Momentum
Momentum is Midstream

January 8th, 2015

West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

Re: Hamilton Compressor Station- Rule 13 Permit Application

Please accept this letter and attached Rule 13 permit application as M3 Appalachia Gathering, LLC's formal request for approval of the proposed construction and operation of the Hamilton natural gas compressor station located in Monongalia County, West Virginia. Startup of operation is planned to begin on or about the first day of July, 2016.

The estimated discharge amounts for regulated air pollutants are as follows: Nitrogen Oxides (NOx) = 29.2 tons per year (tpy); Carbon Monoxide (CO) = 12.8 tpy; Volatile Organic Compounds (VOC) = 11.1 tpy; Sulfur Dioxide (SOx) = 0.1 tpy; Particulate Matter (PM10) = 0.12 tpy; Formaldehyde = 3.52 tpy; Hazardous Air Pollutants (HAPs) = 7.0 tpy; Carbon Dioxide Equivalents (CO2(eq)) = 24,800 tpy.

Included please find the check for the application fee in the amount of $3,500 as well as the receipt for the legal advertisement. Please feel free to contact me with any further questions.

Sincerely,

Eric Tennison
Environmental Health & Safety Manager
M3 Appalachia Gathering, LLC
742 Fairmont Road, Suite E
Westover, WV 26501
e.tennison@m3midstream.com
304-212-4403 ext. 5006 (office)
724-705-3816 (cell)

27355

Wells Fargo Bank, N.A.
23-7/1020

EZShield™ Check Fraud Protection for Business

M3 APPALACHIA GATHERING, LLC
1099 MAIN AVE., STE. 210
DURANGO, CO 81301
(970) 247-4423

DATE 12/28/2015

AMOUNT **********3,500.00

PAY Three thousand five hundred and xx / 100 Dollars

TO THE ORDER OF
WV Dept. of Environmental Protection
Division of Air Quality
601 57th Street
Charleston, WV 25304
USA

VOID AFTER 90 DAYS

AUTHORIZED SIGNATURE

Details on back.

⑈027355⑈ ⑆102000076⑆ 2833200914⑈

M3 APPALACHIA GATHERING, LLC

27355

VENDOR: WVDoep1
REMIT TO: WV Dept. of Environmental Protection
CHECK: 0000027355
COMMENT:
DATE: 12/28/2015

INVOICE	DATE	VOUCHER	COMMENT	AMOUNT	DISCOUNT	NET AMOUNT
CRF 120715a	12/7/2015	0000020569	NSR-13 Permit App Fee	3,500.00	0.00	3,500.00
			TOTALS:	3,500.00	0.00	3,500.00

Eric Tennison

From: Nikki Moon <nmoon@dominionpost.com>
Sent: Friday, January 08, 2016 1:37 PM
To: Brandon King
Cc: Eric Tennison
Subject: Invoice - Thank You!

I was able to get it at a better price for you than what we discussed. This legal is set to start running on Monday.

Thank You!

Nikki

THE DOMINION Post

Classified Advertising Payment Receipt

Date Generated: 1/8/2016

Account No: 1051056
M3 APPALACHIA GATHERING LLC

Email:
WESTOVER, WV 26501

Phone: 304-212-4403

Sales Associate: Nikki Moon | **Phone:** 304-291-9420 | **Email:** classads@dominionpost.com

Urn: 010081679

Order Number:

PO

PAYMENT INFORMATION

Total Order Price: $446.00

Payment Amount: $0

Payment Type: Invoice

TITLES:

Title: Dominion Post | Class: 101 Legals
Start Date: 1/11/2016 | Stop Date: 1/19/2016
Insertions: 8 | Lines: 35.2135 ag

AD COPY PROOF:
Not Shown Actual Size

010081679 **January 11, 12, 13, 14, 15, 16, 18, 19**

AIR QUALITY PERMIT NOTICE

Notice of Application

Notice is given that M3 Appalachia Gathering, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit Registration per the requirements of 45CSR13 (New Source Review – Minor Air Emissions Source) for a Natural Gas Compressor Station located on an Access Road off of WV-218N, near Daybrook, in Monongalia County, West Virginia. The latitude and longitude coordinates are: (Latitude: 39.64194 N; Longitude: 80.205278 W.)

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

Nitrogen Oxides (NOx) = 29.2 tons per year (tpy); Carbon Monoxide (CO) = 12.8 tpy; Volatile Organic Compounds (VOC) = 11.1 tpy; Sulfur Dioxide (SOx) = 0.1 tpy; Particulate Matter (PM10) = 0.12 tpy; Formaldehyde = 3.52 tpy; Hazardous Air Pollutants (HAPs) = 7.0 tpy; Carbon Dioxide Equivalents (CO2(eq)) = 24,800 tpy.

Startup of operation is planned to begin on or about the **first** day of **July 1, 2016**. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

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

Dated this the **7th** day of **January, 2015.**

By: **M3 Appalachia Gathering, LLC**
James C. Roberts V.P. Environmental, Health, and Safety
742 Fairmont Road, Suite E
Westover, WV 26501

Nikki Moon
Classifieds Advisor
Dominion Post
1251 Earl L. Core Rd.
Morgantown, WV 26505
T. 304.291.9420

From: Nikki Moon
Sent: Friday, January 08, 2016 12:08 PM
To:

Rule 13 Permit Application
Hamilton Compressor Station
M3 Appalachia Gathering, LLC

January 7, 2015

Table of Contents

1 Introduction

M3 Appalachia Gathering, LLC (M3 AGS) is submitting this Rule 13 permit application to the West Virginia Department of Environmental Protection (WVDEP) for the proposed construction and operation of the Hamilton natural gas compressor station located in Monongalia County, West Virginia.

1.1 Facility and Project Description.

The Hamilton Compressor Station will compress lean wet natural gas (approximately 95-98% methane) that originates from 3rd party producers and compress the gas to pressures necessary to deliver into M3's Appalachia Gathering System (AGS) 24 inch pipeline. Between 75 MMSCFD and 100 MMSCFD of wet natural gas at approximately 300-450 psig first enters the compressor station via pipeline into a 60 inch diameter by 10 foot inlet separator. The gas then travels through a suction control valve and into the main suction header which feeds into three natural gas driven CAT G3606 engine/compressor units. The gas is compressed to 900-1125 psig and travels to an adjacent Dehydration Station, for ultimate delivery into the AGS gathering system. The compressor station will be located in Monongalia County, WV, at 39° 38' 33.89" N and 80° 12' 16.72" W.

The existing Hamilton Dehydration Station was determined to be a de minimis source of emissions per a WVDEP Permit Determination request but is being included and aggregated into the Hamilton Compressor Station Air Permit application given that it is located within ¼ mile of the Compressor Station. A Permit Determination Form for the Hamilton Dehydration Station was submitted to the WVDEP in August 2014 and reviewed/approved by the WVDEP on October 2, 2014 under Determination No. PD14-064 (Plant ID No. 061-00206). Other proposed major equipment on site will include one 30 barrel waste oil tank, three 500 gallon engine lube oil make-up tanks, three 500 gallon compressor lube oil tanks, two 30 barrel engine coolant tanks, and a 335 gallon methanol storage/containment tank. Existing equipment associated with the Dehydration Unit is provided in Section 1.1.2.

1.1.1 Compressor Engines

M3 AGS is proposing to install three (3) natural gas-fired reciprocating engines (CAT G3606 Units) to compress the natural gas to main gathering system pressures. The engines will be 4-stroke, lean burn, spark ignition engines each rated at 1775 hp and equipped with oxidation catalyst for control of carbon monoxide (CO), volatile organic compound (VOC), and formaldehyde (HCHO) emissions.

1.1.2 Dehydration Equipment

Wet compressed gas from the Hamilton compressors enters the dehydration equipment. The wet gas is passed through an Exterran 60-inch by 10-foot inlet separator. It is then passed through an Exterran 75 MMSCFD Dehydration Skid (Dehy), followed by an Exterran 60-inch by 10-foot Dehy After Scrubber. Once the gas passes through the Dehy After Scrubber, it proceeds to a 24-inch pipeline at 900 to 1125 psig, at a rate of 50-75 MMSCFD. The dehydrated gas is also used for fuel gas for the Compressor engines. Water rich triethylene glycol (TEG) enters a reboiler rated at 1.5 MMBTU/hr where water evaporation occurs. After evaporation occurs in the reboiler, water lean TEG re-enters the Dehy with fresh make-up TEG from the glycol storage tank. Water not evaporated in the reboiler is separated from the gas at two different locations, the inlet separator and the Dehy. Wet gas entering the facility passes through the inlet separator and water droplets present in the influent stream separate from the gas. This water is stored in a 12-foot diameter by 20-foot high (400 barrel) API12F Produced Water Tank (PWT). Most water, which is not absorbed by TEG, separates from the product gas in the Dehy and is stored in the PWT. A 500 gallon TEG make up tank is also present. In addition to the Dehy equipment, an 85 HP generator provides power to instrumentation and electrical equipment.

1.1.3 Storage Tanks

The Hamilton Compressor Station will include 12 storage tanks as follows. Only T02 (Methanol) is expected to have VOC emissions although they will be minimal. The other tanks consist of lube oils for both the engine and compressor on the Compression Units, engine coolant which consist of a 50% ethylene glycol and water mix, or wastes of each. All tanks will have secondary containment.

- T01 – Waste Lube Oil – 30 barrel
- T02 – Methanol 335 gallons
- T03 – Coolant Make Up Tank – 30 barrel
- T04 – Coolant Drain Tank – 30 barrel
- T05 – Engine Lube Oil for CE-1 – 500 gallon
- T06 – Compressor Lube Oil for CE-1 – 500 gallon
- T07 – Engine :Lube Oil for CE-2 – 500 gallon
- T08 – Compressor Lube Oil for CE-2 – 500 gallon
- T09 – Engine Lube Oil for CE-3 – 500 gallon
- T10 - Compressor Lube Oil for CE-3 – 500 gallon
- T11 (T-421 on PFD) – Produced Water Tank – 400 bbl

- T12 (T-301 on PFD) – TEG Storage Tank – 500 gallon

1.1.4 Generator(s)

There will be one small natural gas driven Generator set (GE-1) that will be required for electrical instrumentation and control purposes for the compression equipment. The Genset will be a Gillette Generator natural gas driven 126 HP unit. In addition a 250 KW generator is presently used for electric needs for the existing Dehy equipment.

1.1.5 Miscellaneous Equipment

Other equipment located at the compressor station includes piping, separators, gas scrubbers, filters, valves, and meters. None of this equipment is expected to be a significant source of air emissions although are considered as part of the evaluation of fugitive emissions.

1.2 Application Organization

This Rule 13 application is organized as follows to ensure it matches up with the application form:

- Section 1 – Introduction
- Section 2 – Sample Emission Calculations
- Section 3 – Rule 13 Application Forms;
- Attachment A - Business Certificate;
- Attachment B - Map;
- Attachment C - Installation and Start Up Schedule;
- Attachment D - Regulatory Discussion;
- Attachment E - Plot Plan;
- Attachment F - Detailed Process Flow Diagram;
- Attachment G - Process Description;
- Attachment I - Emission Units Table;
- Attachment J - Emission Points Data Summary Sheet;
- Attachment K - Fugitive Emissions Data Summary Sheet;

- Attachment L - Emissions Unit Data Sheets;
- Attachment M - Air Pollution Control Device Sheet;
- Attachment N - Supporting Emission Calculations;
- Attachment O - Monitoring/Recordkeeping/Reporting/Testing Plans;
- Attachment P – Public Notice;
- Attachment S - Title V Revision Information – Not Applicable;
- Application Fee

2 Sample Emission Calculations and Discussion

The characteristics of air emissions from the Hamilton Compressor Station, along with the methodology used for calculating emissions from the proposed new sources, are described in narrative form below. Detailed supporting calculations are also provided in Attachment N.

Emissions from the Hamilton Compressor Station will result from the natural gas combustion in the compressor engines, TEG dehydration unit reboiler and process emissions, natural gas combustion for the generator, and flashing, working, and breathing losses from the storage tanks. In addition, fugitive emissions from component leaks will result from the operation of the station. The methodologies employed in calculating emissions from these sources have been summarized below, with specific citations included in Attachment N.

2.1 Compressor Engines

Potential emissions of nitrogen oxides (NOX), CO, VOC, formaldehyde are calculated using factors provided by the engine and catalyst manufacturer. Potential emissions of sulfur dioxide (SO2), particulate matter (PM/PM10/PM2.5), and all other hazardous air pollutants (HAPs) are calculated using U.S. EPA's AP-42 factors for four stroke lean burn engines. Potential emissions of greenhouse gas pollutants (GHGs) are calculated using manufacturer's data as available (CO2 and CH4 in this case) and U.S. EPA's emission factors from 40 CFR Part 98, Subpart C for all others.

2.2 Dehydration Process Equipment

Potential emissions of HAPs, VOC, and methane from the dehydration units are calculated using GRI-GLY Calc. This includes combustion emissions from routing the Flash Tank gas to the Reboiler burner and routing the Still Vent through a JATCO BTEX unit to separate any liquids from vapors and gas.

2.3 Reboiler

Potential emissions of all criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas combustion equipment. These calculations assume a site-specific heat content. Greenhouse gas emissions are calculated according to 40 CFR 98 Subpart C.

2.4 Generator(s)

Potential emissions of NOX, CO, VOC, methane, and CO2 are calculated using manufacturer's emission data. Emissions of all other criteria pollutants and HAPs are calculated using U.S. EPA's AP-42 factors for natural gas internal combustion engines. These calculations use site specific heat content.

2.5 Storage Tanks

Working, standing, and flash loss emissions of VOC and HAPs from the methanol storage tanks are calculated using E&P Tank v4.09. Liquid loading emissions are calculated using EPA AP-42 emission factors. No other VOC or HAP emissions are expected from the other storage tanks.

2.6 Fugitive Emissions

Emissions from fugitive equipment leaks are calculated using published EPA emission factors and 40 CFR Part 98, Subpart W emission factors. Emissions from blowdown events are calculated using engineering estimates of the amount of gas vented during each event. Site specific gas analyses were used to speciate VOC, HAP, and GHG emissions.

3 WVDEP Rule 13 Application

The following WVDEP permit application forms contained in this application include all applicable R13 application forms including the required attachments per 45CSR13.

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

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

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

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

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

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

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

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

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

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
M3 Appalachia Gathering, LLC

2. Federal Employer ID No. ***(FEIN):***
45-0718671

3. Name of facility *(if different from above):*
Hamilton Compressor Station

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

5A. Applicant's mailing address:
742 Fairmont Rd, Suite E Westover, WV 26501

5B. Facility's present physical address:
Access Road off 3030 Daybrook Road Fairview, WV 26570

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**

- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

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

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**

- If **YES,** please explain: Owner/Operator

- If **NO,** you are not eligible for a permit for this source.

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

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

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

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

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

12A.

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

See Attachment B

12.B. New site address (if applicable): **Access Road off 3030 Daybrook Road Fairview, WV 26570**	12C. Nearest city or town: **Fairview, WV**	12D. County: **Monongalia**
12.E. UTM Northing (KM): **4388.0417**	12F. UTM Easting (KM): **568.1639**	12G. UTM Zone: **17**

13. Briefly describe the proposed change(s) at the facility:
Site will operate as a natural gas compressor station.

14A. Provide the date of anticipated installation or change: **02/01/2016** – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /	14B. Date of anticipated Start-Up if a permit is granted: **04/01/2016**

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

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

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

17**. Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18**. Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

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

– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**

– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

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

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

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

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

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

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

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

☐ Bulk Liquid Transfer Operations
☐ Chemical Processes
☐ Concrete Batch Plant
☐ Grey Iron and Steel Foundry
☐ Haul Road Emissions
☐ Hot Mix Asphalt Plant
☐ Incinerator
☐ Indirect Heat Exchanger
☐ Quarry
☐ Solid Materials Sizing, Handling and Storage Facilities
☒ Storage Tanks
☒ General Emission Unit, specify: **Compressor Engines & Dehy**

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

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

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

☒ Other Collectors, specify Oxidation catalyst for compressor engines, JATCO BTEX unit for TEG Dehy Unit (utilize condenser and reboiler/burner for overhead vapors/gases).

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

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33**. Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

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

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

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

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ DATE: 12/2/2015

(Please use blue ink) *(Please use blue ink)*

35B. Printed name of signee: **James C. Roberts**		35C. Title: **VP, Environmental Health and Safety**
35D. E-mail: **j.roberts@m3midstream.com**	36E. Phone: **970-769-1955**	36F. FAX:
36A. Printed name of contact person (if different from above):		36B. Title:
36C. E-mail:	36D. Phone:	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

☒ **Attachment A: Business Certificate**
☒ **Attachment B: Map(s)**
☒ **Attachment C: Installation and Start Up Schedule**
☒ **Attachment D: Regulatory Discussion**
☒ **Attachment E: Plot Plan**
☒ **Attachment F: Detailed Process Flow Diagram(s)**
☒ **Attachment G: Process Description**
☒ **Attachment H: Material Safety Data Sheets (MSDS)**
☒ **Attachment I: Emission Units Table**
☒ **Attachment J: Emission Points Data Summary Sheet**
☒ **Attachment K: Fugitive Emissions Data Summary Sheet**
☒ **Attachment L: Emissions Unit Data Sheet(s)**
☒ **Attachment M: Air Pollution Control Device Sheet(s)**
☒ **Attachment N: Supporting Emissions Calculations**
☒ **Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**
☒ **Attachment P: Public Notice**
☐ **Attachment Q: Business Confidential Claims**
☐ **Attachment R: Authority Forms**
☐ **Attachment S: Title V Permit Revision Information**
☒ **Application Fee**

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

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

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

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

4 Attachments

The following Attachments are provided to supplement the Rule 13 Application and include all data required for all emission sources.

- **Attachment A: Business Certificate**

WEST VIRGINIA
STATE TAX DEPARTMENT

BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
M3 APPALACHIA GATHERING, LLC
600 TRAVIS ST 4910
HOUSTON, TX 77002-3025

BUSINESS REGISTRATION ACCOUNT NUMBER: **2252-1954**

This certificate is issued on: **06/28/2011**

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered
to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued.

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS:Must have a copy of this certificate displayed at every job site within West Virginia.

atL006 v.4
L0630373504

STATE OF WEST VIRGINIA
State Tax Department, Tax Account Administration Div
P. 0. Box 2666
Charleston, WV 25330-2666

Earl Ray Tomblin, Governor

Craig A. Griffith, Tax Commissioner

M3 APPALACHIA GATHERING, LLC
1099 MAIN AVE STE 210
DURANGO CO 81301-5157

Letter Id: L0630373504
Issued: 06/2812011
Account#: 2252-1954

RE: Business Registration Certificate

The West Virginia State Tax Department would like to thank you for registering your business. Enclosed is your Business Registration Certificate. This certificate shall be permanent until cessation of business or until suspended, revoked or cancelled. Changes in name, ownership or location are considered a cessation of business; a new Business Registration Certificate and applicable fees are required. Please review the certificate for accuracy.

This certificate must be prominently displayed at the location for which issued. Engaging in business without conspicuously posting a West Virginia Business Registration Certificate in the place of business is a crime and may subject you to fines per W.Va. Code§ 11-9.

When contacting the State Tax Department, refer to the appropriate account number listed on the back of this page. The taxes listed may not be all the taxes for which you are responsible. Account numbers for taxes are printed on the tax returns mailed by the State Tax Department. Failure to timely file tax returns may result in penalties for late filing.

Should the nature of your business activity or business ownership change, your liability for these and other taxes will change accordingly.

To learn more about these taxes and the services offered by the West Virginia State Tax Department, visit our web site at www.wvtax.gov.

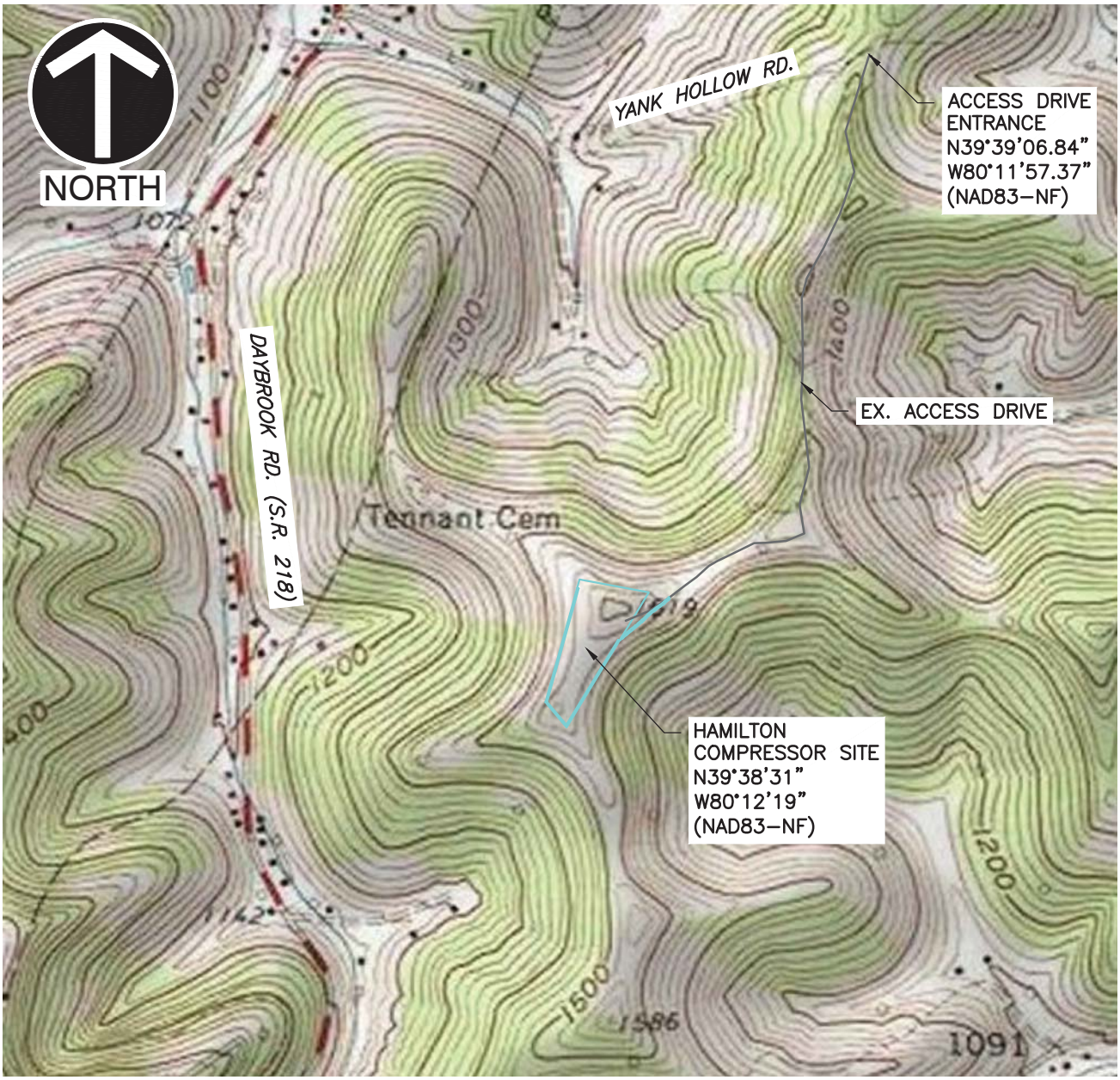
Enclosure

atL006 v.4

Save a stamp and your time. You can now view, file and pay taxes at https://mytaxes.wvtax.gov
More taxes will be available for online access in the future.

TAX	FILING FREQUENCY	ACCOUNT NUMBER
Business Registration Tax		2252-1954
Combined Sales & Use Tax	Monthly	2255-1205
Pass Through Entity Tax	Annual	2255-1194
Severance Tax	Quarterly	2255-1210
WC/Additional Severance Tax	Quarterly	2255-1211

- **Attachment B: Map(s)**



USGS 7.5 MIN. TOPOGRAPHIC QUADRANGLE BLACKSVILLE, WV, DATED 1978.

SCALE IN FEET

0 1000' 2000'

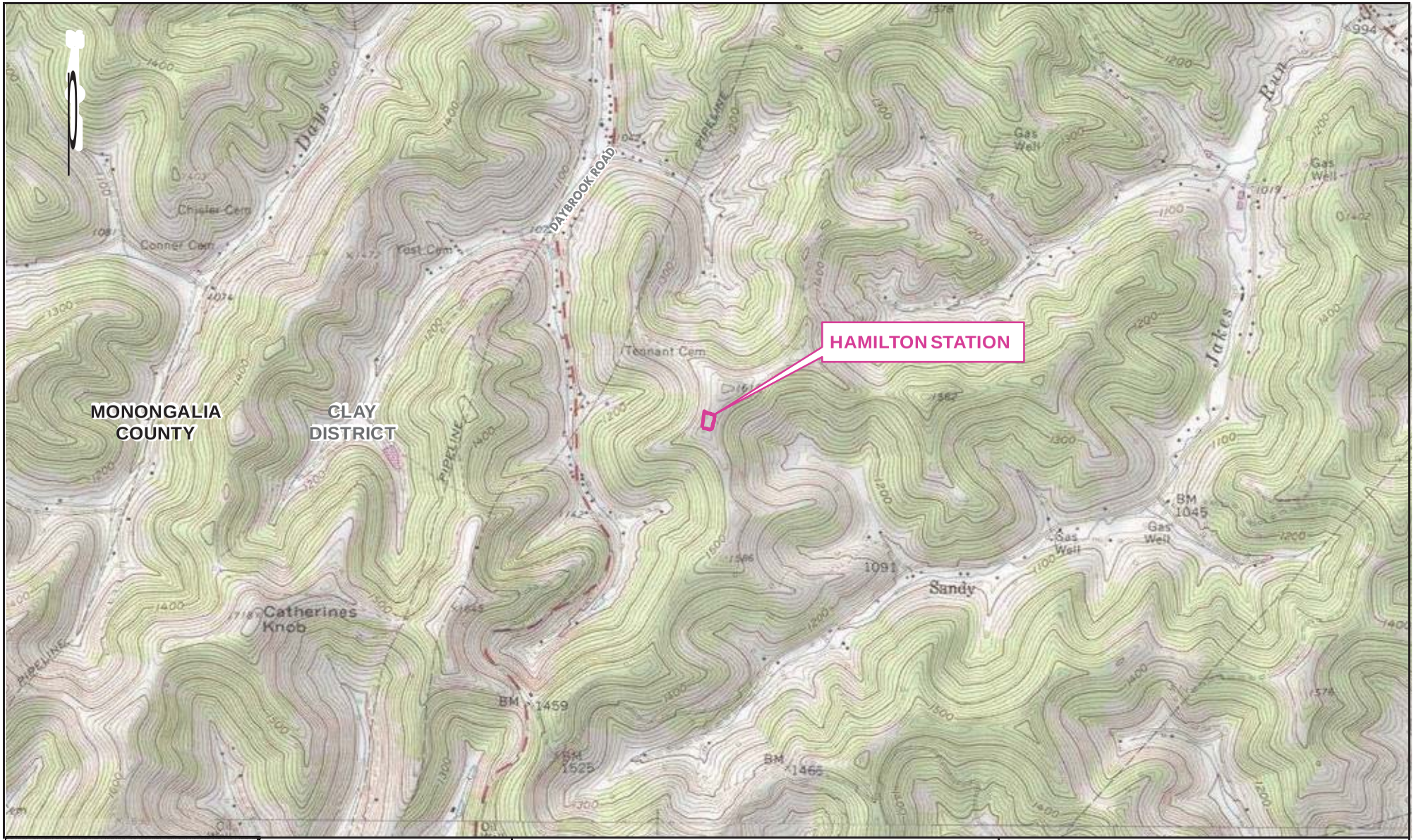
*HAND SIGNATURE ON FILE

Civil & Environmental Consultants, Inc.
250 Old Wilson Bridge Road · Suite 250 · Worthington, OH 43085
614-540-6633 · 888-598-6808
www.cecinc.com

M3 APPALACHIA GATHERING SYSTEM, LLC.
HAMILTON COMPRESSOR SITE
(AFE: A15-397)
MONONGALIA COUNTY, WV

USGS EXHIBIT

DRAWN BY:	BAB	CHECKED BY:	AAG	APPROVED BY:	*AAG	FIGURE NO.:	1
DATE:	JULY 2015	DWG SCALE:	1"=1000'	PROJECT NO:	152-145		



PRO JECT LO CATIO N

MO NO NGALIA CO UNTY, W EST VIRGINIA

REFERENCE: USGS 7.5' TO PO GRAPHIC QUADRANGLE: BLACKSVILLE (1978), W EST VIRGINIA, O BTAINED THRO UGH ESRI USA TO PO MAPS, NATIO NAL GEO GRAPHIC TO PO , AND USGS, ACCESSED 08/2014.

LEGEND

- FACILITY
- CO UNTY BO UNDARY
- DISTRICT BO UNDARY

0 1,000 2,000 4,000 Feet

FIGURE 1
PRO JECT LO CATIO N MAP

gai consultants

HAMILTO N DEHYDRATIO N FACILITY PRO JECT
M3 APPALACHIA GATHERING, LLC

DRAW N BY: SW W | DATE: 8/4/2014
CHECKED: AMS | APPRO VED: CET

Z:\Energy\2014\C141137.00 - M3 - Ha m ilton Pipeline P\GIS\MX D\PRO JECT_LO CATIO N_MAP_2014_08_01.m x d

Hamilton Directions:

From Morgantown, WV, drive on US-19 N/WV-7 W/ Monongahela Boulevard.
Make a slight right onto US-19 N/ WV-7 W and drive for approximately 1.6 miles.
Turn left onto WV-7 W (Mason Dixon Hwy) and drive for approximately 5.2 miles.
Turn left onto Pedlar Run Road and drive for approximately 0.6-mile.
Turn right onto Co Rd 37/1/Jessel Tennant Hill Road/Henderson Ridge Road and drive for approximately 2.1 miles.
Continue onto Long Drain Road for approximately 0.1-mile.
Turn left onto Mooresville Road and drive for approximately 0.3-mile.
Turn left onto Jakes Run Road and drive for approximately 2.8 miles.
Turn right onto Statler Run Road and drive for approximately 3.7 miles.
Continue onto WV-218N/Guston Run Road/Daybrook Road and drive for 0.8-mile until arriving to access road at 3030 Daybrook Road.

- **Attachment C: Installation and Start-Up Schedule**

Emission Unit	Installation Schedule	Start-up Schedule
CE-1, CE-2, CE-3 **Three (3) 1775 HP G3616 engine/compressor units**	**4/1/2016**	**6/1/2016**
GE-1 One (1) 126 HP Genset	**4/1/2016**	**6/1/2016**
T01 - T10 Ten (10) Storage Tanks	**4/1/2016**	**6/1/2016**
Note: Dehy Equipment not included – previously started up via Permit determination		

• Attachment D: Regulatory Discussion

This section documents the applicability determinations made for Federal and State air quality regulations. The monitoring, recordkeeping, reporting, and testing plan are presented in Attachment O. In this section, applicability or non-applicability of the following regulatory programs is addressed:

- Prevention of Significant Deterioration (PSD) permitting;
- Title V of the 1990 Clean Air Act Amendments;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP); and > West Virginia State Implementation Plan (SIP) regulations.

This review is presented to supplement and/or add clarification to the information provided in the WVDEP Rule 13 permit application forms. In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the Hamilton Compressor Station. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the Hamilton Compressor Station. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

Title V Operating Permit Program

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants. The combined emissions for all sources at the Hamilton Compressor Station are well below any of the major source thresholds. Therefore, the Hamilton Compressor Station is not a major source with respect to the Title V permit program and as such is not required to submit a Title V operating permit application.

New Source Performance Standards

New Source Performance Standards (NSPS), located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the

best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the Hamilton Compressor Station.

NSPS Subparts K, Ka, and Kb

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m3 (~19,813 gallons). All of the proposed storage tanks at the Hamilton Compressor Station have a capacity of 1260 gallons or less and the existing Produced Water Storage Tank storage capacity is 16,800 gallons. As such, Subparts K, Ka, and Kb do not apply to the storage tanks at the Hamilton Compressor Station.

NSPS Subparts IIII – Stationary Compression Ignition Internal Combustion Engines

This subpart applies to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines. The Hamilton Compressor Station will not have any compression ignition internal combustion engine, and therefore the requirements of this subpart do not apply.

NSPS Subparts JJJJ – Stationary Spark Ignition Internal Combustion Engines

NSPS Subpart JJJJ affects owners and operators of stationary spark ignition internal combustion engines (SI ICE) that commence construction, reconstruction or modification after June 12, 2006. Applicability dates are based on the manufacture date for new engines. The applicability dates for new engines range from July 1, 2007 to January 1, 2009, depending upon the engine horsepower (hp) and application.

40 CFR §60.4230(a)(4) states:

Owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured:

> (i) On or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500-hp (except lean burn engines with a maximum engine power greater than or equal to 500-hp and less than 1,350-hp);
>
> (ii) On or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500-hp and less than 1,350-hp;

(iii) On or after July 1, 2008, for engines with a maximum engine power less than 500-hp; or

(iv) On or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 kW (25-hp).

The compressor engines proposed for installation at the Hamilton Compressor Station are four stroke lean burn engines (each rated at 1775 HP) that were manufactured after July 1, 2007, and therefore NSPS JJJJ is applicable. Based on the engine manufacturer's specifications and the specifications for the associated catalyst, the engine complies with the emissions standards contain in 40 CFR §60.4233(e). M3 AGS will operate the engine according to the manufacturer's recommended practices and demonstrate compliance with the requirements specified in 40 CFR §60.4244 (testing methods) and 40 CFR§60.4243(b)(2) (maintenance plan/records and performance testing frequency) for non-certified affected SI ICE at the facility. Initial notification of construction commencement will be submitted as required in 40 CFR §60.7(a)(1) and §60.4245(c), and performance testing results will be reported as required in 40 CFR § 60.4245(d).

NSPS Subpart OOOO—Crude Oil and Natural Gas Production, Transmission, and Distribution

Subpart OOOO – Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution, applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. This NSPS was published in the Federal Register on August 16, 2012, with an effective date of October 15, 2012. The list of potentially affected facilities includes:

- Gas wells
- Centrifugal compressors
- Reciprocating compressors
- Pneumatic controllers
- Storage vessels
- Equipment (as defined in §60.5430) located at onshore natural gas processing plants
- Sweetening units located onshore that process natural gas produced from either onshore or offshore wells

The Hamilton Compressor Station does not include gas wells or centrifugal compressors; therefore, the only potentially applicable requirements are those for reciprocating compressors, storage vessels, and pneumatic controllers. Rule applicability for each of these affected categories is discussed below.

Reciprocating Compressors- 40 CFR 60.5385 requires owners and operators of affected reciprocating compressors to change the rod packing prior to operating 26,000 hours or prior to 36 months since start up or the last packing replacement. M3 AGS will comply with this requirement for the proposed compressors.

Storage Vessels – M3 AGS will not be installing any produced fluid tanks at the Hamilton Compressor Station and only one (1) 335 gallon methanol tank that has potential for VOC emissions. Potential VOC emissions from the 335 gallon methanol tank are less than 6 tpy. As such, the tank will not be a storage vessel affected facilities under this rule.

Pneumatic Controllers – The pneumatic controllers that will be installed will be potentially subject to NSPS OOOO. Per 60.5365(d)(2), a pneumatic controller affected facility is a single continuous bleed natural gas driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh. No pneumatic controllers installed will meet the definition of a pneumatic controller affected facility. Therefore, these units are not subject to the requirements of Subpart OOOO.

Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for natural gas operations (Subpart OOOO), internal combustion engines (Subparts IIII and JJJJ), and associated equipment (Subparts D-Dc, KKKK, and K-Kb), the applicability of a particular NSPS to the Hamilton Compressor Station can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to natural gas compressor stations.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

Part 63 NESHAP allowable emission limits are established on the basis of a maximum achievable control technology (MACT) determination for a particular major source. A HAP major source is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. The Hamilton Compressor Station will be an Area (minor) source of HAP since its potential emissions of HAP are less than the 10/25 major source thresholds. NESHAP apply to sources in specifically regulated industrial source categories (Clean Air Act Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type:

- 40 CFR Part 63 Subpart HH – Oil and Natural Gas Production Facilities
- 40 CFR Part 63 HHH – Natural Gas Transmission and Storage Facilities
- 40 CFR Part 63 YYYY – Stationary Combustion Turbines
- 40 CFR Part 63 Subpart ZZZZ- Stationary Reciprocating Internal Combustion Engines (RICE) > 40 CFR Part 63
- Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers

The applicability of these NESHAP Subparts is discussed in the following sections.

