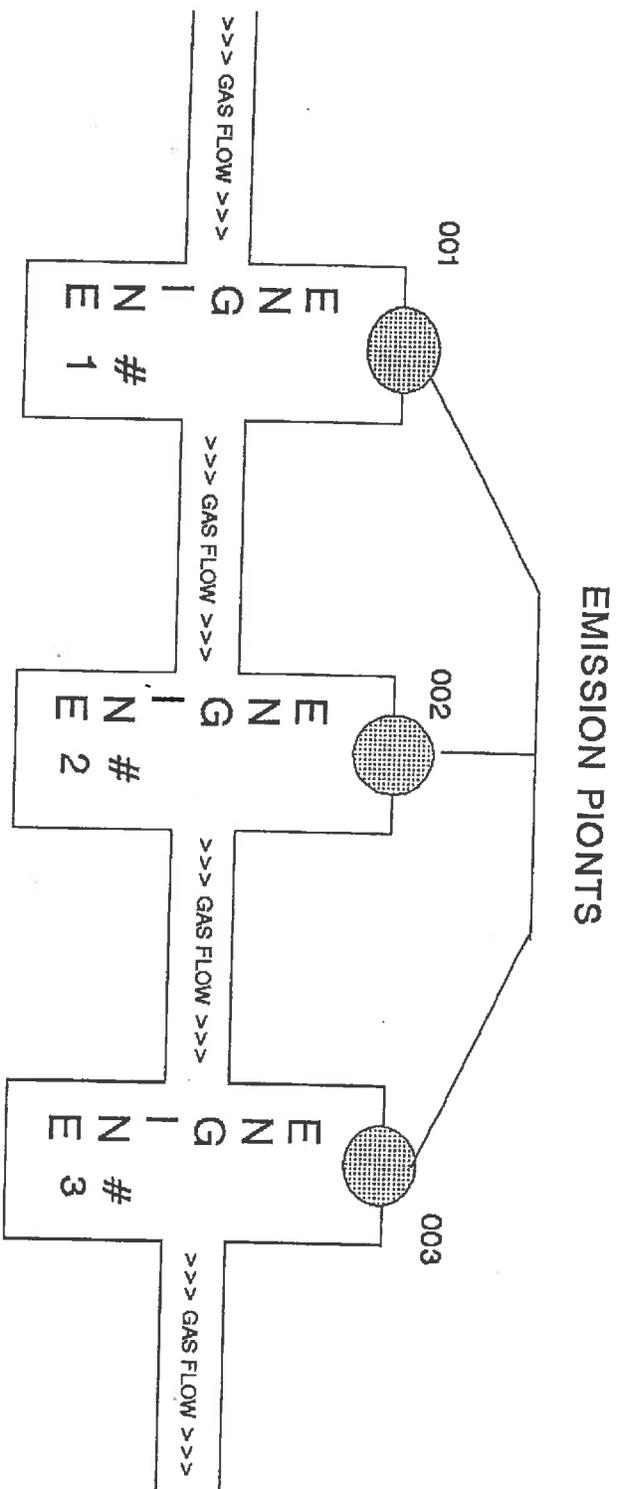
INDEPENDENCE

BENTREE QUAD



Attachment C
Flow Diagram

INDEPENDENCE COMPRESSOR STATION FLOW DIAGRAM



PROPOSED 2-18-98

NOT TO SCALE

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