empire pipeline
A National Fuel Gas Company

April 27, 2016

Mr. Al Carlacci, P.E.
Regional Air Pollution Control Engineer
New York State Department of Environmental Conservation
Division of Air Resources, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

UPS Tracking No. 1Z V31 Y26 A2 9768 9326

Mr. Michael T. Higgins
Deputy Chief Permit Administrator
New York State Department of Environmental Conservation
Division of Environmental Permits
625 Broadway
Albany, New York 12233

UPS Tracking No. 1Z V31 Y26 A2 9861 4716

RE: Empire Pipeline, Inc.
Proposed Wheatfield Dehydration Facility – NA2016
Air Permit Application

Dear Mr. Carlacci and Mr. Higgins:

Enclosed is Empire Pipeline Inc.'s (Empie's) Air Permit application for the proposed Wheatfield Compressor Station located in Wheatfield Township, Niagara County, New York as part of National Fuel's Northern Access 2016 project (NA2016). Empire proposes to install and operate two (2) triethylene glycol dehydration units to be used for the dehydration of natural gas in Empire's transmission pipeline system. Each dehydration unit will be capable of dehydrating a maximum of 442 million standard cubic feet (MMscf) of natural gas per day. Additionally, a thermal oxidation control device will be installed at the facility in order to reduce emissions from the dehydration units. One (1) permit exempt 402 horsepower (hp) emergency generator is also proposed to be operated at the facility.

The enclosed application document includes an introductory summary and the following attachments:

- Figure 1 – Project Locus Map

- Figure 2 – Facility Site Plan
- Attachment A – Air Permit Application Form
- Attachment B – Emissions Calculations
- Attachment C – Long-Chain Gas Analysis Reports
- Attachment D – GLYCalc 4.0 Output File
- Attachment E – Frederick Logan Co. Dehydrator and Thermal Oxidizer Specification Sheets
- Attachment F – Kohler 250REZXB Manufacturer Documentation

Based on the calculated emissions presented in Attachment B, the proposed Wheatfield Dehydration Facility meets the criteria for an Air Facility Registration Certificate as presented in 6 NYCRR Subpart 201-4.1. Therefore, Empire requests that the proposed facility be considered for registration issuance.

If you have any questions or need additional information, please contact me directly by phone (716) 857-6902 or by email at EnnisJ@NatFuel.com.

Sincerely,

Josh Ennis
Senior Engineer I

Enclosure
cc:
J. Joy
M. Kasprzak
J. Kittka
R. Kraemer
T. Kreuz

AIR PERMIT APPLICATION
EMPIRE PIPELINE, INC.
Wheatfield Dehydration Facility
Wheatfield, New York

Empire Pipeline, Inc. (Empire) is submitting this air permit application for the proposed Wheatfield Dehydration Facility that is part of National Fuel's Northern Access 2016 (NA2016) project. The application form is included as Attachment A.

BACKGROUND

The proposed Wheatfield Dehydration Facility will dehydrate natural gas in Empire's transmission pipeline system prior to transmission and/or distribution. The maximum facility dehydration capacity is 884 MMscf per day.

The proposed facility will consist of the following permitted equipment:

- Two (2) 442 MMscfd Frederick Logan Company, Inc. triethylene glycol (TEG) dehydration units, each equipped with a 1.5 MMBtu/hr natural gas-fired reboiler burner. A common 5.0 MMBtu/hr natural gas-fired thermal oxidizer will control emissions from both dehydrator still vents.

In addition, the proposed facility will also consist of the following permit exempt equipment:

- One (1) 402-hp Kohler Power Systems 250REZXB four-stroke rich burn emergency generator; and
- One (1) 1,000 gallon natural gas condensate storage tank.

The proposed facility will be located at 2251 Liberty Drive in Wheatfield, New York. A Project Locus Map and Facility Site Plan are included as Figure 1 and Figure 2, respectively.

The following sections describe the facility equipment; potential to emit (PTE) emissions; and the applicability of selected regulations to each emissions source. Supporting documents are included as Attachments B through F.

<u>TEG Dehydration Units</u>

Each dehydration unit has two primary components: a contactor tower and a reboiler. (Note: the reboiler is also known as a "regenerator.") The contactor tower "contacts" lean TEG with the inlet natural gas stream to extract moisture from the natural gas prior to transmission downstream. Following "contact" with the inlet natural gas stream, rich TEG is sent to the reboiler where water and trace hydrocarbons extracted from the natural gas are boiled off and emitted through the dehydration unit still vents. Emissions from both dehydration unit still vents are routed to a common thermal oxidizer for emissions control. Thus, there is a single emission point for both dehydration unit still vents. The thermal oxidizer has a manufacturer-guaranteed minimum destruction efficiency of 99.9 percent (%) or greater for volatile organic compounds (VOCs). Although the manufacturer will only guarantee 99.9% or greater destruction efficiency for the proposed thermal oxidizer, independent emissions testing completed for a similar unit has demonstrated an actual destruction efficiency of 99.995%. Manufacturer's specifications for the dehydrators and the thermal oxidizer are included as Attachment E.

Each dehydration unit is also equipped with a 1.5 MMBtu natural gas-fired reboiler burner used to heat the reboiler. Emissions from the reboiler burners is exhausted through separate stacks.

Empire has elected to utilize flash tanks (Note: flash tanks are also known as "3-phase separators") for each dehydration unit to further reduce emissions by recovering entrained methane and volatile organic compounds (VOCs) in the rich TEG. Recovered methane and VOCs will be recycled to use as fuel gas for the reboiler burners.

PTE emissions from the dehydrators were calculated using the GRI GLYCalc 4.0 model and recent natural gas sample analysis data. Since the proposed facility will dehydrate gas which originates at three sources, the estimated gas composition used for the GLYCalc model was based on the weighted averages of the compound concentrations from the three (3) upstream facilities along the transmission pipeline system. The natural gas analyses from these sources are included as Attachment C. In order to account for the thermal oxidizer, the 99.9% destruction efficiency for this device was included in the GLYCalc model. GRI GLYCalc output files are included as Attachment D. PTE emissions are based on 8760 hours of operation per year and equipment operational maximums. Facility PTE emissions tables are included as Attachment B.

The proposed dehydrators will be subject to 6 NYCRR Part 212 and therefore must meet the applicable emission limits, control requirements, and monitoring requirements specified in this Part. In accordance with 6 NYCRR 212-2.1(a), Empire must limit actual emissions of any Part 212 listed High Toxicity Air Contaminant (HTAC) from process operations through a capping condition or, must demonstrate compliance with the air cleaning requirements in Part 212. As shown in Attachment D, the combined uncontrolled potential emissions ("emission rate potential) of benzene from the two (2) dehydration still vents is approximately 0.14 lbs/hour. This emission rate potential is within the $\geq$ 0.1 lbs/hour and < 1.0 lbs/hour emission rate potential range specified in 6 NYCRR 212-2.3(b), Table 4 for an "A rated" non-criteria air contaminant. Therefore, the proposed facility is required to control emissions of this contaminant from facility process emissions sources by 90%. [Note: Determination of an air contaminant environmental rating is performed by the NYSDEC but it is conservatively assumed for this permit application that the environmental rating for benzene will be "A".]

The proposed thermal oxidizer meets the specified degree of air cleaning with a guaranteed destruction efficiency of 99.9% or greater, as shown in Attachment E. Since the proposed facility will be utilizing a control device that exceeds the minimum degree of air cleaning, the requirements of 6 NYCRR 212-2.3(b), Table 4 will be met. The exhaust gas temperature from the thermal oxidizer will be monitored in accordance with 6 NYCRR 212-1.7(b)(1).

Additionally, based on the calculated PTE, the proposed facility will not be a major source of hazardous air pollutants (HAPs). Therefore, the dehydration units are not subject to the Federal Clean Air Act (CAA) National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR 63 Subpart HHH.

The natural gas-fired reboiler burners and thermal oxidizer burner are air permit-exempt under 6 NYCRR Part 201-3.2(c)(1)(ii) as they are stationary combustion installations, which are gaseous fuel powered, and have a maximum heat input capacity less than 10 MMBtu/hr. The emissions from these air permit-exempt sources were calculated using AP-42 emission factors for natural gas combustion and are included in facility emissions calculations.

Emergency Generator

The proposed Kohler Power Systems emergency generator is a 402 HP four-stroke rich burn stationary internal combustion engine. This engine is air permit-exempt under 6 NYCRR Part 201-3.2(c)(6) as it is an emergency power generation stationary internal combustion engine that operates for 500 hours per year or less. Emissions from the proposed emergency generator are included in the facility PTE calculations. The manufacturer's engine specification sheet and emissions data sheet are included with Attachment F.

Although exempt from air permitting, this engine is subject to Federal New Source Performance Standards (NSPS) as detailed in 40 CFR 60 Subpart JJJJ. As shown in the *Certificate of Conformity with the Clean Air Act* included with Attachment F, this engine is EPA certified. Therefore, emissions will meet the Subpart JJJJ emission limits.

Storage Tank

The 1,000-gallon condensate storage tank is exempt from air permitting under 6 NYCRR Part 201-3.2(c)(25) as is a storage tank with a capacity less than 10,000 gallons and is not subject to 6 NYCRR Part 229. As with the other air permit-exempt sources, emissions from the proposed storage tank are included in the facility-wide emissions calculations (Refer to Attachment B).

Additionally, the PTE emissions calculations show that total volatile organic compound (VOC) emissions from the 1,000-gallon condensate storage tank *are less than* the 6 tons per year threshold defining a "storage vessel affected facility" subject to emission control under 40 CFR 60 Subpart OOOO. Therefore, no emissions controls are required for this tank under Subpart OOOO.