40 CFR 63 Subpart HH – Oil and Natural Gas Production Facilities

This subpart applies to affected emission points that are located at facilities that are major and area sources of HAP and either process, upgrade, or store hydrocarbon liquids prior to custody transfer or that process, upgrade, or store natural gas prior to entering the natural gas transmission and storage source category. For purposes of this subpart, natural gas enters the natural gas transmission and storage source category after the natural gas processing plant, if present.

The station will process natural gas in its glycol dehydrator prior to the point of custody transfer; therefore, the provisions of NESHAP Subpart HH could apply to the Hamilton Compressor Station although the natural gas is very lean with no detectable benzene noted. The benzene emissions from the glycol dehydrator vents are less than 0.90 mega grams per year (1 tpy), therefore, the Hamilton Compressor Station is exempt from the requirements of NESHAP Subpart HH pursuant to 40 CFR §63.764(e)(1)(ii), except for the requirement to keep records of the actual average natural gas flow rate or actual average benzene emissions from the dehydrator, per 40 CFR §63.774(d)(1).

40 CFR 63 Subpart HHH – Natural Gas Transmission and Storage Facilities

This standard applies to such units at natural gas transmission and storage facilities that are major sources of HAP emissions located downstream of the point of custody transfer (after processing and/or treatment in the production sector), but upstream of the distribution sector. The Hamilton Compressor Station is not a transmission facility; therefore, the provisions of NESHAP Subpart HHH do not apply to the Hamilton Compressor Station.

40 CFR 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

40 CFR §63.6590(c) states that a new or reconstructed stationary RICE located at an area HAP source must meet the requirements of NESHAP Subpart ZZZZ by meeting the requirements of NSPS Subpart JJJJ. No further requirements apply for such engines under NESHAP Subpart ZZZZ.

40 CFR 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers (Area Source Boiler MACT)

This MACT standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types. The existing reboiler at the Hamilton Compressor Station is natural gas-fired and is specifically exempt from this subpart. Therefore, the requirements of this subpart will not apply.

West Virginia SIP Regulations

The Hamilton Compressor Station is potentially subject to regulations contained in the West Virginia Code of State Regulations, Chapter 45 (Code of State Regulations).

The Code of State Regulations fall under two main categories, those regulations that are generally applicable (e.g., permitting requirements), and those that have specific applicability (e.g., PM standards for manufacturing equipment).

45 CSR 2: Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

45 CSR 2 applies to fuel burning units, defined as equipment burning fuel "for the primary purpose of producing heat or power by indirect heat transfer". The TEG Reboiler is a fuel burning unit and therefore must comply with this regulation. Per 45 CSR 2-3, opacity of emissions from this unit shall not exceed 10 percent based on a six minute block average. Per 45 CSR 2-11, units less than 10 MMBtu/hr are exempt from the PM emission requirements in this rule. The TEG Reboiler is 1.5 MMBtu/hr and therefore the PM emission requirements do not apply.

45 CSR 4: To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

According to 45 CSR 4-3:

No person shall cause, suffer, allow or permit the discharge of air pollutants which cause or contribute to an objectionable odor at any location occupied by the public.

The Hamilton Compressor Station is generally subject to this requirement. However, due to the nature of the process at the station, production of objectionable odor from the compressor station during normal operation is unlikely.

45 CSR 6: Control of Air Pollution from the Combustion of Refuse

45 CSR 6 applies to activities involving incineration of refuse, defined as "the destruction of combustible refuse by burning in a furnace designed for that purpose. For the purposes of this rule, the destruction of any combustible liquid or gaseous material by burning in a flare or flare stack, thermal oxidizer or thermal catalytic oxidizer stack shall be considered incineration." The Hamilton Compressor Station will not have any processes meeting this definition and therefore this regulation will not apply.

45 CSR 16: Standards of Performance for New Stationary Sources

45 CSR 16-1 incorporates the federal Clean Air Act (CAA) standards of performance for new stationary sources set forth in 40 CPR Part 60 by reference. As such, by complying with all applicable requirements of 40 CFR Part 60 at the Hamilton Compressor Station (discussed earlier in this attachment), M3 AGS will be complying with 45 CSR 16.

45 CSR 17: To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter

According to 45 CSR 17-3.1:

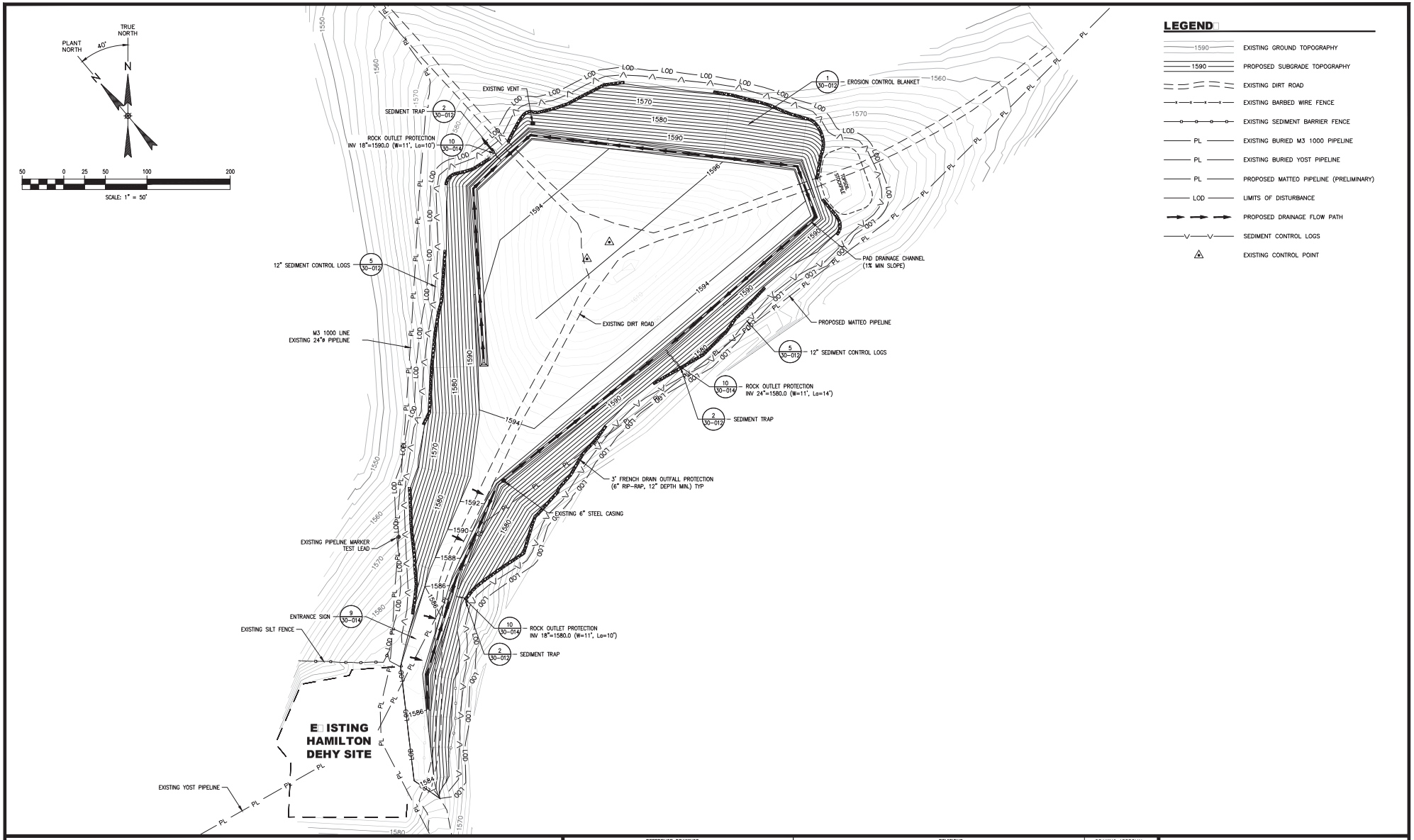
No person shall cause, suffer, allow or permit fugitive particulate matter to be discharged beyond the boundary lines of the property lines of the property on which the discharge originates or at any public or residential location, which causes or contributes to statutory air pollution.

Due to the nature of the activities at the Hamilton Station it is unlikely that fugitive particulate matter emissions will be emitted under normal operating conditions. However, M3 AGS will take measures to ensure any fugitive particulate matter emissions will not cross the property boundary should any such emissions occur.

45 CSR 21-28: Petroleum Liquid Storage in Fixed Roof Tanks

45 CSR 21-28 applies to any fixed roof petroleum liquid storage tank with a capacity greater than 40,000 gallons. The capacity of each storage tank proposed for the Hamilton Compressor Station is less than 1260 gallons and the existing Produced Water Storage Tank has a maximum capacity of 16,800 gallons. Also none of the tanks will contain petroleum liquids; therefore, 45 CSR 21-28 will not apply.

- **Attachment E: Plot Plan**



NOTES:

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							CLIENT	
							PROJECT MGMT.	
							PROCESS	
							MECHANICAL	
							PIPING	
							CHECK	
		0	ISSUED FOR CONSTRUCTION	MRJ 10/20/15	MGB 10/20/15	CAF 10/20/15		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE		

Momentum
Momentum is Midstream

APPALACHIA GATHERING SYSTEM, LLC
HAMILTON COMPRESSOR STATION
MONONGALIA CO. **E&S CONTROL PLAN** WEST VIRGINIA

DATE DRAWN	SCALE	PROJ. NO.	DWG. NO.	REV
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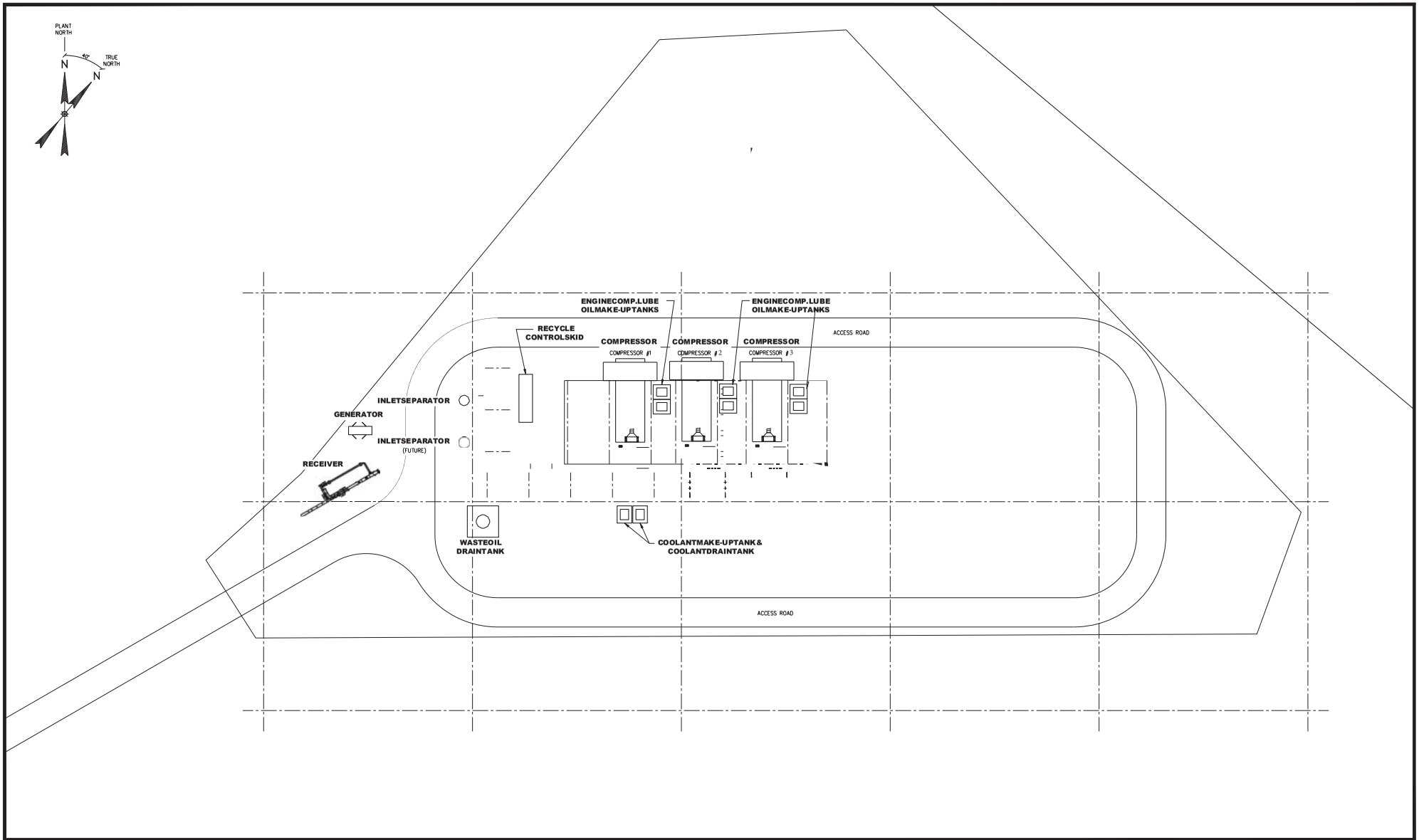
DRAWN BY: MRJ	ENGINEER: MGB	FILE: HAMCS-30-011.DWG		



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							CLIENT	
							PROJECT MGMT	
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							PIPING	
							CHECK	
		A	ISSUED FOR PERMIT	EMH 05/11/15		CAF 05/11/15		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE		

Momentum
Momentum is Midstream

APPALACHIAGATHERINGSYSTEM,LLC
HAMILTONCOMPSTATION
PERMITSITEPLAN

DATE DRAWN	SCALE	PROJ. NO.	DWG. NO.	REV
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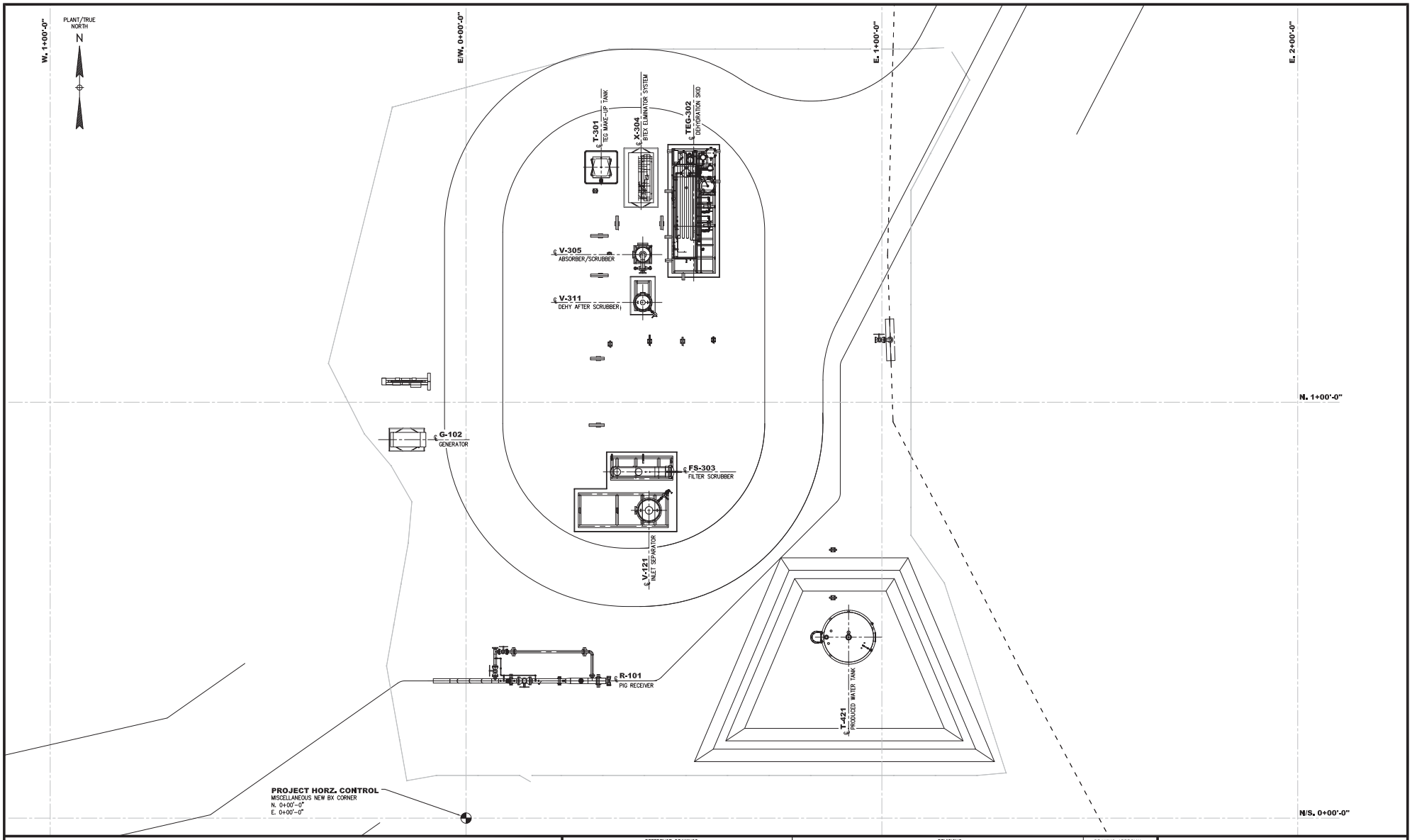
DRAWN BY: EMH	ENGINEER:	FILE: HAMCS-20-PERMIT.DWG		



NOTES:

△ = FIRE EXTINGUISHER – 20lb ABC

□ = SPILL KIT

REFERENCE DRAWINGS		REVISIONS					DRAWING APPROVAL	
							DATE	APPV'D BY
							CLIENT	
							PROJECT MGMT	
							PROCESS	
							MECHANICAL	
							PIPING	
							CHECK	
		A	ISSUED FOR REVIEW	MAH 04/07/15				
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE		

Momentum
Momentum is Midstream

APPALACHIA GATHERING SYSTEM, LLC
HAMILTON STATION
SAFETY PLAN

MONONGALIA — WEST VIRGINIA

DATE DRAWN	SCALE	PROJ. NO.	DWG. NO.	REV
08/14/14	1"=10'-0"	A14-378	HAM-20-EHS	A

DRAWN BY	ENGINEER	FILE
EMH		HAM-20-EHS.dwg

- **Attachment F: Detailed Process Flow Diagram(s)**

□-100
INLET SEPARATOR
SIZE: 60" I.D. x 10'-0" S/S
MANUF: EXTERRAN
MAWP: 1440 PSIG @ 120°F
MDMT: 4°F @ 1440 PSIG
FLOW: 76-81 MMSCFD @ 300 PSIG

□-□00
FUEL GAS SCRUBBER

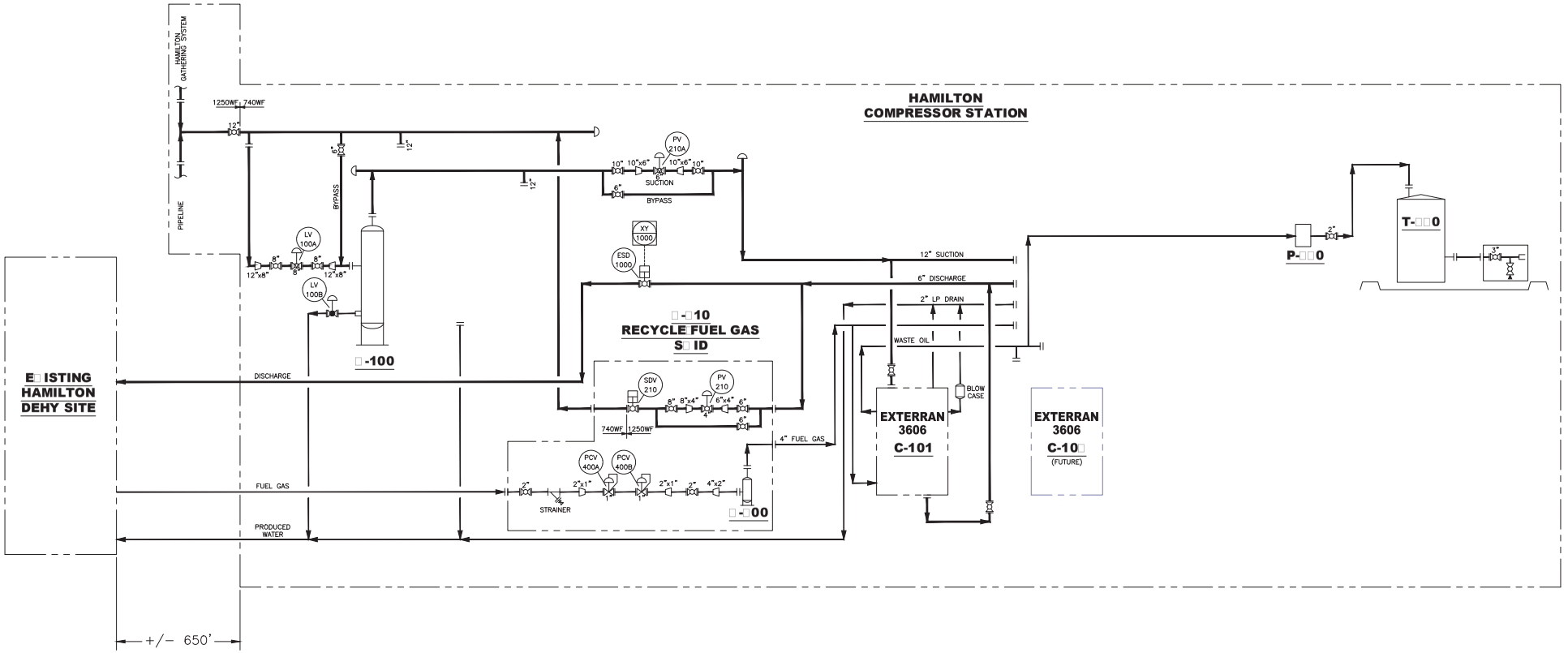
C-101
COMPRESSOR
ENGINE:
COMPRESSOR:
COOLER:

C-10□
COMPRESSOR
ENGINE:
COMPRESSOR:
COOLER:

C-10□
COMPRESSOR
ENGINE:
COMPRESSOR:
COOLER:

P-□□0
□ASTE OIL PUMP
MFR:
MODEL:
SIZE:
CAPY: GPM

T-□□0
□ASTE OIL DRAIN TAN□
(30 BBL)
SIZE: 6'-6" DIA x 5'-0" HIGH
MAUNF:
API 12F
SINGLE WALL



NOTES:

REFERENCE DRAWINGS		REVISIONS					DRAWING APPROVAL	
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							CLIENT	
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							PROCESS	
							MECHANICAL	
							PIPING	
							CHECK	
		A	ISSUED FOR PERMIT	EMH 09/11/15	CHK DATE	CAF 09/11/15		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE		

Momentum
Momentum is Midstream

APPALACHIA GATHERING SYSTEM, LLC
HAMILTON COMP STATION - BFD
STATION FLO□ DIAGRAM

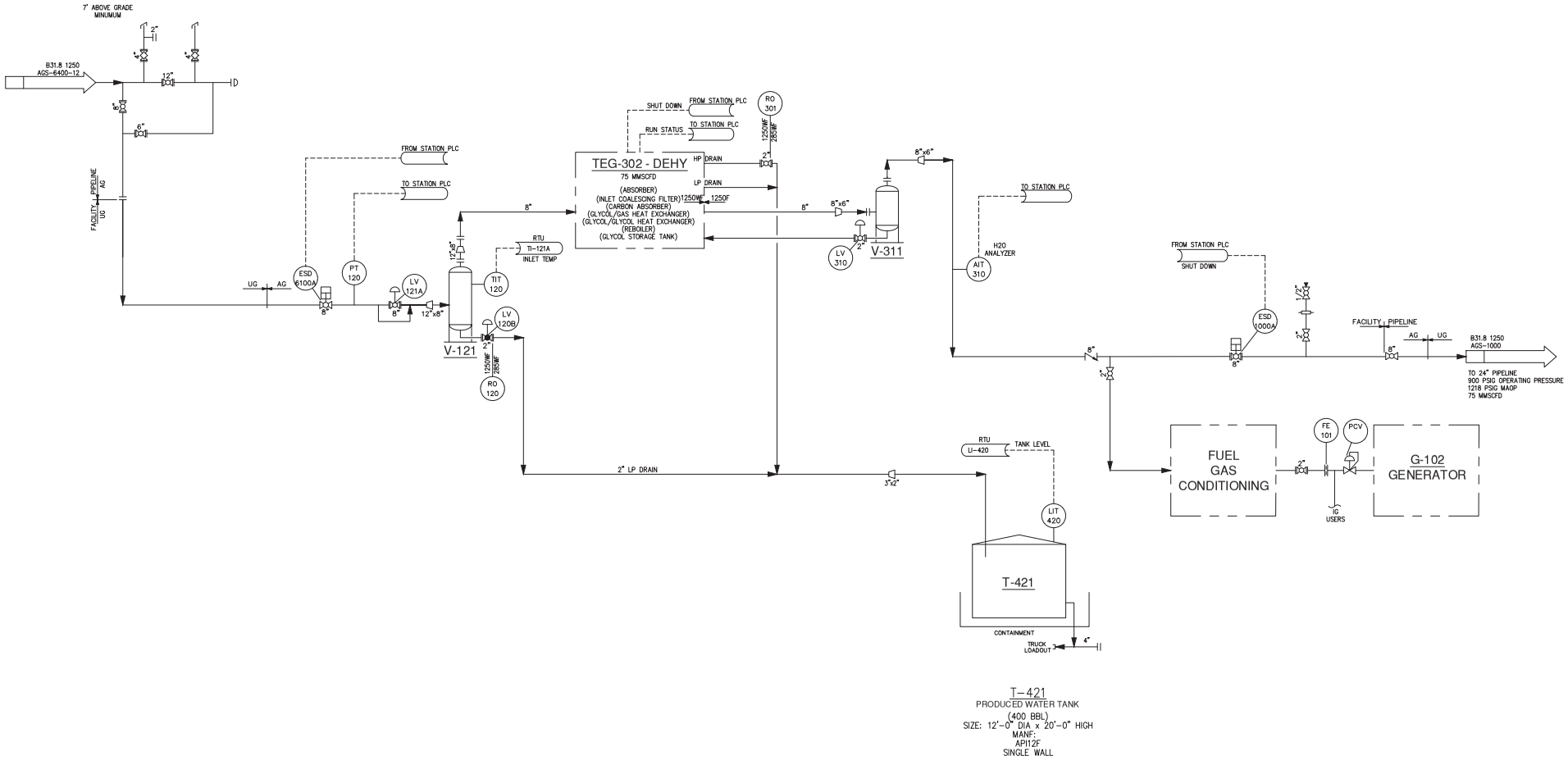
DATE DRAWN	SCALE	PROJ. NO.	DWG. NO.	REV
7/2015	NONE	A15-397	HAMCS-10-010	A
DRAWN BY: MJM	ENGINEER: RK	FILE: HAMCS-10-010.DWG		

V-121
INLET SEPARATOR
SIZE: 60" x 10'-0" S/S
MANUF: EXTERRAN
MAWP: 1440 PSIG @ 120°F
MDMT: 4°F @ 1440 PSIG
FLOW: __ MMSCFD @ ____ PSIG

TEG-302
DEHYDRATION SKID
MANF: PESCO
REGEN BURNER DUTY : 1.5MM BTU/HR
75 MMSCFD @ 900 PSIG
DESIGN: 1250 PSIG @ 120°F

V-311
DEHY AFTER SCRUBBER
SIZE: 60" x 10'-0" S/S
MANUF: EXTERRAN
MAWP: 1440 PSIG @ 120°F
MDMT: 4°F @ 1440 PSIG

G-102
GENERATOR



T-421
PRODUCED WATER TANK
(400 BBL)
SIZE: 12'-0" DIA x 20'-0" HIGH
MANF:
API12F
SINGLE WALL

NOTES:

REFERENCE DRAWINGS		REVISIONS					DRAWING APPROVAL	
							DATE	APPV'D BY
							CLIENT	
							PROJECT MGMT	
							PROCESS	
							MECHANICAL	
							PIPING	
							CHECK	
		0	ISSUED FOR CONSTRUCTION	CCN 09/22/14	RK 09/22/14	QBC 09/22/14		
DWG. NO.	TITLE	REV.	DESCRIPTION	BY DATE	CHK DATE	APPR DATE		

Momentum
Momentum is Midstream

APPALACHIA GATHERING SYSTEM, LLC
HAMILTON STATION - BFD
DEHY & UTILITIES

MONONGALIA WEST VIRGINIA

DATE DRAWN	SCALE	PROJ. NO.	DWG. NO.	REV
06/10/14	NONE	A14-378	HAM-10-010	0
DRAWN BY: CCN	ENGINEER: RK	FILE: HAM-10-010.DWG		

• Attachment G: Process Description

The Hamilton Compressor Station will compress lean wet natural gas (approximately 95-98% methane) that originates from 3rd party producers and compress the gas to pressures necessary to deliver into M3's Appalachia Gathering System (AGS) 24 inch pipeline. Between 75 MMSCFD and 100 MMSCFD of wet natural gas at approximately 300-450 psig first enters the compressor station via pipeline into a 60 inch diameter by 10 foot inlet separator. The gas then travels through a suction control valve and into the main suction header which feeds into three natural gas driven CAT G3606 engine/compressor units. The gas is compressed to 900-1125 psig and travels to the existing Hamilton Dehydration Station, for ultimate delivery into the AGS gathering system. The compressor station will be located in Monongalia County, WV, at 39° 38' 33.89" N and 80° 12' 16.72" W.

Other major equipment on site will include one 30 barrel waste oil tank, three 500 gallon engine lube oil make-up tanks, three 500 gallon compressor lube oil tanks, two 30 barrel engine coolant tanks, and a 335 gallon methanol storage/containment tank.

Wet compressed gas from the Hamilton compressors will enter the existing Hamilton dehydration equipment. The wet gas is passed through an Exterran 60-inch by 10-foot inlet separator. It is then passed through an Exterran 75 MMSCFD Dehydration Skid (Dehy), followed by an Exterran 60-inch by 10-foot Dehy After Scrubber. Once the gas passes through the Dehy After Scrubber, it proceeds to a 24-inch pipeline at 900 to 1125 psig, at a rate of 50-75 MMSCFD. The dehydrated gas is also used for fuel gas for the Compressor engines. Water rich triethylene glycol (TEG) enters a reboiler rated at 1.5 MMBTU/hr where water evaporation occurs. After evaporation occurs in the reboiler, water lean TEG re-enters the Dehy with fresh make-up TEG from the glycol storage tank. Water not evaporated in the reboiler is separated from the gas at two different locations, the inlet separator and the Dehy. Wet gas entering the facility passes through the inlet separator and water droplets present in the influent stream separate from the gas. This water is stored in a 12-foot diameter by 20-foot high (400 barrel) API12F Produced Water Tank (PWT). Most water, which is not absorbed by TEG, separates from the product gas in the Dehy and is stored in the PWT. A 500 gallon TEG make up tank is also present. In addition to the Dehy equipment, an 85 HP generator provides power to instrumentation and electrical equipment.

- **Attachment H: Material Safety Data Sheets (MSDS)**

Section 1 Identification

Manufacturer Information:

Appalachia Gas Gathering, LLC
1099 Main Ave, Suite 210
Durango, CO. 81301
(970) 247-4423
www.m3midstream.com

Emergency Phone #:

Chemtrec (800) 424-9300
Appalachia Gas Gathering (800) 873-0647

Product Identification: NATURAL GAS

Trade Name/Synonyms:
Natural Gas, Residue Gas, Fuel Gas

Chemical Family:
Aliphatic Hydrocarbon

Recommended Use/Restrictions:
Industrial

Section 2 Hazard(s) Identification

GHS Classification:
Flammable Gas, Category 1
Health, Category 2
Gas under pressure

GHS Label Elements:

Signal Word:
Danger

Hazard Statement:
Extremely flammable
Forms explosive mixtures with air

Precautionary Statement:
Asphyxiant gas, oxygen deficiency must be considered. May cause cardiac sensitization. Overexposure may cause loss of consciousness. Liquefied material may cause frostnip, frostbite and freeze burns. Keep away from heat/flames/hot surfaces.

Section 3 Composition/ Info on Ingredients

Component	Cas No.	Typical%
Methane	74-82-8	95 - 100
Ethane	74 - 84 - 0	0 - 5
Nitrogen	7727 - 37 - 9	0 - 2
Carbon Dioxide	124 - 38 - 9	0 - 2
Propane	74-98-6	0 - 2
Butane	106 - 97 - 8	Trace
Isobutane	75 - 28 - 5	Trace

*Values do not reflect absolute minimums or maximums; those values may vary from time to time.

Section 4 First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, institute cardiopulmonary resuscitation (CPR). If breathing is difficult, ensure clear airway and give oxygen. Get immediate medical attention.

Skin:
Flush area with tepid water. Do not use hot water. Do not rub affected area

Eyes:
Burns due to either hot or cold contact require immediate medical attention. Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing.

Ingestion:
Although risk of ingestion is extremely unlikely, seek immediate medical attention

Re-warming:
Initiate controlled rapid re-warming in a warm bath with a temperature between 38 to 41.1 degrees Celsius (100 to 106 degrees Fahrenheit) as quickly as possible. The temperature of the bath should be kept constant. The bath should be large enough to permit complete immersion of the cryo-injured part, avoiding contact with the sides of the bath. A whirlpool bath would be ideal. Complete re-warming generally takes about 20 minutes and may be associated with increasing pain as thawing progresses.

Immediate Symptoms:
Symptoms include headache, excitation, euphoria, dizziness, un-coordination, drowsiness, light-headedness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death.

Delayed Symptoms:
Acute or chronic overexposure to this material or its components may cause systemic toxicity, including adverse effects to the following: central nervous system, lungs, heart and testes.
This product contains asphyxiant and carbon dioxide, which may cause adverse reproductive and/or developmental effects. Pre-existing medical conditions, which may be aggravated by exposure, include disorders of the respiratory and cardiovascular systems and central nervous system.

Section 5 Fire Fighting Measures

Extinguishing Equipment:
Any extinguisher capable of handling Class B fires is recommended, including extinguishing media such as

CO2, dry chemical or foam. Water spray is recommended to cool or protect exposed materials or structures. Water may be ineffective for extinguishment, unless used under favorable conditions by experienced fire fighters. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces.

Specific Hazards:

Containers can build up pressure if exposed to heat (fire). Stay away from storage tank ends. Withdraw immediately in case of rising sound from venting safety device or any discoloration of storage tank due to fire.

Protective Equipment:

Firefighters must wear MSHA/NIOSH approved positive pressure breathing apparatus (SCBA) with full-face mask and full protective equipment.

Basic Fire Fighting Procedure:

Gas fires should not be extinguished unless flow of gas can be immediately stopped. Shut off gas source and allow gas to burn out.

If leak or spill has not ignited, ventilate area and use water spray to disperse gas or vapor and to protect personnel attempting to stop a leak.

Use water spray to cool adjacent structures and to protect personnel. Shut off source flow if possible.

Explosion Hazard(s):

Extremely flammable. Vapors form flammable or explosive mixtures with air at room temperature. Vapor or gas may spread to distant ignition sources and flash back.

Fires involving this product may release carbon monoxide, carbon dioxide, reactive hydrocarbons and irritating vapors.

Fire and Explosion Data:

Flash point: Flammable Gas

Autoignition Temperature: 900-1170^{o}F(482-632^{o}C)

Flammability: Lower 3.8% (LEL) Upper 17% (LEL)

Section 6 Accidental Release Measures

Personal Precautions:

Caution should be exercised regarding personnel safety and exposure to the released product. Notify local authorities and the National Response Center, if required.

Emergency Procedures:

Evacuate area endangered by gas. Keep ignition sources out of the area. Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind. (See Personal Protection Information Section). Isolate for ½ mile in all directions if tank, rail car or tank truck is involved in release.

Methods/Materials for Containment:

Keep ignition sources out of the area and shut off all ignition sources. Use water spray to reduce vapors. Shut off leak if safe to do so. Isolate hazard area and deny entry.

Cleanup Procedures:

Isolate area and deny entry. Remove sources of ignition. Ventilate closed in areas.

Section 7 Handling and Storage

Handling Procedures:

Avoid contact with strong oxidizers. Use non-sparking tools.

Safe Storage Procedures:

Store in tightly closed containers in a cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles. Ground lines and equipment used during transfer to reduce the possibility of

static spark-initiated fire or explosion.

Empty Containers:
Do not cut, grind, drill, weld or reuse containers unless adequate precautions are taken against these hazards. Empty containers may contain product residue. Do not reuse without adequate precautions.

Section 8 Exposure Controls/PPE

Exposure Limits:
Concentrations greater than 5000 parts per million by volume.

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

Personal Protective Equipment:
Eyes/Face: Wear safety glasses with side shields. Have eye washing facilities readily available where eye contact can occur.
Skin: Avoid skin contact with this material. Use appropriate chemical protective gloves when handling. Use good personal hygiene.

Respiratory: Ventilation and other forms of engineering controls are the preferred means for controlling exposures.
Clothing/Gloves: Wear approved FRC clothing and gloves when required.

Section 9 Physical and Chemical Properties

Boiling Point:	-259°F (-162°C) Based on Methane
Specific Gravity:	0.693
Melting Point:	-297°F (-183°C) Based on Methane
% Volatile:	ND
Vapor Pressure:	ND
Evaporation Rate (Water = 1):	Very Fast
Vapor Density (Air = 1):	0.56 Based on Methane
Viscosity:	ND
% Solubility in Water:	Slightly Soluable
Octanol/Water Partition Coefficient:	ND
Pour Point:	ND
pH:	ND
Freezing Point:	ND
Appearance/Odor:	Colorless gas under pressure with a slight hydrocarbon odor.

Section 10 Stability and Reactivity

Reactivity:
Stable
HMIS Classification for Reactivity: 0
Chemical Stability:
Incompatible with oxidizing agents. See precautions under Handling/Storage.

Possibility of Hazardous Reaction:
Combustion may produce CO, NOx, SOx, and reactive hydrocarbons.
Conditions to Avoid:
Avoid heat, flames, sparks, and other ignition sources.
Incompatible Materials:
Avoid contact with strong oxidizers.
Hazardous Decomposition:
Combustion can yield carbon dioxide, carbon monoxide, other organic compounds and non-combusted hydrocarbons.

Section 11 Toxicological Information

Routes of Exposure:
Skin: Skin absorption is unlikely**.**
Eyes: Direct contact with liquefied material may cause frostbite and permanent damage
Inhalation: Concentrations greater than 5000 parts per million by volume in air can significantly lower the effective oxygen concentration, potentially causing loss of consciousness. Consider both concentration of Sweet Natural Gas and oxygen deficiency
Ingestion: Not a normal route of exposure.
Immediate Effects:
May cause cardiac sensitization. Overexposure may cause loss of consciousness. Liquefied material may cause frostnip, frostbite and freeze burns.
Delayed Effects:
Exposure to components of Natural Gas may cause the following specific symptoms, depending on the concentration and duration of exposure: eye flickering, muscle twitching and psychomotor agitation.
Chronic Effects:
Acute or chronic overexposure to this material or its components may cause systemic toxicity, including adverse effects to the following: central nervous system, lungs, heart and testes.
Measure of Toxicity:
HMIS Classification for Health: 1
Description of Symptoms:
Symptoms include headache, excitation, euphoria, dizziness, un-coordination, drowsiness, light-headedness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death.
Target Organs:
Central nervous system, lungs, heart and testes.

Carcinogenicity:
Based on available information this product does not contain any components or chemicals currently known to the State of California to cause cancer, birth defects or reproductive harm at levels which would be subject to Proposition 65. Reformulation, use or processing of this product may affect its composition and require re-evaluation. All major components of this product are listed on the TSCA Inventory.

Section 12 Ecological Information

Aquatic Toxicity:
No ecotoxicity data are available for this product's components.
Persistence and Degradability:

Data Not Available

Mobility/Absorption:
Data Not Available
Bioaccumulative Potential:
Data Not Available

Section 13 Disposal Considerations

Disposal Methods:
Dispose of contents in accordance with local/regional/national/international regulations.
See section 7 for Handling Procedures. See section 8 for Personal Protective Equipment recommendations.

Section 14 Transport Information

General Transportation Information:	Natural gas, compressed
DOT Proper Shipping Name (49 CFR 172.101):	2.1
DOT Hazard Classes (49 CFR 172.101):	UN 1971
UN/NA Code (49 CFR 172.101):	NA
Packing Group (49 CFR 172.101):	Natural gas, compressed, 2.1, UN
Bill of Lading Description (49 CFR 172.202):	
DOT Labels Required (49 CFR 172.101):	Flammable gas
DOT Placards Required (49 CFR 172.504):	

Section 15 Regulatory Information

This product contains substances subject to accident prevention regulations when present above the threshold quantities of 10,000 pounds (Section 112 [r] of the Clean Air Act). There may be specific regulations at the local, regional or state level that pertain to this product.

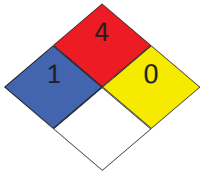
Sara Title III Information: Listed below are the hazard categories for the Superfund Amendments and Reauthorization Act (SARA) Section 311/312 (40 CRF 370):

Immediate Hazard: x Delayed Hazard: x Fire Hazard: x
Pressure Hazard: x Reactivity Hazard:

This product does not contain toxic chemicals (in excess of the applicable de minimis concentration) that are subject to the annual toxic chemical release reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313 (40 CFR 372).

Section 16 Other Information

NFPA Rating:	Health:	1
	Fire:	4
	Reactivity:	0



Manufacturer assumes no responsibility for injury to third party proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, manufacturer assumes no responsibility for injury to third party proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, third party assumes the risk in their use of the material

Revised: Feb 3, 2015

MATERIAL SAFETY DATA SHEET

Methanex Corporation encourages the user of this product to read and understand the entire MSDS, and expects the user to follow the precautions specified unless the conditions of use necessitate particular procedures or methods.

1. Identification

Product Name: Methanol
CAS Number: 67-56-1

Recommended Use: Solvent, fuel, feedstock

Prepared by: TOXI.COMM INC. 5815 Plantagenet St., Montreal, QC, H3S 2K4
Revision: March 1, 2013

Product: **Synonyms:**	**Methanol (CH_3OH)** Methanol, methyl hydrate, wood spirit, methyl hydroxide	**EMERGENCY NUMBERS** **24-hour**
Company Identification:	**Methanex Corporation** **1800 Waterfront Centre** **200 Burrard Street** **Vancouver, B.C.** **V6C 3M1** **Tel. #: (604)-661-2600** **Methanex Methanol Company** **15301 Dallas Parkway, Ste 900** **Addison, TX 75001** **Tel#: (972) 702-0909**	**CANUTEC Emergency Tel.# (613)-996-6666** (Canada) ***666 (cellular)** **OR** **CHEMTREC Emergency Tel. #: 1-800-262-8200** (Canada and USA)

2. Hazard identification

Emergency Overview

Colourless liquid, with a mild, characteristic alcohol odour when pure. Readily absorbs moisture.
Flammable liquid and vapour: Burns with a clean, clear flame, which is almost invisible in daylight, or a light blue flame. Can decompose at high temperatures forming carbon monoxide and formaldehyde. Confined space hazard.
Toxic: May be harmful if inhaled, absorbed through the skin or swallowed. Mild central nervous system depressant. May cause headache, nausea, dizziness, drowsiness, and incoordination. Severe vision effects, including increased sensitivity to light, blurred vision, and blindness may develop following an 8-24 hour symptom-free period. Coma and death may result.
Irritant: Causes eye irritation.
Possible teratogen/embryotoxin: May harm the unborn child, based on animal information.

OSHA Hazard Communication Standard
This product is a “Hazardous Chemical” as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects

Inhalation: Causes mild central nervous system (CNS) depression with nausea, headache, vomiting, dizziness, incoordination and an appearance of drunkenness. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.
Eye Contact: Moderate eye irritant.
Skin Contact: In general, primary alcohols such as methanol are not considered to be irritant to the skin. Repeated or prolonged exposure to methanol may cause dry, itchy, scaling skin (dermatitis).
Skin Absorption: Can be absorbed through the skin and cause harmful effects as described in "Inhalation" above.
Skin Sensitization: Not considered to be a sensitizer.
Respiratory Sensitization: Not considered to be a sensitizer
Ingestion: There have been reports of accidental or intentional ingestion of methanol although ingestion is not a typical route of occupational exposure. Ingestion of as little as 10 ml of methanol can cause blindness and 30 ml (1 ounce) can cause death if victim is not treated. Ingestion causes mild central nervous system (CNS) depression with nausea, headache, vomiting, dizziness, incoordination and an appearance of drunkenness. Metabolic acidosis and severe visual effects can occur following an 8-24 hour latent period. Coma and death, usually due to respiratory failure, may occur if medical treatment is not received. Visual effects may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness.

Birth Defects/Developmental Effects: has caused teratogenic and fetotoxic effects, in the absence of maternal toxicity in animal studies.
Reproductive Effects: Not considered a reproductive toxin.

3. Composition/information on ingredients

Component	CAS #	Amount%
Methanol	67-56-1	99-100

4. First-aid measures

Inhalation: Methanol is toxic and flammable. Take proper precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment and remove any sources of ignition). Remove source of contamination or move victim to fresh air, provide oxygen therapy if available. Immediately transport victim to an emergency care facility.
Skin Contact: Avoid direct contact. Wear chemical protective clothing, if necessary. As quickly as possible, remove contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately flush with lukewarm, gently flowing water for 15-20 minutes. Immediately obtain medical attention. Completely decontaminate clothing, shoes and leather goods before re-use or discard.
Eye Contact: Avoid direct contact. Wear chemical protective goggles, if necessary. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for 15-20 minutes, while

holding the eyelid(s) open. If a contact lens is present, **Do not** delay irrigation or attempt to remove the lens until flushing is done. Take care not to rinse contaminated water into the unaffected eye or onto the face. Immediately obtain medical attention.
Ingestion: Never give anything by mouth if victim is rapidly losing consciousness, is unconscious or convulsing. Have victim rinse mouth thoroughly with water. **Do not induce vomiting**. If vomiting occurs naturally, have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.
First Aid Comments: Provide general supportive measures (comfort, warmth, rest). Consult a physician and/or the nearest Poison Control Centre for all exposures.
All first-aid procedures should be periodically reviewed by a physician familiar with the material and its conditions of use in the workplace.
Note to Physicians: The severity of outcome following methanol ingestion may be more related to the time between ingestion and treatment, rather than the amount ingested. Therefore, there is a need for rapid treatment of any ingestion exposure. Both ethanol and fomepizole are effective antidotes for methanol poisoning, although fomepizole is preferred.

5. Fire-fighting measures

Suitable Extinguishing Media: Synthetic Fire fighting foam AR-FFF (3% solution), carbon dioxide, dry chemical powder, water spray or fog. Water may be effective for cooling, diluting, or dispersing methanol, but may not be effective for extinguishing a fire because it will not cool methanol below its flash point. Fire-fighting foams, such as multipurpose alcohol-resistant foams, are recommended for most flammable liquid fires. If water is used for cooling, the solution will spread if not contained. Mixtures of methanol and water at concentrations greater than 20% methanol can burn.

Special Hazards Arising from the Chemical
Hazardous Combustion Products: During a fire, carbon monoxide, carbon dioxide and irritating and toxic gases such as formaldehyde may be generated.
Unusual Fire and Explosion Hazards: Can accumulate in confined spaces, resulting in a toxicity and flammability hazard. Closed containers may rupture violently and suddenly release large amounts of product when exposed to fire or excessive heat for a sufficient period of time. Flame may be invisible during the day. The use of infrared and or heat detection devices is recommended.

Advice for Firefighters
Fire-Fighting Procedures: Evacuate area and fight fire from a safe distance or protected location. Approach fire from upwind. Cool fire-exposed containers, tanks or equipment by applying hose streams.
Special Protective Equipment for Firefighters: Full face, positive pressure, self-contained breathing apparatus (NIOSH approved or equivalent) or airline and appropriate chemical protective fire-fighting clothing.
NOTE: The use of cartridge masks is NOT recommended.

6. Accidental release measures

Personal Precautions, Protective Equipment and Emergency Procedures: Restrict access to area until completion of cleanup. Ensure cleanup is conducted by trained personnel only. Wear adequate personal protective equipment. Extinguish or remove all sources of ignition. Notify government occupational health and safety and environmental authorities.

Methods and Materials for Containment and Cleaning up: Do not touch spilled material. Prevent material from entering sewers, waterways or confined spaces. Stop or reduce leak if safe to do so. Contain spill with earth, sand, or absorbent material which does not react with spilled

material. Remove liquid by intrinsically safe pumps or vacuum equipment designed for vacuuming flammable materials (i.e. equipped with inert gases and ignition sources controlled). Place in suitable, covered, labelled containers.
SMALL SPILLS: Soak up spill with absorbent material which does not react with spilled chemical. Put material in suitable, covered, labelled containers. Flush area with water.
Contaminated absorbent material may pose the same hazards as the spilled product.
LARGE SPILLS: If necessary, contain spill by diking. Alcohol resistant foams may be applied to spill to diminish vapour and fire hazard. Collect liquid with explosion proof pumps.

7. Handling and storage

Precautions for Handling: No smoking or open flame in storage, use or handling areas. Use explosion proof electrical equipment. Ensure proper electrical grounding and bonding equipment procedures are in place.

Storage: Store this material in a cool, dry, well-ventilated area away from oxidizing materials and corrosive atmospheres, in a fireproof area. Keep amount in storage to a minimum.
Storage area should be clearly identified, clear of obstruction and accessible only to trained and authorized personnel. It is recommended that storage procedures be evaluated using NFPA 70E standard and NFPA 497 practice. Do not store below ground level, or in confined spaces. Have appropriate fire extinguishers and spill cleanup equipment in or near storage area. Store away from strong oxidizers, mineral acids and metals. See Section 10, **Stability and reactivity** for more information.
Ground and bond all containers and storage vessels. Store away from heat and ignition sources and out of direct sunlight. Post storage area as a “No Smoking” area.

8. Exposure controls/personal protection

Exposure Limits
ACGIH

Time-Weighted Average (TLV-TWA):	200 ppm - Skin
Short-Term Exposure Limit (TLV-STEL):	250 ppm - Skin
TLV Basis - Critical Effect(s):	Headache; Eye damage; Dizziness; Nausea

Personal Protection
Eye/face Protection: Chemical safety goggles. A face shield may also be necessary.
Skin Protection: Chemical protective gloves, coveralls, boots, and/or other chemical protective clothing. Safety shower/eye-wash fountain should be readily available in the immediate work area.
Hand protection: Butyl or Viton ®. Since methanol is recognized as a skin absorption hazard, check with glove manufacturers for appropriate glove material, thickness and resistance to breakthrough.
Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. Use an approved positive-pressure full-face self-contained breathing apparatus or a full-face supplied air respirator. The person wearing the respirator should be medically approved, fit tested and trained to operate the breathing apparatus.

Engineering Controls
Ventilation: Engineering methods to control hazardous conditions are preferred. Methods include

mechanical (local exhaust) ventilation, process or personnel enclosure and control of process conditions. Administrative controls and personal protective equipment may also be required. Because of the high potential hazard associated with this substance, stringent control measures such as enclosure (closed handling systems) should be considered. To reduce the fire/explosion hazard, consider the use of an inert gas in the process system.
Use approved explosion-proof equipment and intrinsically safe electrical systems in areas of use.
For large-scale operations, consider the installation of leak and fire detection equipment along with a suitable, automatic fire suppression system.
Use a non-sparking, grounded, ventilation system separate from other exhaust ventilation systems. Exhaust directly to the outside.
Supply sufficient replacement air to make up for air removed by exhaust system.

9. Physical and chemical properties

Appearance: Liquid, clear, colourless
Odour: Mild characteristic alcohol odour
Odour Threshold: detection: 4.2 - 5960 ppm
(geometric mean) 160 ppm
recognition: 53 – 8940 ppm
(geometric mean) 690 ppm
pH: Not applicable
Freezing Point: -97.8°C
Boiling Point: 64.7°C
Boiling Range: Not determined
Flash Point: 11.0^{o}C
Solubility: Completely soluble
Partial Coefficient: Log P (oct) = -0.82
Vapour Pressure: 12.8 kPa @ 20°C
Viscosity: 0.3 cP@ 25°C
Upper Explosive Limit (UEL): 36.5 %
Lower Explosive Limit (LEL): 6%
Auto Ignition Temperature: 464°C
Solvent Solubility: Soluble in all proportions in ethanol, benzene, other alcohols, chloroform, diethyl ether, other ethers, esters, ketones and most organic solvents
Critical Temperature: 239.4°C
Specific Gravity: 0.791-0.793 @ 20°C
Evaporation Rate: 4.1 (n-butyl acetate =1)
Vapour Density: 1.105 @ 15°C (air = 1)
Decomposition Temperature: Not determined
Sensitivity to Impact: No
Sensitivity to Static Charge: Low
Percent Volatility: 100

10. Stability and reactivity

Chemical Stability: Stable as supplied.
Possibility of Hazardous Reactions: Polymerisation will not occur
Conditions to Avoid: Heat, open flames, static discharge, sparks and other ignition sources.
Incompatible Materials: Avoid contact with strong oxidizers, strong mineral or organic acids, and strong bases. Contact with these materials may cause a violent or explosive reaction.
Methanol is not compatible with gasket and O-rings materials made of Buna-N and Nitrile.
Methanol is corrosive to type 12L14 carbon steel at room temperature and type 3003 aluminum,

copper (10-100% methanol solution) and admiralty brass, at 93 deg C. Methanol is not corrosive to most metals.
Methanol attacks some forms of plastic, rubber and coatings.
Hazardous Decomposition Products: Decomposes on heating to produce carbon monoxide and formaldehyde.

11. Toxicological information

Acute toxicity
Ingestion
LD50 (oral, rat): 5600 mg/kg
LD50 (oral, rabbit): 14200 mg/kg
Dermal
LD50 (dermal, rabbit): 15800 mg/kg
Inhalation
LC50 (rabbit): 81000 mg/m^3/14h
LC50 (rat): 64000 ppm/4h
Eye Damage/Irritation
Moderate eye irritant.
Skin Corrosion/Irritation
Not considered to be an irritant.
Sensitization
Not considered to be a sensitizer.
Repeated Dose Toxicity
No relevant data found
Chronic Toxicity and Carcinogenicity
Not listed by IARC, NTP, ACGIH OR OSHA as a carcinogen.
Teratogenicity, Embryotoxicity and/or Fetotoxicity
Methanol has produced fetotoxicity in rats and teratogenicity in mice exposed by inhalation to high concentrations that did not produce significant maternal toxicity.
Reproductive Toxicity
Not considered to be a reproductive toxin.
Mutagenicity
There is insufficient information available to conclude that methanol is mutagenic.

12. Ecological information

LC50 (96h, fish): 15400 -29400 mg/l
EC50 (48h, daphnia): > 10000 mg/l
EC50 (72h, algae): 22000 mg/l Selenastrum carpricornutum (*Pseudokichnerela subcapitata*)

Persistence and degradability
Readily biodegradable
Bioaccumulation
Does not bioaccumulate. Partition coefficient: n-octanol/water 0.77
Mobility in Soil
Mobile in soils
PBT/vPvB

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT). This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

Terrestial Fate

The mobility of methanol in the subsurface will not be significantly limited by adsorption. Sorption of methanol to organic carbon in soil will be minor, and methanol will tend to remain in soil pore water.

Aquatic Fate

Methanol is completely miscible with water. Accordingly, its mobility in the subsurface will not be limited by solubility. Methanol has been shown to undergo rapid biodegradation in a variety of screening studies using sewage seed and activated sludge inoculum, which suggests that biodegradation will occur in aquatic environments where the concentration does not inhibit bacterial activity.

Atmospheric Fate

Methanol has a vapour pressure of 127 mm Hg at 25°C and is expected to exist solely as a vapour in the ambient atmosphere. Vapour-phase methanol is degraded in the atmosphere by reaction with photo chemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 17 days.

Other Adverse Effects

Do not flush into surface water or sanitary sewer system.

13. Disposal considerations

Review federal, provincial or state, and local government requirements prior to disposal. Store material for disposal as indicated in Section 7, **Handling and storage**. Disposal by controlled incineration or by secure land fill may be acceptable.

Recycle wherever possible. Large volumes may be suitable for re-distillation or, if contaminated, incineration. Can be disposed of in a sewage treatment facility. Methanol levels of up to 0.1% act as a food source for bacteria; above this level may be toxic to bacteria. When pumping through sewage collection systems, the level of methanol should be kept below the flammable range (a 25% methanol/water mixture is non-flammable at temperatures below 39°C). 1 ppm of methanol is equivalent to 1.5 ppm BOD loading in the sewage plant.

Container disposal

Empty containers may contain hazardous residue. Return to supplier for reuse if possible. Never weld, cut or grind empty containers. If disposing of containers, ensure they are well rinsed with water, then disposed of at an authorised landfill. After cleaning, all existing labels should be removed.

14. Transport information

Canada Transportation of Dangerous Goods (TDG):
UN Number: UN1230
Proper Shipping Name: Methanol
Hazard Class: 3(6.1)
Packing Group: II
Labels required: Flammable Liquid and Toxic
Limited Quantity: ≤ 1 litre
ERG Guide Number: 131

United States Department of Transport (49CFR):
(Domestic Only)
UN Number: UN1230
Proper Shipping Name: Methanol
Hazard Class: 3(6.1)
Packing Group: II
Labels required: Flammable Liquid and Toxic
Limited Quantity: ≤ 1 litre
ERG Guide Number: 131

International Air Transport Association (IATA):
UN Number: UN1230
Proper Shipping Name: Methanol
Hazard Class: 3(6.1)
Packing Group: II
Labels required: Flammable Liquid and Toxic (Toxic label may be eliminated under SP 104)

International Maritime Organization (IMO):
UN Number: UN1230
Proper Shipping Name: Methanol
Hazard Class: 3(6.1)
Packing Group: II
Labels required: Flammable Liquid and Toxic
Flash Point = 11°C
EmS No. F-E, S-D
Stowage Category “B”, Clear of living quarters

Marine Pollutant:
No

15. Regulatory information

CANADIAN FEDERAL REGULATIONS

Hazardous Products Act Information: CPR Compliance
This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Classification
B2 - Flammable and combustible material - Flammable liquid
D1B - Poisonous and infectious material - Immediate and serious effects - Toxic
D2A - Poisonous and infectious material - Other effects - Very toxic
D2B - Poisonous and infectious material - Other effects - Toxic

CEPA, Domestic Substances List
Methanol is listed on the Domestic Substances List.

WHMIS Ingredient Disclosure List
Listed at 1%

UNITED STATES REGULATIONS

29CFR 1910.1200 (OSHA): Hazardous
40CFR 116-117 (EPA): Hazardous
40CFR 355, Appendices A and B: Subject to Emergency Planning and Notification
40CFR 372 (SARA Title III): Listed
40CFR 302 (CERCLA): Listed
TOXIC SUBSTANCES CONTROL ACT (TSCA): Listed in the inventory
CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986: Not listed
OEHHA/CALIFORNIA Title 27, Sec. 25306: Listed

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	1	3	0

References:

1. International Programme on Chemical Safety, Methanol, Environmental Health Criteria, World Health Organization 1997
2. Patty's Industrial Hygiene and Toxicology, 5th Edition
3. Fire Protection Guide to Hazardous Materials, 13th Edition
4. Lanigan, S., Final report on the Safety Assessment of Methyl Alcohol, International Journal of Toxicology., Volume 20, Supplement 1 (2001)
5. Forsberg, K., Quick Selection Guide to Chemical Protective Clothing
6. Nelson, B.K., Teratological assessment of Methanol and Ethanol at high inhalation levels in rats, Fundamental and Applied Toxicology, Volume 5
7. NIOSH Guide to Chemical Hazards
8. Hazardous Substance Data Base (HSDB)
9. CCOHS Cheminfo.
10. RTECS

Original Preparation Date: September 22, 2005

Disclaimer: The information above is believed to be accurate and represents the best information currently available to us. Users should make their own investigations to determine the suitability of the information for their particular purposes. This document is intended as a guide to the appropriate precautionary handling of the material by a properly trained person using this product.

Methanex Corporation and its subsidiaries make no representations or warranties, either express or implied, including without limitation any warranties of merchantability, fitness for a particular purpose with respect to the information set forth herein or the product to which the information refers. Accordingly, Methanex Corp. will not be responsible for damages resulting from use of or reliance upon this information.

This Material Safety Data Sheet may not be changed, or altered in any way without the expressed knowledge and permission of Methanex Corporation.

MSDS version: 2.0
Revisions: Revised and re-issued March 1, 2013

Material Safety Data Sheet
The Dow Chemical Company

Product Name: NORKOOL(TM) SLH 50

Issue Date: 10/05/2009
Print Date: 30 Jul 2010

The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Product and Company Identification

Product Name
NORKOOL(TM) SLH 50

COMPANY IDENTIFICATION
The Dow Chemical Company
2030 Willard H. Dow Center
Midland, MI 48674
USA

Customer Information Number: 800-258-2436

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 989-636-4400
Local Emergency Contact: 989-636-4400

2. Hazards Identification

Emergency Overview
Color: Green to blue
Physical State: Liquid.
Odor: Characteristic
Hazards of product:

WARNING! Harmful or fatal if swallowed. May cause eye irritation. Isolate area.

OSHA Hazard Communication Standard
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Health Effects
Eye Contact: May cause slight eye irritation. Corneal injury is unlikely. Vapor or mist may cause eye irritation.
Skin Contact: Brief contact is essentially nonirritating to skin. Prolonged contact may cause slight skin irritation with local redness. Repeated contact may cause skin irritation with local redness.
Skin Absorption: Prolonged skin contact is unlikely to result in absorption of harmful amounts. Repeated skin exposure to large quantities may result in absorption of harmful amounts. Massive

contact with damaged skin or of material sufficiently hot to burn skin may result in absorption of potentially lethal amounts.
Inhalation: At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material or mist may cause respiratory irritation and other effects.
Ingestion: Oral toxicity is expected to be moderate in humans due to ethylene glycol even though tests with animals show a lower degree of toxicity. Ingestion of quantities (approximately 65 mL (2 oz.) for diethylene glycol or 100 mL (3 oz.) for ethylene glycol) has caused death in humans. May cause nausea and vomiting. May cause abdominal discomfort or diarrhea. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure.
Effects of Repeated Exposure: For Ethylene glycol: Repeated excessive exposure may cause irritation of the upper respiratory tract. In humans, effects have been reported on the following organs: Central nervous system. Observations in humans include: Nystagmus (involuntary eye movement). In animals, effects have been reported on the following organs: Kidney. Liver.
Birth Defects/Developmental Effects: Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major and possibly only route of exposure to produce birth defects. Exposures by inhalation or skin contact, the primary routes of occupational exposure, had minimal effect on the fetus, in animal studies.
Reproductive Effects: Ingestion of large amounts of ethylene glycol has been shown to interfere with reproduction in animals.

3. Composition Information

Component	CAS #	Amount
Ethylene glycol	107-21-1	> 45.0 - < 55.0 %
Water	7732-18-5	> 45.0 - < 55.0 %

4. First-aid measures

Eye Contact: Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.
Skin Contact: Immediately flush skin with water while removing contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Contaminated leather items such as shoes should be disposed of properly. Safety shower should be located in immediate work area.
Inhalation: Move person to fresh air; if effects occur, consult a physician.
Ingestion: Do not induce vomiting. Seek medical attention immediately. If person is fully conscious give 1 cup or 8 ounces (240 ml) of water. If medical advice is delayed and if an adult has swallowed several ounces of chemical, then give 3-4 ounces (1/3-1/2 Cup) (90-120 ml) of hard liquor such as 80 proof whiskey. For children, give proportionally less liquor at a dose of 0.3 ounce (1 1/2 tsp.) (8 ml) liquor for each 10 pounds of body weight, or 2 ml per kg body weight [e.g., 1.2 ounce (2 1/3 tbsp.) for a 40 pound child or 36 ml for an 18 kg child].
Notes to Physician: If several ounces (60 - 100 ml) of ethylene glycol have been ingested, early administration of ethanol may counter the toxic effects (metabolic acidosis, renal damage). Consider hemodialysis or peritoneal dialysis & thiamine 100 mg plus pyridoxine 50 mg intravenously every 6 hours. If ethanol is used, a therapeutically effective blood concentration in the range of 100 - 150 mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion. Consult standard literature for details of treatment. 4-Methyl pyrazole (Antizol®) is an effective blocker of alcohol dehydrogenase and should be used in the treatment of ethylene glycol (EG), di- or triethylene glycol (DEG, TEG), ethylene glycol butyl ether (EGBE), or methanol intoxication if available. Fomepizole protocol (Brent, J. et al., New England Journal of Medicine, Feb. 8, 2001, 344:6, p. 424-9): loading dose 15 mg/kg intravenously, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, EG, DEG, TEG or EGBE are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, CNS depression, renal tubular injury, and possible late stage cranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. In severe

poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. Maintain adequate ventilation and oxygenation of the patient. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

Emergency Personnel Protection: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

5. Fire Fighting Measures

Extinguishing Media: To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam.

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Unusual Fire and Explosion Hazards: This material will not burn until the water has evaporated. Residue can burn.

Hazardous Combustion Products: Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Combustion products may include and are not limited to: Carbon monoxide. Carbon dioxide. Combustion products may include trace amounts of: Nitrogen oxides.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Small spills: Absorb with materials such as: Cat litter. Sawdust. Vermiculite. Zorb-all®. Collect in suitable and properly labeled containers. Large spills: Dike area to contain spill. Contain spilled material if possible. See Section 13, Disposal Considerations, for additional information.

Ignition Sources Removal: Keep away from sources of ignition.

Dust Control: Not applicable.

Personal Precautions: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to Section 7, Handling, for additional precautionary measures.

Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling

General Handling: Do not swallow. Avoid contact with eyes. Wash thoroughly after handling. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Storage

Do not store in: Galvanized steel. Opened or unlabeled containers. Store in the following material(s): Carbon steel. Stainless steel. Store in original unopened container. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact. See Section 10 for more specific information.

8. Exposure Controls / Personal Protection

Exposure Limits

Component	List	Type	Value
Ethylene glycol	ACGIH	Ceiling Aerosol.	100 mg/m3

Personal Protection

Eye/Face Protection: Use safety glasses (with side shields). If there is a potential for exposure to particles which could cause eye discomfort, wear chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

Skin Protection: When prolonged or frequently repeated contact could occur, use protective clothing chemically resistant to this material. Selection of specific items such as faceshield, boots, apron, or full-body suit will depend on the task. When handling hot material, protect skin from thermal burns as well as from skin absorption.

Hand protection: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures. Use gloves with insulation for thermal protection, when needed. Examples of preferred glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Avoid gloves made of: Polyvinyl alcohol ("PVA"). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Physical State	Liquid.
Color	Green to blue
Odor	Characteristic
Odor Threshold	No test data available
Flash Point - Closed Cup	Water boils off
Flammability (solid, gas)	Not applicable to liquids

Flammable Limits In Air	**Lower**: No test data available **Upper**: No test data available
Autoignition Temperature	427 °C (801 °F) *Literature* Ethylene Glycol
Vapor Pressure	13 mmHg @ 20 °C *Literature*
Boiling Point (760 mmHg)	107 °C (225 °F) *Literature* .
Vapor Density (air = 1)	>1.0 *Literature*
Specific Gravity (H2O = 1)	1.079 *Literature*
Freezing Point	-38 °C (-36 °F) *ASTM D1177*
Melting Point	Not applicable to liquids
Solubility in water (by weight)	100 % *Literature*
pH	9.5 (@ 100 %) *ASTM D1287* (typical value)
Decomposition Temperature	No test data available
Partition coefficient, n-octanol/water (log Pow)	No data available for this product. See Section 12 for individual component data.
Evaporation Rate (Butyl Acetate = 1)	< 0.8 *Estimated.*
Kinematic Viscosity	3.7 cSt @ 20 °C *Literature*

10. Stability and Reactivity

Stability/Instability
Thermally stable at recommended temperatures and pressures.
Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems.

Incompatible Materials: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.

Hazardous Polymerization
Will not occur.

Thermal Decomposition
Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity
Ingestion
For Ethylene glycol: Lethal Dose, Human, adult 3 Ounces
For Ethylene glycol: LD50, Rat 6,000 - 13,000 mg/kg
Skin Absorption
For Ethylene glycol: LD50, Rabbit > 22,270 mg/kg
Inhalation
For Ethylene glycol: LC50, 7 h, Aerosol, Rat > 3.95 mg/l

Repeated Dose Toxicity
For Ethylene glycol: Repeated excessive exposure may cause irritation of the upper respiratory tract. In humans, effects have been reported on the following organs: Central nervous system. Observations in humans include: Nystagmus (involuntary eye movement). In animals, effects have been reported on the following organs: Kidney. Liver.

Chronic Toxicity and Carcinogenicity
Ethylene glycol did not cause cancer in long-term animal studies.

Developmental Toxicity
Based on animal studies, ingestion of very large amounts of ethylene glycol appears to be the major and possibly only route of exposure to produce birth defects. Exposures by inhalation or skin contact, the primary routes of occupational exposure, had minimal effect on the fetus, in animal studies.

Reproductive Toxicity
Ingestion of large amounts of ethylene glycol has been shown to interfere with reproduction in animals.

Genetic Toxicology
For Ethylene glycol: In vitro genetic toxicity studies were negative. For Ethylene glycol: Animal genetic toxicity studies were negative.

12. Ecological Information

ENVIRONMENTAL FATE

Data for Component: **Ethylene glycol**

Movement & Partitioning
Bioconcentration potential is low (BCF < 100 or Log Pow < 3). Potential for mobility in soil is very high (Koc between 0 and 50). Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.
Henry's Law Constant (H): 8.05E-09 atm*m3/mole; 25 °C Estimated.
Partition coefficient, n-octanol/water (log Pow): -1.36 Measured
Partition coefficient, soil organic carbon/water (Koc): 1 Estimated.
Distribution in Environment: Mackay Level 1 Fugacity Model:

Air	Water.	Biota	Soil	Sediment
2.1 %	98 %	< 0.01 %	< 0.01 %	< 0.01 %

Persistence and Degradability
Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).
Indirect Photodegradation with OH Radicals

Rate Constant	Atmospheric Half-life	Method
8.32E-12 cm3/s	15 h	Estimated.

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
> 94 %	28 d	OECD 301F Test
90 %	1 d	OECD 302B Test

Theoretical Oxygen Demand: 1.29 mg/mg

ECOTOXICITY

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

Fish Acute & Prolonged Toxicity
LC50, fathead minnow (Pimephales promelas): 15,400 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, water flea Daphnia magna: 15,500 mg/l
Toxicity to Micro-organisms
EC50; bacteria, Growth inhibition (cell density reduction): > 5,000 mg/l

13. Disposal Considerations

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. FOR UNUSED & UNCONTAMINATED

PRODUCT, the preferred options include sending to a licensed, permitted: Recycler. Reclaimer. Incinerator or other thermal destruction device.

14. Transport Information

DOT Non-Bulk
NOT REGULATED

DOT Bulk
Proper Shipping Name: OTHER REGULATED SUBSTANCES, LIQUID, NOS
Technical Name: CONTAINS ETHYLENE GLYCOL
Hazard Class: 9 **ID Number:** NA3082 **Packing Group:** PG III

IMDG
NOT REGULATED

ICAO/IATA
NOT REGULATED
Additional Information

Reportable quantity: 9,091 lb – ETHYLENE GLYCOL

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. Regulatory Information

OSHA Hazard Communication Standard
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Immediate (Acute) Health Hazard	Yes
Delayed (Chronic) Health Hazard	Yes
Fire Hazard	No
Reactive Hazard	No
Sudden Release of Pressure Hazard	No

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 313
This product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

Component	CAS #	Amount
Ethylene glycol	107-21-1	> 45.0 - < 55.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Hazardous Substances List and/or Pennsylvania Environmental Hazardous Substance List:
The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

Component	CAS #	Amount
Ethylene glycol	107-21-1	> 45.0 - < 55.0 %

Pennsylvania (Worker and Community Right-To-Know Act): Pennsylvania Special Hazardous Substances List:
To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)
This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

US. Toxic Substances Control Act
All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30
CEPA - Domestic Substances List (DSL)
This product contains one or more substances which are not listed on the Canadian Domestic Substances List (DSL). Contact your sales or technical service representative for more information.

16. Other Information

Hazard Rating System

NFPA	Health	Fire	Reactivity
	1	1	0

Recommended Uses and Restrictions
Engine Cooling Line Heaters Intended as a heat transfer fluid for closed-loop systems. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

Revision
Identification Number: 1354 / 1001 / Issue Date 10/05/2009 / Version: 3.0
Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

N/A	Not available
W/W	Weight/Weight
OEL	Occupational Exposure Limit
STEL	Short Term Exposure Limit
TWA	Time Weighted Average
ACGIH	American Conference of Governmental Industrial Hygienists, Inc.
DOW IHG	Dow Industrial Hygiene Guideline
WEEL	Workplace Environmental Exposure Level
HAZ_DES	Hazard Designation
Action Level	A value set by OSHA that is lower than the PEL which will trigger the need for activities such as exposure monitoring and medical surveillance if exceeded.