Facility

The EPA released the proposed rule 40 CFR 60, Subpart OOOOa on August 18, 2015 to regulate emissions sources and emissions from the oil and gas industry not regulated by the current New Source Performance Standards (NSPS), 40 CFR 60, Subpart OOOO. Subpart OOOOa has not been finalized at the time of this application submittal but it is anticipated that the proposed facility will be subject to the final rule once promulgated and therefore be required to meet applicable leak detection, recordkeeping, reporting, and other proposed compliance requirements.

CONCLUSION

Based on the calculated PTE emissions the proposed Wheatfield Dehydration Facility will have potential air pollutant emissions less than the applicable major source thresholds. Additionally, PTE and projected actual emissions from the facility are less than 50% of the applicable major source thresholds and annual process emissions of a persistent, bioaccumulative or toxic (PBT) compound less than the thresholds in Table 1 of 6 NYCRR Part 201-9. Therefore, the facility meets the requirements for an Air Facility Registration Certificate specified under 6 NYCRR Subpart 201-4.1.

Figure 1
Wheatfield Dehydration Facility

Project Locus Map

NOTE:

Topo imagery provided by ESRI Online Services and USGS 7.5 Minute Quad of Tonawanda West, dated 1980.

Site Coordinates are in Decimal Degrees:

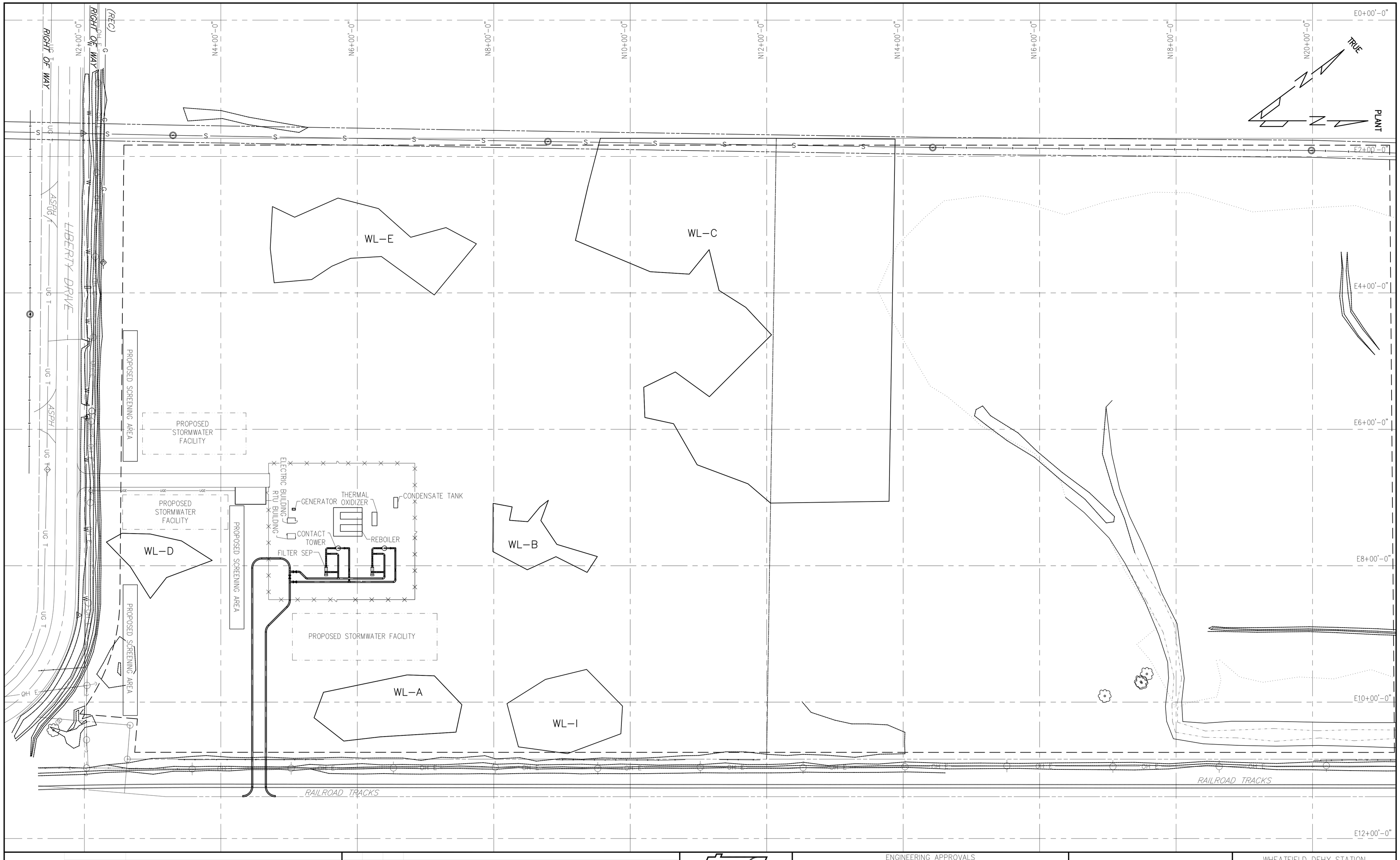
78° 55' 29.89" W 43° 4' 36.64" N

Date 05-19-2015	DAY ENVIRONMENTAL, INC. Environmental Consultants Rochester, New York 14606 New York, New York 10170	Project Title PROPOSED DEHYDRATION FACILITY WHEATFIELD, NEW YORK EMPIRE PIPELINE, INC.	Project No. 5012I-14 FIGURE 1
Drawn By CPS		Drawing Title Project Locus Map	
Scale AS NOTED			

Last Date Saved: 29 May 2015 Document Path: E:\GIS\GIS Mapping\Nation_Fuel\5012I-14NFUEL-Wheatfield\5012I-2 - Wheatfield Locus.mxd

Figure 2
Wheatfield Dehydration Facility

Facility Site Plan



811 Know what's below. Call before you dig.

NOTICE TO: UGI CORPORATION HAS USE FACILITIES IN THE VICINITY CONTAINS THE FOLLOWING SUBJECT, BE AND OTHER FACILITIES IN YOUR PROJECT, BE PROVIDED WITH SUFFICIENT TIME TO PROTECT, SUPPORT OR REMOVE SUCH FACILITIES. PLEASE CALL 1-800-409-8000 AT LEAST TWO WEEKS, EXCLUDING NON-TOWN OFFICE HOLIDAYS, IN ADVANCE OF EXCAVATION. UGI WILL MARK OUT ALL UNDERGROUND FACILITIES. PLEASE CONTACT UGI. NOTICE TO: UGI MARKING DEPARTMENT (570) 357-7676.

DWG NUMBER	REFERENCE DRAWING

REV	DSN	CHK	DESCRIPTION
B	CLT		REVISED PER COMMENTS
A	CLT		PRELIMINARY

total control SOLUTIONS
CALDWELL, OHIO
(740) 732-6162

ENGINEERING APPROVALS

TITLE	DATE	SIGNATURE	BID DATE	BID SIGNATURE	CONSTRUCTION DATE	CONSTRUCTION SIGNATURE
DESIGNED CLT	11/6/15					
DRAWN CLT	11/6/15					
CHECKED						
APPROVED						