The Dow Chemical Company urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have

obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

MATERIAL SAFETY DATA SHEET
TRIETHYLENE GLYCOL ,99%

Section 1 - Chemical Product and Company Identification

MSDS Name: TRIETHYLENE GLYCOL ,99%

Catalog Numbers: 13959-0000, 13959-0010, 13959-0025, 13959-0051, 13959-0250

Synonyms:

Company Identification:
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

Company Identification: (USA)
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

For information in the US, call: 800-ACROS-01

For information in Europe, call: +32 14 57 52 11

Emergency Number, Europe: +32 14 57 52 99

Emergency Number US: 201-796-7100

CHEMTREC Phone Number, US: 800-424-9300

CHEMTREC Phone Number, Europe: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name:	%	EINECS#
112-27-6	TRIETHYLENE GLYCOL ,99%	99%	203-953-2

Hazard Symbols: None listed

Risk Phrases: None listed

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Hygroscopic (absorbs moisture from the air).

Potential Health Effects

Eye: Causes mild eye irritation.

Skin: Causes mild skin irritation.

Ingestion: Expected to be a low ingestion hazard.

Inhalation: May cause respiratory tract irritation.

Chronic:

Section 4 - First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion: Get medical aid. Wash mouth out with water.

Inhalation: Remove from exposure and move to fresh air immediately. Get medical aid.

Notes to Physician:

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media: Use water spray, dry chemical, carbon dioxide, or chemical foam.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container.

Section 7 - Handling and Storage

Handling: Avoid breathing dust, vapor, mist, or gas. Avoid contact with skin and eyes.

Storage: Store in a cool, dry place. Store in a tightly closed container. Keep under a nitrogen blanket.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls:

Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

CAS# 112-27-6:

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Viscous liquid

Color: very slightly yellow

Odor: mild odor - sweetish odor

pH: Not available

Vapor Pressure: < .001 mm Hg @20 deg C

Viscosity: 48 mPas 20 deg C

Boiling Point: 285 deg C @ 760.00mm Hg (545.00°F)

Freezing/Melting Point: -7 deg C (19.40°F)

Autoignition Temperature: 371 deg C (699.80 deg F)

Flash Point: 165 deg C (329.00 deg F)

Explosion Limits: Lower: .09 vol %

Explosion Limits: Upper: .01 vol %

Decomposition Temperature: Not available
Solubility in water: soluble in water
Specific Gravity/Density: 1.1250g/cm3
Molecular Formula: C6H14O4
Molecular Weight: 150.17

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, exposure to moist air or water.
Incompatibilities with Other Materials Strong oxidizing agents, strong acids.
Hazardous Decomposition Products Carbon monoxide, carbon dioxide.
Hazardous Polymerization Will not occur.

Section 11 - Toxicological Information

RTECS#: CAS# 112-27-6: YE4550000

LD50/LC50: RTECS:
CAS# 112-27-6: Draize test, rabbit, eye: 500 mg Mild;
Draize test, rabbit, skin: 500 mg/24H Mild;
Oral, mouse: LD50 = 20000 mg/kg;
Oral, rabbit: LD50 = 8400 mg/kg;
Oral, rabbit: LD50 = 8400 mg/kg;
Oral, rat: LD50 = 17 gm/kg;
Oral, rat: LD50 = 15000 mg/kg;
Skin, rabbit: LD50 = >20 mL/kg;
.
Other: Oral, mouse: LDL0 = 18500 mg/kg

Carcinogenicity: TRIETHYLENE GLYCOL ,99% - Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65.

Other: See actual entry in RTECS for complete information. The toxicological properties have not been fully investigated.

Section 12 - Ecological Information

Ecotoxicity: Not available

Section 13 - Disposal Considerations

Dispose of in a manner consistent with federal, state, and local regulations.

Section 14 - Transport Information

	IATA	IMO	RID/ADR
Shipping Name:	Not available	Not available	Not available
Hazard Class:			
UN Number:			
Packing Group:			

Section 15 - Regulatory Information

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:Not available
Risk Phrases:

Safety Phrases:

S 24/25 Avoid contact with skin and eyes.

WGK (Water Danger/Protection)

CAS# 112-27-6: 1

Canada

CAS# 112-27-6 is listed on Canada's DSL List

US Federal

TSCA

CAS# 112-27-6 is listed on the TSCA Inventory.

Section 16 - Other Information

MSDS Creation Date: 7/16/1996

Revision #0 Date Original.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantibility or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential, or exemplary damages howsoever arising, even if the company has been advised of the possibility of such damages.

- **Attachment I: Emission Units Table**

Attachment I

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
CE-1	CE-1	CAT G3616 Comp Engine (C-101)	2016	1775 HP	New	Ox Cat (C1)
CE-2	CE-2	CAT G3616 Comp Engine (C-102)	2016	1775 HP	New	Ox Cat (C2)
CE-3	CE-3	CAT G3616 Comp Engine (C-103)	2016	1775 HP	New	Ox Cat (C3)
GE-1	GE-1	Gillette Natural Gas Generator	2016	126 HP	New	N/A
T01	T01	Waste Lube Oil (T-450)	2016	30 BBL	New	N/A
T02	T02	Methanol	2016	335 Gal	New	N/A
T03	T03	Coolant Make Up Tank	2016	30 BBL	New	N/A
T04	T04	Coolant Drain Tank	2016	30 BBL	New	N/A
T05	T05	Engine Lube Oil for CE-1	2016	500 Gal	New	N/A
T06	T06	Compressor Lube Oil for CE-1	2016	500 Gal	New	N/A
T07	T07	Engine Lube Oil for CE-2	2016	500 Gal	New	N/A
T08	T08	Compressor Lube Oil for CE-2	2016	500 Gal	New	N/A
T09	T09	Engine Lube Oil for CE-3	2016	500 Gal	New	N/A
T10	T10	Compressor Lube Oil for CE-3	2016	500 Gal	New	N/A
T11	T11	Produced Water Tank (T-421)	2014	400 BBL	Mod/Exist	N/A
T12	T12	TEG Storage Tank (T-301)	2014	500 Gal	Mod/Exist	N/A
TEG-1	TEG-1	TEG Dehy Unit (TEG-302)	2014	75 MMSCF	Mod/Exist	X-304 (C4)
REB-1	REB-1	TEG Reboiler Unit (TEG-302)	2014	1.5 MMSCF	Mod/Exist	N/A
GE-2	GE-2	85 HP Generator (G-102)	2014	85 HP	Mod/Exist	N/A

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

- **Attachment J: Emission Points Data Summary Sheet**

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
CE-1	Upward vertical stack	CE-1	Compress -or engine	C-1	Oxidation catalyst	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	1.96 10.72 2.47 0.007 0.001 1.02 1.24 1726	8.57 46.96 10.80 0.03 0.004 4.46 5.43 7559	1.96 0.63 0.67 0.007 0.001 0.24 0.45 1726	8.57 2.74 2.91 0.03 0.004 1.03 1.99 7559	Gas/Vapor	EE O - Vendor data (see Att. L and N)	
CE-2	Upward vertical stack	CE-2	Compress -or engine	C-2	Oxidation catalyst	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	1.96 10.72 2.47 0.007 0.001 1.02 1.24 1726	8.57 46.96 10.80 0.03 0.004 4.46 5.43 7559	1.96 0.63 0.67 0.007 0.001 0.24 0.45 1726	8.57 2.74 2.91 0.03 0.004 1.03 1.99 7559	Gas/Vapor	EE O - Vendor data (see Att. L and N)	
CE-3	Upward vertical stack	CE-3	Compress -or engine	C-3	Oxidation catalyst	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	1.96 10.72 2.47 0.007 0.001 1.02 1.24 1726	8.57 46.96 10.80 0.03 0.004 4.46 5.43 7559	1.96 0.63 0.67 0.007 0.001 0.24 0.45 1726	8.57 2.74 2.91 0.03 0.004 1.03 1.99 7559	Gas/Vapor	EE O - Vendor data (see Att. L and N)	
GE-1	Tank Vent	GE-1	Generator Engine – 126 HP	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.28 0.56 0.19 0.001 0.013 0.07 0.09 123	1.22 2.43 0.85 0.003 0.06 0.30 0.41 537	0.28 0.56 0.19 0.001 0.013 0.07 0.09 123	1.22 2.43 0.85 0.003 0.06 0.30 0.41 537	Gas/Vapor	EE O - Vendor data (see Att. L and N)	

T-01	Relief Vent	T-01	Waste Lube Oil Tank	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	Gas/Vapor	EE (see Att. H and N – Tanks 4.09 – min VOC)	
T-02	Relief Vent	T-02	Methanol Tank	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.00 0.00 0.002 0.00 0.00 0.00 0.002 0.00	0.00 0.00 0.009 0.00 0.00 0.00 0.009 0.00	0.00 0.00 0.002 0.00 0.00 0.00 0.002 0.00	0.00 0.00 0.009 0.00 0.00 0.00 0.009 0.00	Gas/Vapor	EE (see Att. H, L and N)	
T-03 and T-04	Relief Vent	T-03 and T-04	Coolant Make up and Drain Tanks	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	Gas/Vapor	EE (see Att. H -SDS)	
T-05 through T-10	Relief Vent	T-05 –T-10	Engine and Compress -or Lube Oil Tanks	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	Gas/Vapor	EE (see Att. H and N – Tanks 4.09 for Waste Lube Oil)	
T-11	Relief Vent	T-11 (T-421)	Produced Water Tank	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.00 0.00 0.004 0.00 0.00 0.00 0.004 0.00	0.00 0.00 0.02 0.00 0.00 0.00 0.02 0.00	0.00 0.00 0.004 0.00 0.00 0.00 0.004 0.00	0.00 0.00 0.02 0.00 0.00 0.00 0.02 0.00	Gas/Vapor	EE (see Att. H, L and N)	
T-12	Relief Vent	T-12 (T-301)	TEG Storage Tank	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	Gas/Vapor	EE (see Att. H, L and N)	

TEG-1	Upward Vertical Stack	TEG-1	TEG Dehy Unit	C-4 (X-304)	Cond-ensor	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.00 0.00 2.11 0.00 0.00 0.00 0.21 618	0.00 0.00 9.23 0.00 0.00 0.00 0.92 2700	0.00 0.00 0.11 0.00 0.00 0.00 0.01 31	0.00 0.00 0.46 0.00 0.00 0.00 0.05 135	Gas/Vapor	EE O - Vendor data (see Att. L, M and N) – Assume 10% of VOC is HAP	
REB-1	Upward Vertical Stack	REB-1	TEG Dehy Reboiler	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.15 0.12 0.01 0.001 0.01 0.00 0.00 195.0	0.66 0.53 0.05 0.004 0.05 0.00 0.00 854.0	0.15 0.12 0.01 0.001 0.01 0.00 0.00 195.0	0.66 0.53 0.05 0.004 0.05 0.00 0.00 854.0	Gas/Vapor	EE O - Vendor data (see Att. L and N)	
GE-2	Upward Vertical Stack	GE-2	Generator Engine – 85 HP (existing Dehy)	N/A	N/A	N/A	N/A	NOx CO VOC SO2 PM/PM10 Formaldehyde Total HAP CO2(eq)	0.375 0.375 0.131 0.0003 0.0001 0.03 0.04 83	1.64 1.64 0.57 0.002 0.0002 0.13 0.18 362	0.375 0.375 0.131 0.0003 0.0001 0.03 0.04 83	1.64 1.64 0.57 0.002 0.0002 0.13 0.18 362	Gas/Vapor	EE O - Vendor data (see Att. L and N)	

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

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

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

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

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

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

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

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

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (^{o}F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
CE-1	1.67	847	12213	93.3	1595	34	4388.370	568.200
CE-2	1.67	847	12213	93.3	1595	34	4388.370	568.208
CE-3	1.67	847	12213	93.3	1595	34	4388.370	568.216
GE-1	0.30	1300	1063	250.7	1595	15	4388.358	568.172
REB-1	1.50	1000	965	9.1	1585	25	4388.047	568.164
GE-2	0.21	1200	580	276.2	1585	10	4388.047	568.164

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

- **Attachment K: Fugitive Emissions Data Summary Sheet**

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☐ Yes ☒ No ☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☐ Yes ☒ No ☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☒ Yes ☐ No ☒ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☒ Yes ☐ No ☒ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads						
Unpaved Haul Roads						
Storage Pile Emissions						
Loading/Unloading Operations	VOC HAP	0.014 0.010	0.062 0.035	0.014 0.010	0.062 0.035	O-EPA AP-42 Sec 5.2
Wastewater Treatment Evaporation & Operations						
Equipment Leaks	VOC HAP CO2(eq)	Does not apply	0.390 0.293 233.00	Does not apply	0.390 0.293 233.00	O-EPA 453, 40 CFR O[4 &] 98
General Clean-up VOC Emissions						
Other						

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

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

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

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

- **Attachment L: Emissions Unit Data Sheet(s)**

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

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

Identification Number (as assigned on *Equipment List Form*): CE-1 through CE-3

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

Compressor Engine #1 – #3: Three (3) Caterpillar 3606 natural gas fired compressor engines equipped with oxidation catalyst. Unless otherwise noted, emission numbers and ratings are for each engine.

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

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

N/A

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

Does not produce any materials. Compresses natural gas to maintain pipeline pressure.

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

Internal combustion of natural gas.

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

6. Combustion Data (if applicable):

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

Natural gas – 13,080 scf/hr (each engine), 114.6 MMscf/yr (each engine)

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

Natural gas with negligible H2S and ash content.

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

22.6 @ 60 °F and 14.7 psia.

(d) Percent excess air: Unknown

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

13.51 MMBtu/hr spark ignition reciprocating internal combustion engine.

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

N/A

(g) Proposed maximum design heat input: 13.51 × 10^6 BTU/hr.

7. Projected operating schedule:

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

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

@ 847 °F and 14.7 psia

a.	NO_X	1.96	lb/hr	grains/ACF
b.	SO_2	0.007	lb/hr	grains/ACF
c.	CO	10.72	lb/hr	grains/ACF
d.	PM_{10}	0.001	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	2.47	lb/hr	grains/ACF
g.	Pb	N/A	lb/hr	grains/ACF
h.	Specify other(s)			
	Formaldehyde	1.02	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
Replace the reciprocating compressor rod packing before 26,000 hours or 36 months from the date of the most recent rod packing element Monitor the number of hours of operation for each reciprocating compressor	Maintain records of maintenance conducted on the engine Maintain documentation that the engine meets the emission standards of 40 CFR 60.4233(e) Maintain records of all notification submitted Maintain records of the date and time of each reciprocating compressor rod packing element Maintain records of the deviations in cases where the compressor was not operated in compliance with 60.5383
REPORTING	**TESTING**
Submission of an initial notification as required in 40 CFR 60.7(a)(1) Submit a copy of each performance test Submit an annual NSPS OOOO report one year from the initial annual report	Initial performance test and subsequent performance testing every 8760 hours or every three years, whichever comes first.

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

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

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

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

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty
See attached manufacturer specification sheet

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

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

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

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

Genset Engine #1: One (1) natural gas fired generator engines.

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

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

N/A

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

Does not produce any materials. Electrical natural gas fired generator to provide compressor station power.

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

Internal combustion of natural gas.

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

6. Combustion Data (if applicable):

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

Natural gas – 1330 scf/hr, 11.6 MMscf/yr

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

Natural gas with negligible H2S and ash content.

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

14.2 @ 60 °F and 14.7 psia.

(d) Percent excess air: Unknown

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

1.33 MMBtu/hr spark ignition reciprocating internal combustion engine.

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

N/A

(g) Proposed maximum design heat input: 1.33 × 10^6 BTU/hr.

7. Projected operating schedule:

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

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

@ 1300 °F and 14.7 psia

a.	NO_X	0.28	lb/hr	grains/ACF
b.	SO_2	0.001	lb/hr	grains/ACF
c.	CO	0.56	lb/hr	grains/ACF
d.	PM_{10}	0.013	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.19	lb/hr	grains/ACF
g.	Pb	N/A	lb/hr	grains/ACF
h.	Specify other(s)			
	Formaldehyde	0.07	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
None	None
REPORTING	**TESTING**
None	None

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

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

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

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

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

See attached manufacturer specification sheet

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

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

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

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

Genset Engine #1: One (1) natural gas fired generator engines.

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

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

N/A

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

Does not produce any materials. Electrical natural gas fired generator to provide compressor station power.

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

Internal combustion of natural gas.

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

6. Combustion Data (if applicable):

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

Natural gas – 600 scf/hr, 4.84 MMscf/yr

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

Natural gas with negligible H2S and ash content.

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

14.2 @ 60 °F and 14.7 psia.

(d) Percent excess air: Unknown

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

0.57 MMBtu/hr spark ignition reciprocating internal combustion engine.

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

N/A

(g) Proposed maximum design heat input: 0.57 × 10^6 BTU/hr.

7. Projected operating schedule:

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

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

@ 1200 °F and 14.7 psia

a.	NO_X	0.375	lb/hr	grains/ACF
b.	SO_2	0.0003	lb/hr	grains/ACF
c.	CO	0.375	lb/hr	grains/ACF
d.	PM_{10}	0.0001	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.131	lb/hr	grains/ACF
g.	Pb	N/A	lb/hr	grains/ACF
h.	Specify other(s)			
	Formaldehyde	0.03	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
None	None
REPORTING	**TESTING**
None	None

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

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

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

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

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

See attached manufacturer specification sheet

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Hamilton Compressor Station	2. Tank Name Produced Water Storage Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) T-11	4. Emission Point Identification No. (as assigned on *Equipment List Form*) T-11
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 16800 Gallons	
9A. Tank Internal Diameter (ft) 12	9B. Tank Internal Height (or Length) (ft) 20
10A. Maximum Liquid Height (ft) 19	10B. Average Liquid Height (ft) 10
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 10
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 16000 Gallons	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
76143	300

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 5

15. Maximum tank fill rate (gal/min): 20

16. Tank fill method: ☒ Submerged ☐ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year
N/A	5

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

☒ Fixed Roof ___x___ vertical ___ horizontal ___ flat roof ___x___ cone roof ___ dome roof

x other (describe) Horizontal poly tank

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

19. Tank Shell Construction:

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

20A. Shell Color	20B. Roof Color	20C. Year Last Painted
Green	Green	2014

21. Shell Condition (if metal and unlined):

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

22A. Is the tank heated? ☒ YES ☐ NO

22B. If YES, provide the operating temperature (°F) 60

22C. If YES, please describe how heat is provided to tank. Electric Heater

23. Operating Pressure Range (psig): 0 to 0.3

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft) 0.1

25. Complete the following section for **Floating Roof Tanks** ☒ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type (check one): ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe): N/A

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

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

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:

LADDER WELL	
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:

GAUGE-HATCH/SAMPLE PORT	
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:

ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)

VACUUM BREAKER	
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

RIM VENT	
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

DECK DRAIN (3-INCH DIAMETER)	
OPEN:	90% CLOSED:

STUB DRAIN
1-INCH DIAMETER:

OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)

26. Complete the following section for Internal Floating Roof Tanks ☒ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

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

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

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

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  - Vacuum Setting — Pressure Setting 4 ounces
- ☒ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

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

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
See Tanks 4.09					

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

☐ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name Hamilton Compressor Station	2. Tank Name Methanol Tank
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) T-02	4. Emission Point Identification No. (as assigned on *Equipment List Form*) T-02
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): None	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. 335 Gallons	
9A. Tank Internal Diameter (ft) 3	9B. Tank Internal Height (or Length) (ft) 6
10A. Maximum Liquid Height (ft) 3	10B. Average Liquid Height (ft) 2
11A. Maximum Vapor Space Height (ft) 1	11B. Average Vapor Space Height (ft) 1
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. 335 Gallons	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
3685	335

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
4

15. Maximum tank fill rate (gal/min) 10

16. Tank fill method ☐ Submerged ☒ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year
N/A	4

18. Type of tank (check all that apply):
☒ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof
x other (describe) Horizontal poly tank
☐ External Floating Roof ___ pontoon roof ___ double deck roof
☐ Domed External (or Covered) Floating Roof
☐ Internal Floating Roof ___ vertical column support ___ self-supporting
☐ Variable Vapor Space ___ lifter roof ___ diaphragm
☐ Pressurized ___ spherical ___ cylindrical
☐ Underground
☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION (optional if providing TANKS Summary Sheets)

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

20A. Shell Color N/A	20B. Roof Color N/A	20C. Year Last Painted

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

22A. Is the tank heated? ☐ YES ☒ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): 0 to 5

24. Complete the following section for **Vertical Fixed Roof Tanks** ☒ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☒ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe): N/A

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

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

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:

LADDER WELL	
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:

GAUGE-HATCH/SAMPLE PORT	
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:

ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)

VACUUM BREAKER	
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

RIM VENT	
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

DECK DRAIN (3-INCH DIAMETER)	
OPEN:	90% CLOSED:

STUB DRAIN
1-INCH DIAMETER:

OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)

26. Complete the following section for Internal Floating Roof Tanks ☒ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION (optional if providing TANKS Summary Sheets)

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

V. LIQUID INFORMATION (optional if providing TANKS Summary Sheets)

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

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

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  - Vacuum Setting — Pressure Setting 4 ounces
- ☒ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

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

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss Amount	Working Loss Units	Annual Loss (lb/yr)	Estimation Method[1]
See Tanks 4.09					

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

☐ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

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

Identification Number (as assigned on *Equipment List Form*):

1. Loading Area Name: Methanol Loading T-02

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):
☐ Drums ☐ Marine Vessels ☐ Rail Tank Cars ☒ Tank Trucks

3. Loading Rack or Transfer Point Data:

Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1

4. Does ballasting of marine vessels occur at this loading area?
☐ Yes ☐ No ☒ Does not apply

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:

6. Are cargo vessels pressure tested for leaks at this or any other location?
☐ Yes ☒ No
If YES, describe:

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

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

weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*							
Pump ID No.		NA					
Liquid Name		Methanol					
Max. daily throughput (1000 gal/day)		0.335	(335 gallons - max)				
Max. annual throughput (1000 gal/yr)		3.7	(3685 gallons - max throughput)				
Loading Method [1]		SP = Splash Fill					
Max. Fill Rate (gal/min)		10					
Average Fill Time (min/loading)		30					
Max. Bulk Liquid Temperature (^{o}F)		~70					
True Vapor Pressure [2]		1.61 psia					
Cargo Vessel Condition [3]		Unknown					
Control Equipment or Method [4]		NA					
Minimum control efficiency (%)		0					
Maximum Emission Rate	Loading (lb/hr)	~0.01 lb/hr VOC					
	Annual (lb/yr)	~67 lb/yr VOC					
Estimation Method [5]		AP-42					

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

[2] At maximum bulk liquid temperature

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

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

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance

TM = Test Measurement based upon test data submittal
O = other (describe)

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

MONITORING	RECORDKEEPING
None	Throughput of liquid loaded at site (gal/yr)
REPORTING	**TESTING**
None	None

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

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

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

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

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

Attachment L
EMISSIONS UNIT DATA SHEET
BULK LIQUID TRANSFER OPERATIONS

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

Identification Number (as assigned on *Equipment List Form*):

1. Loading Area Name: Produced Water Loading T-11

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):
☐ Drums ☐ Marine Vessels ☐ Rail Tank Cars ☒ Tank Trucks

3. Loading Rack or Transfer Point Data:

Number of pumps	1
Number of liquids loaded	1
Maximum number of marine vessels, tank trucks, tank cars, and/or drums loading at one time	1

4. Does ballasting of marine vessels occur at this loading area?
☐ Yes ☐ No ☒ Does not apply

5. Describe cleaning location, compounds and procedure for cargo vessels using this transfer point:

6. Are cargo vessels pressure tested for leaks at this or any other location?
☐ Yes ☒ No
If YES, describe:

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

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

weeks/quarter	13	13	13	13

8. Bulk Liquid Data *(add pages as necessary):*							
Pump ID No.		NA					
Liquid Name		Produced Water					
Max. daily throughput (1000 gal/day)		3.4 (estimated for loading one 80 bbl truck)					
Max. annual throughput (1000 gal/yr)		76.1					
Loading Method [1]		SUB = Submerged Fill					
Max. Fill Rate (gal/min)		60					
Average Fill Time (min/loading)		60					
Max. Bulk Liquid Temperature (^{o}F)		~70					
True Vapor Pressure [2]		0.30 psia					
Cargo Vessel Condition [3]		Unknown					
Control Equipment or Method [4]		NA					
Minimum control efficiency (%)		0					
Maximum Emission Rate	Loading (lb/hr)	~0.01 lb/hr VOC					
	Annual (lb/yr)	~60 lb/yr VOC					
Estimation Method [5]		AP-42					

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

[2] At maximum bulk liquid temperature

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

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

[5] EPA = EPA Emission Factor as stated in AP-42
MB = Material Balance

TM = Test Measurement based upon test data submittal
O = other (describe)

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

MONITORING	RECORDKEEPING
None	Throughput of liquid loaded at site (gal/yr)
REPORTING	**TESTING**
None	None

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

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

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

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

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

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

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

Identification Number (as assigned on *Equipment List Form*): REB-1 and TEG-1

1. Name or type and model of proposed affected source: 75 MMSCFD dehydration unit with 1.5 MMBtu/hr heat input rated reboiler
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: 75 million standard cubic feet per day of natural gas
4. Name(s) and maximum amount of proposed material(s) produced per hour: Does not produce any materials. Removes water from natural gas.
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: External combustion of natural gas in reboiler.

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

6. Combustion Data (if applicable):

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

Reboiler - Natural gas – 1,500 scfh

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

Natural gas with negligible H2S and ash content.

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

Estimate = 10 @ 60 °F and 14.7 psia.

(d) Percent excess air: Unknown

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

Natural gas fired external combustion heater – 1.50 MMbtu/hr input rating

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

N/A

(g) Proposed maximum design heat input: 1.50 $\times 10^6$ BTU/hr.

7. Projected operating schedule:

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

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

@ 212 °F and 14.7 psia

a.	NO_X	0.15	lb/hr	grains/ACF
b.	SO_2	0.001	lb/hr	grains/ACF
c.	CO	0.12	lb/hr	grains/ACF
d.	PM_{10}	0.01	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	2.11	lb/hr	grains/ACF
g.	Pb	N/A	lb/hr	grains/ACF
h.	Specify other(s)			
	HAPs	0.21	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
Throughput of wet natural gas. Operating parameters of dehydration unit for GLYCalc (temperature, pressure, glycol flow rate) Conduct visual inspections during operation rounds confirming the pilot is lit.	Annual emissions calculated with GLYCalc. Maintain records of the times and duration of all periods which the pilot flame was absent.
REPORTING	**TESTING**
None	None

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

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

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

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

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

See attached manufacturer specification sheet

G3606

GAS ENGINE SITE SPECIFIC TECHNICAL DATA
Exterran
M3 Coopers Run/Hamilton

GAS COMPRESSION APPLICATION

ENGINE SPEED (rpm):	1000	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	9.2:1	RATING LEVEL:	CONTINUOUS
AFTERCOOLER TYPE:	SCAC	FUEL SYSTEM:	GAV
JACKET WATER OUTLET (°F):	190		WITH AIR FUEL RATIO CONTROL
ASPIRATION:	TA	**SITE CONDITIONS:**	
COOLING SYSTEM:	JW, OC+AC	FUEL:	Gas Analysis
CONTROL SYSTEM:	CIS/ADEM3	FUEL PRESSURE RANGE(psig):	42.8-47.0
EXHAUST MANIFOLD:	DRY	FUEL METHANE NUMBER:	90.8
COMBUSTION:	LOW EMISSION	FUEL LHV (Btu/scf):	929
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	ALTITUDE(ft):	1500
		MAXIMUM INLET AIR TEMPERATURE(°F):	100
		STANDARD RATED POWER:	1775 bhp@1000rpm

				MAXIMUM RATING	SITE RATING AT MAXIMUM INLET AIR TEMPERATURE		
RATING		**NOTES**	**LOAD**	**100%**	**100%**	**75%**	**50%**
ENGINE POWER	(WITHOUT FAN)	(1)	bhp	1775	1775	1331	888
INLET AIR TEMPERATURE			°F	100	100	100	100
ENGINE DATA							
FUEL CONSUMPTION (LHV)		(2)	Btu/bhp-hr	6860	6860	7102	7619
FUEL CONSUMPTION (HHV)		(2)	Btu/bhp-hr	7610	7610	7879	8453
AIR FLOW (@inlet air temp, 14.7 psia)	(WET)	(3)(4)	ft3/min	4921	4921	3806	2564
AIR FLOW	(WET)	(3)(4)	lb/hr	20924	20924	16181	10900
FUEL FLOW (60ºF, 14.7 psia)			scfm	218	218	170	121
INLET MANIFOLD PRESSURE		(5)	in Hg(abs)	74.3	74.3	57.9	41.2
EXHAUST TEMPERATURE - ENGINE OUTLET		(6)	°F	847	847	870	937
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(7)(4)	ft3/min	12213	12213	9613	6821
EXHAUST GAS MASS FLOW	(WET)	(7)(4)	lb/hr	21496	21496	16625	11218
EMISSIONS DATA - ENGINE OUT							
NOx (as NO2)		(8)(9)	g/bhp-hr	0.50	0.50	0.50	0.50
CO		(8)(9)	g/bhp-hr	2.74	2.74	2.74	2.74
THC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	6.30	6.30	6.50	6.77
NMHC (mol. wt. of 15.84)		(8)(9)	g/bhp-hr	0.94	0.94	0.98	1.01
NMNEHC (VOCs) (mol. wt. of 15.84)		(8)(9)(10)	g/bhp-hr	0.63	0.63	0.65	0.68
HCHO (Formaldehyde)		(8)(9)	g/bhp-hr	0.26	0.26	0.28	0.31
CO2		(8)(9)	g/bhp-hr	441	441	460	494
EXHAUST OXYGEN		(8)(11)	% DRY	12.8	12.8	12.1	11.1
HEAT REJECTION							
HEAT REJ. TO JACKET WATER (JW)		(12)	Btu/min	18749	18749	15593	13024
HEAT REJ. TO ATMOSPHERE		(12)	Btu/min	7103	7103	6619	6199
HEAT REJ. TO LUBE OIL (OC)		(12)	Btu/min	9132	9132	8667	8453
HEAT REJ. TO AFTERCOOLER (AC)		(12)(13)	Btu/min	17645	17645	9609	1869

COOLING SYSTEM SIZING CRITERIA			
TOTAL JACKET WATER CIRCUIT (JW)	(13)	Btu/min	20624
TOTAL AFTERCOOLER CIRCUIT (OC+AC)	(13)(14)	Btu/min	29487
A cooling system safety factor of 0% has been added to the cooling system sizing criteria.			

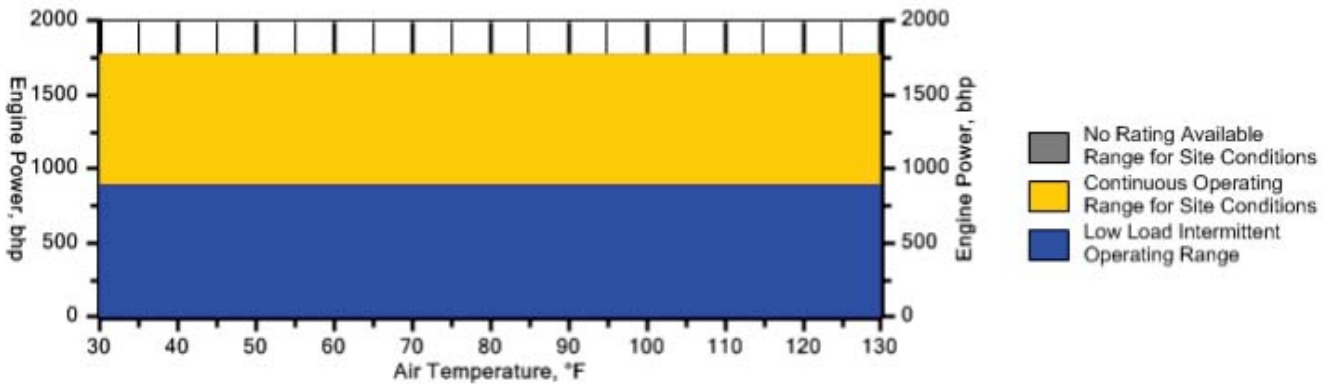
CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1, adjusted for fuel, site altitude and site inlet air temperature. 100% rating at maximum inlet air temperature is the maximum engine capability for the specified fuel at site altitude and maximum site inlet air temperature. Maximum rating is the maximum capability at the specified aftercooler inlet temperature for the specified fuel at site altitude and reduced inlet air temperature. Lowest load point is the lowest continuous duty operating load allowed. No overload permitted at rating shown.

For notes information consult page three.

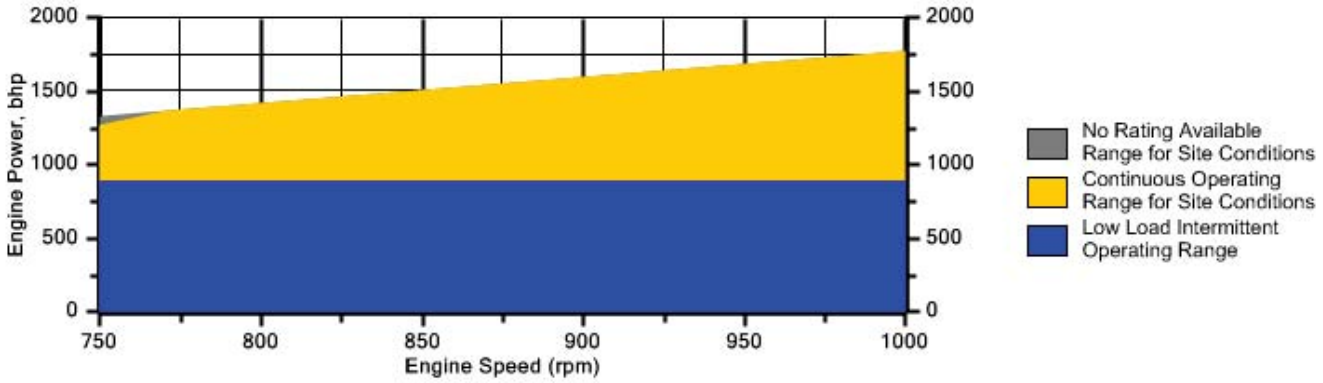
Engine Power vs. Inlet Air Temperature

Data represents temperature sweep at 1500 ft and 1000 rpm



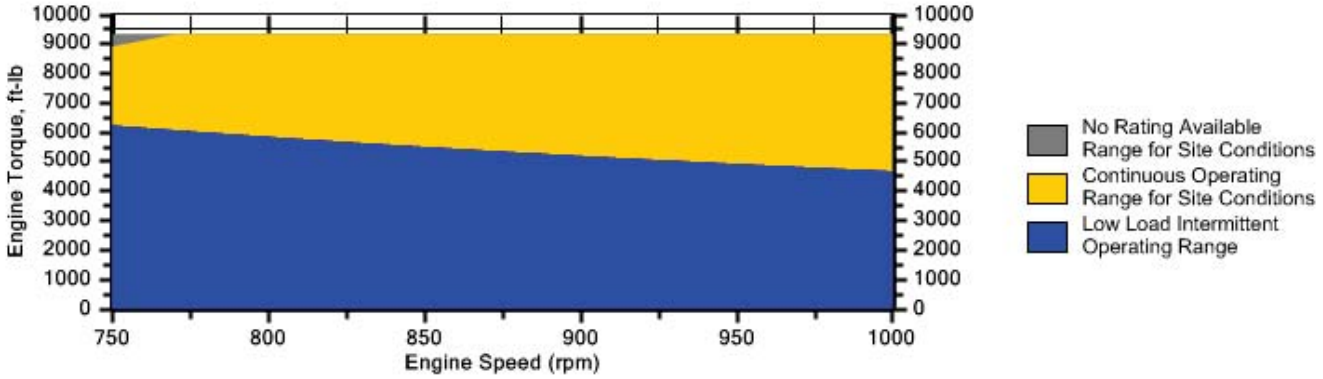
Engine Power vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 °F



Engine Torque vs. Engine Speed

Data represents speed sweep at 1500 ft and 100 °F



Note: At site conditions of 1500 ft and 100°F inlet air temp., constant torque can be maintained down to 770 rpm. The minimum speed for loading at these conditions is 750 rpm.