DEHY STATION
PLOT PLAN

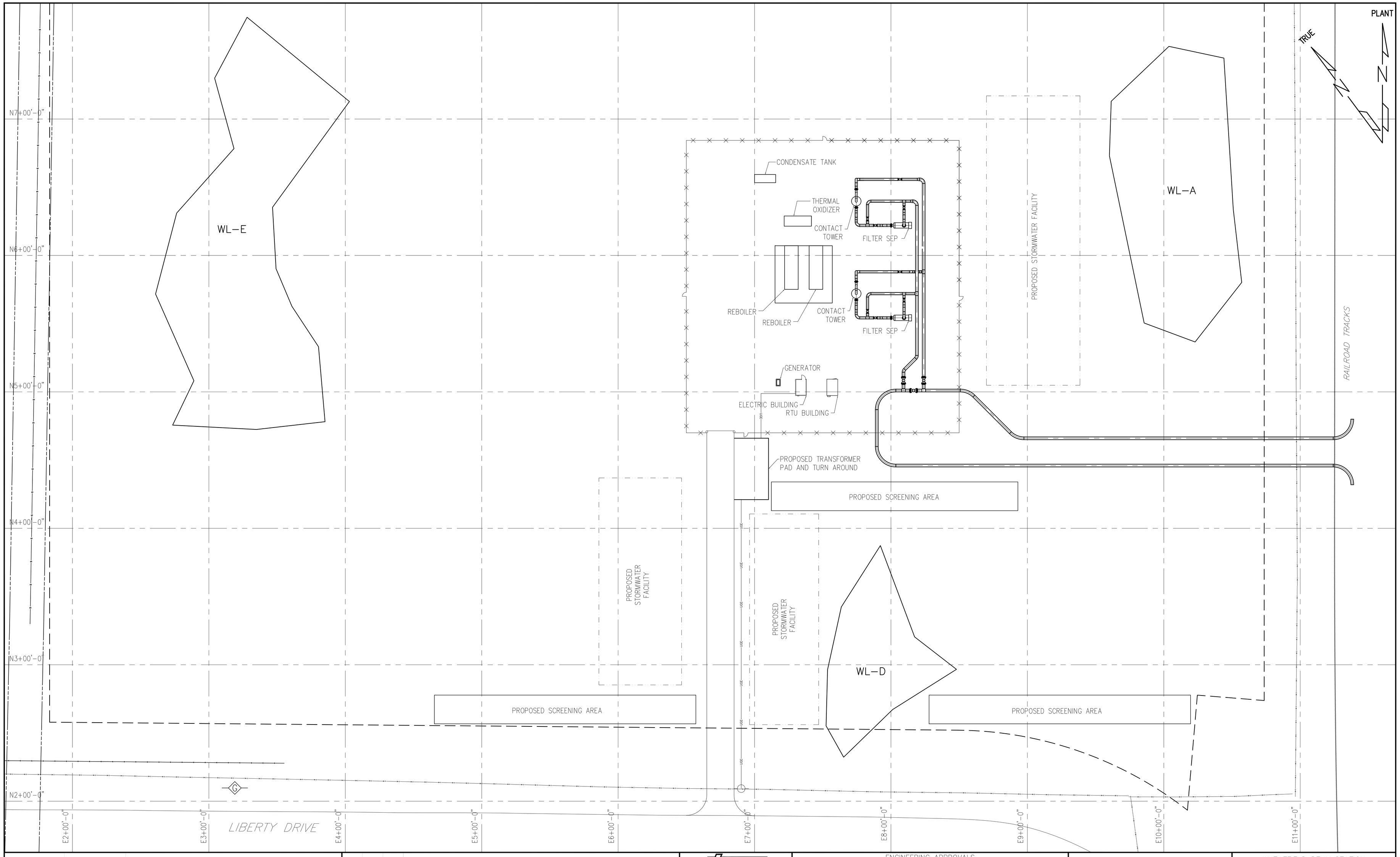
LOC. NIAGARA COUNTY, NEW YORK

SCALE 1"= 60'-0" | TCS JOB # 290

WHEATFIELD DEHY STATION

empire pipeline
A National Fuel Gas Company

DWG. # 290-A-0001 | SHEET 1 OF 1 | REV. B



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NOTIFY THE CALL BEFORE YOU DIG NUMBER AT LEAST TWO WORKING DAYS BEFORE YOU DIG, TO ARRANGE FOR THE MARKING OF UNDERGROUND UTILITIES. THIS SERVICE IS FREE OF CHARGE. IT IS THE LAW. FAILURE TO NOTIFY THE CALL BEFORE YOU DIG NUMBER MAY RESULT IN SERIOUS INJURY OR DEATH. DIGGING WITHOUT THE MARKING SERVICE FIRST MAY RESULT IN FINES.

DWG NUMBER	REFERENCE DRAWING

REV	DSN	CHK	DESCRIPTION
B	CLT		REVISED PER COMMENTS
A	CLT		PRELIMINARY

total control SOLUTIONS
CALDWELL, OHIO
(740) 732-6162

ENGINEERING APPROVALS

TITLE	DATE	SIGNATURE	DATE (BID)	SIGNATURE	DATE (CONSTRUCTION)
DESIGNED CLT	11/6/15				
DRAWN CLT	11/6/15				
CHECKED					
APPROVED					

DEHY STATION ENLARGED PLOT PLAN

LOC. NIAGARA COUNTY, NEW YORK

SCALE 1"= 30'-0" | TCS JOB # 290

WHEATFIELD DEHY STATION

empire pipeline
A National Fuel Gas Company

DWG. # 290-A-0002 | SHEET 1 OF 1 | REV. B

ATTACHMENT A
Wheatfield Dehydration Facility

Air Permit Application Form

New York State Department of Environmental Conservation
Air Permit Application

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

DEC ID	Application ID	DEC Use Only
- -	- - /	/ /

Section I - Certification

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information required to complete this application, I believe the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Responsible Official Ronald C. Kraemer	Title President
Signature	Date 4/27/16

P.E. Certification

I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments as they pertain to the practice of engineering. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Professional Engineer	NYS License No.
Signature	Date

Section II - Identification Information

Application Type

☒ New ☐ Renewal ☐ Significant Modification ☐ Administrative Amendment ☐ Minor Modification

☐ Application for the construction of a new facility ☐ Application involves the construction of new emission unit(s)

Facility

☐ Confidential

Name Wheatfield Dehydration Facility

Location Address 2251 Liberty Drive

☐ City / ☑ Town / ☐ Village Wheatfield — Zip 14304

Owner/Firm

Taxpayer ID: 3 8 2 8 5 0 8 7 3

Name Empire Pipeline, Inc.

Street Address 6363 Main Street

City Williamsville — State/Province NY — Country US — Zip 14221

Owner Classification: ☐ Federal ☐ State ☐ Municipal ☒ Corporation/Partnership ☐ Individual

Owner/Firm Contact Information

Name Joshua Z. Ennis	Phone (716) 857-6902
E-mail Address EnnisJ@natfuel.com	Fax (716) 857-7456
Affiliation National Fuel Gas Supply Corporation	Title Senior Engineer 1

Street Address 6363 Main Street

City Williamsville — State/Province NY — Country US — Zip 14221

Facility Contact Information

Name Joshua Z. Ennis	Phone (716) 857-6902
E-mail Address EnnisJ@natfuel.com	Fax (716) 857-7456
Affiliation National Fuel Gas Supply Corporation	Title Senior Engineer 1

Street Address 6363 Main Street

City Williamsville — State/Province NY — Country US — Zip 14221

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Project Description ☒ Continuation Sheet(s)

Empire Pipeline, Inc. is proposing to construct a new natural gas dehydration facility in Wheatfield, Niagara County, NY as part of the National Fuel Gas Northern Access 2016 Expansion project. The proposed Wheatfield Dehydration Facility will consist of the following equipment: Two (2) 442 MMscfd triethylene glycol (TEG) natural gas dehydrators with a common 5.0 MMBtu/hr thermal oxidizer for emissions control (each dehydrator is also equipped with a permit

Section III - Facility Information

Facility Classification

☐ Hospital ☐ Residential ☐ Educational/Institutional ☐ Commercial ☐ Industrial ☒ Utility

Affected States (Title V Facilities Only)

☐ Vermont ☐ Massachusetts ☐ Rhode Island ☐ Pennsylvania Tribal Land: _____
☐ New Hampshire ☐ Connecticut ☐ New Jersey ☐ Ohio Tribal Land:

SIC Code(s)			NAICS Code(s)			
4922			486210			

Facility Description ☐ Continuation Sheet(s)

The proposed facility is a natural gas dehydration facility that removes water from natural gas in Empire Pipeline, Inc.'s transmission pipeline prior to transmission/distribution. The facility equipment is as described above. A locus map and site plan are included with this application.

Compliance Statements (Title V Facilities Only)

I certify that as of the date of this application the facility is in compliance with all applicable requirements. ☐ Yes ☐ No

If one or more emission units at the facility are not in compliance with all applicable requirements at the time of signing this application (the 'NO" box must be checked), the noncomplying units must be identified in the "Compliance Plan" block on page 8 of this form along with the compliance plan information required. For all emission units at the facility that are operating in compliance with all applicable requirements, complete the following:

☐ This facility will continue to be operated and maintained in such a manner as to assure compliance for the duration of the permit, except those emission units referenced in the compliance plan portion of this application.

☐ For all emission units subject to any applicable requirements that will become effective during the term of the permit, this facility will meet such requirements on a timely basis.

☐ Compliance certification reports will be submitted at least once per year. Each report will certify compliance status with respect to each applicable requirement, and the method used to determine the status.

Facility Applicable Federal Requirements ☒ Continuation Sheet(s)

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause
40	CFR	68							
6	NYCRR	200		6					
6	NYCRR	200		7					
6	NYCRR	201	1	1					

Facility State Only Requirements ☐ Continuation Sheet(s)

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause
	ECL	19	0301						
6	NYCRR	201	1	4					
6	NYCRR	201	1	5					
6	NYCRR	211		2					

DEC ID
- -

Section II - Identification Information

Project Description (continuation)
1.5 MMbtu reboiler burner), one (1) permit exempt 402 horsepower (HP) emergency generator; and one (1) permit exempt 1,000-gallon aboveground storage tanks containing natural gas condensate.

New York State Department of Environmental Conservation
Air Permit Application Form

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- -

Section III - Facility Information

Facility Applicable Federal Requirements (continuation)									
Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause
6	NYCRR	201	1	7					
6	NYCRR	201	1	8					
6	NYCRR	201	3	2					
6	NYCRR	201	3	3					
6	NYCRR	201	4						
6	NYCRR	211		1					
6	NYCRR	215		2					

New York State Department of Environmental Conservation
Air Permit Application

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- -

Facility Compliance Certification

☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause

		CAS Number	Contaminant Name
☐ Applicable Federal Requirement ☐ State Only Requirement	☐ Capping		

Monitoring Information

☐ Ambient Air Monitoring ☐ Work Practice Involving Specific Operations ☐ Record Keeping/Maintenance Procedures

Description

Work Practice	Process Material		Reference Test Method
Type	Code	Description	

Parameter		Manufacturer's Name/Model Number
Code	Description	

Limit		Limit Units	
Upper	Lower	Code	Description

Averaging Method		Monitoring Frequency		Reporting Requirements	
Code	Description	Code	Description	Code	Description

Facility Emissions Summary

☒ Continuation Sheet(s)

CAS Number	Contaminant Name	Potential to Emit (lbs/yr)	Potential to Emit Range Code	Actual (lbs/yr)
0NY075 - 00 - 5	PM-10		A	
0NY750 - 02 - 5	PM-2.5		A	
007446 - 09 - 5	Sulfur Dioxide		A	
0NY210 - 00 - 0	Oxides of Nitrogen		B	
000630 - 08 - 0	Carbon Monoxide		B	
007439 - 92 - 1	Lead (elemental)		-	
0NY998 - 00 - 0	Total Volatile Organic Compounds		A	
0NY100 - 00 - 0	Total Hazardous Air Pollutants		A	
0NY750 - 00 - 0	Carbon Dioxide Equivalents		H	
00071-43-2	Benzene		Y	
00100-41-4	Ethylbenzene		Y	
00050-00-0	Formaldehyde		Y	

New York State Department of Environmental Conservation
Air Permit Application Form

DEC ID
- -

Section III - Facility Information

Facility Emissions Summary (continuation)				
CAS No.	Contaminant Name	PTE		Actual
		(lbs/yr)	Range	(lbs/yr)
00110-54-3	Hexane		Y	
00108-88-3	Toluene		Y	
01330-20-7	Xylene		Y	

Continuation Sheet 3 of 6

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
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Section IV - Emission Unit Information

Emission Unit Description ☐ Continuation Sheet(s)

Emission Unit	U - 0 0 0 0 1

This emission unit includes two (2) 442 MMscfd TEG natural gas dehydration units controlled with a common 5.0 MMBtu/hr thermal oxidizer.

Building Information ☐ Continuation Sheet(s)

Building ID	Building Name	Length (ft)	Width (ft)	Orientation

Emission Point Information ☐ Continuation Sheet(s)

Emission Point	0 0 0 0 1					
Ground Elevation (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section Length (in)	Cross Section Width (in)
572	20		48	1450		
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal
11.33	5928				150	

Emission Point						
Ground Elevation (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section Length (in)	Cross Section Width (in)
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal

Emission Source/Control Information ☒ Continuation Sheet(s)

Emission Source ID	Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model Number
D E H Y 1	I	Fall 2016	Spring 2017				Frederick Logan Company, Inc.

Design Capacity	Design Capacity Units Code	Design Capacity Units Description	Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description
442	0107	Million cubic feet of gas dehydrated				

Emission Source ID	Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model Number
D E H Y 2	I	Fall 2016	Spring 2017				Frederick Logan Company, Inc.

Design Capacity	Design Capacity Units Code	Design Capacity Units Description	Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description
442	0107	Million cubic feet of gas dehydrated				

New York State Department of Environmental Conservation
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Section IV - Emission Unit Information

Emission Source/Control (continuation)								
Emission Unit	U - 0 0 0 0 1							
Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.	
TO001	K	Fall 2016	Spring 2017		127	Thermal Oxidation	Frederick Logan Company, Inc.	
Design Capacity	Design Capacity Units Code	Design Capacity Units Description			Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description
5	25	Million Btu per hour						
Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.	
Design Capacity	Design Capacity Units Code	Design Capacity Units Description			Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description
Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.	
Design Capacity	Design Capacity Units Code	Design Capacity Units Description			Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description
Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.	
Design Capacity	Design Capacity Units Code	Design Capacity Units Description			Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description
Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.	
Design Capacity	Design Capacity Units Code	Design Capacity Units Description			Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description
Emission Source ID	Emission Source Type	Date of Construction	Date of Operation	Date of Removal	Control Type Code	Control Type Description	Manufacturer's Name/Model No.	
Design Capacity	Design Capacity Units Code	Design Capacity Units Description			Waste Feed Code	Waste Feed Description	Waste Type Code	Waste Type Description

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Process Information

☐ Continuation Sheet(s)

Emission Unit	U - 0 0 0 0 1	Process	D H Y

Description

This process includes two (2) 442 MMscfd TEG natural gas dehydration units controlled with a common 5.0 MMBtu/hr thermal oxidizer.

Source Classification Code (SCC)	Total Throughput		Throughput Quantity Units	
	Quantity/Hr	Quantity/Yr	Code	Description
31000304				

☐ Confidential ☒ Operating at Maximum Capacity	Operating Schedule		Building	Floor/Location
	Hours/Day	Days/Year		

Emission Point Identifier(s)

0001						

Emission Source/Control Identifier(s)

DEHY1	DEHY2	TO001				

Emission Unit	-	Process

Description

Source Classification Code (SCC)	Total Throughput		Throughput Quantity Units	
	Quantity/Hr	Quantity/Yr	Code	Description

☐ Confidential ☐ Operating at Maximum Capacity	Operating Schedule		Building	Floor/Location
	Hours/Day	Days/Year		

Emission Point Identifier(s)

Emission Source/Control Identifier(s)

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements							☒ Continuation Sheet(s)		
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Cl.	Subcl.
U-00001				6	NYCRR	212	1	3					
U-00001				6	NYCRR	212	1	5	a				
U-00001				6	NYCRR	212	1	5	g				
U-00001				6	NYCRR	212	1	6					

Emission Unit	Emission Point	Process	Emission Source	Emission Unit State Only Requirements							☐ Continuation Sheet(s)		
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Cl.	Subcl.

Emission Unit Compliance Certification ☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause
6	NYCRR	212	1	7	b	1			

☒ Applicable Federal Requirement ☐ State Only Requirement ☐ Capping

Emission Unit	Emission Point	Process	Emission Source	CAS Number	Contaminant Name
U-00001	00001	DHY	TO001	00071-43-2	

Monitoring Information

☐ Continuous Emission Monitoring
☐ Intermittent Emission Testing
☐ Ambient Air Monitoring
☒ Monitoring of a Process or Control Device Parameters as a Surrogate
☐ Work Practice Involving Specific Operations
☐ Record Keeping/Maintenance Procedures

Description

Monitoring of a Process or Control Device Parameters as a Surrogate: A temperature monitoring device will be used to measure the exhaust gas temperature from the thermal oxidizer to ensure the emission control requirements specified in 6 NYCRR 212-2.3(b) are met.

Work Practice	Process Material		Reference Test Method
Type	Code	Description	

Parameter		Manufacturer's Name/Model Number
Code	Description	
03	Temperature	The Frederick Logan Company, Inc.

Limit		Limit Units	
Upper	Lower	Code	Description
	1450	44	Temperature (degrees F)

Averaging Method		Monitoring Frequency		Reporting Requirements	
Code	Description	Code	Description	Code	Description
61	Minimum	01	Continuous	10	Upon Request

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Section IV - Emission Unit Information

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements (continuation)									
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Clause	Subcl.
U-00001				6	NYCRR	212	1	7	a				
U-00001				6	NYCRR	212	1	7	b	1			
U-00001				6	NYCRR	212	2	1	a				
U-00001				6	NYCRR	212	2	2	b				
U-00001				6	NYCRR	212	2	3					

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Section IV - Emission Unit Information

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements (continuation)									
				Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Clause	Subcl.
EXEMPT	Permit Exempt Emergency			40	CFR	60	JJJJ	4233	e				
	Generator Requirements			40	CFR	60	JJJJ	4234					
				40	CFR	60	JJJJ	4237	b				
				40	CFR	60	JJJJ	4243	b	1			
				40	CFR	60	JJJJ	4243	d				
				40	CFR	60	JJJJ	4245	a	1			
				40	CFR	60	JJJJ	4245	a	2			
				40	CFR	60	JJJJ	4245	a	3			
				40	CFR	60	JJJJ	4245	b				
				40	CFR	60	JJJJ	4245	d				

Continuation Sheet 6 of 6

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Determination of Non-Applicability (Title V Only)

☐ Continuation Sheet(s)

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause

Emission Unit	Emission Point	Process	Emission Source	
				☐ Applicable Federal Requirement ☐ State Only Requirement

Description

Rule Citation

Title	Type	Part	Subpart	Section	Subdivision	Paragraph	Subparagraph	Clause	Subclause

Emission Unit	Emission Point	Process	Emission Source	
				☐ Applicable Federal Requirement ☐ State Only Requirement

Description

Process Emissions Summary

☐ Continuation Sheet(s)

Emission Unit	-	Process

CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined

Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions	
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)

Emission Unit	-	Process

CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined

Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions	
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)

Emission Unit	-	Process

CAS Number	Contaminant Name	% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined

Potential to Emit			Standard Units	Potential to Emit How Determined	Actual Emissions	
(lbs/hr)	(lbs/yr)	(standard units)			(lbs/hr)	(lbs/yr)

New York State Department of Environmental Conservation
Air Permit Application

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Emission Unit	Emission Unit Emissions Summary				☐ Continuation Sheet(s)
-					
CAS Number	Contaminant Name				
ERP (lbs/yr)	Potential to Emit		Actual Emissions		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
CAS Number	Contaminant Name				
ERP (lbs/yr)	Potential to Emit		Actual Emissions		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
CAS Number	Contaminant Name				
ERP (lbs/yr)	Potential to Emit		Actual Emissions		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	
CAS Number	Contaminant Name				
ERP (lbs/yr)	Potential to Emit		Actual Emissions		
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)	

Compliance Plan ☐ Continuation Sheet(s)

For any emission units which are not in compliance at the time of permit application, the applicant shall complete the following:

Consent Order		Certified progress reports are to be submitted every 6 months beginning / /

Emission Unit	Process	Emission Source	Applicable Federal Requirement									
			Title	Type	Part	Subpart	Section	Subdiv.	Parag.	Subparag.	Clause	Subcl.

Remedial Measure(s) / Intermediate Milestone(s)	R/I	Date Scheduled

New York State Department of Environmental Conservation
Air Permit Application

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Request for Emission Reduction Credits

☐ Continuation Sheet(s)

Emission Source

Emission Reduction Description

Contaminant Emission Reduction Data

Baseline Period ____ /____ /_____ to ____ / ____ / _____

Reduction	
Date	Method

CAS Number	Contaminant Name	ERC (lbs/yr)	
		Netting	Offset

Facility to Use Future Reduction

Name

Application ID - - /

Location Address

☐ City/ ☐ Town / ☐ Village | State | Zip

Use of Emission Reduction Credits

☐ Continuation Sheet(s)

Emission Source

Proposed Project Description

Contaminant Emissions Increase Data

CAS Number	Contaminant Name	PEP (lbs/yr)

Statement of Compliance

☐ All facilities under the ownership of this "owner/firm" are operating in compliance with all applicable requirements and state regulations including any compliance certification requirements under Section 114(a)(3) of the Clean Air Act Amendments of 1990, or are meeting the schedule of a consent order.