NOTES

1. Engine rating is with two engine driven water pumps. Tolerance is ± 3% of full load.

2. Fuel consumption tolerance is ± 2.5% of full load data.

3. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.

4. Inlet and Exhaust Restrictions must not exceed A&I limits based on full load flow rates from the standard technical data sheet.

5. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.

6. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.

7. Exhaust flow value is on a "wet" basis. Flow is a nominal value with a tolerance of ± 6 %.

8. Emissions data is at engine exhaust flange prior to any after treatment.

9. Emission values are based on engine operating at steady state conditions. Fuel methane number cannot vary more than ± 3. Values listed are higher than nominal levels to allow for instrumentation, measurement, and engine-to-engine variations. They indicate "Not to Exceed" values. THC, NMHC, and NMNEHC do not include aldehydes. An oxidation catalyst may be required to meet Federal, State or local CO or HC requirements.

10. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ

11. Exhaust Oxygen level is the result of adjusting the engine to operate at the specified NOx level. Tolerance is ± 0.5.

12. Heat rejection values are nominal. Tolerances, based on treated water, are ± 10% for jacket water circuit, ± 50% for radiation, ± 20% for lube oil circuit, and ± 5% for aftercooler circuit.

13. Aftercooler heat rejection includes an aftercooler heat rejection factor for the site elevation and inlet air temperature specified. Aftercooler heat rejection values at part load are for reference only. Do not use part load data for heat exchanger sizing.

14. Cooling system sizing criteria are maximum circuit heat rejection for the site, with applied tolerances.

Constituent	Abbrev	Mole %	Norm
Water Vapor	H2O	0.0115	0.0115
Methane	CH4	96.7490	96.7380
Ethane	C2H6	2.4777	2.4774
Propane	C3H8	0.1257	0.1257
Isobutane	iso-C4H1O	0.0200	0.0200
Norbutane	nor-C4H1O	0.0210	0.0210
Isopentane	iso-C5H12	0.0204	0.0204
Norpentane	nor-C5H12	0.0134	0.0134
Hexane	C6H14	0.0346	0.0346
Heptane	C7H16	0.0000	0.0000
Nitrogen	N2	0.2943	0.2943
Carbon Dioxide	CO2	0.2438	0.2438
Hydrogen Sulfide	H2S	0.0000	0.0000
Carbon Monoxide	CO	0.0000	0.0000
Hydrogen	H2	0.0000	0.0000
Oxygen	O2	0.0000	0.0000
Helium	HE	0.0000	0.0000
Neopentane	neo-C5H12	0.0000	0.0000
Octane	C8H18	0.0000	0.0000
Nonane	C9H20	0.0000	0.0000
Ethylene	C2H4	0.0000	0.0000
Propylene	C3H6	0.0000	0.0000
TOTAL (Volume %)		100.0114	100.0001

Fuel Makeup:	Gas Analysis
Unit of Measure:	English
Calculated Fuel Properties	
Caterpillar Methane Number:	90.8
Lower Heating Value (Btu/scf):	929
Higher Heating Value (Btu/scf):	1031
WOBBE Index (Btu/scf):	1227
THC: Free Inert Ratio:	184.82
Total % Inerts (% N2, CO2, He):	0.54%
RPC (%) (To 905 Btu/scf Fuel):	100%
Compressibility Factor:	0.998
Stoich A/F Ratio (Vol/Vol):	9.70
Stoich A/F Ratio (Mass/Mass):	16.94
Specific Gravity (Relative to Air):	0.573
Specific Heat Constant (K):	1.311

CONDITIONS AND DEFINITIONS

Caterpillar Methane Number represents the knock resistance of a gaseous fuel. It should be used with the Caterpillar Fuel Usage Guide for the engine and rating to determine the rating for the fuel specified. A Fuel Usage Guide for each rating is included on page 2 of its standard technical data sheet.

RPC always applies to naturally aspirated (NA) engines, and turbocharged (TA or LE) engines only when they are derated for altitude and ambient site conditions.

Project specific technical data sheets generated by the Caterpillar Gas Engine Rating Pro program take the Caterpillar Methane Number and RPC into account when generating a site rating.

Fuel properties for Btu/scf calculations are at 60F and 14.696 psia.

Caterpillar shall have no liability in law or equity, for damages, consequently or otherwise, arising from use of program and related material or any part thereof.

FUEL LIQUIDS

Field gases, well head gases, and associated gases typically contain liquid water and heavy hydrocarbons entrained in the gas. To prevent detonation and severe damage to the engine, hydrocarbon liquids must not be allowed to enter the engine fuel system. To remove liquids, a liquid separator and coalescing filter are recommended, with an automatic drain and collection tank to prevent contamination of the ground in accordance with local codes and standards.

To avoid water condensation in the engine or fuel lines, limit the relative humidity of water in the fuel to 80% at the minimum fuel operating temperature.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2015 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Power Solutions International, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: FPSIB8.80NGP-020

Effective Date: 12/09/2014

Expiration Date: 12/31/2015

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 12/09/2014

Revision Date: N/A

Manufacturer: Power Solutions International, Inc.
Engine Family: FPSIB8.80NGP
Certification Type: Mobile and Stationary
Fuel : Natural Gas (CNG/LNG)
LPG/Propane
Emission Standards : NOx (g/Hp-hr) : 1
CO (g/Hp-hr) : 2
VOC (g/Hp-hr) : 0.7NMHC + NOx (g/kW-hr) : 2.7
CO (g/kW-hr) : 4.4
HC + NOx (g/kW-hr) : 2.7
Emergency Use Only : N

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 1048, 40 CFR Part 60, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 1048, 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 1048, 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 1048, 40 CFR Part 60. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 1048, 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 1048, 40 CFR Part 60.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

PRIME POWER SYSTEMS

By Gillette Generators, Inc.

PRIME MODEL

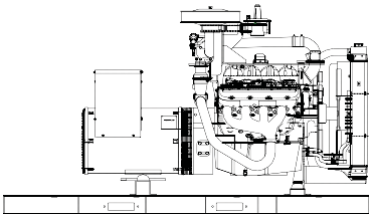
PR-800

60 HERTZ

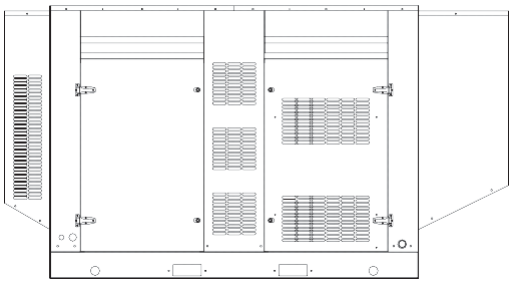
LIQUID COOLED NG ENGINE GENERATOR SET

KW POWER RATINGS RANGE FOR 60 HZ

Model	HZ	PRIME 105ºC RISE NATURAL GAS
PR-800-60 HERTZ	60	80



"OPEN" GEN-SET



"LEVEL 2" HOUSED GEN-SET

STANDARD FEATURES

- All generator sets are USA prototype built and thoroughly tested. Production models are USA factory built and 100% load tested.
- Mastertrak telematics remote monitoring equipment with 2 year service subscription. Required for all prime powered generators.
- All generators are UL-1446 certified.
- Solid state, frequency compensated voltage regulation is standard on all gen-sets.
- Electronic engine governor incorporates a throttle body actuator, which allows precise isochronous frequency regulation.
- A brushless rotating field generator design with shunt wound excitation system and connectable at 1 phase or a broad range of 3 phase voltages.
- SENTINEL "ULTIMATE" digital controller allows programming to basic engine functions in the field. Controller has stop-manual-auto mode and engine shutdowns, signaled by full text LCD indicators.
- Heavy Duty 100%-125% rated Circuit Breaker is standard on all gen-sets.
- All generator set control systems components and accessories provide a 1-year limited warranty at time of initial start-up. Generators and engines are governed by separate warranties.
- "OPEN" Generator Sets: There is no enclosure, so gen-set must be placed within a weather protected area, un-inhabited by humans or animals, with proper ventilation. Muffler and flexible exhaust hose are not supplied, as installation requirements are not known. However, these two items are available as optional equipment.
- "LEVEL 2" Aluminum Housing: Full weather protection and superior sound attenuation for specific low noise applications. Critical grade muffler is standard.

GENERATOR RATINGS

GENERATOR MODEL	VOLTAGE		PH	HZ	NATURAL GAS FUEL 105°C RISE PRIME RATING		POWER LEAD CONNECTIONS
	L-N	L-L			KW/KVA	AMP	
PR-800-1-1	120	240	1	60	80/80	333	4 LEAD DEDICATED 1 PH.
PR-800-3-2	120	208	3	60	80/100	278	12 LEAD LOW WYE
PR-800-3-3	120	240	3	60	80/100	241	12 LEAD HIGH DELTA
PR-800-3-4	277	480	3	60	80/100	120	12 LEAD HIGH WYE
PR-800-3-5	127	220	3	60	80/100	263	12 LEAD LOW WYE
PR-800-3-16	346	600	3	60	80/100	96	4 LEAD DEDICATED 3 PH.

RATINGS: All single phase gen-sets are dedicated 4 lead windings, rated at unity (1.0) power factor. All three phase gen-sets are 12 lead windings, rated at (.8) power factor. 105°C "PRIME RATINGS" are strictly for gen-sets provide the prime source of electric power, where normal utility power is unavailable or unreliable. A 10% overload is allowed for a total of 1 hour, within every 12 hours of operation of PRIME RATED systems. All gen-set power ratings are based on temperature rise measured by resistance method as defined by MIL-STD 705C and IEEE STD 115, METHOD 6.4.4. All generators have class H (180°C) insulation system on both rotor and stator windings. All factory tests and KW/KVA charts shown above are based on 105°C (prime) R/R winding temperature, within a maximum 40°C ambient condition. Specifications & ratings are subject to change without prior notice.

APPLICATION AND ENGINEERING DATA FOR MODEL PR-800-60 HZ

GENERATOR SPECIFICATIONS

Manufacturer ..... Marathon Electric Generators
Model & Type .....363CSL1617, 4 Pole, 4 Lead, Single Phase
..... 362CSL1606, 4 Pole, 12 Lead, re-connectable, Three Phase
..... 362PSL1635, 4 Pole, 4 Lead, Three Phase
Exciter ..... Brushless, shunt excited
Voltage Regulator ..... Solid State, HZ/Volts
Voltage Regulation ..... ½%, No load to full load
Frequency ..... Field convertible, 60 HZ to 50 HZ
Frequency Regulation ..... ½% (½ cycle, no load to full load)
Unbalanced Load Capability ..... 100% of prime amps
Total Stator and Load Insulation ..... Class H, 180°C
Temperature Rise ..... 105°C R/R, prime rating @ 40°C amb.
1 Ø Motor Starting @ 30% Voltage Dip (240V) ..... 210 kVA
3 Ø Motor Starting @ 30% Voltage Dip (208-240V) ..... 260 kVA
3 Ø Motor Starting @ 30% Voltage Dip (480V) ..... 340 kVA
Bearing ..... 1, Pre-lubed and sealed
Coupling ..... Direct flexible disc
Total Harmonic Distortion ..... Max 3½% (MIL-STD705B)
Telephone Interference Factor ..... Max 50 (NEMA MG1-22)
Deviation Factor ..... Max 5% (MIL-STD 405B)
Ltd. Warranty Period ..... 24 Months from date of start-up or
..... 1000 hours use, first to occur.

GENERATOR FEATURES

- World Renown Marathon Electric Generator having UL-1446 certification.
- Full generator protection with **SENTINEL "ULTIMATE"** controller, having UL-508 certification.
- Automatic voltage regulator with over-excitation, under-frequency compensation, under-speed protection, and EMI filtering. Entire solid-state board is encapsulated for moisture protection.
- Generator power ratings are based on temperature rise, measured by resistance method, as defined in MIL-STD 705C and IEEE STD 115, Method 6.4.4.
- Power ratings will not exceed temperature rise limitation for class H insulation as per NEMA MG1-22.40.
- Insulation resistance to ground, exceeds 1.5 meg-ohm.
- Stator receives 2000 V. hi-potential test on main windings, and rotor windings receive a 1500 V. hi-potential test, as per MIL-STD 705B.
- Full amortisseur windings with UL-1446 certification.
- Complete engine-generator torsional acceptance, confirmed during initial prototype testing.
- Full load testing on all engine-generator sets, before shipping.
- Self ventilating and drip-proof & revolving field design

ENGINE SPECIFICATIONS AND APPLICATIONS DATA

ENGINE

Manufacturer ..... Power Solutions Inc. (PSI)
Model and Type ..... Ind, Power Train, Vortec, 8.8L, 4 cycle
Aspiration ..... Naturally
Cylinder Arrangement ..... 8 Cylinders, V-8
Displacement Cu. In. (Liters) 537 (8.8)
Bore & Stroke In. (Cm.) ..... 4.35 x 4.50 (11.5 x 11.4)
Compression Ratio
..... 10.1:1
Main Bearings & Style ..... 5, Bi-Metal Steel and Aluminum
Cylinder Head ..... Cast Iron
Pistons ..... Cast Aluminum
Crankshaft ..... Nodular Iron
Exhaust Valve ..... Inconel, A193
Governor ..... Electronic
Frequency Reg. (no load-full load) ..... Isochronous
Frequency Reg. (steady state) ..... ± 1/4%
Air Cleaner ..... Dry, Replaceable Cartridge
Engine Speed 1800
Piston Speed, ft/min (m./min) ..... .1311 (399)
Max Power, bhp (kwm) Prime/NG 126 (94)
Ltd. Warranty Period ..... 12 Months or 2000 hrs., first to occur

FUEL SYSTEM

Type ..... NAT. GAS, Vapor Withdrawal
Fuel Pressure (kpa), in. H_2O ..... (1.74), 7"
Secondary Fuel Regulator ..... NG or LPG Vapor System
Auto Fuel Lock-Off Solenoid ..... Standard on all sets
Fuel Supply Inlet Line ..... 1¼" NPTF

FUEL CONSUMPTION

NAT. GAS: FT^3/HR (M^3/HR)	PRIME
100% LOAD	1330 (37.6)
75% LOAD	1030 (29.1)
50% LOAD	730 (20.6)
NG = 1000 BTU X FT^3/HR = Total BTU/HR	

OIL SYSTEM

Type ..... Full Pressure
Oil Pan Capacity qt. (L) 8.5 (8.0)
Oil Pan Cap. W/ filter qt. (L) 9.0 (8.5)
Oil Filter ..... 1, Replaceable Spin-On

ELECTRICAL SYSTEM

Ignition System ..... Electronic
Eng. Alternator and Starter:
Ground ..... Negative
Volts, DC 12
Recommended Battery to -18°C (0°F): ... 12 VDC, Size BCI# 27, Max Dimensions: ..... 12" lg X 6 3/4" wi X 9" hi, with standard round posts. Min output at 700 CCA. Battery tray (max. dim. at 12"lg x 7"wi), hold down straps, battery cables, and battery charger, is furnished. Installation of (1) starting battery is required, with possible higher AMP/HR rating, as described above, if normal environment averages -13°F (-25°C) or cooler.

APPLICATION AND ENGINEERING DATA FOR MODEL PR-800-60 HZ

COOLING SYSTEM

Type of System ..... Pressurized, closed recovery
Coolant Pump ..... Pre-lubricated, self-sealing
Cooling Fan Type (no. of blades) ..... Pusher (12)
Fan Diameter inches (cm) ..... 23.6" (599)
Ambient Capacity of Radiator °F (°C) 125 (51.6)
Engine Jacket Coolant Capacity Gal (L) 3.6 (13.7)
Radiator Coolant Capacity Gal. (L) 5.6 (25.5)
Maximum Restriction of Cooling Air Intake
and discharge side of radiator in. H_20 (kpa) ..... 0.5 (.125)
Water Pump Capacity gpm (L/min) 33 (125)
Heat Reject Coolant: Btu/min (kw) 7320 (129)
Low Radiator Coolant Level Shutdown ..... Standard
Note: Coolant temp. shut-down switch setting at 212°F (100°C) with 50/50 (water/antifreeze) mix.

AIR REQUIREMENTS

Combustion Air, cfm (m^3/min) 314 (8.9)
Radiator Air Flow cfm (m^3/min) 12,000 (340)
Heat Rejected to Ambient:
Engine: kw (btu/min) 24.9 (1476)
Alternator: kw (btu/min) 16 (912)

EXHAUST SYSTEM

Exhaust Outlet Size ..... 3.5"
Max. Back Pressure, in. hg (KPA) 3.0 (10.2)
Exhaust Flow, at rated kw: cfm (m^3/min) 1063 (30.1)
Exhaust Temp., at rated kw: °F (°C) 1300 (704)
Engines are EPA certified for LPG and Natural Gas.

SOUND LEVELS MEASURED IN dB(A)

	Open Set	Level 2 Encl.
Level 1, Residential Silencer	91	N/A
Level 2, Critical Silencer		88
	81	
Level 3, Hospital Silencer		86
	80	

Note: Open sets (no enclosure) has (3) optional silencer system choices due to unknown job-site applications. Level 2 enclosure has installed critical silencer with upgrade to hospital silencer. Sound tests are averaged from several test points and taken at 23 ft. (7 m) from source of noise at normal operation.

DERATE GENERATOR FOR ALTITUDE

3% per 1000 ft.(305m) above 3000 ft. (914m) from sea level

DERATE GENERATOR FOR TEMPERATURE

2% per 10°F(5.6°C) above 85°F (29.4°C)

DIMENSIONS AND WEIGHTS

	Open Set	Level 2 Enclosure
Length in (cm)	98 (248)	134 (339)
Width in (cm)	48 (122)	48 (122)
Height in (cm)	64 (163)	72.5 (183)
1 Ø Net Weight lbs (kg)	2684 (1217)	3484 (1580)
1 Ø Ship Weight lbs (kg)	2874 (1303)	3734 (1694)
3 Ø Net Weight lbs (kg)	2624 (1190)	3444 (1562)
3 Ø Ship Weight lbs (kg)	2814 (1276)	3694 (1676)

SENTINEL ULTIMATE DIGITAL MICROPROCESSOR CONTROLLER

SENTINEL ULTIMATE

The "**Ultimate**" controller is an auto start mains (utility) failure module for single gen-set applications. This controller includes a backlit LCD display which continuously displays the status of the engine and generator at all times.

The "**Ultimate**" controller will also monitor speed, frequency, voltage, current, oil pressure, coolant temp., and fuel levels. These modules have been designed to display warning and shut down status. It also includes: (11) configurable inputs • (8) configurable outputs • voltage monitoring • mains (utility) failure detection • (250) event logs • configurable timers • automatic shutdown or warning during fault detection • remote start (on load) • engine preheat • advanced metering capability • hour meter • text LCD displays • protected solid state outputs • test buttons for: stop/reset • manual mode • auto mode • lamp test • start button • power monitoring (kWh, kVAr, kVAh, kVArh)

This controller includes the "**Ultimate**" in expansion features including RS232, RS484 (using MODBUS-RTU/TCP), direct USB connection with PC, expansion optioned using DSENet for remote annunciation and remote relay interfacing for a distance of up to 3300FT. The controller software is freely downloadable from the internet and allows monitoring with direct USB cable, LAN, or by internet via the built in web interface.

Further expansion is available by adding the optional "WebNet" gateway interface module. This device will allow comprehensive monitoring of the generator via the cloud including identification, location, and status. Some advantages of this module include: reduced site visits and maintenance costs • remote fuel management • fault analysis • asset tracking • automatic system alerts • maximized system up-time.

STANDARD AND OPTIONAL FEATURES FOR MODEL PR-800-60 HZ

STANDARD FEATURES

CONTROL PANEL:

SENTINEL "ULTIMATE" digital microprocessor with logic allows programming in the field. Controller has:

- STOP-MANUAL-AUTO modes and automatic engine shutdowns, signaled by full text LCD indicators:
- Low oil pressure
- High engine temp
- Low Radiator Level
- Three auxiliary alarms
- Battery fail alarm
- Engine fail to start
- Engine over speed
- Engine under speed
- Over & under voltage

Also included is tamper-proof engine hour meter

ENGINE:

Full flow oil filter • Air filter • Oil pump • Solenoid type starter motor • Hi-temp radiator • Jacket water pump • Thermostat • Pusher fan and guard • Exhaust manifold • Residential Silencer • 12 VDC battery charging alternator • Flexible exhaust connector • "Isochronous" duty, electronic governor • Secondary dry fuel regulator • Dry fuel lock-off solenoid • Vibration isolators • Closed coolant recovery system with 50/50 water to anti-freeze mixture

AC GENERATOR SYSTEM:

AC generator • Shunt excited • Brushless design • Circuit Breaker installed and wired to gen-set • Direct connection to engine with flex disc • Class H, 180°C insulation • Self ventilated • Drip proof construction • UL Certified

VOLTAGE REGULATOR:

½% Voltage regulation • EMI filter • Under-speed protection • Over-excitation protection • total encapsulation

DC ELECTRICAL SYSTEM:

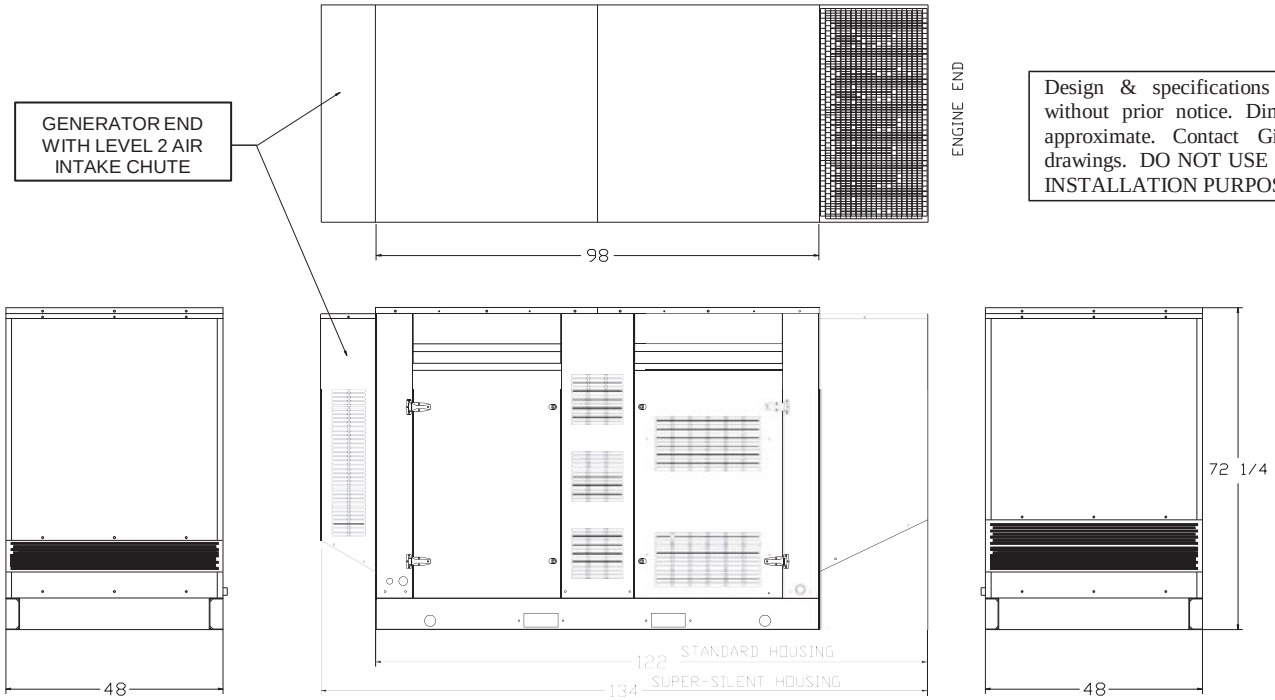
Battery tray • Battery cables • Battery hold down straps • 2-stage battery float charger with maintaining & recharging automatic charge stages

WEATHER/SOUND PROOF ALUMINUM HOUSING CORROSION RESISTANT PROTECTION CONSISTING OF:

- 9 Heated And Agitated Wash Stages.
- Zinc Phosphate Etching-coating Stage
- Final Baked On Enamel Powder Coat
- 18/8 Stainless Steel Hardware

ACCESSORY ITEMS

- Engine Coolant Heater with automatic 80°F on, 100°F off, thermostat
- Starting Battery Heater Blanket with automatic 60°F on, 80°F off, thermostat
- Battery Charger Upgrade, float type, 12 VDC at max. charge, with ammeter on charger.
- External Permanent Magnet Generator (PMG) for increased induction motor starting capacity on 1∅ or 3 ∅ sets, & short circuit protection.
- Exhaust Silencer Hospital Grade.
- All brushed type 304 stainless steel weather and sound deadening housing for coastal areas.
- DSE WebNet Gateway expansion module will allow communications with a host server via Ethernet and the DSE cloud connection for mapping static locations, real time instrumentation, control event log tables, and automatic system alerts via email.
- Remote Annunciator for up to (10) reporting functions. An additional relay expansion module, plus a second Annunciator adds another (10) reporting functions.



Design & specifications subject to change without prior notice. Dimensions shown are approximate. Contact Gillette for certified drawings. DO NOT USE DIMENSIONS FOR INSTALLATION PURPOSES.

NALCO Champion
An Ecolab Company

10/13/15

Momentum

Cole Caudill
Project Manager
1099 Main Ave. Suite 210
Durango, CO 81301

Recommendation for Injection Equipment

As per your request, the following is a recommendation for Injection Equipment for the Statler pad. The Statler pad is quoted at 10 gallons per day against 1100psi.

Equipment

Nalco Champion has found in the Northeast that the Tank Vault tank and containment best suit our customer needs. This tank consists of a 335 gallon poly tank with poly containment and cover. It is durable and easy access that utilizes quick connect pins. An added feature is that it completely keeps the chemical and pump under cover and out of the weather.

Nalco Champion has worked with several pumps in the Marcellus and Utica. Nalco Champion has found that the Timberline is one of the most efficient and dependable pumps for the solar application. This system comes with 100 feet of stainless for injection as well as an atomized injection system.

The Below pricing includes the hydrate inhibitor, all hardware, and installation of each tank system. This tank and pump has the capability of pumping up to 10 gallons per day against 1100psi.

NALCO Champion
An Ecolab Company

Solar Pricing per set with chemical

1. 335/gal Black Tank Assembly - containment, tank, solar pole, ground mount panel,
   335/gal Tank Cover
   1 Timberline Model 4001 single head solar powered chemical injection pump, 1 battery in a box, 1 – 140W Panel
   1 Retractable Injector Atomizer K-1000-1 with spring tip
   100 feet of 3/8 inch stainless
   All fittings to connect tank to the injection point
   330 gallons HI-18FB

   Nalco Champion will collect, deliver, and install all equipment

Total Equipment Cost $7,890.38

Total Chemical Cost $3,488.10

Total Cost per setup $11,378.48

Please feel free to contact me at 304- 282-4678 or Bryan.Hooton@champ-tech.com to order all products or if you require more information.

Sincerely,

Bryan Hooton
Northeast Salesman
NALCO Champion | An Ecolab Company
193 Weatherford Blvd
Buckhannon WV 26201

NALCO Champion

An Ecolab Company

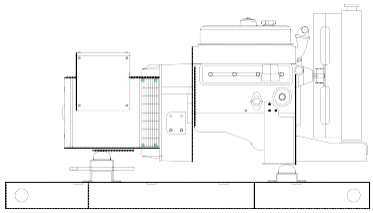
PRIME POWER SYSTEMS
By Gillette Generators, Inc.

MODEL
PR-550
60 HERTZ

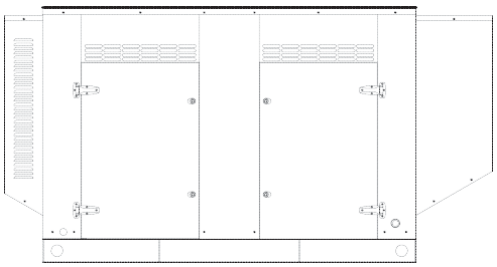
LIQUID COOLED NG ENGINE GENERATOR SET

KW POWER RATINGS RANGE FOR 60 HZ

Model	HZ	PRIME 105ºC RISE N.G.
PR-550-60 HERTZ	60	55



"OPEN" GEN-SET



"LEVEL 2" HOUSED GEN-SET

STANDARD FEATURES

- All generator sets are USA prototype built and thoroughly tested. Production models are USA factory built and 100% load tested.
- Mastertrak telematics remote monitoring equipment with 2 year service subscription. Required for all prime powered generators.
- All generators are UL-1446 certified.
- Solid state, frequency compensated voltage regulation is standard on all gen-sets.
- Electronic engine governor incorporates a throttle body actuator, which allows precise isochronous frequency regulation.
- A brushless rotating field generator design with shunt wound excitation system and connectable at 1 phase or a broad range of 3 phase voltages.
- SENTINEL "ULTIMATE" digital controller allows programming to basic engine functions in the field. Controller has stop-manual-auto mode and engine shutdowns, signaled by full text LCD indicators.
- Heavy Duty 100%-125% rated Circuit Breaker is standard on all gen-sets.
- All generator set control systems components and accessories provide a 1-year limited warranty at time of initial start-up. Generators and engines are governed by separate warranties.
- "OPEN" Generator Sets: There is no enclosure, so gen-set must be placed within a weather protected area, un-inhabited by humans or animals, with proper ventilation. Muffler and flexible exhaust hose are not supplied, as installation requirements are not known. However, these two items are available as optional equipment.
- "LEVEL 2" Aluminum Housing: Full weather protection and superior sound attenuation for specific low noise applications. Critical grade muffler is standard.

GENERATOR RATINGS

GENERATOR MODEL	VOLTAGE		PH	HZ	NATURAL GAS FUEL 105°C RISE PRIME RATING		POWER LEAD CONNECTIONS
	L-N	L-L			KW/KVA	AMP	
PR-550-1-1	120	240	1	60	55/55	229	4 LEAD DEDICATED 1 PH.
PR-550-3-2	120	208	3	60	55/69	191	12 LEAD LOW WYE
PR-550-3-3	120	240	3	60	55/69	166	12 LEAD HIGH DELTA
PR-550-3-4	277	480	3	60	55/69	83	12 LEAD HIGH WYE
PR-550-3-5	127	220	3	60	55/69	181	12 LEAD LOW WYE
PR-550-3-16	346	600	3	60	55/69	66	4 LEAD DEDICATED 3 PH.

RATINGS: All single phase gen-sets are dedicated 4 lead windings, rated at unity (1.0) power factor. All three phase gen-sets are 12 lead windings, rated at (.8) power factor. 105°C "PRIME RATINGS" are strictly for gen-sets provide the prime source of electric power, where normal utility power is unavailable or unreliable. A 10% overload is allowed for a total of 1 hour, within every 12 hours of operation of PRIME RATED systems. All gen-set power ratings are based on temperature rise measured by resistance method as defined by MIL-STD 705C and IEEE STD 115, METHOD 6.4.4. All generators have class H (180°C) insulation system on both rotor and stator windings. All factory tests and KW/KVA charts shown above are based on 105°C (prime) R/R winding temperature, within a maximum 40°C ambient condition. Specifications & ratings are subject to change without prior notice.

APPLICATION AND ENGINEERING DATA FOR MODEL PR-550-60 HZ

GENERATOR SPECIFICATIONS

Manufacturer..... Marathon Electric Generators
Model & Type.....361CSL1613, 4 Pole, 4 Lead, Single Phase
..... 361CSL1602, 4 Pole, 12 Lead re-connectable, Three Phase
..... 361PSL1633, 4 Pole, 4 lead, 600 VAC, Three Phase
Exciter.....Brushless, shunt excited
Voltage Regulator ..... Solid State, HZ/Volts
Voltage Regulation .....½%, No load to full load
Frequency.....Field convertible, 60 HZ to 50 HZ
Frequency Regulation .....½% (½ cycle, no load to full load)
Unbalanced Load Capability..... 100% of prime amps
Total Stator and Load Insulation.....Class H, 180°C
Temperature Rise .....105°C R/R, prime rating @ 40°C amb.
1 Ø Motor Staring @ 30% Voltage Dip (240V) .....130 kVA
3 Ø Motor Staring @ 30% Voltage Dip (208-240V).....200 kVA
3 Ø Motor Staring @ 30% Voltage Dip (480V) .....260 kVA
Bearing..... 1, Pre-lubed and sealed
Coupling.....Direct flexible disc
Total Harmonic Distortion ..... Max 3½% (MIL-STD705B)
Telephone Interference Factor ..... Max 50 (NEMA MG1-22)
Deviation Factor..... Max 5% (MIL-STD 405B)
Ltd. Warranty Period..... 24 Months from date of start-up or
.....1000 hours use, first to occur.

GENERATOR FEATURES

- World Renown Marathon Electric Generator having UL-1446 certification.
- Full generator protection with **SENTINEL "ULTIMATE"** controller, having UL-508 certification.
- Automatic voltage regulator with over-excitation, under-frequency compensation, under-speed protection, and EMI filtering. Entire solid-state board is encapsulated for moisture protection.
- Generator power ratings are based on temperature rise, measured by resistance method, as defined in MIL-STD 705C and IEEE STD 115, Method 6.4.4.
- Power ratings will not exceed temperature rise limitation for class H insulation as per NEMA MG1-22.40.
- Insulation resistance to ground, exceeds 1.5 meg-ohm.
- Stator receives 2000 V. hi-potential test on main windings, and rotor windings receive a 1500 V. hi-potential test, as per MIL-STD 705B.
- Full amortisseur windings with UL-1446 certification.
- Complete engine-generator torsional acceptance, confirmed during initial prototype testing.
- Full load testing on all engine-generator sets, before shipping.
- Self ventilating and drip-proof & revolving field design

ENGINE SPECIFICATIONS AND APPLICATIONS DATA

ENGINE

Manufacturer..... General Motors
Model and Type .....Ind. Power Train, Vortec, 5.7L, 4 cycle
Aspiration..... Natural
Cylinder Arrangement.....8 Cylinders, V-8
Displacement Cu. In. (Liters).....350 (5.7)
Bore & Stroke In. (Cm.).....4 x 3.48 (10.2 x 8.84)
Compression Ratio 9.1:1
Main Bearings & Style..... 5M 400 Copper Lead
Cylinder Head ..... Hardened Cast Iron
Pistons.....High, Silicon Aluminum
Crankshaft.....Nodular Iron
Exhaust Valve ..... Forged Steel
Governor .....Electronic
Frequency Reg. (no load-full load) .....Isochronous
Frequency Reg. (steady state) .....± 1/4%
Air Cleaner.....Dry, Replaceable Cartridge
Engine Speed ....1800 rpm
Piston Speed, ft/min (m./min) 1044 (318)
Max Power, bhp (kwm) Prime/NG 85 (63)
Ltd. Warranty Period.....12 Months or 2000 hrs., first to occur

FUEL SYSTEM

Type .....NAT. GAS, Vapor Withdrawal
Fuel Pressure (kpa), in. H_2O* .....(1.74) 7"
Secondary Fuel Regulator.....NG Vapor System
Auto Fuel Lock-Off Solenoid ..... Standard on all sets
Fuel Supply Inlet Line.....1" NPTF
* Measured at gen-set fuel inlet, downstream of any dry fuel accessories.

FUEL CONSUMPTION

NAT. GAS: FT^3/HR (M^3/HR)	PRIME
100% LOAD	720 (20.3)
75% LOAD	626 (17.7)
50% LOAD	450 (12.7)
NG = 1000 BTU X FT^3/HR = Total BTU/HR	

OIL SYSTEM

Type ..... Full Pressure
Oil Pan Capacity qt. (L) 5.0 (4.7)
Oil Pan Cap. W/ filter qt. (L) 6.5 (6.2)
Oil Filter..... 1, Replaceable Spin-On

ELECTRICAL SYSTEM

Ignition System .....Electronic
Eng. Alternator and Starter:
Ground .....Negative
Volts DC 12
Max. Amp Output of Alternator 70
Recommended Battery to -18°C (0°F): .. 12 VDC, Size BCI# 24F Max Dimensions: ..10 3/4" lg X 6 3/4" wi X 9" hi, with standard round posts. Min. output at 600 CCA. Battery tray (max. dim. at 12"lg x 7"wi), hold down straps, battery cables, and battery charger, is furnished. Installation of (1) starting battery is required, with possible higher AMP/HR rating, as described above, if normal environment averages -13°F (-25°C) or cooler.

APPLICATION AND ENGINEERING DATA FOR MODEL PR-550-60 HZ

COOLING SYSTEM

Type of System ..... Pressurized, closed recovery
Coolant Pump .....Pre-lubricated, self-sealing
Cooling Fan Type (no. of blades) ..... Pusher (10)
Fan Diameter inches (cm)..... 21" (533)
Ambient Capacity of Radiator °F (°C).....125 (51.6)
Engine Jacket Coolant Capacity Gal (L).....1.8 (6.8)
Radiator Coolant Capacity Gal. (L) 5.2 (19.7)
Maximum Restriction of Cooling Air Intake
and discharge side of radiator in. H_20 (kpa)..... .5 (.125)
Water Pump Capacity gpm (L/min)..... ..... 27 (100)
Heat Reject Coolant: Btu/min (kw) 3200 (54.9)
Low Radiator Coolant Level Shutdown……...Standard
Note: Coolant temp. shut-down switch setting at 212°F (100°C) with 50/50 (water/antifreeze) mix.

COOLING AIR REQUIREMENTS

Combustion Air, cfm (m^3/min) ……...…185 (5.2)
Radiator Air Flow cfm (m^3/min) ……6000 (170)
Heat Rejected to Ambient:
Engine: kw (btu/min) ……..…..30.9 (1760)
Alternator: kw (btu/min)……...7.5 (430)

EXHAUST SYSTEM

Exhaust Outlet Size.....2.5"
Max. Back Pressure in. hg (KPA).....3.0 (10.2)
Exhaust Flow, at rated kw: cfm (m^3/min)..... .....580 (16.5)
Exhaust Temp., at rated kw: °F (ºC) 1200 (649)
Engines are EPA certified for Natural Gas.

SOUND LEVELS MEASURED IN dB(A)

	Open Set	Level 2 Encl.
Level 2, Critical Silencer	.....74.	
	.....	67
Level 3, Hospital Silencer	.....72.	
	.....	65

Note: Open sets (no enclosure) has (3) optional silencer system choices due to unknown job-site applications. Level 2 enclosure has installed critical silencer with upgrade to hospital silencer. Sound tests are averaged from several test points and taken at 23 ft. (7 m) from source of noise at normal operation.

DERATE GENERATOR FOR ALTITUDE

3% per 1000 ft. (305m) above 3000 ft.(914m) from sea level

DERATE GENERATOR FOR TEMPERATURE

2% per 10°F (5.6°C) above 85°F (29.4°C)

DIMENSIONS AND WEIGHTS

	Open Set	Level 2 Enclosure
Length in (cm).....	78 (199)	102 (258)
Width in (cm).....	42 (107)	42 (107)
Height in (cm)	38 (97)	53 (134)
1 Ø Net Weight lbs (kg).....	1931 (876)	2471 (1121)
1 Ø Ship Weight lbs (kg)	2031 (921)	2571 (1166)
3 Ø Net Weight lbs (kg).....	1891 (858)	2431 (1103)
3 Ø Ship Weight lbs (kg)..	1991 (903)	2531 (1148)

SENTINEL ULTIMATE DIGITAL MICROPROCESSOR CONTROLLER

SENTINEL ULTIMATE
The "**Ultimate**" controller is an auto start mains (utility) failure module for single gen-set applications. This controller includes a backlit LCD display which continuously displays the status of the engine and generator at all times.
The "**Ultimate**" controller will also monitor speed, frequency, voltage, current, oil pressure, coolant temp., and fuel levels. These modules have been designed to display warning and shut down status. It also includes: (11) configurable inputs • (8) configurable outputs • voltage monitoring • mains (utility) failure detection • (250) event logs • configurable timers • automatic shutdown or warning during fault detection • remote start (on load) • engine preheat • advanced metering capability • hour meter • text LCD displays • protected solid state outputs • test buttons for: stop/reset • manual mode • auto mode • lamp test • start button • power monitoring (kWh, kVAr, kVAh, kVArh)

This controller includes the "**Ultimate**" in expansion features including RS232, RS484 (using MODBUS-RTU/TCP), direct USB connection with PC, expansion optioned using DSENet for remote annunciation and remote relay interfacing for a distance of up to 3300FT. The controller software is freely downloadable from the internet and allows monitoring with direct USB cable, LAN, or by internet via the built in web interface.

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STANDARD AND OPTIONAL FEATURES FOR MODEL PR-550-60HZ

STANDARD FEATURES

CONTROL PANEL:

SENTINEL "ULTIMATE" digital microprocessor with logic allows programming in the field. Controller has:

- STOP-MANUAL-AUTO modes and automatic engine shutdowns, signaled by full text LCD indicators:
- Low oil pressure
- High engine temp
- Low Radiator Level
- Three auxiliary alarms
- Battery fail alarm
- Engine fail to start
- Engine over speed
- Engine under speed
- Over & under voltage

Also included is tamper-proof engine hour meter

ENGINE:

Full flow oil filter • Air filter • Oil pump • Solenoid type starter motor • Hi-temp radiator • Jacket water pump • Thermostat • Pusher fan and guard • Exhaust manifold • Residential Silencer • 12 VDC battery charging alternator • Flexible exhaust connector • "Isochronous" duty, electronic governor • Secondary dry fuel regulator • Dry fuel lock-off solenoid • Vibration isolators • Closed coolant recovery system with 50/50 water to anti-freeze mixture

AC GENERATOR SYSTEM:

AC generator • Shunt excited • Brushless design • Circuit Breaker installed and wired to gen-set • Direct connection to engine with flex disc • Class H, 180°C insulation • Self ventilated • Drip proof construction • UL Certified

VOLTAGE REGULATOR:

½% Voltage regulation • EMI filter • Under-speed protection • Over-excitation protection • total encapsulation

DC ELECTRICAL SYSTEM:

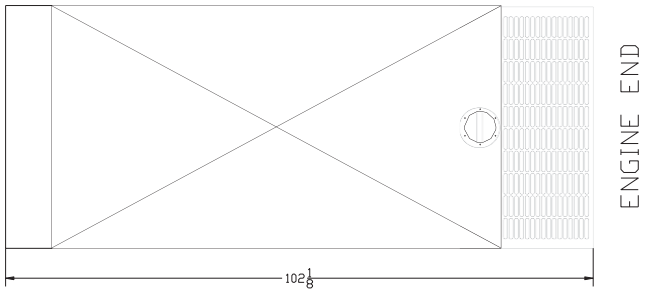
Battery tray • Battery cables • Battery hold down straps • 2-stage battery float charger with maintaining & recharging automatic charge stages

WEATHER/SOUND PROOF ALUMINUM HOUSING CORROSION RESISTANT PROTECTION CONSISTING OF:

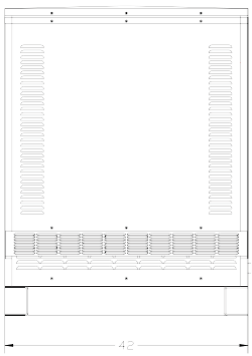
- 9 Heated And Agitated Wash Stages.
- Zinc Phosphate Etching-coating Stage
- Final Baked On Enamel Powder Coat
- 18/8 Stainless Steel Hardware

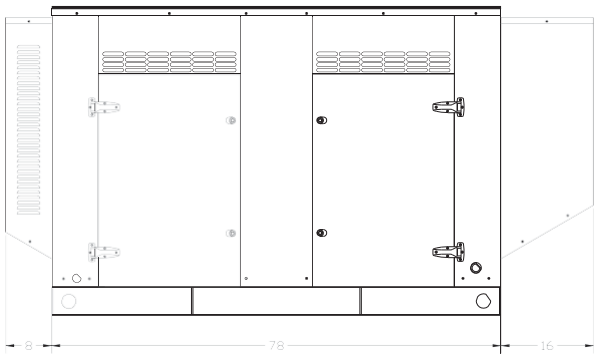
ACCESSORY ITEMS

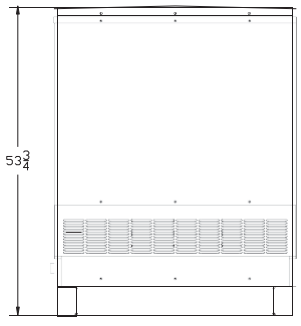
- ☐ Engine Coolant Heater with automatic 80°F on, 100°F off, thermostat
- ☐ Starting Battery Heater Blanket with automatic 60°F on, 80°F off, thermostat
- ☐ Battery Charger Upgrade, float type, 12 VDC at max. charge, with ammeter on charger.
- ☐ External Permanent Magnet Generator (PMG) for increased induction motor starting capacity on 1∅ or 3 ∅ sets, and short circuit protection.
- ☐ Exhaust Silencer Hospital Grade
- ☐ All brushed type 304 stainless steel weather and sound deadening housing for coastal areas.
- ☐ DSE WebNet Gateway expansion module will allow communications with a host server via Ethernet and the DSE cloud connection for mapping static locations, real time instrumentation, control event log tables, and automatic system alerts via email.
- ☐ Remote Annunciator for up to (10) reporting functions. An additional relay expansion module, plus a second Annunciator adds another (10) reporting functions.



Design & specifications subject to change without prior notice. Dimensions shown are approximate. Contact Gillette for certified drawings.
DO NOT USE DIMENSIONS FOR INSTALLATION PURPOSES.







UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2015 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: **Power Solutions International, Inc.**
(U.S. Manufacturer or Importer)

Certificate Number: FPSIB5.70NGP-006

Effective Date: 10/20/2014

Expiration Date: 12/31/2015

Byron J. Bunker, Division Director
Compliance Division

Issue Date: 10/20/2014

Revision Date: N/A

Manufacturer: Power Solutions International, Inc.
Engine Family: FPSIB5.70NGP
Certification Type: Mobile and Stationary
Fuel : Natural Gas (CNG/LNG)
LPG/Propane
Emission Standards : VOC (g/Hp-hr) : 0.7
CO (g/Hp-hr) : 2
NOx (g/Hp-hr) : 1HC + NOx (g/kW-hr) : 2.7
CO (g/kW-hr) : 4.4
NMHC + NOx (g/kW-hr) : 2.7
Emergency Use Only : N

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 60, 40 CFR Part 1048, 1065, 1068, and 60 (stationary only and combined stationary and mobile) and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following nonroad engines, by engine family, more fully described in the documentation required by 40 CFR Part 60, 40 CFR Part 1048 and produced in the stated model year.

This certificate of conformity covers only those new nonroad spark-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60, 40 CFR Part 1048 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60, 40 CFR Part 1048. This certificate of conformity does not cover nonroad engines imported prior to the effective date of the certificate.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068.20 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60, 40 CFR Part 1048. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60, 40 CFR Part 1048.

This certificate does not cover large nonroad engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

Design Conditions – Item #1

Gas Flow Rate: 75 MMscfd
Specific Gravity: 0.65
Inlet Pressure: 915 psig
Inlet Temperature: 120°F
Outlet Water Content: 7 lb. H_2O / MMscf
Comments: Sweet Gas Service

Item #1

Quantity	Description	Price US$
1	Absorber/Scrubber Selling Price	
	Equipment, Exterran Standard Part No. HANO-486842035 *Modified • 42" ID x 30'-0" S/S x 1440 psig MAWP at 120°F, -11°F MDMT, No Corrosion Allowance, ASME Code Constructed and Stamped, NB Registered, Structure Packed Absorber/Scrubber • Lower & Upper with 5" Vane & 3" SS Wire Mesh Mist Extractor • 3 Pass 4"/8" Gas/Glycol Heat Exchanger Vessel Connections: • 10" 600# RF Flanged Inlet / Gas Outlet • 18" 600# RF Manway • 2" NPT Scrubber Level Control • 2" NPT Absorber Level Control • 2" NPT Glycol In & Out • 1" NPT Liquid Outlet • 1" NPT Scrubber Drain • 1" NPT Absorber Drain • 1" NPT Relief Valve • 1" NPT Blow Down • ¾" NPT Scrubber Gauge Glass • ¾" NPT Absorber Gauge Glass • ¾" NPT Thermometer • ½" NPT Pressure Gauge	Included
	Accessory, HANO-774010051 *Modified • Ship Loose Sweet Gas Accessories • *(1) - 2" NPT Fisher L2 Snap Acting LLC with 1-7/8" x 12" PVC Displacer • *(1) - 1" NPT Kimray EAH Dump Valve with 3/8" Std Trim • (1) - 1" NPT Mercer 91 Thermal Relief Valve set @ 1440# • (1) - Sight Glass Assembly complete with Penberthy 1RL5 Reflex Sight Glass, 330J Gauge Cocks and Needle Valves • (1) - 0-2000# 4" DF Pressure Gauge • (1) - 1/4" NPT Pressure Regulator with 0-35# output • (1) - Thermometer with SS Thermowell	
	Paint • *Exterran Standard Coastline IF-173 Enamel System (Colony Green)	Included
	Total Price for Absorber/Scrubber with Ship Loose Accessories	

Delivery
- Origin: Ex-Works, Alleyton, Texas
- Delivery: 4 - 5 Weeks ARO
- Stock Items Subject to Prior Sale

Estimated Shipping Dimensions & Weights
- Dimensions, LWH, Ft.-In.: 35'-0" x 6'-0" x 6'-0"
- Dry Weight, Lbs.: 42,000

Design Conditions – Item #2 & #3

Fluid No. 1: Saturated Natural Gas	Fluid No. 2: TEG	Fluid No. 3: Dehydrated Natural Gas
Flow Rate: 75 MMSCFD	Circulation: 14.4 GPM	Flow Rate: 75 MMSCFD
Specific Gravity: 0.65	Specific Gravity:	Specific Gravity: 0.65
Inlet Pressure: 915 psig	Glycol/Water Ratio: 2.5	Outlet Pressure: psig
Inlet Temperature: 120°F	Hydrate Temperature:	Outlet Temperature: °F
Water Content: 110.2 lb. H_2O / MMSCF	Dewpoint Temperature:	Water Content: 7 lb. H_2O / MMSCF
Comments: Sweet Gas Service		

Item # 2

Quantity	Description	Price US$
1	Glycol Regenerator Selling Price	
	Equipment, Exterran Standard Part No. HANO-488715010 *Modified • Regenerator with Sparger, 1.5MM Btu/hr, 48" OD x 22'-6" long, atmospheric pressure • Firetube: 18" Non-Code ERW Pipe (150.7 Sq. Ft.) • 36" FLAMECO Flame Arrestor w/4" Venture Burner • (2) Sock Filters, 10-3/4" OD x 4'-9" s/s ASME Code, 75 micron elements, w/3 Valve By-Pass & 1" NPT Mercer TRV set @ 125# • Charcoal Filter, 28" OD x 4'-6" s/s ASME Code w/3 Valve By-Pass & 1" NPT Mercer TRV set @ 125# • Still Column, 20" OD x 7'-8" w/Reflux Coil & Temp Indicator • Stack, 18" OD x 10'-0" S/S • (2) Kimray 45015 PV Pumps (Third Pump can be installed as option) • *(2) – High Pressure Glycol Filters, Nowata, 1S1N, complete with bypass piping and isolation valves • Heat Exchanger, Non-Code 14 Pass 2" fintube pipe inside 4" pipe, split 2/12 Exterran Standard Vertical Three-Phase Glycol Separator, 36" OD x 10'-0" s/s x 125 psig MAWP ASME Code w/2" 150# RF Inlet/Gas Outlet and the following controls: • (2) 2" NPT Norriseal 1001 LLC (one snap acting & one throttle acting) • Glycol Outlet: (1) 2" 150# RF Norriseal 2220 Dump Valve w/3/4" Std throttling trim and isolation ball valve • Distillate Out: (1) 1" NPT Belgas 119 Control Valve w/isolation valve • 2" NPT Mercer Thermal Relief Valve set @ 125# • (2) Penberthy N7A Gauge Cocks w/5/8" Gauge Glass • ¼" LM, 0-160# Precision Instrument Pressure Gauge w/isolation valve • ½" NPT Precision Instrument B3B6 Temperature Indicator • Gas Outlet: 1" NPT Fisher 1805 Regulator/Back Pressure Controller tee's off to Fuel Gas Scrubber inlet Burner Assembly train consisting of: • Process Solutions BSL/Igniter model PSP-12110-4X-01 (Optional Solar Panel available if required) • (1) Kimray T-12 Temperature Controller • (1) Kimray T-12M High Temp Shutdown w/Belgas P50 Regulator • (1) Kimray 112-SMT Control Valve	Included

	• Fuel Gas Line: (1) 1" NPT Wellmark 2002PR Regulator & (1) 1" NPT Wellmark 2001PR Regulator • Stripping Gas: (1) ½" NPT Belgas P037 Regulator (0-30# out) • Pilot Gas: (1) ¼" NPT Belgas P50 Regulator w/isolation valve • (1) 10" x 1'-7" x 250# ASME Code Fuel Gas Scrubber • (2) 1" NPT Mercer TRV set @ 125# • (5) ¼" LM Precision Instrument Pressure Gauges w/isolation valves • ½" NPT Precision Instrument B3B6 Temperature Indicator	
	Structural • 10'-6" x 30'-0" Oilfield Type Structural Steel Skid, *Complete with cookie sheet type containment pan.	
	Paint • *Exterran Standard Coastline IF-173 Enamel System (Colony Green)	Included
	Total Price for Regenerator Package	
Delivery • Origin: Ex-Works, Alleyton, Texas • Delivery: 10 Weeks ARO • Drawings: Upon Receipt of Order • Stock Items Subject to Prior Sale		
Regenerator Estimated Shipping Dimensions & Weights • Dimensions, LWH, Ft.-In.: 38'-6" x 11'-10" x 12'-0" • Dry Weight, Lbs.: 43,400		

Item #3

Quantity	Description	Price US$
1	BTEX Eliminator Selling Price	
	Equipment, BTEX Eliminator System "S.T. Dual Inlet Quad 5-120" • (5) 5" x 120" Stainless Steel Shell & Tube Condenser • (1) Structural Skid Frame • (1) J-5000cx JATCO Tank • (1) 2" Complete Control set to route V.O.C.'s to reboiler • (1) 2" Style Flame Arrestor • (1) 12 oz. PRV • (1) High Liquid Level Shut Down Assembly • (1) 150 PSI Glycol PSV • (1) 4" JATCO Compound Injector Burner Set • (1) 6' x 12' Skid Mounted Production Building w/Insulation Constructed from galvanized aluminum • (2) CATCO 12 x 24 Catalytic Gas Heaters	Included
	Total Price for Regenerator Package	
Delivery • Origin: Ex-Works, Oklahoma City, Oklahoma • Delivery: 6 – 8 Weeks ARO • Stock Items Subject to Prior Sale		

Design Conditions – Item #4

Fluid No. 1: Natural Gas	Fluid No. 2: Condensate/Oil
Flow Rate: 75 MMSCFD	Flow Rate: BOPD
Specific Gravity: 0.65	Specific Gravity:
Operating Pressure: 915 psig	
Operating Temperature: 120°F	

Comments: Sweet Gas Service

Item #4

Quantity	Description	Price US$
1	Filter Separator Selling Price	
	Equipment, Exterran Standard Part No. HANO-486530016 *Modified • 30" OD x 12'-6"S/S x 1440 psig MAWP at 120°F, -20°F MDMT w/ (2) 16" Vertical Sumps, No Corrosion Allowance, ASME Code Constructed and Stamped, NB Registered Horizontal Coalescing Filter Separator • SS Mesh Mist Extractor • 21 - 4-1/2" x 72" 0.3 Micron JFF-372-CE Filter Elements Vessel Connections: • 10" 600# RF Inlet/ Gas Outlet • 2" NPT Level Control • 1" NPT Liquid Outlet • 1" NPT Drain • 1" NPT Relief Valve • ¾" NPT Gauge Glass • ¾" NPT Thermometer • ½" NPT Pressure Gauge • ½" NPT DPI Gauge	Included
	Accessory Package, HANO-775010153 • Standard Ship Loose Norriseal Dual Sump Sweet Gas Accessories • (2) - 2" NPT Norriseal 1001 Throttling LLC w/10" PVC Displacer • (2) - 1" NPT Norriseal 2220 Dump Valve w/3/8" Std Trim • (1) - 1" NPT Mercer 91 Thermal Relief Valve "D" orifice, set @ 1440# • (2) - Sight Glass Assembly complete with Penberthy 1RL5 Reflex Sight Glass, 330J Gauge Cocks and Needle Valve • (1) - 1/4" NPT Belgas Pressure Regulator w/0-35# output • (1) - Supply Gas Assembly complete with Pressure Regulator, Drip Pot, Pressure Gauges and Needle Valves • (1) - Differential Pressure Assembly complete with DP Gauge and 3 Valve Manifold • (1) – Pressure Gauge, 4" DF, ½" NPT, 0-2000# • (1) – Pressure Gauge, 2-1/2" DF, ¼" NPT,0-200#	
	Paint • *Exterran Standard Coastline IF-173 Enamel System (Colony Green)	Included
	Total Price for Filter Separator w/ Ship Loose Accessories	
Delivery • Origin: Ex-Works, Alleyton, Texas • Delivery: 4 - 5 Weeks ARO • Optional Stock Items Subject to Prior Sale		
Estimated Shipping Dimensions & Weights • Dimensions, LWH, Ft.-In.: 13'-2" x 3'-3" x 8'-1" • Dry Weight, Lbs.:		

Item #5

Quantity	Description	Price US$
1	Vertical Two Phase Separator Selling Price	
	Equipment, Exterran Standard Part No. HANO-486360100 *Modified	Included

	• 60" ID x 10'-0" S/S x 1440 psig MAWP at 120°F, +4°F MDMT, 1/16 Corrosion Allowance, ASME Code Constructed and Stamped, NB Registered, Vertical Two Phase Separator • SS Vane Mist Eliminator Vessel Connections, • 12" 600# RF Inlet / Gas Outlet • *(2) 2" 600#RF Bridle • 2" NPT Level Control • 2" NPT Liquid Outlet • 2" NPT High Level Switch • 2" NPT Low Level Switch • 2" NPT Drain • 2" NPT Relief Valve • ¾" NPT Thermometer • * ¾"NPT Temperature Transmitter • ¾" NPT Gauge Glass • ½" NPT Pressure Gauge	
	Concrete Block, (CBC8400X1200) • 84" OD x 12" Concrete Block	
	Paint • *Exterran Standard Coastline IF-173 Enamel System (Colony Green)	Included
	Total Price for Separator w/ Ship Loose Accessories	
Delivery • Origin: Ex-Works, Alleyton, Texas • Delivery: 4 - 5 Weeks ARO • Stock Items Subject to Prior Sale		
Estimated Shipping Dimensions & Weights • Dimensions, LWH, Ft.-In.: 14'-3" x 6'-1" • Dry Weight, Lbs.: 25,500		

Item #6

Quantity	Description	Price US$
1	Vertical Two Phase Separator Selling Price	
	Equipment, Exterran Standard Part No. HANO-485642050 *Modified • 42" OD x 10'-0" S/S x 1440 psig MAWP at 120°F, -11°F MDMT, No Corrosion Allowance, ASME Code Constructed and Stamped, NB Registered, Vertical Two Phase Separator • SS Mesh Mist Eliminator Vessel Connections, • 6" 600# RF Inlet / Gas Outlet • *(2) 2" 600#RF Bridle • 2" NPT Level Control • 2" NPT Liquid Outlet • 2" NPT High Level Switch • 2" NPT Low Level Switch • 2" NPT Drain • 2" NPT Relief Valve • ¾" NPT Thermometer • ¾" NPT Gauge Glass • ½" NPT Pressure Gauge	Included
	Concrete Block, (CBC6000X1200) • 60" OD x 12" Concrete Block	
	Paint	Included

- **Attachment M: Air Pollution Control Device Sheet(s)**

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): C1 - C3

Equipment Information

1. Manufacturer: EMIT Technologies Model No. ELS-4200-1820F-4CEO-361	2. Control Device Name: C1-C3 (Oxidation Catalysts) Type: Catalytic Oxidation Catalyst
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: CO – 94% (Estimated), VOC (NMNEHC) – 73% (Estimated) Formaldehyde – 77% (Estimated)	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: 12213 SCFM	10. Capacity: N/A
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. N/A	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal. N/A	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☒ Yes	☐ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	**Maximum**	**Typical**
Pressure (mmHg):		
Heat Content (BTU/scf):		
Oxygen Content (%):		
Moisture Content (%):		
Relative Humidity (%):		

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor
☐ Particulate (type): ☒ Other

17. Inlet gas velocity: ft/sec

18. Pollutant specific gravity:

19. Gas flow into the collector:
12213 ACF @ 847 °F and PSIA

20. Gas stream temperature:
Inlet: 847 °F
Outlet: Varies °F

21. Gas flow rate:
Design Maximum: ACFM
Average Expected: 12213 ACFM

22. Particulate Grain Loading in grains/scf:
Inlet:
Outlet:

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant		Emission Capture Efficiency %	OUT Pollutant		Control Efficiency %
	lb/hr	grains/acf		lb/hr	grains/acf	
A CO	10.72		100	0.63		94
B VOC (NMNEHC)	2.47		100	0.66		73
C Formaldehyde	1.02		100	0.23		77
D						
E						

24. Dimensions of stack: Height 34 ft. Diameter 1.67 ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): None

28. Describe the collection material disposal system:

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet?

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

MONITORING: Operate and maintain catalyst element according to the recommendations of the manufacturer	RECORDKEEPING: Keep records of all catalytic reduction device maintenance
REPORTING: None	TESTING: None

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

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
CO – 94% (Estimated), VOC (NMNEHC) – 73% (Estimated) Formaldehyde – 77% (Estimated)

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
CO – 94% (Estimated), VOC (NMNEHC) – 73% (Estimated) Formaldehyde – 77% (Estimated)

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
See attached manufacturer's specification sheet.

2585 Heartland Or.
Sheridan, WY 82801
Office: 1 Direct: +1 (307) 675.5081
riames@emittechnologies.com

Prepared For:
Doug Kern
EXTERRAN

QUOTE: QU0-16826-Y8N1
Expires: October 29, 2015

INFORMATION PROVIDED BY CATERPILLAR

Engine:	G3606
Horsepower:	1775
RPM:	1000
Compression Ratio:	9.0
Exhaust Flow Rate:	12213 CFM
Exhaust Temperature:	847 •F
Reference:	OM8605-06-001
Fuel:	Natural Gas
Annual Operating Hours:	8760

Uncontrolled Emissions

	glbho-hr	Lb/Hr	Tons/Year
NOx:	0.50	1.96	8.57
CO:	2.74	10.72	46.96
THC:	6.30	24.65	107.98
NMHC	0.94	3.68	16.11
NMNEHC:	0.63	2.47	10.80
HCHO:	0.26	1.02	4.46
02:	12.80%		

POST CATALYST EMISSIONS

g/bhp-hr

NOx:	Unaffected by Oxidation Catalyst
CO:	<0.16
VOC:	<0.17
HCHO:	<0.06

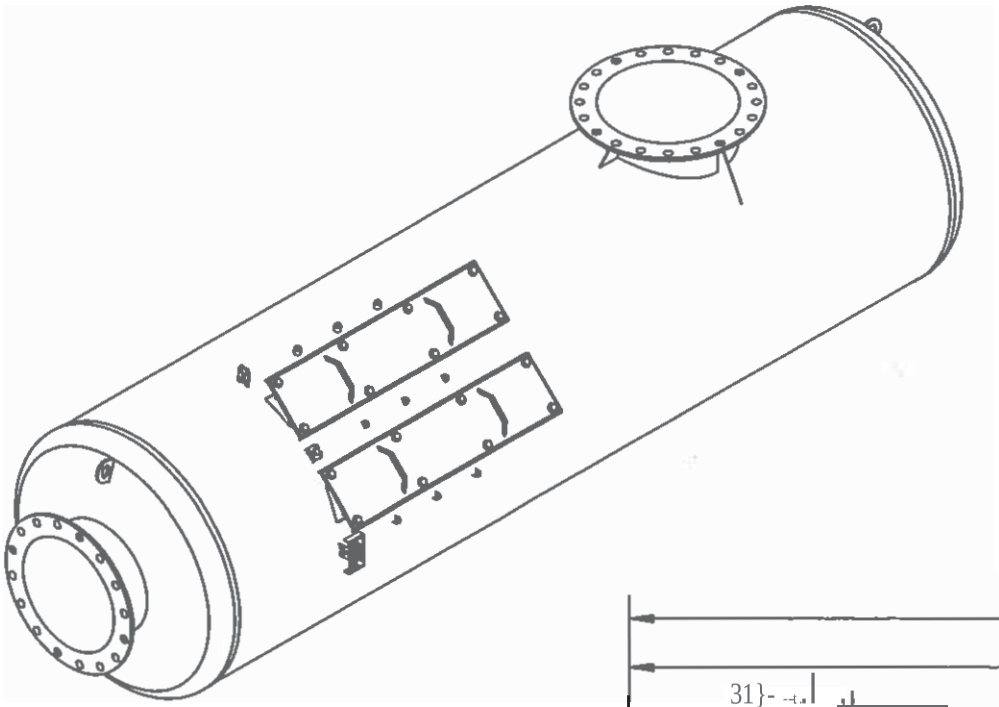
CONTROL EQUIPMENT

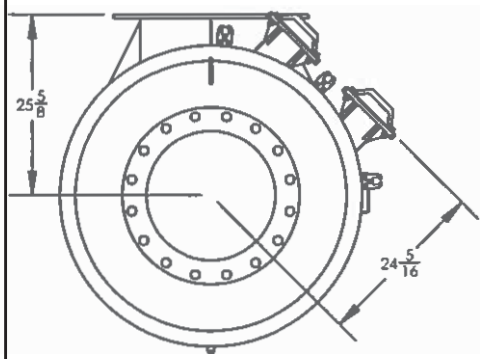
Catalyst Housing

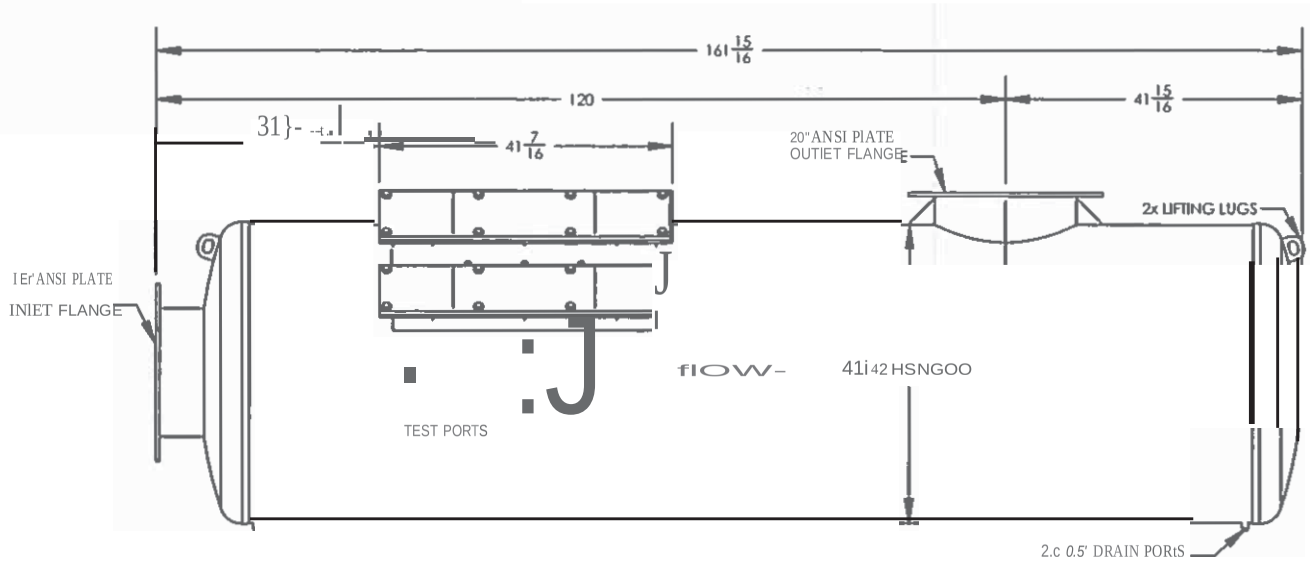
Model:	ELS-4200-1820F-4CE0-361
Manufacturer:	EMIT Technologies, Inc
Element Size:	Rectangle 36" x 15" x 3.5"
Housing Type:	4 Element Capacity
Catalyst Installation:	Accessible Housing
Construction:	10 gauge Carbon Steel
Sample Ports:	9 (0.5" NPn
Inlet Connections:	18" Flat Face Flange
Outlet Connections:	20" Flat Face Range
Configuration:	End In / Side Out
Silencer:	
Silencer Grade:	I
Insertion Loss:	
Estimated Lead Time:	2 Weeks to Ship

Catalyst Element

Model:	**RT-3615-Z**
Catalyst Type:	Oxidation, Standard Precious Group Metals
Substrate Type:	BRAZED
Manufacturer:	EMIT Technologies, Inc
Element Quantity:	2
Element Size:	Rectangle 36" x 15"x 3.5"
Estimated Lead Time:	7-10 Business Days to Ship







NOTES

TtJ"J JI i CRITICAL
LANGES. · N.