Source of Emission Reduction Credit - Facility

Name

Permit ID - - /

Location Address

☐ City/ ☐ Town / ☐ Village | State | Zip

Emission Source	CAS Number	Contaminant Name	ERC (lbs/yr)	
			Netting	Offset

New York State Department of Environmental Conservation
Air Permit Application

DEC ID
- -

Supporting Documentation

Required Supporting Documentation:

- ☐ List of Exempt Activities (form attached)
- ☒ Plot Plan
- ☐ Process Flow Diagram
- ☐ Methods Used to Determine Compliance (form attached)
- ☒ Calculations

Optional Supporting Documentation:

- ☐ Air Quality Model (____ / ____ / _____)
- ☐ Confidentiality Justification
- ☐ Ambient Air Monitoring Plan (____ / ____ / _____)
- ☐ Stack Test Protocols/Reports (____ / ____ / _____)
- ☐ Continuous Emissions Monitoring Plans/QA/QC (____ / ____ / _____)
- ☐ MACT Demonstration (____ / ____ / _____)
- ☐ Operational Flexibility: Description of Alternative Operating Scenarios and Protocols
- ☐ Title IV: Application/Registration (where appropriate)
- ☐ ERC Quantification (form attached)
- ☐ Baseline Period Demonstration
- ☐ Use of ERC(s) (form attached)
- ☐ Analysis of Contemporaneous Emissions Increase/Decrease
- ☐ LAER Demonstration (____ / ____ / _____)
- ☐ BACT Demonstration (____ / ____ / _____)
- ☐ Other Document(s):

Long-Chain Gas Analysis Reports	(/ /)
GRI GLYCalc 4.0 Output Files	(01 / 08 / 2016)
FLOCO, Inc. Dehydrator and Thermal Oxidizer Specification Sheets	(/ /)
Kohler 250REZXB Specification Sheet	(/ /)
Kohler 250REZXB EPA Certificate of Conformity with the CAA	(12 / 04 / 2015)
Kohler 250REZXB Emissions Data Sheet	(/ /)
	(/ /)
	(/ /)
	(/ /)
	(/ /)
	(/ /)
	(/ /)
	(/ /)
	(/ /)

ATTACHMENT B
Wheatfield Dehydration Facility

Emissions Calculations

Table 1 - PTE Emissions Summary
Empire Pipeline, Inc. - Wheatfield Dehydration Facility

Empire Pipeline, Inc. - Wheatfield Dehydration Facility Facility Air Pollutant PTE Emissions Summary[1]									
Pollutant	**NOx (tons/year)**	**CO (tons/year)**	**VOC (NMNEHC) (tons/year)**	**PM (tons/year)**	**SO2 (tons/year)**	**Total GHG (tons CO2e/year)**	**Formaldehyde (tons/year)**	**Benzene (tons/year)**	**Total HAPS (tons/year)**
Proposed Emissions Sources									
DEHY1 & DEHY2	N/A	N/A	0.02	N/A	N/A	1	N/A	<0.01	<0.01
Proposed Exempt Emissions Sources									
Emergency Generator	0.02	0.01	0.01	0.01	<0.01	161	0.01	<0.01	0.02
Thermal Oxidizer Burner	2.15	1.80	0.12	0.16	0.01	2592	0.00	<0.01	0.04
Dehydrator Reboiler Burner (x2)	1.29	1.08	0.07	0.10	0.01	1546	0.00	<0.01	0.02
1000-gal Condensate Storage Tank	N/A	N/A	0.58	N/A	N/A	6	N/A	<0.01	0.02
Fugitive Emissions (blowdowns, venting, leaks, etc.)	N/A	N/A	0.06	N/A	N/A	120	N/A	N/A	N/A
Total Facility PTE Emissions [2]	***3.45***	***2.90***	***0.86***	***0.27***	***0.02***	***4426***	***0.02***	***<0.01***	***0.11***
Projected Actual Emissions [3]	***2.15***	***1.81***	***0.23***	***0.16***	***0.01***	***2732***	***<0.01***	***<0.01***	***0.04***
Major Source Threshold	**100**	**100**	**50**	**100**	**100**		**10**	**10**	**25**

Notes:

(1) Refer to Table 2 for detailed calculations.

(2) Total Facility PTE Emissions may not appear equivalent to the sum of displayed values due to rounding.

(3) Projected Actual Emissions based on 2015 gas quality data that indicates one dehydrator at the Wheatfield Dehydration Facility would have operated for a maximum of 48 hours during the year. Dehydrator still emissions were calculated using GLYCalc 4.0 using the actual anticipated glycol pump rate, wet gas pressure, wet gas temperature and 48 hours of operation. Dehydrator reboiler burner emissions were also calculated based on 48 hours of operation per year. Emergency generator emissions are based on a maximum of 50 hours of operation per year for maintenance and testing operations. Storage tank emissions estimated assuming one turnover per year. All other emissions sources and parameters used in the calculation of actual emissions are equivalent to those presented in the PTE emissions calculations in Table 2.

Table 2 - PTE Emissions
Empire Pipeline, Inc. - Wheatfield Dehydration Facility

Empire Pipeline, Inc. - Wheatfield Dehydration Facility
Facility Air Pollutant PTE Emissions

Source ID	DEHY1 & DEHY2 (x2 442 MMSCFD Triethylene Glycol Dehydration System Controlled Still Emissions)		Thermal Oxidizer Burner				x2 Dehydrator Reboiler Burner				Emergency Generator				1000-gal Condensate Storage Tank		Fugitive Emissions	
Manufacturer/Model	The Frederick Logan Company, Inc.		The Frederick Logan Company, Inc.				The Frederick Logan Company, Inc.				Kohler Power Systems, Inc. / 250REZXB							
Fuel Type			Natural Gas				Natural Gas				Natural Gas							
Annual Operating Hours	8760	(1)(2)	8760			(3)(4)	8760			(3)(4)	500			(5)(6)		(7)		(8)(9)
Engine Horsepower	N/A		N/A				N/A				402							
Heat Input Capacity (MMBtu/hr)	N/A		5.00				1.50				2.84							
Criteria Pollutant	Emissions		Emission Factor		Emissions		Emission Factor		Emissions		Emission Factor		Emissions		Emissions		Emissions	
	lbs/hr	tpy	Value	Units	lbs/hr	tpy	Value	Units	lbs/hr	tpy	Value	Units	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
NOx			100	lbs/MMscf	0.49	2.1	100	lbs/MMscf	0.29	1.3	0.10	g/kW-hr	0.07	0.02				
CO			84	lbs/MMscf	0.41	1.8	84	lbs/MMscf	0.25	1.1	0.08	g/kW-hr	0.05	0.01				
VOC (NMNEHC)	0.0038	0.0164	5.5	lbs/MMscf	0.03	0.1	5.5	lbs/MMscf	0.02	0.1	0.06	g/kW-hr	0.04	0.01	0.133	0.584	0.014	0.063
PM Total			7.60	lbs/MMscf	0.04	0.2	7.60	lbs/MMscf	0.02	0.1	0.0194	lbs/MMBtu	0.06	0.01				
SO2			0.60	lbs/MMscf	0.00	0.0	0.60	lbs/MMscf	0.00	0.0	0.000588	lbs/MMBtu	0.00	0.00				
Greenhouse Gases (GHGs) (10)	Emissions		Emission Factor		Emissions		Emission Factor		Emissions		Emission Factor		Emissions		Emissions		Emissions	
	lbs/hr	tons CO2e/year	Value	Units	lbs/hr	tons CO2e/year	Value	Units	lbs/hr	tons CO2e/year	Value	Units	lbs/hr	tons CO2e/year	lbs/hr	tons CO2e/year	lbs/hr	tons CO2e/year
CO2			120000	lbs/MMscf	588	2576	120000	lbs/MMscf	353	1546	952	g/kW-hr	630	157	0.0002	0.001	0.002	0.008
CH4	0.0052	0.5650	2.3	lbs/MMscf	0.011	1.2	2.3	lbs/MMscf	0.007	0.030	0.230	lbs/MMBtu	0.653	4.08	0.0584	6.4	1.09	120
N2O			2.2	lbs/MMscf	0.011	14	2.2	lbs/MMscf	0.006	0.028								
Total GHG	0.0052	0.5650			588	2592			353	1546			630	161	0.06	6.40	1.09	120
Select Individual Hazardous Air Pollutants (HAPs) (11)	Emissions		Emission Factor		Emissions		Emission Factor		Emissions		Emission Factor		Emissions		Emissions		Emissions	
	lbs/hr	tpy	Value	Units	lbs/hr	tpy	Value	Units	lbs/hr	tpy	Value	Units	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
Benzene	0.0002	0.0006	0.0021	lbs/MMscf	0.000	0.000	0.0021	lbs/MMscf	0.000	0.000	0.00158	lbs/MMBtu	0.004	0.001	0.000	0.001	0.000	0.000
Ethylbenzene	0.0002	0.0002									0.0000248	lbs/MMBtu	0.000	0.000	0.000	0.000	0.000	0.000
Formaldehyde			0.075	lbs/MMscf	0.000	0.002	0.075	lbs/MMscf	0.000	0.001	0.0205	lbs/MMBtu	0.058	0.015				
Hexane	0.0002	0.0002	1.8	lbs/MMscf	0.009	0.039	1.8	lbs/MMscf	0.005	0.023					0.003	0.014	0.000	0.000
Toluene	0.0002	0.0002	0.0034	lbs/MMscf	0.000	0.000	0.0034	lbs/MMscf	0.000	0.000	0.000558	lbs/MMBtu	0.002	0.000	0.000	0.001	0.000	0.000
Xylene	0.0002	0.0002									0.000195	lbs/MMBtu	0.001	0.000	0.000	0.000	0.000	0.000
Total HAPs (12)	0.0002	0.0012			0.009	0.041			0.006	0.024			0.092	0.023	0.000	0.016	0.000	0.000

Notes:

(1) Dehydrator still emissions estimated using GRI GLYCalc 4.0. Each dehydrator is equipped with a flash tank and the "Still Emissions" from both dehydrators are routed through a single thermal oxidizer with a destruction efficiency of 99.9%. Operating parameters are based on equipment operational maximums and are specified in the GLYCalc report. "Still Emissions" correspond to the combined controlled regenerator and flash tank emissions reported in GLYCalc.

(2) The following GLYCalc input parameters are used in the calculation of the dehydrator still emissions: Wet Gas Pressure = 1250 psig (PTE); Wet Gas Temperature = 100 °F (PTE); Glycol Pump Rate = 25 gpm (PTE).

(3) Emissions factors provided by AP-42 Tables 1.4-1 through 1.4-3. Emission factors converted from lbs/MMscf to lbs/MMBtu using a default natural gas high heating value of 1020 MMBtu/MMscf.

(4) Equipment specifications based on manufacturer documentation.

(5) Emissions factors provided by AP-42 Table 3.2-3 with the exceptions of NOx, CO, VOC, and CO_2 which are based on the certified emissions data presented in the manufacturer's emissions data sheet.

(6) Equipment specifications based on Kohler Power Systems 250REZXB Specification Sheet. Heat Input Capacity calculated from provided 2872 scf/hr at 100% load value for standby operation using specification sheet provided HP and default natural gas high heating value of 1020

(7) Facility storage tanks include: One 1,000 gallon aboveground horizontal tank containing condensate. Emissions (working, breathing, and flashing) for the drip fluid tank estimated using API E&P Tanks v.3.0 assuming similar characteristics to other National Fuel condensate/drip fluid tanks and 10 turnovers per year.

(8) Fugitive emissions sources include: valves, connectors, flanges, open-ended lines, blowdowns. Fugitive equipment leaks were calculated using average emission factors presented in Table 2-4 of EPA Document EPA-453/R-95-017, "Protocol for Equipment Leak Emissions Estimates". Component counts based Table W-1B to Subpart W of Part 98 - Default Average Component Counts for Major Onshore Natural Gas Production Equipment assuming two meters/piping and two dehydrators for the Eastern U.S.

(9) Blowdown emissions are conservatively estimated based on the emergency shutdown blowdown volume for another National Fuel facility. It is assumed that the facility will experience 1 emergency shutdown event per year.

(10) Global Warming Potentials: 25 for CH_4, 298 for N_20. Based on 40 CFR 98, Subpart A, Table A-1 - *Global Warming Potentials*

(11) Other HAPs, in addition to those listed as 'Selected HAPs' are emitted. Those HAPs are included in Total HAPs (see below).

(12) Total HAPs is the sum of emissions of all HAPs listed in the applicable AP-42 list for each combustion source. Total HAPs listed for controlled dehydrator still emissions is equal to the sum of all HAP emissions included in the output of the GRI GLYCalc 4.0 model: benzene, toluene, ethylbenzene, and hexane.

(13) Facility totals (Table 1) may not appear equivalent to sum of displayed values in this table due to rounding.

Table 3 - Fugitive Emissions
Empire Pipeline, Inc. - Wheatfield Dehydration Facility

Empire Pipeline, Inc. - Wheatfield Dehydration Facility
Fugitive Emissions Calculations

Transmission Pipeline Component Leaks[1]			Pollutant							
Component Type	Emission Factor (kg/hr/comp.)	Number of Components[2]	VOC (tpy)	CO_2 (tons CO_{2e}/yr)	CH_4 (tons CO_{2e}/yr)	Benzene (tpy)	Ethylbenzene (tpy)	Hexane (tpy)	Toluene (tpy)	Xylene (tpy)
Valves	0.0045	72	0.038	0.005	72.4	0.000	0.000	0.000	0.000	0.000
Pump seals	0.0024	0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Others	0.0088	4	0.004	0.001	7.9	0.000	0.000	0.000	0.000	0.000
Connectors	0.0002	270	0.006	0.001	12.1	0.000	0.000	0.000	0.000	0.000
Flanges	0.00039	0	0.000	0.000	0.0	0.000	0.000	0.000	0.000	0.000
Open-ended Lines	0.0020	4	0.001	0.000	1.79	0.000	0.000	0.000	0.000	0.000

Blowdowns			Pollutant							
Blowdown Type	Volume (scf/event)[3]	Number of Events per Year[4]	VOC (tpy)	CO_2 (tons CO_{2e}/yr)	CH_4 (tons CO_{2e}/yr)	Benzene (tpy)	Ethylbenzene (tpy)	Hexane (tpy)	Toluene (tpy)	Xylene (tpy)
Emergency Shutdown Events	50000	1	0.013	0.002	25.5	0.000	0.000	0.000	0.000	0.000

Notes:
(1) Fugitive equipment leaks were calculated using average emission factors presented in Table 2-4 of EPA Document EPA-453/R-95-017, "Protocol for Equipment Leak Emissions Estimates".
(2) Source component counts based Table W-1B to Subpart W of Part 98 - Default Average Component Counts for Major Onshore Natural Gas Production Equipment assuming two meters/piping and two dehydrators for the Eastern U.S.
(3) Blowdown volume conservatively estimated based on emergency shutdown volume for another National Fuel facility.
(4) It is conservatively assumed that the facility will experience 1 emergency shutdown event per year.
(5) Natural gas composition estimated based on long-chain gas analyses.
(6) Global Warming Potentials: 25 for CH_4, 298 for N_20. Based on 40 CFR 98, Subpart A, Table A-1 - *Global Warming Potentials*

ATTACHMENT C
Wheatfield Dehydration Facility

Long-Chain Gas Analysis Reports

MSES consultants, inc.
CORROSION PRODUCTS DIVISION

Equipment • Products • Test Kits

609 W. Main Street • PO Drawer 190 • Clarksburg, WV 26302-0190
304.624.9700 • 304.622.0981 • 304.842.3325 • www.msesproducts.com
Office Fax 24 hour website/e-store

November 6, 2013
Project Number 13-039

Josh Ennis, PE
Associate Engineer - Air Compliance
Engineering Services Department
National Fuel Gas Supply Corp.
1100 State Street
Erie, PA 16501

TRANSMISSION LETTER
REPORT OF AIR EMISSION
GAS ANALYSIS

Dear Mr. Tedesco,

Enclosed is one (1) copy of the Gas Analysis Results from Jackson Station sampling on October 29, 2013. Also enclosed is a copy of the original field sheets which accompanied the samples to the laboratory, for your records. If you have any questions about this report, please do not hesitate to contact Mr. Jason N. Rine, Corrosion Products Division Director. Thank you.

Respectfully submitted,

Jason N Rine
Director
Corrosion Products Division
MSES consultants, inc.
j.rine@msesinc.com
304.624.9700

enclosures

Corrosion Products Division

Corrosion Products Division - MSES consultants, inc.
609 West Main Street ■ P. O. Drawer 190
Clarksburg, West Virginia 26301
304-624-9700 Main ▪ 304-622-0981 Fax ▪ E-mail cpd@msesinc.com

FIELD COLLECTION REPORT
GAS SAMPLE

Company Name National Fuel

Sample Name Jackson Station

Sample Number NF-1-10-29-13

Sample Date 10-29-13

Sample Time 8:06a

Sampled By JNR

SAMPLE COLLECTED FROM:

- ☐ Well
- ☐ Pipeline
- ☐ Storage
- ☐ Fuel Gas
- ☐ Other

SAMPLE INFORMATION:

Sample Description 1" tap on outlet on station

Sample Temperature

Sample Pressure 105 lbs

Sample Odor

Purge Time 4 cycles

Sample Source

GAS ANALYSIS PROGRAM REQUESTED:

Company to Specify:

GPA-2286

LOCATION SKETCH

Sample Location:

Sampler Remarks Bottles 039, 054

Samples per GPA-2166

WEATHER:

Air Temperature 31°

Conditions partly cloudy

CONTACT INFORMATION:

Name:

Address:

Telephone: Fax

E-mail:

OCT 30 2013

MFM

MSES consultants, inc.
CMSES consultants, inc. CORROSION PRODUCTS DIVISION
PO Drawer 190 - Clarksburg, WV 26302-0190
Telephone: 304.624.9700 - Fax: 304.622.0981

Extended Fractional Analysis

National Fuel

Analysis No:	1
Analysis Date:	10/28/2013
MSES Project No.:	13-039

SAMPLE COLLECTION INFORMATION

Client:	National Fuel	Sample Date:	10/29/2013
Sample Location:	Jackson Station	Sample Time:	8:06 AM
Sample Collection Source:	N/A	Collected By:	JNR
MSES Sample Number:	NF-1-10-29-2013	Sample Pressure:	1056.0
Date Received at Lab:	10/30/2013	Sample Temp. (°F):	N/A
Collection Remark:	N/A	Sample Container Type:	Cylinder
		MSES/CPD ID#	39
		Client ID #:	N/A

ANALYSIS REPORT

FRACTIONAL ANALYSIS

COMPONENTS	MOLE PERCENT	GPM
NITROGEN	0.2119	
CARBON DIOXIDE	0.0748	
METHANE	97.2248	
ETHANE	2.4813	0.66
PROPANE	0.0072	0.00
I-BUTANE	<0.0001	0.00
N-BUTANE	<0.0001	0.00
I-PENTANE	<0.0001	0.00
N-PENTANE	<0.0001	0.00
I-HEXANES	<0.0001	0.00
N-HEXANE	<0.0001	0.00
I-HEPTANES	<0.0001	0.00
N-HEPTANE	<0.0001	0.00
I-OCTANES	<0.0001	0.00
N-OCTANE	<0.0001	0.00
I-NONANES	<0.0001	0.00
N-NONANE	<0.0001	0.00
DECANES +	<0.0001	0.00
TOTAL	100.000	