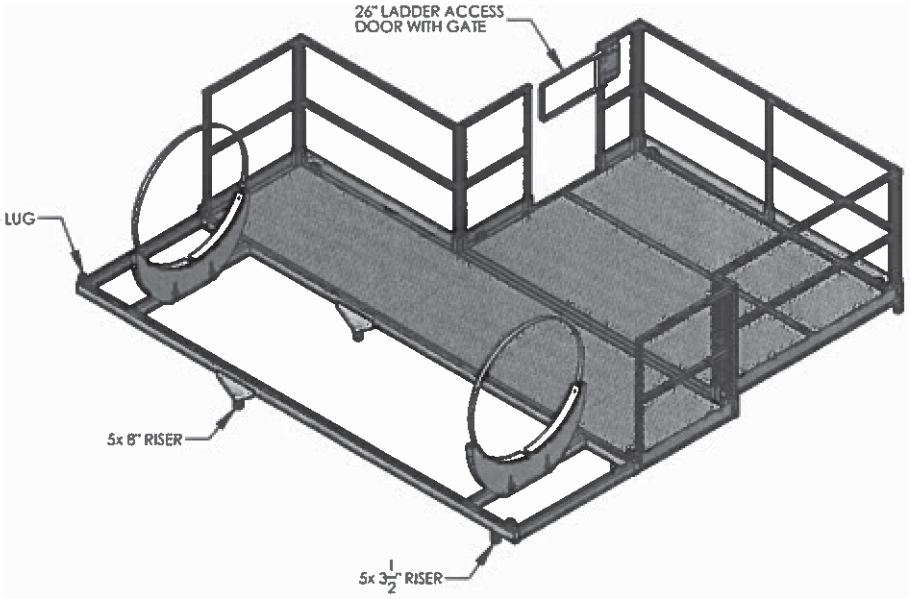
CASE NUMBER	E.N	CUSTOMER	DO NOT SCALE DRAWING
CHM		ENGINE	DIMENSIONS ARE IN INCHES TWO DECIMAL ± THREE DECIMAL ±
PROPRIETARY AND CONFIDENTIAL		COOLER	MATERIAL CARBON STEEL
THIS DRAWING AND SPECIFICATIONS ARE THE PROPERTY OF EMIT TECHNOLOGIES AND SHALL NOT BE REPRODUCED, DISTRIBUTED, DISCLOSED OR USED FOR MANUFACTURE OR SALE WITHOUT THE PERMISSION OF EMIT TECHNOLOGIES.		LOCATION	DRAWN BY TJS
		SITE NAME	CHECKED BY
		UNIT NUMBER	DATE

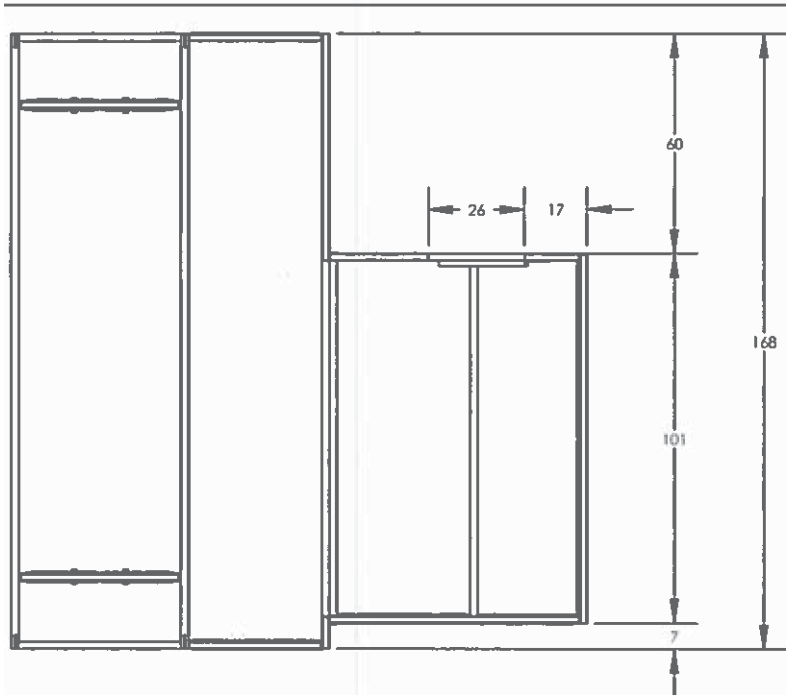
EMIT TECHNOLOGIES
P.O. Box 6785 Ph. 307-673-0883
Sheridan, WY 82801 Fax 307-675-5977

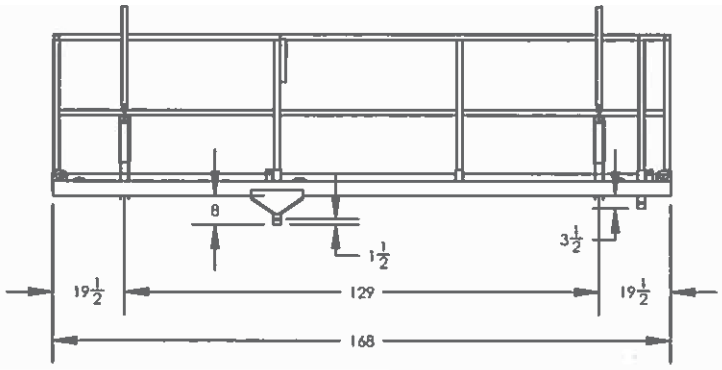
DESCRIPTION:
ELS-4200-1820F-4CE0-361

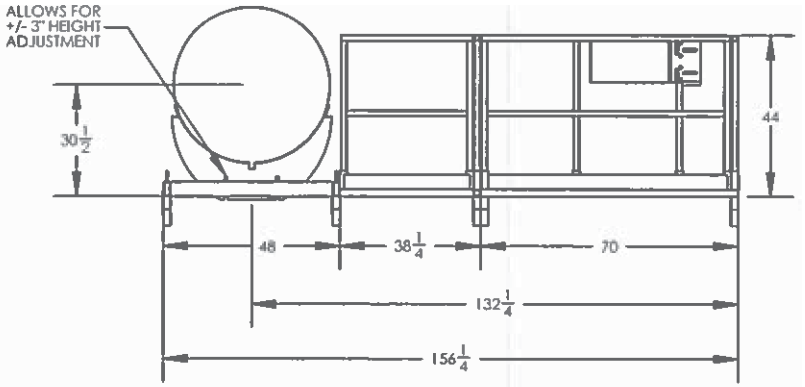
SIZE	ITEM NO.	REV.
A		BA

SCALE:1:28 | WEIGHT: 1680 lbs. | SHEET 1 OF 1









NOTES

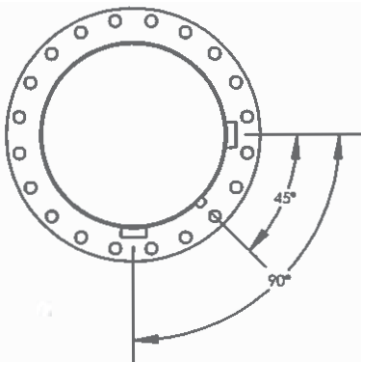
CASE NUMBER	EJN	CUSTOMER	DO NOT SCALE DRAWING
PROJECT REV CHM 1		ENGINE	DIMENSIONS ARE IN INCHES TWO DECIMAL ± THREE DECIMAL ±
		COOLER	MATERIAL CARBON STEEL
		LOCATION	DRAWN BY RPI
		SITE NAME	CHECKED BY
		UNIT NUMBER	DATE 9/30/2015

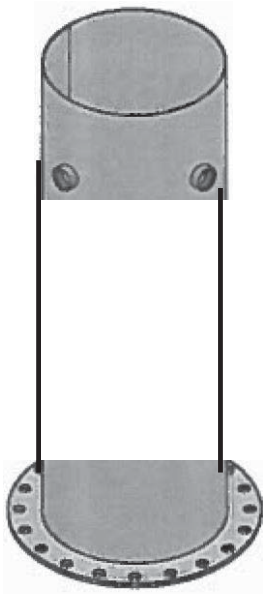
ff!(T

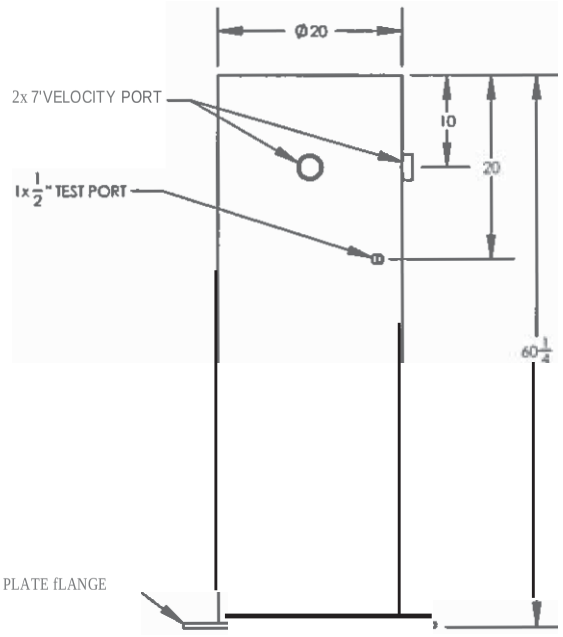
OESCHIPTION an Wf 82801 :h.307-673-0883
DESCI-EL :!OO-fl ax 307-675-5977
CTS- H-PF-H-003

SIZE	.IEUNO.	REV.
A	68389-0309	BA

SCALE:1:50 | WEIGHT· 19241bs. | SHEET 1 OF 1







CASE NUMBER / EJN	CUSTOMER	DO NOT SCALE DRAWING	EMIT TECHNOLOGIES
CRM	ENGINE	DIMENSIONS ARE IN INCHES TWO DECIMAL ± THREE DECIMAL ±	P.O. Box 6785 Sheridan, WY 82801 Ph. 307-673-0883 Fax 307-675-5977
NOTES	COOLER	MATERIAL: CARBON STEEL	
PROPRIETARY AND CONFIDENTIAL THIS DRAWING AND SPECIFICATIONS ARE THE PROPERTY OF EMIT TECHNOLOGIES AND SHALL NOT BE REPRODUCED, DISTRIBUTED, DISCLOSED OR USED FOR MANUFACTURE OR SALE WITHOUT THE PERMISSION OF EMIT TECHNOLOGIES.	LOCATION	DRAWN BY: MWJ	DESCRIPTION: TPA-200-X-1046-0600-0500-0100-R-S-XX-CS
	SITE NAME	CHECKED BY	SIZE: A · ITEM NO.: 68920-2000 · REV.: BA
	UNIT NUMBER	DATE	SCALE: 1:20 · WEIGHT: 146.48 lbs. · SHEET 1 OF 1

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): C4

Equipment Information

1. Manufacturer: Jatco, Inc. Model No. S.T. Dual Inlet Quad 5-120	2. Control Device Name: C4 (Jatco BTEX Unit) Type: Condensor/Heat Exchanger
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected: VOC – 98% - note that Glycalc used 95% to be conservative	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: Min - Still Vent Vapors SCFM	10. Capacity: N/A
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. Normally less than 1 gpm - condensing overhead vapors from TEG Still Vent	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal. Liquids are routed to the Produced Water Tank. Vapors are routed to the TEG Reboiler and combusted in the burner(s).	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☐ Yes	☒ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	**Maximum**	**Typical**
Pressure (mmHg):		
Heat Content (BTU/scf):		
Oxygen Content (%):		
Moisture Content (%):		
Relative Humidity (%):		

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor
☐ Particulate (type): ☒ Other VOC

17. Inlet gas velocity: ft/sec

18. Pollutant specific gravity:

19. Gas flow into the collector:
Varies ACF @ 212 °F and 1 PSIA

20. Gas stream temperature:
Inlet: 212 °F
Outlet: Varies °F

21. Gas flow rate:
Design Maximum: ACFM
Average Expected: ACFM

22. Particulate Grain Loading in grains/scf:
Inlet:
Outlet:

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant		Emission Capture Efficiency %	OUT Pollutant		Control Efficiency %
	lb/hr	grains/acf		lb/hr	grains/acf	
A VOC	2.11		100	0.11		95
B						
C						
D						
E						

24. Dimensions of stack: Height 25 ft. Diameter 1.50 ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table:	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	Weight % for Size Range	Weight % for Size Range
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): Still Vent Vapors are routed to heat exchanger and cooled with liquids routed to Produced Water Tank via Jatco Tank. Vapors are routed to the Reboiler Burner.

28. Describe the collection material disposal system: Per 27, Liquids routed to Produced Water Tank.

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet?

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

MONITORING: Operate and maintain Jatco Unit according to the recommendations of the manufacturer. Monitor presence of flame in TEG Reboiler during Operation Rounds.	RECORDKEEPING: Keep records of Jatco Unit downtime and record any time that a flame is not present in burner.
REPORTING: None	TESTING: None

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

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
100%

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.
VOC – 99.4% (use 95% in Glycal to be conservative)

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
See attached manufacturer's specification sheet.

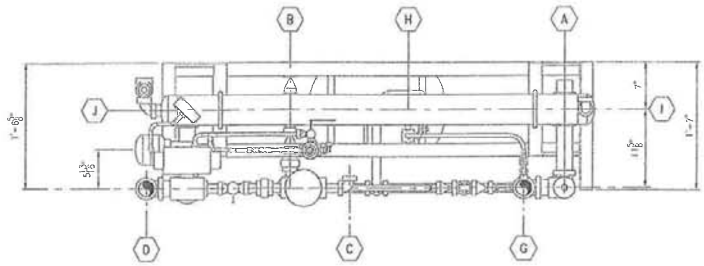
JATCO Shell & Tube
Steam to Liquid Heat Exchangers

Completely constructed with 304 stainless steel. Single pass tube construction. Available in 4" and 5" O.D. 304 stainless steel shell. Units can be configured in series to increase cooling capacity.

Specifications:

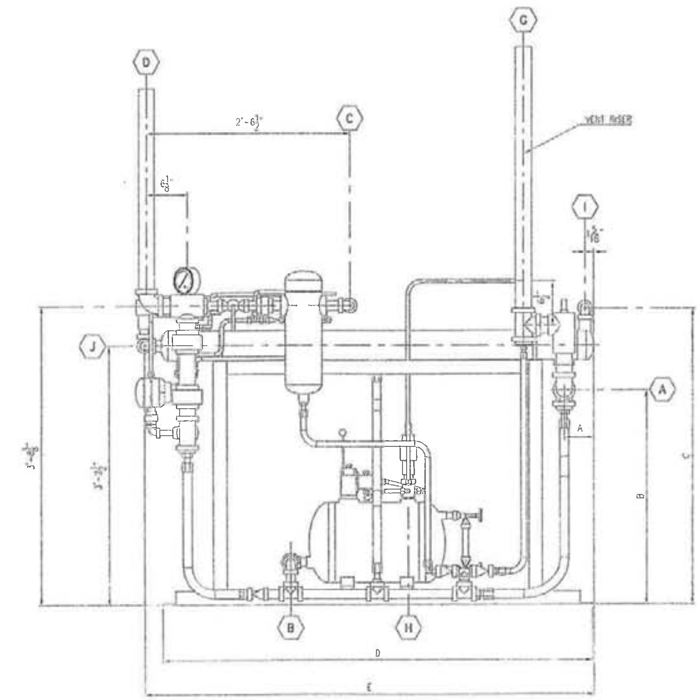
Test pressure:	400 psi
Operating pressure:	1 psi Shell (Vapor Side) / 150 psi Tube Sheet (Glycol Side)
Max operating temp:	225°F
Max Condenser Vapor Outlet Temp:	10° F Approach to Inlet Glycol of the Condenser
Shell:	Schedule 10 304 stainless steel pipe
Tubes:	½" Diameter .035 Wall 304 stainless steel
Tube length:	60" - 120"

Model #	No. of Passes	Diameter	Tube Bundle Length	Cooling Surface
S.T 4-60	1	4"	60"	13.75 sq. ft.
S.T 4-72	1	4"	72"	16.50 sq. ft.
S.T. 4-96	1	4"	96"	22.00 sq. ft.
S.T. 5-60	1	5"	60"	25.54 sq. ft.
S.T. 5-72	1	5"	72"	30.65 sq. ft.
S.T. 5-96	1	5"	96"	40.80 sq. ft.
S.T. 5-120	1	5"	120"	51.00 sq. ft.



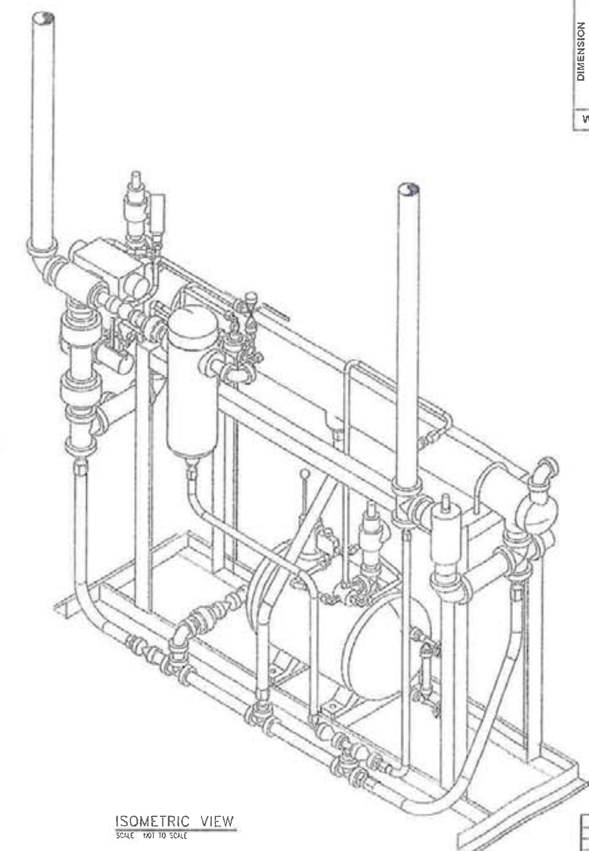
PLAN VIEW

SCALE: 1 1/2" = 1'-0"



ELEVATION VIEW

SCALE: 1 1/2" = 1'-0"



ISOMETRIC VIEW

SCALE: NOT TO SCALE

		BTEX ELIMINATOR SIZE			
		4-60	4-96	5-72	5-120
DIMENSION	A	4 1/2"	4 1/2"	6 1/2"	6 1/2"
	B	33"	33"	31 1/2"	31 1/2"
	C	42"	42"	43 1/2"	43 1/2"
	D	64 1/2"	98	74"	95 1/2"
	E	61 11/16"	97 11/16"	73 11/16"	121 11/16
WT.		510#	-	-	975#

SCHEDULE OF OPENINGS

		BTEX ELIMINATOR SIZE				SERVICE
		4-60	4-96	5-72	5-120	
CONNECTION	A	2" NPT	3" NPT	4" NPT	4" NPT	VAPOR INLET
	B	1" NPT	1" NPT	1" NPT	1" NPT	CONDENSATE OUTLET
	C	1" NPT	1" NPT	1" NPT	2" NPT	BTEX OUTLET
	D	2" NPT	2" NPT	2" NPT	2" NPT	BY PASS
	E					
	F	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	TEMP. CONTROLER INPUT
	G	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	I.S.H. OUTPUT
	H	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	FROM INSTUMENT GAS SUPPLY
	I	1" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	GLYCOL OUTLET
	J	1" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	GLYCOL INLET

0 ISSUED FOR CONSTRUCTION

REV DESCRIPTION DATE BY CK

JATCO, INC.
ENVIRONMENTAL PROTECTION EQUIPMENT

CLIENT: STOCK

TITLE: BTEX SHELL AND TUBE 1" CONTROLS

SCALE: AS NOTED

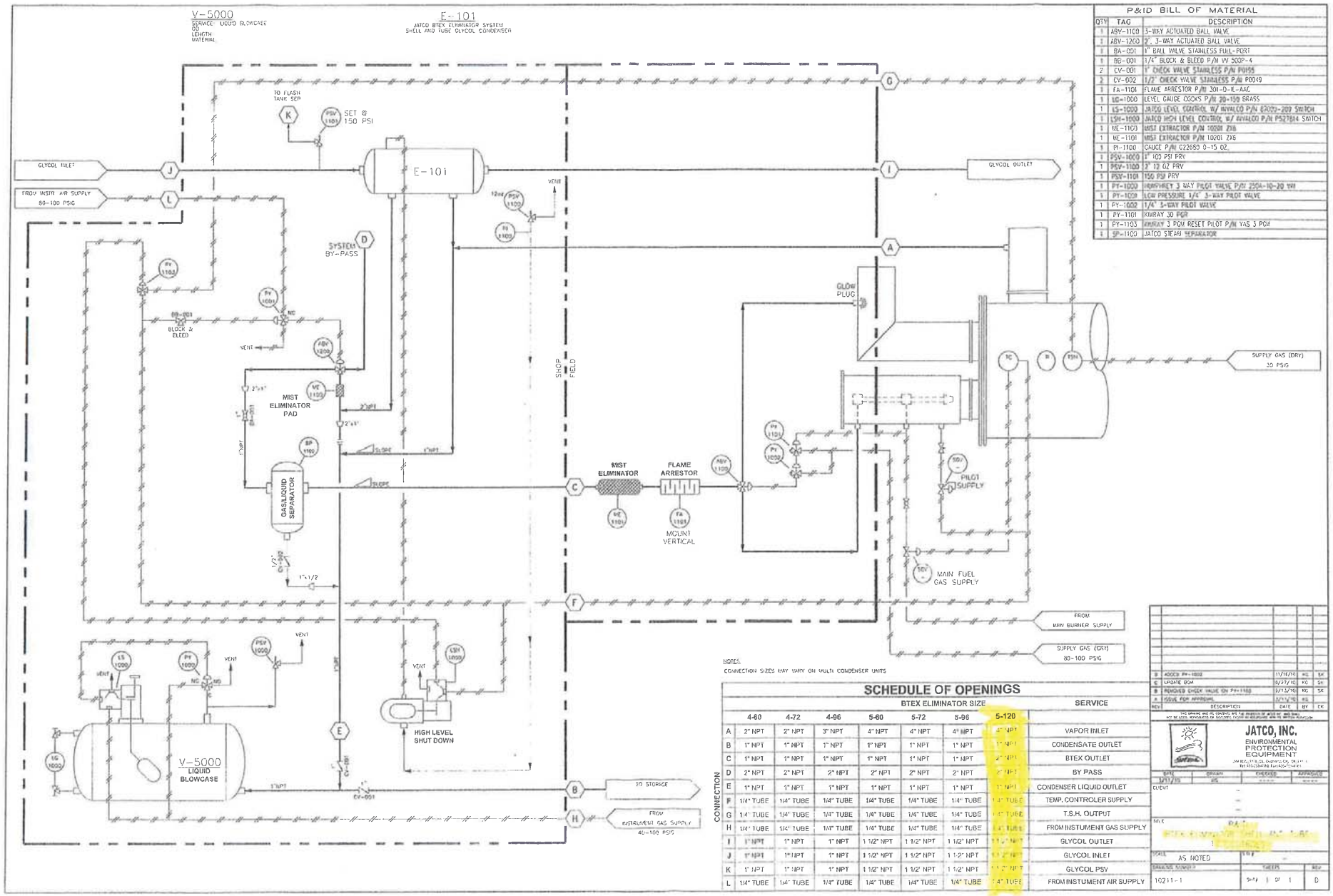
DRAWING NUMBER: 10212

SHEET 1 OF 1

REV 0

V-5000
SERVICE: LIQUID BLOWCASE
OD
LENGTH
MATERIAL

E-101
JATCO BTEX ELIMINATOR SYSTEM
SHELL AND TUBE GLYCOL CONDENSER



NOTES:
CONNECTION SIZES MAY VARY ON MULTI CONDENSER UNITS

SCHEDULE OF OPENINGS

CONNECTION	BTEX ELIMINATOR SIZE 4-60	4-72	4-96	5-60	5-72	5-96	5-120	SERVICE
A	2" NPT	2" NPT	3" NPT	4" NPT	4" NPT	4" NPT	4" NPT	VAPOR INLET
B	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	CONDENSATE OUTLET
C	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	2" NPT	BTEX OUTLET
D	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	BY PASS
E	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	CONDENSER LIQUID OUTLET
F	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	TEMP. CONTROLER SUPPLY
G	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	T.S.H. OUTPUT
H	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	FROM INSTUMENT GAS SUPPLY
I	1" NPT	1" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	GLYCOL OUTLET
J	1" NPT	1" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	GLYCOL INLET
K	1" NPT	1" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	GLYCOL PSV
L	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	FROM INSTUMENT AIR SUPPLY

P&ID BILL OF MATERIAL

QTY	TAG	DESCRIPTION
1	ABV-1100	3-WAY ACTUATED BALL VALVE
1	ABV-1200	2", 3-WAY ACTUATED BALL VALVE
8	BA-001	1" BALL VALVE STAINLESS FULL-PORT
1	BB-001	1/4" BLOCK & BLEED P/N VV 500P-4
2	CV-001	1" CHECK VALVE STAINLESS P/N P0155
2	CV-002	1/2" CHECK VALVE STAINLESS P/N P0049
1	FA-1101	FLAME ARRESTOR P/N 301-D-IL-AAC
1	LG-1000	LEVEL GAUGE COCKS P/N 20-150 BRASS
1	LS-1000	JATCO LEVEL CONTROL W/ HYVALCO P/N 67002-209 SWITCH
1	LSH-1000	JATCO HIGH LEVEL CONTROL W/ HYVALCO P/N P527614 SWITCH
1	ME-1100	MIST EXTRACTOR P/N 10008 ZSS
1	ME-1101	MIST EXTRACTOR P/N 10201 ZXS
1	PI-1100	GAUGE P/N 022680 0-15 OZ.
1	PSV-1000	1" 100 PSI PRV
1	PSV-1100	2" 12 OZ PRV
1	PSV-1101	150 PSI PRV
1	PY-1000	HONEYWELL 3 WAY PILOT VALVE P/N 2504-10-20 VH
1	PY-1001	LOW PRESSURE 1/4" 3-WAY PILOT VALVE
1	PY-1002	1/4" 3-WAY PILOT VALVE
1	PY-1101	KIMRAY 30 PGP
1	PY-1103	KIMRAY 3 PGM RESET PILOT P/N YAS 3 PGM
1	SP-1100	JATCO STEAM SEPARATOR

REV	DESCRIPTION	DATE	BY	CK
B	ADDED PY-1002	11/16/10	KG	SK
C	UPDATE BOM	8/27/10	KG	SK
B	REMOVED CHECK VALVE ON PY-1103	8/13/10	KG	SK
A	ISSUE FOR APPROVAL	3/14/10	KG	

JATCO, INC.
ENVIRONMENTAL PROTECTION EQUIPMENT

DATE	DRAWN	ENGR'D	APPROVED
3/11/10	KG		

CLIENT:

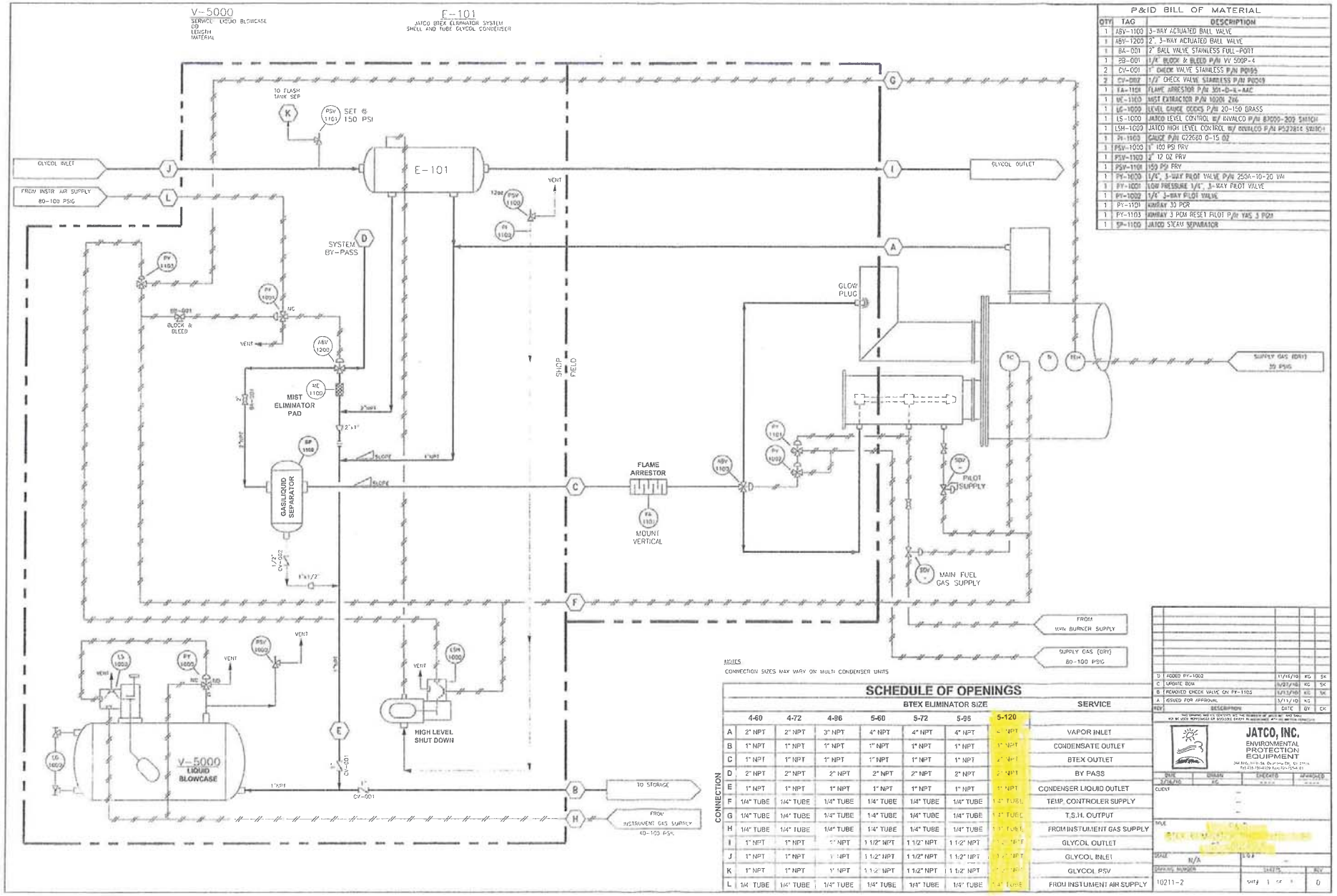
TITLE: P&ID

SCALE: AS NOTED

DRAWING NUMBER: 10211-1

SHEET 1 OF 1

REV: D



NOTES
CONNECTION SIZES MAY VARY ON MULTI CONDENSER UNITS

SCHEDULE OF OPENINGS

CONNECTION	BTEX ELIMINATOR SIZE 4-60	4-72	4-96	5-60	5-72	5-96	5-120	SERVICE
A	2" NPT	2" NPT	3" NPT	4" NPT	4" NPT	4" NPT	4" NPT	VAPOR INLET
B	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	CONDENSATE OUTLET
C	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	2" NPT	BTEX OUTLET
D	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	2" NPT	BY PASS
E	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	CONDENSER LIQUID OUTLET
F	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	TEMP. CONTROLER SUPPLY
G	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	T.S.H. OUTPUT
H	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	FROM INSTRUMENT GAS SUPPLY
I	1" NPT	1" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	GLYCOL OUTLET
J	1" NPT	1" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	GLYCOL INLET
K	1" NPT	1" NPT	1" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	1 1/2" NPT	GLYCOL PSV
L	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	1/4" TUBE	FROM INSTUMENT AIR SUPPLY

P&ID BILL OF MATERIAL

QTY	TAG	DESCRIPTION
1	ABV-1100	3-WAY ACTUATED BALL VALVE
1	ABV-1200	2", 3-WAY ACTUATED BALL VALVE
1	BA-001	2" BALL VALVE, STAINLESS FULL-PORT
1	BB-001	1/4" BLOCK & BLEED P/N VV 500P-4
2	CV-001	1" CHECK VALVE STAINLESS P/N P0155
2	CV-002	1/2" CHECK VALVE STAINLESS P/N P0049
1	FA-1101	FLAME ARRESTOR P/N 301-D-4-AAC
1	MC-1100	MIST EXTRACTOR P/N 10201 ZnS
1	LG-1000	LEVEL GAUGE COCKS P/N 20-150 BRASS
1	LS-1000	JATCO LEVEL CONTROL W/ INVALCO P/N 83000-202 SWITCH
1	LSH-1000	JATCO HIGH LEVEL CONTROL W/ INVALCO P/N 852281C SWITCH
1	PI-1100	GAUGE P/N G22680 0-15 OZ
1	PSV-1000	1" 100 PSI PRV
1	PSV-1100	2" 12 OZ PRV
1	PSV-1101	150 PSI PRV
1	PY-1000	1/4", 3-WAY PILOT VALVE P/N 250A-10-2C VAI
1	PY-1001	LOW PRESSURE 1/4", 3-WAY PILOT VALVE
1	PY-1002	1/4" 3-WAY PILOT VALVE
1	PY-1101	KIMRAY 30 PCR
1	PY-1103	KIMRAY 3 PCM RESET PILOT P/N YAS 3 PCH
1	SP-1100	JATCO STEAM SEPARATOR

REV	DESCRIPTION	DATE	BY	CK
D	ADDED PY-1002	11/15/10	KG	SK
C	UPDATE BOM	5/27/10	KG	SK
B	REMOVED CHECK VALVE ON PY-1103	5/13/10	KG	SK
A	ISSUED FOR APPROVAL	3/11/10	KG	

JATCO, INC.
ENVIRONMENTAL PROTECTION EQUIPMENT

DATE	DRAWN	CHECKED	APPROVED
3/24/10	KG		

CLIENT

SCALE N/A

DRAWING NUMBER 10211-2

SHEET 1 OF 1

REV D

- **Attachment N: Supporting Emission Calculations**

Attachment N - Table 1

	CAT	G3606 LE
Source:	COMPRESSOR #1	
Rated Capacity (hp)	1775	
Rated Capacity (MMBtu/hr)	11.80	
Potential Fuel Usage (MMcf/hr)	0.0115	
Potential Fuel Usage (MMcf/yr)	101.1	
Potential Operating Hours	8760	

	CAT	G3606 LE
	COMPRESSOR #2	
	1775	
	11.80	
	0.0115	
	101.1	
	8760	

	Gillette	PR-800
	Generator Engine #1	
	126	
	1.30	
	0.0013	
	11.13	
	8760	

Dehy Station Generator

	Gilette	PR-550
	Generator Engine #2 -Dehy	
	85	
	0.57	
	0.0006	
	4.84	
	8760	

Pollutant	Emission Factor, Other	Emission Factor, AP-42	Emissions		Emission Factor, Other	Emission Factor, AP-42	Emissions		Emission Factor, Other	Emission Factor, AP-42	Emissions		Emission Factor, Other	Emission Factor, AP-42	Emissions		Emissions	
units	(g/bhp-hr)	(lb/MMBtu)	lb/hr	tpy	(g/bhp-hr)	(lb/MMBtu)	lb/hr	tpy	(g/bhp-hr)	(lb/MMBtu)	lb/hr	tpy	(g/bhp-hr)	(lb/MMBtu)	lb/hr	tpy	**lb/hr**	**tpy**
PM		9.99E-03	0.118	0.516		9.99E-03	0.118	0.516		9.99E-03	0.013	0.057		9.99E-03	0.006	0.025	**0.254**	**1.11**
PM-10		7.71E-05	0.001	0.004		7.71E-05	0.001	0.004		7.71E-05	0.000	0.000		7.71E-05	0.00004	0.00019	**0.002**	**0.01**
PM-2.5		7.71E-05	0.001	0.004		7.71E-05	0.001	0.004		7.71E-05	0.000	0.000		7.71E-05	0.000	0.000	**0.002**	**0.01**
NOx	0.5	-	1.957	8.57	0.5	-	1.957	8.57	1.0	-	0.278	1.22	2.0	-	0.375	1.64	**4.567**	**20.00**
SO_2		5.88E-04	0.007	0.03		5.88E-04	0.007	0.03		5.88E-04	0.001	0.00		5.88E-04	0.0003	0.0015	**0.015**	**0.07**
CO	0.160	-	0.626	2.74	0.160	-	0.626	2.74	2.0	-	0.556	2.43	2.0	-	0.375	1.64	**2.183**	**9.56**
VOC	0.17	-	0.665	2.91	0.17	-	0.665	2.91	0.7	-	0.194	0.85	0.7	-	0.131	0.57	**1.656**	**7.26**
Total HAP			0.454	1.99		0.00E+00	0.454	1.99		0.00E+00	0.093	0.41			0.040	0.18	**1.040**	**4.56**
Benzene		4.40E-04	0.005	0.02		4.40E-04	0.005	0.02		4.40E-04	0.001	0.00		4.40E-04	0.0002	0.0011	**0.011**	**0.05**
Naphthalene		7.44E-05	0.001	0.00		7.44E-05	0.001	0.00		7.44E-05	0.000	0.00		7.44E-05	0.000	0.0002	**0.002**	**0.01**
Toluene		4.08E-04	0.005	0.02		4.08E-04	0.005	0.02		4.08E-04	0.001	0.00		4.08E-04	0.0002	0.0010	**0.010**	**0.05**
Formaldehyde, HCHO	0.06	-	0.235	1.03	0.06	-	0.235	1.03		5.28E-02	0.069	0.30		5.28E-02	0.030	0.1307	**0.568**	**2.49**
1,1,2,2 - Tetrachloroethane		4.00E-05	0.000	0.002		4.00E-05	0.000	0.002		4.00E-05	0.000	0.00		4.00E-05	0.000	0.0001	**0.001**	**0.00**
1,1,2-Trichloroethane		3.18E-05	0.000	0.002		3.18E-05	0.000	0.002		3.18E-05	0.000	0.00		3.18E-05	0.000	0.0001	**0.001**	**0.00**
1,1-Dichloroethane		2.36E-05	0.000	0.001		2.36E-05	0.000	0.001		2.36E-05	0.000	0.00		2.36E-05	0.000	0.0001	**0.001**	**0.00**
1,3 - Butadiene		2.67E-04	0.003	0.014		2.67E-04	0.003	0.014		2.67E-04	0.000	0.00		2.67E-04	0.000	0.0007	**0.007**	**0.03**
1,3 - Dichloropropene		2.64E-05	0.000	0.001		2.64E-05	0.000	0.001		2.64E-05	0.000	0.00		2.64E-05	0.000	0.0001	**0.001**	**0.00**
2,2,4-Trimethylpentane		2.50E-05	0.000	0.001		2.50E-05	0.000	0.001		2.50E-05	0.000	0.00		2.50E-05	0.000	0.0001	**0.001**	**0.00**
Acetaldehyde		8.36E-03	0.099	0.432		8.36E-03	0.099	0.432		8.36E-03	0.011	0.05		8.36E-03	0.005	0.0207	**0.213**	**0.93**
Biphenyl		2.12E-04	0.003	0.011		2.12E-04	0.003	0.011		2.12E-04	0.000	0.00		2.12E-04	0.000	0.0005	**0.005**	**0.02**
Acrolein		5.14E-03	0.061	0.266		5.14E-03	0.061	0.266		5.14E-03	0.007	0.03		5.14E-03	0.003	0.0127	**0.131**	**0.57**
Carbon Tetrachloride		3.67E-05	0.000	0.002		3.67E-05	0.000	0.002		3.67E-05	0.000	0.00		3.67E-05	0.000	0.0001	**0.001**	**0.00**
Chlorobenzene		3.04E-05	0.000	0.002		3.04E-05	0.000	0.002		3.04E-05	0.000	0.00		3.04E-05	0.000	0.0001	**0.001**	**0.00**
Chloroform		2.85E-05	0.000	0.001		2.85E-05	0.000	0.001		2.85E-05	0.000	0.00		2.85E-05	0.000	0.0001	**0.001**	**0.00**
Ethylbenzene		3.97E-05	0.000	0.002		3.97E-05	0.000	0.002		3.97E-05	0.000	0.00		3.97E-05	0.00002	0.00010	**0.001**	**0.004**
Ethylene Dibromide		4.43E-05	0.001	0.002		4.43E-05	0.001	0.002		4.43E-05	0.000	0.00		4.43E-05	0.000	0.0001	**0.001**	**0.00**
Methanol		2.50E-03	0.030	0.129		2.50E-03	0.030	0.129		2.50E-03	0.003	0.01		2.50E-03	0.001	0.0062	**0.064**	**0.28**
Methylene Chloride		2.00E-05	0.000	0.001		2.00E-05	0.000	0.001		2.00E-05	0.000	0.00		2.00E-05	0.000	0.0000	**0.001**	**0.00**
Napthalene		7.44E-05	0.001	0.004		7.44E-05	0.001	0.004		7.44E-05	0.000	0.00		7.44E-05	0.000	0.0002	**0.002**	**0.01**
PAH		2.69E-05	0.000	0.001		2.69E-05	0.000	0.001		2.69E-05	0.000	0.00		2.69E-05	0.000	0.0001	**0.001**	**0.00**
Phenol		2.40E-05	0.000	0.001		2.40E-05	0.000	0.001		2.40E-05	0.000	0.00		2.40E-05	0.000	0.0001	**0.001**	**0.00**
Styrene		2.36E-05	0.000	0.001		2.36E-05	0.000	0.001		2.36E-05	0.000	0.00		2.36E-05	0.000	0.0001	**0.001**	**0.00**
Vinyl Chloride		1.49E-05	0.000	0.001		1.49E-05	0.000	0.001		1.49E-05	0.000	0.00		1.49E-05	0.000	0.0000	**0.000**	**0.00**
Xylene		1.84E-04	0.002	0.010		1.84E-04	0.002	0.010		1.84E-04	0.000	0.00		1.84E-04	0.0001	0.0005	**0.005**	**0.02**
n-hexane		4.45E-04	0.005	0.023		4.45E-04	0.005	0.023		4.45E-04	0.001	0.00		4.45E-04	0.0003	0.0011	**0.011**	**0.05**

Vendor Sheet Values

Attachment N Table 2 - Hamilton Station - Potential to Emit Analysis, Dehy Station Summary

Pollutant Emissions in Pounds per Hour using AP-42

Pollutant	Reboiler emissions (lb/hr)	75 MMSCFD Dehydrator[1]	Total emissions (lb/hr)
VOC	0.010	0.110	0.140
PM 10	0.010	0.000	0.030
S02	0.001	0.000	0.003
NOX	0.150	0.000	0.200
CO	0.120	0.000	0.130

Pollutant Emissions in Tons per year

Pollutant	Reboiler emissions (tpy)	75 MMSCFD Dehydrator[1]	Total emissions (tpy)
VOC	0.050	0.460	0.580
PM 102	0.050	0.000	0.140
S02	0.004	0.000	0.014
NOX	0.660	0.000	0.900
CO	0.530	0.000	0.530

Notes

[1]per GRI-GlyCalc Version 4.0 - Aggregate Calculations Report

[2] Assume PM-10 = PM,,

0 1

Attachment N - Table 3 - VOC Fugitive Emissions - Emission Unit

Average inlet product composition VOC weight fraction: 0.010

Component	Service	Emission Factor [1]	Number of Components [2]	Uncontrolled Emissions [3] [4]	
				lbs/hr	tpy
		(lb/hr-unit)			
	Gas/Vapor	0.00992	160	0.016	0.070
	Light Oil/Liquid	0.00551	10	0.055	0.241
Valves	Heavy Oil	0.0000185	0	0.000	0.000
	Light Oil/Liquid	0.02866	1	0.010	0.042
Pumps	Heavy Oil	0.00113	0	0.000	0.000
	Gas/Vapor	0.00086	75	0.001	0.003
	Light Oil/Liquid	0.000243	5	0.000	0.000
Flanges	Heavy Oil	0.00000086	0	0.000	0.000
	Gas/Vapor	0.00044	50	0.000	0.001
	Light Oil/Liquids	0.0004630	5	0.002	0.010
Connectors	Heavy Oil	0.00001653	0	0.000	0.000
Other/Compressors	Gas/Vapor	0.0194	3	0.001	0.003
Relief Valves	Gas/Vapor	0.0194	24	0.005	0.020
			Total VOC	0.089	0.390
			Total HAPS	0.067	0.293

Notes:
Average VOC weight fraction estimated based on Neel well natural gas analysis (approx 1030 BTU/SCF).
* Only pump in VOC service is methanol transfer pump - assume 100% VOC for estimate and 4 months of winter operating time.