ANALYTICAL RESULTS

REAL VALUES ARE CALCULATED AT 14.696 PSI AND 60° F

BTU/SCF (DRY):	1028.20
BTU/SCF (WET):	1026.56
SUM. FACTOR (DRY):	0.9979
SUM. FACTOR (WET):	0.9975
ETHANE + GPM:	0.6653
REAL DENSITY:	0.5685

COMMENTS

Sample Collected per GPA 2166-05: Obtaining Natural Gas Samples for Analysis by Gas Chromatography

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mixtures by Temperature Programmed Gas Chromatography

(2) Physical properties and values used in calculations were acquired from GPA 2145-09: Table of Physical properties for Hydrocarbons and Other Compounds of Interest to the Natural Gas Industry

(3) Limit of Detection = 0.0001 Mole Percent

MSES consultants, inc.
CORROSION PRODUCTS DIVISION

PO Drawer 190 - Clarksburg, WV 26302-0190
Telephone: 304.624.9700 - Fax: 304.622.0981
Website: www.msesinc.com/analysis

Aromatic Hydrocarbon Analysis

National Fuel

Analysis No:	1
Analysis Date:	10/28/2013
MSES Project No.:	13-039

SAMPLE COLLECTION INFORMATION

Client:	National Fuel	Sample Date:	10/29/2013
Sample Location:	Jackson Station	Sample Time:	8:06 AM
Sample Collection Source:	N/A	Collected By:	JNR
MSES Sample Number:	NF-1-10-29-2013	Sample Pressure:	1056.0
Date Received at Lab:	10/30/2013	Sample Temp. (°F):	N/A
Collection Remark:	None	Sample Container Type:	Cylinder
		MSES/CPD ID#	39
		Client ID #:	N/A

ANALYSIS REPORT

COMPONENTS	UNITS	ANALYTICAL METHODS	RESULTS
C_6H_6 BENZENE	ppmV	GPA 2286-95	<0.1
C_7H_8 TOLUENE	ppmV	GPA 2286-95	<0.1
C_8H_{10} ETHYLBENZENE	ppmV	GPA 2286-95	<0.1
C_8H_{10} XYLENE	ppmV	GPA 2286-95	<0.1

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mixtures by Temperature Programmed Gas Chromatography

(2) Sample Collected per GPA 2166-95: Obtaining Natural Gas Samples for Analysis by Gas Chromatography

(3) Limit of Detection = 0.1 ppmV

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Extended Gas Analysis
National Fuel

Analysis No:	1
Analysis Date:	10/28/2013
MSES Project No.:	13-039

SAMPLE COLLECTION INFORMATION

Client:	National Fuel	Sample Date:	10/29/2013
Sample Location:	Jackson Station	Sample Time:	8:06 AM
Sample Collection Source:	N/A	Collected By:	JNR
MSES Sample Number:	NF-1-10-29-2013	Sample Pressure:	1056.0
Date Received at Lab:	10/30/2013	Sample Temp. (°F):	N/A
Collection Remark:	None	Sample Container Type:	Cylinder
		MSES/CPD ID#	MSES 39
		Client ID #:	N/A

ANALYSIS REPORT

COMPONENTS	UNITS	ANALYTICAL METHODS	RESULTS
C_5H_{10} CYCLOPENTANE	Mole %	GPA 2286	<0.0001
C_6H_{12} CYCLOHEXANE	Mole %	GPA 2286	<0.0001
C_6H_{14} n-HEXANE	Mole %	GPA 2286	<0.0001
C_6H_{14} 2 METHYLPENTANE (isohexane)	Mole %	GPA 2286	<0.0001
C_6H_{14} 3 METHYLPENTANE	Mole %	GPA 2286	<0.0001
C_6H_{14} 2,2 DIMETHYLBUTANE (neohexane)	Mole %	GPA 2286	<0.0001
C_6H_{14} 2,3 DIMETHYLBUTANE	Mole %	GPA 2286	<0.0001
C_7H_{14} METHYLCYCLOHEXANE	Mole %	GPA 2286	<0.0001
C_7H_{16} n-HEPTANE	Mole %	GPA 2286	<0.0001
C_8H_{18} n-OCTANE	Mole %	GPA 2286	<0.0001
C_8H_{18} 2,2,4 TRIMETHYLPENTANE (isooctane)	Mole %	GPA 2286	<0.0001
C_9H_{20} n-NONANE	Mole %	GPA 2286	<0.0001
$C_{10}H_{22}$ n-DECANE	Mole %	GPA 2286	<0.0001
$C_{11}H_{24}$ UNDECANE	Mole %	GPA 2286	<0.0001
$C_{12}H_{26}$ DODECANE	Mole %	GPA 2286	<0.0001
$C_{13}H_{28}$ TRIDECANE	Mole %	GPA 2286	<0.0001
$C_{14}H_{30}$ TETRADECANE	Mole %	GPA 2286	<0.0001

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mixtures by Temperature Programmed Gas Chromatography

(2) Sample Collected per GPA 2166-95: Obtaining Natural Gas Samples for Analysis by Gas Chromatography

(3) Limit of Detection = 0.0001 Mole Percent

Corrosion Products Division

Corrosion Products Division - *MSES consultants, inc.*

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FIELD COLLECTION REPORT
GAS SAMPLE

Company Name NATL FUELS

Sample Name

Sample Number 125-126

Sample Date 3-9-15

Sample Time 10 AM

Sampled By J. PUGH

SAMPLE COLLECTED FROM:

- ☐ Well
- ☒ Pipeline LINE X
- ☐ Storage
- ☐ Fuel Gas
- ☐ Other

SAMPLE INFORMATION:

Sample Description

Sample Temperature

Sample Pressure 687#

Sample Odor MERCAPTIN

Purge Time

Sample Source

GAS ANALYSIS PROGRAM REQUESTED:

Company to Specify:

LOCATION SKETCH

Sample Location:

Sampler Remarks

WEATHER:

Air Temperature 30 DEG

Conditions SUNNY

CONTACT INFORMATION:

Name: ~~[illegible]~~ & TOM FERGER

Address:

716-481-4050

Telephone: Fax

E-mail:

MAR 11 2015

JTBL

MSES consultants, inc.

CORROSION PRODUCTS DIVISION

Gas Corrosion Analysis

National Fuel and Gas

PO Drawer 190 - Clarksburg, WV 26302-0190
Telephone: 304.624.9700 - Fax: 304.622.0981
Website: www.msesinc.com/analysis

Analysis No:	1
Analysis Date:	03/12/2015
MSES Project No.:	15-053

SAMPLE COLLECTION INFORMATION

Client:	National Fuel and Gas	Sample Date:	3/9/2015
Sample Location:	Line X	Sample Time:	10:00 AM
Sample Collection Source:	Pipeline	Collected By:	JP
MSES Sample Number:	N/A	Sample Pressure:	687
Date Received at Lab:	3/11/2015	Sample Temp. (°F):	N/A
Collection Remarks:	N/A	Sample Container Type:	Cylinder
		MSES/CPD ID#	125, 126
		Client ID #:	N/A

ANALYSIS REPORT

COMPONENTS	UNITS	ANALYTICAL METHODS	RESULTS
H_2S HYDROGEN SULFIDE	PPMV	ASDTM D5504-08	<0.1
O_2 OXYGEN	Mole %	GPA 2261-00	0.0156
CO_2 CARBON DIOXIDE	Mole %	GPA 2261-00	0.0877

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mxitures by Temperature Programmed Gas Chromatography

(2) Physical properties and values used in calculations were acquired from GPA 2145-09: Table of Physical properties for Hydrocarbons and Other Compounds of Interest to the Natural Gas Industry

(3) Sulfur Compounds Analysis and Reporting Performed by Gas Chromatography using a Sulfur Chemiluminescence Detector Following Procedures Outlined by ASTM Method D5504-08

MSES consultants, inc.
CMSES consultants, inc. CORROSION PRODUCTS DIVISION

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Fractional Analysis

National Fuel and Gas

Analysis No:	1
Analysis Date:	03/12/2015
MSES Project No.:	15-053

SAMPLE COLLECTION INFORMATION

Client:	National Fuel and Gas	Sample Date:	3/9/2015
Sample Location:	Line X	Sample Time:	10:00 AM
Sample Collection Source:	Pipeline	Collected By:	JP
MSES Sample Number:	N/A	Sample Pressure:	687
Date Received at Lab:	3/11/2015	Sample Temp. (°F):	N/A
Collection Remarks:	N/A	Sample Container Type:	Cylinder
		MSES/CPD ID#	125, 126
		Client ID #:	N/A

ANALYSIS REPORT

FRACTIONAL ANALYSIS

COMPONENTS	MOLE PERCENT	GPM
METHANE	97.1009	
ETHANE	2.3977	0.64
PROPANE	0.1029	0.03
I-BUTANE	0.0034	0.00
N-BUTANE	0.0078	0.00
I-PENTANE	0.0011	0.00
N-PENTANE	0.0010	0.00
NITROGEN	0.2811	
CARBON DIOXIDE	0.0877	
OXYGEN	0.0156	
HEXANES (PLUS)	0.0008	0.00
TOTAL	100.0000	

ANALYTICAL RESULTS AT BASE CONDITIONS (CALCULATED VALUES)

BTU/SCF (DRY):	1028.37
BTU/SCF (SATURATED):	1010.78
PRESSURE (PSIA):	14.696
TEMPERATURE (°F)	60.00
Z FACTOR (DRY):	0.9979
Z FACTOR (SATURATED):	0.9976
ETHANE + GPM	0.6739

SPECIFIC GRAVITIES (CALCULATED VALUES)

IDEAL GRAVITY	0.5688
REAL GRAVITY	0.5698

COMMENTS

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mxitures by Temperature Programmed Gas Chromatography

(2) Physical properties and values used in calculations were acquired from GPA 2145-09: Table of Physical properties for Hydrocarbons and Other Compounds of Interest to the Natural Gas Industry