Notes:

(1) Emission factors are from Table 2-4 of the USEPA guidance EPA-453/R-95-017 dated November 1995 and 40 CFR 60 Subpart OOOO requirements.

(2) Component counts based on assumption that all 3 compressors are in operation and includes methanol in light liquids.

(3) Annual emission calculations based on 8760 hrs/year.

(4) No HAPs in gas analysis - only HAP is methanol.

Attachment N - Table 4 - GHG Fugitive Emissions

Average inlet gas composition Methane weight fraction: 0.946

Component	Service	Emission Factor [1]	Number of Components [2]	LDAR Program	Uncontrolled Emissions [3]	
					lbs/hr	tpy
		(lb/hr-unit)				
	Gas/Vapor	0.00992	160	N/A	1.501	6.577
	Light Oil	0.00551	10	N/A	0.052	0.228
Valves	Heavy Oil	0.0000185	0	N/A	0.000	0.000
	Light Oil	0.02866	1	N/A	0.000	0.000
Pumps	Heavy Oil	0.00113	0	N/A	0.000	0.000
	Gas/Vapor	0.00086	75	N/A	0.061	0.267
	Light Oil	0.000243	5	N/A	0.000	0.000
Flanges	Heavy Oil	0.00000086	0	N/A	0.000	0.000
	Gas/Vapor	0.00044	50	N/A	0.021	0.091
	Light Oil	0.0004630	5	N/A	0.000	0.000
Connectors	Heavy Oil	0.00001653	0	N/A	0.000	0.000
Other/Compressors	Gas/Vapor	0.0194	3	N/A	0.055	0.241
Relief Valves	Gas/Vapor	0.0194	24	N/A	0.440	1.929
					2.131	9.334

Notes:
Methane weight fraction based on Neel Well gas analysis. Methanol included as light liquids with no methane content.

Pollutant	Total Potential Emission Rate (lbs/hr)	Total Potential Emission Rate (tons/year)	CO_2 equivalents	
Methane	2.131	9.334	53.275	233.345
			Total CO_2e	**233** tpy

Greenhouse gas emission factors are based on 40 CFR Part 98 (Mandatory Greenhouse Gas Reporting) Subpart C (General Stationary Fuel Combustion Sources) Tables C-1 and C-2 (Updated November 2013)

CO2 equivalents	
GWP (Methane) =	25

Global Warming Potential (GWP), Table A-1, 40 CFR Part 98, Subpart A

Notes:

(1) Emission factors are from Table 2-4 of the USEPA guidance EPA-453/R-95-017 dated November 1995 and 40 CFR 60 Subpart OOOO requirements.

(2) Component counts based on assumption that all 3 compressors are in operation and includes methanol injection.

(3) Annual emission calculations based on 8760 hrs/year.

Attachment N - Table 5 - GHG Combustion Emissions

Component	Rating - HP or MMBtu	Pollutant	Emission Factor [1]	Units	Uncontrolled Emissions [2] lbs/hr	Uncontrolled Emissions [2] tpy	CO2(eq) lb/hr	CO2(eq) tpy
		CH4	0.001	Kg/MMBtu	0.03	0.13	**0.74**	**3.25**
		CO2	441	g/hp-hr	1724.17	7551.88	**1724.17**	**7551.88**
Compressor Engine CE-1	1775	N2O	0.0001	Kg/MMBtu	0.00	0.01	**0.89**	**3.88**
		CH4	0.001	Kg/MMBtu	0.03	0.13	**0.74**	**3.25**
		CO2	441	g/hp-hr	1724.17	7551.88	**1724.17**	**7551.88**
Compressor Engine CE-2	1775	N2O	0.0001	Kg/MMBtu	0.00	0.01	**0.89**	**3.88**
		CH4	0.001	Kg/MMBtu	0.03	0.13	**0.74**	**3.25**
		CO2	441	g/hp-hr	1724.17	7551.88	**1724.17**	**7551.88**
Compressor Engine CE-3	1775	N2O	0.0001	Kg/MMBtu	0.00	0.01	**0.89**	**3.88**
		CH4	0.001	Kg/MMBtu	0.00	0.01	**0.07**	**0.32**
		CO2	441	g/hp-hr	122.39	536.08	**122.39**	**536.08**
Generator Engine GE-1	126	N2O	0.0001	Kg/MMBtu	0.00	0.00	**0.09**	**0.38**
		CH4	0.001	Kg/MMBtu	0.00	0.01	**0.07**	**0.32**
		CO2	441	g/hp-hr	82.57	361.64	**82.57**	**361.64**
Generator Engine GE-2	85	N2O	0.0001	Kg/MMBtu	0.00	0.00	**0.09**	**0.38**
		CH4	0.001	Kg/MMBtu	0.00	0.01	**0.07**	**0.32**
		CO2	59	Kg/MMBtu	194.70	852.79	**194.70**	**852.79**
TEG Reboiler REB-1	1.5	N2O	0.0001	Kg/MMBtu	0.00	0.00	**0.09**	**0.38**
TEG Still Vent - TEG-1 (Non combusted CH4 from Jatco unit vapors - est 95% control)		CH4			24.70	108.00	**30.88**	**135.00**
							5608.42	**24564.65**

GE-3606 Engine CO2 (eq) Emissions each =	**1725.80**	**7559.01**
GE-1 Engine CO2 (eq) Emissions each =	**122.55**	**536.78**
GE-2 Engine CO2 (eq) Emissions each =	**82.73**	**362.34**
REB-1 CO2 (eq) Emissions each =	**194.86**	**853.49**

Notes:
Greenhouse gas emission factors are based on 40 CFR Part 98 (Mandatory Greenhouse Gas Reporting) Subpart C (General Stationary Fuel Combustion Sources) Tables C-1 and C-2 (Updated November 2013)

CO2 equivalents	
GWP (Methane) =	25
GWP (N2O) =	298

Global Warming Potential (GWP), Table A-1, 40 CFR Part 98, Subpart A

Notes:

(1) Emission factors for CO2 are from CAT engine data sheet for G3606 engines and also used for Genset engine. Emission factor for CO2 for reboiler is from 40 CFR 98 Table C-2 = 59.0 kg/MMBtu. Emission Factor from 40 CFR 98 Table C-2 of 0.001 kg/MMBtu for CH4 and 0.0001 kg/MMBtu for N2O from natural gas combustion. HHV = 7610 Btu/bhp-hr used for calc. on CAT 3606 engine. For Genset fuel usage factor = 1330 ft3/hr = 1.33 MMBtu/hr used.

(2) Annual emission calculations based on 8760 hrs/year.

Attachment N - Table 6 - Truck Loading Associated with Methanol (T02) and Prod Water (T11)

Emission Point	Loading Properties				Throughput[a]
	Loading Temperature (F)	Loading Temperature (R)	Vapor Pressure (psi)	Vapor Molecular Weight (lb/lb-mol)	Annual (1,000 gal/yr)
Methanol Product Loading	62	521.67	1.6	32.0	3.69
Produced Water Unloading	62	521.67	0.3	18.7	76.00

Emission Point	Saturation Factor[b]	Loading Loss[c] ($lb/10^3$ gal)	Uncontrolled VOC Emissions[d]		Uncontrolled HAP Emissions[e]	Uncontrolled HAP Emissions[e]
			Annual (ton/yr)	Hourly (lb/hr)	Annual (ton/yr)	Hourly (lb/hr)
Methanol Product Loading	1.45	18.165	0.033	0.008	0.033	0.008
Produced Water Loading	0.6	7.486	0.028	0.006	0.001	0.000
Totals			0.062	0.014	0.035	0.008

Notes:

(a) Maximum annual throughput methanol: 3,685 gal/yr
Maximum annual throughput Produced Water: 76,143 gal/yr

(b) Saturation factor for loading, dedicated loading taken from Table 5.2-1 (dedicated normal service) of Section 5.2 of AP-42, Fifth Edition, Volume 1.

(c) Loading loss calculated according to the methodology in Section 5.2 of AP-42, Fifth Edition, Volume 1.
Sample Calculation, average loading loss for methanol:

L_L ($lb/10^3$ gal)= 12.46 SMP / T ; S = Saturation Factor (--)
M = Vapor Molecular Weight (lb/lb-mol)
P = Vapor Pressure (psi)
T = Loading Temperature (R)

$$L_L = \frac{(12.46)\ (1.5)\ (32\ lb/lb\text{-}mol)\ (1.600\ psi)}{521.67\ R} = 18.165\ lb / 10^3\ gal$$

(d) Emissions estimated by applying the loading loss to the applicable loading throughput.
sample calculation for methanol, annual emissions:

$$\frac{18.165\ lb}{1000\ gal} \times \frac{4 \times 1{,}000\ gal}{yr} \times \frac{ton}{2{,}000\ lb} = 0.033\ \frac{VOC\ ton}{yr}$$

	Methanol	
(e) Total HAP emissions estimated from vapor compositions:	100.00%	Methanol
	5.00%	Produced Water

(f) Control efficiency = 0%

Produced Water Estimate for Hamilton 400 bbl Storage Tank T-421
Sample date = 5/14/2014 from Daybrook Compressor Station and Wetzel Dehy

Constituent	Daybrook mg/L	Wetzel mg/l	Average mg/L	Average Weight Fract	Average Weight %	Value used for Tanks 4.09 Liquid %	Representative Chemical
Benzene	0.290	0.166	0.228	2.2755E-07	2.28E-05	0.10%	Benzene
Ethylbenzene	0.000	0.000	0.000	0.0000E+00	0.00E+00	0.00%	Ethylbenzene
Toluene	3.400	0.489	1.945	1.9445E-06	1.94E-04	0.25%	Toluene
Xylene	0.559	0.361	0.460	4.6000E-07	4.60E-05	0.15%	Xylene
TPH - DRO	776.000	8642.000	4709.000	4.7090E-03	0.4709	1.75%	Distallate Fuel Oil No. 2
TPH - GRO	186.000	15.700	100.850	1.0085E-04	0.0101	0.50%	Gasoline (RVP 7)
TPH - ORO	37.800	126.000	81.900	8.1900E-05	0.0082	0.25%	Crude Oil (RVP 5)
Other Constituents:							
Methanol						1.00%	Methanol
Triethelyne Glycol						1.00%	Propylene Glycol
Water						95.00%	Water
						100.00%	Total

Assume primary constituent water at 8.34 lb/gal = 2.2 lb/liter = 1 kg/liter

Example Calculation - Benzene Average Weight Fraction and %:

Benz concentration mg/L Average	Density H2O kg/L	Benz Wt Fract Unitless	Benzene Wt % %
0.23	1.00	0.000000228	0.0000228

Attachment N - Table 8 - Estimated Flashing Losses - Hamilton 400 BBL Produced Water Tank

Factors from TCEQ Document - "Determining Emissions From Produced Water Storage Tanks"
(See attachment and note that Barnett Shale Gas is much richer than Marcellus Lean Gas)

Throughput from Tanks 4.09 = 76143 gal/year
1813 bbl/year

Flash Emissions

	Gas Production Site Factor	Emissions	Emissions
Pollutant	Avg Emissions (lb/bbl)	lb/hr	ton/year
VOC	0.01	2.07E-03	0.0090646
Benzene	0.0001	2.07E-05	9.065E-05
Toluene	0.0003	6.21E-05	0.0002719
*Ethylbenzene	0.000006	1.24E-06	5.439E-06
Xylene(s)	0.00006	1.24E-05	5.439E-05
n-Hexane	N/A	0	0

* - Note that Ethylbenzene not found in Produced Water samples

Total Tank Emissions for Att J - Add Tanks 4.09 estimate with flash

	lb/hr	ton/year	
VOC	0.0032	0.0141	Includes GRO, DRO, and ORO
Benzene	0.0001	0.0006	
Toluene	0.0004	0.0017	
*Ethylbenzene	1.24E-06	5.44E-06	
Xylene(s)	0.0001	0.0006	

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JWMC Number:	MAGL1001	***Run Date:***	03/01/13
Customer Name:	M-3		
Station Name:	NEEL	***Eff. Date:***	3/1/2013
Station Number:		***Sampled by:***	CK
Producer:		***Procure Date:***	02/21/13
Field:		***Pressure (lbs.):***	450.00
Co. or Pr.:	MARION	***Temperature (° F):***	28
State:	WV.	***Bottle Number:***	5606

Remarks:

Component	***Mole Percent***	***GPM @ 14.696***	***Ideal BTU @ 14.696***
Hydrogen Sulfide	0.0000		
Nitrogen	0.3367		
Methane	97.1829		981.55
Carbon Dioxide	0.2282		0.00
Ethane	2.1392	0.571	37.86
Propane	0.1025	0.028	2.58
I-Butane	0.0023	0.001	0.07
N-Butane	0.0072	0.002	0.23
I-Pentane	0.0004	0.000	0.02
N-Pentane	0.0006	0.000	0.02
2,2-Dimethylbutane	0.0000	0.000	0.00
2,3-Dimethylbutane	0.0000	0.000	0.00
2-Methylpentane	0.0000	0.000	0.00
3-Methylpentane	0.0000	0.000	0.00
n-Hexane	0.0000	0.000	0.00
2,2-Dimethylpentane	0.0000	0.000	0.00
Methylcyclopentane	0.0000	0.000	0.00
Benzene	0.0000	0.000	0.00
3,3-Dimethylpentane	0.0000	0.000	0.00
Cyclohexane	0.0000	0.000	0.00
2-Methylhexane	0.0000	0.000	0.00
2,3 dimethylpentane	0.0000	0.000	0.00
3- methylhexane	0.0000	0.000	0.00
1t,2-Dimethylcyclopentane	0.0000	0.000	0.00
1c,2-Dimethycyclopentane	0.0000	0.000	0.00
n-heptane	0.0000	0.000	0.00
Methylcyclohexane	0.0000	0.000	0.00
2,5-Dimethylhexane	0.0000	0.000	0.00
2,4-Dimethyhexane	0.0000	0.000	0.00
Toluene	0.0000	0.000	0.00
2-Methylheptane	0.0000	0.000	0.00
4-Methylheptane	0.0000	0.000	0.00

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Fairfield,TX Oklahoma City,OK Mounds,OK Tulsa,OK
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Customer Name:	M-3				
Station Name:	NEEL			***Eff. Date:***	3/1/2013
Station Number:				***Sampled by:***	CK
3-Methylheptane		0.0000	0.000		0.00
1c,2-Dimethycyclohexane		0.0000	0.000		0.00
N-Octane		0.0000	0.000		0.00
1t,2-Dimethylcyclohexane		0.0000	0.000		0.00
1t,3-Dimethylcyclohexane		0.0000	0.000		0.00
1c,3-Dimethylcyclohexane		0.0000	0.000		0.00
Ethylcyclohexane		0.0000	0.000		0.00
Ethylbenzene		0.0000	0.000		0.00
M-Xylene		0.0000	0.000		0.00
P-Xylene		0.0000	0.000		0.00
O-Xylene		0.0000	0.000		0.00
N-Nonane		0.0000	0.000		0.00
Decanes		0.0000	0.000		0.00
Undecanes		0.0000	0.000		0.00
TOTAL		**100.0000**	**0.602**		**1022.33**
Ideal Gravity	0.5690		**Real Gravity**	0.5702	
Compressibility Factor (Z) @ 14.696 PSIA & 60 DEG. F =					0.9979
Base Pressures		**14.73**	**14.65**		**15.025**
GPM		0.604	0.600		0.616
Ideal BTU Dry		1024.70	1019.13		1045.22
Ideal BTU Sat.		1006.87	1001.30		1027.35
Real BTU Dry		1026.83	1021.25		1047.44
Real BTU Sat.		1008.97	1003.37		1029.53

GPA METHOD 2286-95

Note: Calibration, Standards, and testing procedures are achieved pursuant to GPA regulations.

This Analysis Report is not intended for submission to Louisiana Department of Environmental Quality.

Deborah Murphy
J-W ANALYST

DISTRIBUTION:
1 35

We appreciate your business

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Phone: 304.596.2084 | Fax: 304.596.2086

Certifications: WV Department of Health #: 00354, 00443 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

M3 MIDSTREAM LLC
742 FAIRMONT RD SUITE E

WESTOVER, WV 26501-

Thursday, June 05, 2014

Lab Number: 212690-2014-W **Sample ID:** DAYBROOK

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: **Organics**							
Benzene	0.2896	mg/l	SW8021B/5030B	5/27/2014 18:17	MC	0.0007	
Ethylbenzene	ND	mg/l	SW8021B/5030B	5/27/2014 18:17	MC	0.0014	
Toluene	3.400	mg/l	SW8021B/5030B	5/27/2014 18:17	MC	0.002	
Xylene	0.559	mg/l	SW8021B/5030B	5/27/2014 18:17	MC	0.003	
4-Bromochlorobenzene (Surrogate)	94.2	%	SW8021B	5/27/2014 18:17	MC		

Remarks:

Date Sample Collected: 5/14/2014 AM
Sample Submitted By: A. ROUSSEAU
Date Sample Received: 5/23/2014 11:15
Sample temp. upon receipt: 23.0 Deg C

ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

***Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.**

NOTE: Sample analyzed was improperly preserved or received in an improper container.

NOTE: #Holding time exceeded for this analysis.

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M3 MIDSTREAM LLC
742 FAIRMONT RD SUITE E

WESTOVER, WV 26501-

Thursday, June 05, 2014

Lab Number: 212690-2014-W **Sample ID:** DAYBROOK

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: **Total Petroleum Hydrocarbons**							
TPH - DRO	776	mg/l	SW8015B/3535A	6/5/2014 12:35	AT	1	
TPH - GRO	186	mg/l	SW8015B/5030B	5/27/2014 17:38	AT	0.12	
TPH - ORO	37.8	mg/l	SW8015B/3535A	6/5/2014 12:35	AT	1	
4-Bromochlorobenzene (Surrogate)	106	%	SW8015B	5/27/2014 17:38	AT		
o-Terphenyl (Surrogate)	109	%	SW8015B	6/5/2014 12:35	AT		

Remarks:

Date Sample Collected: 5/14/2014 AM
Sample Submitted By: A. ROUSSEAU
Date Sample Received: 5/23/2014 11:15
Sample temp. upon receipt: 23.0 Deg C

ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

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MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

M3 MIDSTREAM LLC
742 FAIRMONT RD SUITE E

WESTOVER, WV 26501-

Thursday, June 05, 2014

Lab Number: 212691-2014-W **Sample ID:** WETZEL CO.

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: **Organics**							
Benzene	0.1655	mg/l	SW8021B/5030B	5/27/2014 16:31	AT	0.0007	
Ethylbenzene	ND	mg/l	SW8021B/5030B	5/27/2014 16:31	AT	0.0014	
Toluene	0.489	mg/l	SW8021B/5030B	5/27/2014 16:31	AT	0.002	
Xylene	0.361	mg/l	SW8021B/5030B	5/27/2014 16:31	AT	0.003	
4-Bromochlorobenzene (Surrogate)	104	%	SW8021B	5/27/2014 16:31	AT		

Remarks:

Date Sample Collected: 5/14/2014 AM
Sample Submitted By: A. ROUSSEAU
Date Sample Received: 5/23/2014 11:15
Sample temp. upon receipt: 23.0 Deg C

ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

***Method Code: STANDARD METHODS 19TH ED; US EPA METHODS FOR THE CHEMICAL ANALYSIS OF WATER AND WASTES, Rev. 83; US EPA METHODS FOR THE DETERMINATION OF METALS IN ENVIRONMENTAL SAMPLES, May 1994; TEST METHODS FOR EVALUATING SOLID WASTE, SW-846, 3rd ED; USEPA Manual for Certification of Laboratories Analyzing Drinking Water, 5th ED. In accordance with EPA Regulations, all reports, including raw data and quality control data, are maintained by the laboratory for a minimum of 5 years.**

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M3 MIDSTREAM LLC
742 FAIRMONT RD SUITE E

WESTOVER, WV 26501-

Thursday, June 05, 2014

Lab Number: 212691-2014-W **Sample ID:** WETZEL CO.

Parameter	Value	Units	Method	Date/Time Analyzed	Analyst	MDL	MCL
Analyte Group: **Total Petroleum Hydrocarbons**							
TPH - DRO	8642	mg/l	SW8015B/3535A	6/4/2014 15:35	AT	1	
TPH - GRO	15.7	mg/l	SW8015B/5030B	5/27/2014 16:31	AT	0.12	
TPH - ORO	126	mg/l	SW8015B/3535A	6/4/2014 15:35	AT	1	
4-Bromochlorobenzene (Surrogate)	103	%	SW8015B	5/27/2014 16:31	AT		
o-Terphenyl (Surrogate)	99.1	%	SW8015B	6/4/2014 15:35	AT		

Remarks:

Date Sample Collected: 5/14/2014 AM
Sample Submitted By: A. ROUSSEAU
Date Sample Received: 5/23/2014 11:15
Sample temp. upon receipt: 23.0 Deg C

ND = Not Detected at the MDL or MRL
MDL - Minimum Detectable Limit
MRL - Minimum Reporting Limit
MCL - Maximum Contaminant Level, USEPA Regulated
[MCL] = Maximum Contaminant Level, Non-Regulated

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NOTE: Sample analyzed was improperly preserved or received in an improper container.

NOTE: #Holding time exceeded for this analysis.

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

Identification		
User Identification:	T-421 (T-11)	
City:	Charleston	
State:	West Virginia	
Company:	M3 AGS	
Type of Tank:	Vertical Fixed Roof Tank	
Description:	400 bbl Produced Water Tank - Hamilton	
Tank Dimensions		
Shell Height (ft):		20.00
Diameter (ft):		12.00
Liquid Height (ft) :		19.00
Avg. Liquid Height (ft):		10.00
Volume (gallons):		15,228.53
Turnovers:		5.00
Net Throughput(gal/yr):		76,142.67
Is Tank Heated (y/n):	Y	
Paint Characteristics		
Shell Color/Shade:	Gray/Medium	
Shell Condition	Good	
Roof Color/Shade:	Gray/Medium	
Roof Condition:	Good	
Roof Characteristics		
Type:	Cone	
Height (ft)		0.40
Slope (ft/ft) (Cone Roof)		0.05
Breather Vent Settings		
Vacuum Settings (psig):		-0.03
Pressure Settings (psig)		0.03

Meterological 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

T-421 (T-11) - Vertical Fixed Roof Tank
Charleston, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Produced Water	All	60.00	40.00	80.00	70.00	0.2661	0.1273	0.5232	19.3119			18.71	Option 1: VP60 = 6 VP70 = 7
Benzene						1.1679	0.6526	1.9837	78.1100	0.0010	0.0043	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.8778	1.9127	4.2008	50.0000	0.0025	0.0063	207.00	Option 4: RVP=5
Distillate fuel oil no. 2						0.0065	0.0031	0.0120	130.0000	0.0175	0.0003	188.00	Option 1: VP60 = .0065 VP70 = .009
Gasoline (RVP 7)						3.4847	2.2812	5.1585	68.0000	0.0050	0.0469	92.00	Option 4: RVP=7, ASTM Slope=3
Methyl alcohol						1.4421	0.7455	2.6344	32.0400	0.0100	0.0525	32.04	Option 2: A=7.897, B=1474.08, C=229.13
Produced Water1						0.2561	0.1214	0.5070	18.0000	0.9500	0.8862	18.00	Option 2: A=8.10765, B=1750.286, C=235
Propylene glycol						0.0009	0.0003	0.0027	76.1100	0.0100	0.0000	76.11	Option 2: A=8.2082, B=2085.9, C=203.54
Toluene						0.3301	0.1717	0.5984	92.1300	0.0025	0.0030	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0904	0.0432	0.1768	106.1700	0.0015	0.0005	106.17	Option 2: A=7.009, B=1462.266, C=215.11

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

T-421 (T-11) - Vertical Fixed Roof Tank
Charleston, West Virginia

Annual Emission Calcaulations	
Standing Losses (lb):	34.0570
Vapor Space Volume (cu ft):	1,146.0530
Vapor Density (lb/cu ft):	0.0009
Vapor Space Expansion Factor:	0.1010
Vented Vapor Saturation Factor:	0.8750
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,146.0530

Tank Diameter (ft):	12.0000
Vapor Space Outage (ft):	10.1333
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.1333
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.1333
Roof Height (ft):	0.4000
Roof Slope (ft/ft):	0.0500
Shell Radius (ft):	6.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0009
Vapor Molecular Weight (lb/lb-mole):	19.3119
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2661
Daily Avg. Liquid Surface Temp. (deg. R):	519.6700
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):	529.6700
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1010
Daily Vapor Temperature Range (deg. R):	40.0000
Daily Vapor Pressure Range (psia):	0.3960
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2661
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1273
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.5232
Daily Avg. Liquid Surface Temp. (deg R):	519.6700
Daily Min. Liquid Surface Temp. (deg R):	499.6700
Daily Max. Liquid Surface Temp. (deg R):	539.6700
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8750
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.2661
Vapor Space Outage (ft):	10.1333
Working Losses (lb):	9.3149
Vapor Molecular Weight (lb/lb-mole):	19.3119
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2661
Annual Net Throughput (gal/yr.):	76,142.6661
Annual Turnovers:	5.0000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	15,228.5332
Maximum Liquid Height (ft):	19.0000
Tank Diameter (ft):	12.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	43.3719

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

Emissions Report for: Annual

T-421 (T-11) - Vertical Fixed Roof Tank
Charleston, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Produced Water	9.31	34.06	43.37
Produced Water1	8.25	30.18	38.43
Gasoline (RVP 7)	0.44	1.60	2.03
Crude oil (RVP 5)	0.06	0.22	0.27
Benzene	0.04	0.14	0.18
Toluene	0.03	0.10	0.13
Xylenes (mixed isomers)	0.00	0.02	0.02
Distillate fuel oil no. 2	0.00	0.01	0.01
Methyl alcohol	0.49	1.79	2.28
Propylene glycol	0.00	0.00	0.00

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

Identification

User Identification:	Methanol WV
City:	
State:	West Virginia
Company:	
Type of Tank:	Horizontal Tank
Description:	Methanol WV

Tank Dimensions

Shell Length (ft):		6.50
Diameter (ft):		3.00
Volume (gallons):		335.00
Turnovers:		11.00
Net Throughput(gal/yr):		3,685.00
Is Tank Heated (y/n):	N	
Is Tank Underground (y/n):	N	

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good

Breather Vent Settings

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

Meterological 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

Methanol WV - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Methyl alcohol	All	63.43	53.60	73.25	58.06	1.6051	1.1753	2.1628	32.0400			32.04	Option 2: A=7.897, B=1474.08, C=229.13

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

Methanol WV - Horizontal Tank

Annual Emission Calcaulations	
Standing Losses (lb):	12.8868
Vapor Space Volume (cu ft):	29.2648
Vapor Density (lb/cu ft):	0.0092
Vapor Space Expansion Factor:	0.1485
Vented Vapor Saturation Factor:	0.8868
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	29.2648
Tank Diameter (ft):	3.0000
Effective Diameter (ft):	4.9841
Vapor Space Outage (ft):	1.5000
Tank Shell Length (ft):	6.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0092
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.6051
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):	517.7333
Tank Paint Solar Absorptance (Shell):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1485
Daily Vapor Temperature Range (deg. R):	39.3149
Daily Vapor Pressure Range (psia):	0.9875
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.6051
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	1.1753
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	2.1628
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:	0.8868
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	1.6051
Vapor Space Outage (ft):	1.5000
Working Losses (lb):	4.5122
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.6051
Annual Net Throughput (gal/yr.):	3,685.0000
Annual Turnovers:	11.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	3.0000

Working Loss Product Factor:	1.0000
Total Losses (lb):	17.3990

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

Emissions Report for: Annual

Methanol WV - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	4.51	12.89	17.40

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

Identification

User Identification:	Waste Lube Oils
City:	
State:	West Virginia
Company:	
Type of Tank:	Vertical Fixed Roof Tank
Description:	Waste Lube Oils

Tank Dimensions

Shell Height (ft):	5.00
Diameter (ft):	6.50
Liquid Height (ft) :	5.00
Avg. Liquid Height (ft):	5.00
Volume (gallons):	1,241.14
Turnovers:	1.00
Net Throughput(gal/yr):	1,241.14
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)	0.00
Radius (ft) (Dome Roof)	0.00

Breather Vent Settings

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

Meterological 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

Waste Lube Oils - Vertical Fixed Roof Tank
, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Residual oil no. 6	All	63.43	53.60	73.25	58.06	0.0000	0.0000	0.0001	190.0000			387.00	Option 1: VP60 = .00004 VP70 = .00006

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

Waste Lube Oils - Vertical Fixed Roof Tank
, West Virginia

Annual Emission Calcaulations	
Standing Losses (lb):	0.0006
Vapor Space Volume (cu ft):	14.7943
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0710
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	14.7943
Tank Diameter (ft):	6.5000
Vapor Space Outage (ft):	0.4458
Tank Shell Height (ft):	5.0000
Average Liquid Height (ft):	5.0000
Roof Outage (ft):	0.4458
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.4458
Dome Radius (ft):	6.5000
Shell Radius (ft):	3.2500
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
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):	517.7333
Tank Paint Solar Absorptance (Shell):	0.6800
Tank Paint Solar Absorptance (Roof):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0710
Daily Vapor Temperature Range (deg. R):	39.3149
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0000
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0001
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:	1.0000
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0000
Vapor Space Outage (ft):	0.4458
Working Losses (lb):	0.0003

Vapor Molecular Weight (lb/lb-mole):	190.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0000
Annual Net Throughput (gal/yr.):	1,241.1372
Annual Turnovers:	1.0000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	1,241.1372
Maximum Liquid Height (ft):	5.0000
Tank Diameter (ft):	6.5000
Working Loss Product Factor:	1.0000

Total Losses (lb):	0.0009

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

Emissions Report for: Annual

Waste Lube Oils - Vertical Fixed Roof Tank
, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Residual oil no. 6	0.00	0.00	0.00

• Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans

ATTACHMENT O - MONITORING, RECORDING, REPORTING, AND TESTING PLANS

Plan Type	Emission unit	Pollutant	Requirements	Frequency	Method of Measurement	Regulatory Reference
Monitoring, Recordkeeping	Compressor Engines	NOX, CO, VOC	Performance test	Initial and every three years or 8,760 hours of operation	EPA Test Methods	NSPS JJJJ
Monitoring, Recordkeeping	Compressor Engines	N/A	Maintenance records	Each occurrence	N/A	NSPS JJJJ
Monitoring, Recordkeeping	Compressor	VOC	Change rod packing	Every 36 months or 26,000 hours of operation	N/A	NSPS OOOO
Monitoring, Recordkeeping Monthly Records	Liquid Loading	VOC	Monitor throughput of loading	Monthly	Records	
Monitoring, Recordkeeping	TEG Dehy Unit	VOC	Monitor throughput, Jatco and burner operation	During operating rounds	Observation and instrumentation/ metering	40 CFR 63 HH

See Attachment D for more regulatory information

- **Attachment P: Public Notice**

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that M3 Appalachia Gathering, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit Registration per the requirements of 45CSR13 (New Source Review – Minor Air Emissions Source) for a Natural Gas Compressor Station located on an Access Road off of WV-218N, near Daybrook, in Monongalia County, West Virginia. The latitude and longitude coordinates are: (Latitude: 39.64194 N; Longitude: 80.205278 W.)

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

- Nitrogen Oxides (NOx) = 29.2 tons per year (tpy);
- Carbon Monoxide (CO) = 12.8 tpy;
- Volatile Organic Compounds (VOC) = 11.1 tpy;
- Sulfur Dioxide (SOx) = 0.1 tpy;
- Particulate Matter (PM10) = 0.12 tpy;
- Formaldehyde = 3.52 tpy;
- Hazardous Air Pollutants (HAPs) = 7.0 tpy;
- Carbon Dioxide Equivalents (CO_2(eq)) = 24,800 tpy.

Startup of operation is planned to begin on or about the **first** day of **July 1**, **2016**. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

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

Dated this the **7th** day of **January**, **2015**.

By: **M3 Appalachia Gathering, LLC**
James C. Roberts V.P. Environmental, Health, and Safety
742 Fairmont Road, Suite E
Westover, WV 26501

- **Attachment Q: Business Confidential Forms – N/A**

Not Applicable for this permit application.

- **Attachment R: Authority Forms – N/A**

Not applicable for this application.

- **Attachment S: Title V Permit Revision Information – N/A**

Not applicable for this application.

- **Application Fee**

Total Fee = $2,500 = $1000 Construction (45CSR13) + $1,000 NSPS Applicability (45CSR22-3) + $500 (45CSR22 Group 8 Facility/Source Category)