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Extended Gas Analysis
National Fuel and Gas

Analysis No:	1
Analysis Date:	National Fuel and Gas
MSES Project No.:	15-053

SAMPLE COLLECTION INFORMATION

Client:	National Fuel and Gas	Sample Date:	3/9/2015
Sample Location:	Line X	Sample Time:	10:00 AM
Sample Collection Source:	Pipeline	Collected By:	JP
MSES Sample Number:	N/A	Sample Pressure:	687
Date Received at Lab:	3/11/2015	Sample Temp. (°F):	N/A
Collection Remarks:	N/A	Sample Container Type:	Cylinder
		MSES/CPD ID#	125, 126
		Client ID #:	N/A

ANALYSIS REPORT

COMPONENTS	UNITS	ANALYTICAL METHODS	RESULTS
C_5H_{10} CYCLOPENTANE	Mole %	GPA 2186	<0.0001
C_6H_{12} CYCLOHEXANE	Mole %	GPA 2186	<0.0001
C_6H_{14} n-HEXANE	Mole %	GPA 2186	0.0004
C_6H_{14} 2 METHYLPENTANE (isohexane)	Mole %	GPA 2186	<0.0001
C_6H_{14} 3 METHYLPENTANE	Mole %	GPA 2186	0.0003
C_6H_{14} 2,2 DIMETHYLBUTANE (neohexane)	Mole %	GPA 2186	<0.0001
C_6H_{14} 2,3 DIMETHYLBUTANE	Mole %	GPA 2186	<0.0001
C_7H_{14} METHYLCYCLOHEXANE	Mole %	GPA 2186	<0.0001
C_7H_{16} n-HEPTANE	Mole %	GPA 2186	<0.0001
C_8H_{18} n-OCTANE	Mole %	GPA 2186	<0.0001
C_8H_{18} 2,2,4 TRIMETHYLPENTANE (isooctane)	Mole %	GPA 2186	<0.0001
C_9H_{20} n-NONANE	Mole %	GPA 2186	<0.0001
$C_{10}H_{22}$ n-DECANE	Mole %	GPA 2186	<0.0001
$C_{11}H_{24}$ UNDECANE	Mole %	GPA 2186	<0.0001
$C_{12}H_{26}$ DODECANE	Mole %	GPA 2186	<0.0001
$C_{13}H_{28}$ TRIDECANE	Mole %	GPA 2186	<0.0001
$C_{14}H_{30}$ TETRADECANE	Mole %	GPA 2186	<0.0001

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mxitures by Temperature Programmed Gas Chromatography

(2) Limit of Detection= 0.0001 Mole Percent

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Aromatic Hydrocarbon Analysis

National Fuel and Gas

Analysis No:	1
Analysis Date:	03/12/2015
MSES Project No.:	15-053

SAMPLE COLLECTION INFORMATION

Client:	National Fuel and Gas	Sample Date:	3/9/2015
Sample Location:	Line X	Sample Time:	10:00 AM
Sample Collection Source:	Pipeline	Collected By:	JP
MSES Sample Number:	N/A	Sample Pressure:	687
Date Received at Lab:	3/11/2015	Sample Temp. (°F):	N/A
Collection Remarks:	N/A	Sample Container Type:	Cylinder
		MSES/CPD ID#	125, 126
		Client ID #:	N/A

ANALYSIS REPORT

COMPONENTS	UNITS	ANALYTICAL METHODS	RESULTS
C_6H_6 BENZENE	ppmV	GPA 2286-95	<0.1
C_7H_8 TOLUENE	ppmV	GPA 2286-95	<0.1
C_8H_{10} ETHYLBENZENE	ppmV	GPA 2286-95	<0.1
C_8H_{10} XYLENE	ppmV	GPA 2286-95	<0.1

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mxitures by Temperature Programmed Gas Chromatography

(2) Limit of Detection = 0.1 ppmV

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Sulfur Compounds Analysis

National Fuel and Gas

Analysis No:	1
Analysis Date:	03/12/2015
MSES Project No.:	15-053

SAMPLE COLLECTION INFORMATION

Client:	National Fuel and Gas	Sample Date:	3/9/2015
Sample Location:	Line X	Sample Time:	10:00 AM
Sample Collection Source:	Pipeline	Collected By:	JP
MSES Sample Number:	N/A	Sample Pressure:	687
Date Received at Lab:	3/11/2015	Sample Temp. (°F):	N/A
Collection Remarks:	N/A	Sample Container Type:	Cylinder
		MSES/CPD ID#	125, 126
		Client ID #:	N/A

ANALYSIS REPORT

COMPONENTS	UNITS	ANALYTICAL METHODS	RESULTS
H_2S HYDROGEN SULFIDE	PPMV	ASTM D-6228	<0.1
COS CARBONYL SULFIDE	PPMV	ASTM D-6228	<0.1
CS_2 CARBON DISULFIDE	PPMV	ASTM D-6228	<0.1
SO_2 SULFUR DIOXIDE	PPMV	ASTM D-6228	<0.1
CH_4S METHYL MERCAPTAN	PPMV	ASTM D-6228	<0.1
C_2H_6S ETHYL MERCAPTAN	PPMV	ASTM D-6228	<0.1
$(CH_3)_2S$ DIMETHYL SULFIDE	PPMV	ASTM D-6228	<0.1
$(CH_3)_3CSH$ *tert*-BUTYL MERCAPTAN	PPMV	ASTM D-6228	1.452
$C_2H_5SCH_3$ ETHYL METHYL SULFIDE	PPMV	ASTM D-6228	<0.1
TOTAL SULFUR COMPOUNDS	PPMV	ASTM D-6228	1.539

ANALYTICAL METHODS AND VALUES

(1) Sulfur Compounds Analysis and Reporting Performed by Gas Chromatography using a Sulfur Chemiluminescence Detector Following Procedures Outlined by ASTM Method D5504-08

(2) Limit of Detection = 0.1 ppmV

Corrosion Products Division

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FIELD COLLECTION REPORT
GAS SAMPLE

Company Name: Natl Fuel
Sample Name: Clermont West
Sample Number: NF-16-10-28-14
Sample Date: 10-28-14
Sample Time: 2:54 p
Sampled By: JNR

SAMPLE COLLECTED FROM:
- ☐ Well
- ☑ Pipeline
- ☐ Storage
- ☐ Fuel Gas
- ☐ Other

SAMPLE INFORMATION:

Sample Description: Bottom Dehy
Sample Temperature: 68°F
Sample Pressure: 682 lbs
Sample Odor:
Purge Time: 6 cycles
Sample Source:

GAS ANALYSIS PROGRAM REQUESTED:

Company to Specify:
GPA-2286

LOCATION SKETCH

Sample Location:

Sampler Remarks: Actual 058
Sampled per GPA-2166

WEATHER:

Air Temperature: 64°
Conditions: cloudy

CONTACT INFORMATION:

Name:
Address:
Telephone: Fax
E-mail:

OCT 30 2014

MSES consultants, inc.
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Extended Gas Analysis
National Fuel and Gas

Analysis No:	1
Analysis Date:	National Fuel and Gas
MSES Project No.:	14-051

SAMPLE COLLECTION INFORMATION

Client:	National Fuel and Gas	Sample Date:	10/28/2014
Sample Location:	Clermont West	Sample Time:	2:54 PM
Sample Collection Source:	Pipeline	Collected By:	JNR
MSES Sample Number:	NF-16-10-28-14	Sample Pressure:	682
Date Received at Lab:	10/30/2014	Sample Temp. (°F):	68
Collection Remarks:	Before Dehy	Sample Container Type:	Cylinder
		MSES/CPD ID#	058
		Client ID #:	N/A

ANALYSIS REPORT

COMPONENTS	UNITS	ANALYTICAL METHODS	RESULTS
C_5H_{10} CYCLOPENTANE	Mole %	GPA 2186	<0.0001
C_6H_{12} CYCLOHEXANE	Mole %	GPA 2186	<0.0001
C_6H_{14} n-HEXANE	Mole %	GPA 2186	0.0004
C_6H_{14} 2 METHYLPENTANE (isohexane)	Mole %	GPA 2186	<0.0001
C_6H_{14} 3 METHYLPENTANE	Mole %	GPA 2186	<0.0001
C_6H_{14} 2,2 DIMETHYLBUTANE (neohexane)	Mole %	GPA 2186	<0.0001
C_6H_{14} 2,3 DIMETHYLBUTANE	Mole %	GPA 2186	<0.0001
C_7H_{14} METHYLCYCLOHEXANE	Mole %	GPA 2186	<0.0001
C_7H_{16} n-HEPTANE	Mole %	GPA 2186	<0.0001
C_8H_{18} n-OCTANE	Mole %	GPA 2186	<0.0001
C_8H_{18} 2,2,4 TRIMETHYLPENTANE (isooctane)	Mole %	GPA 2186	<0.0001
C_9H_{20} n-NONANE	Mole %	GPA 2186	<0.0001
$C_{10}H_{22}$ n-DECANE	Mole %	GPA 2186	<0.0001
$C_{11}H_{24}$ UNDECANE	Mole %	GPA 2186	<0.0001
$C_{12}H_{26}$ DODECANE	Mole %	GPA 2186	<0.0001
$C_{13}H_{28}$ TRIDECANE	Mole %	GPA 2186	<0.0001
$C_{14}H_{30}$ TETRADECANE	Mole %	GPA 2186	<0.0001

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mxitures by Temperature Programmed Gas Chromatography

(2) Limit of Detection= 0.0001 Mole Percent

(3) Gas sampling was performed following procedures outlined in GPA 2166-05: Obtaining Natural Gas Samples for Analysis by Gas Chromatography

MSES consultants, inc.
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Aromatic Hydrocarbon Analysis

National Fuel and Gas

Analysis No:	1
Analysis Date:	11/05/2014
MSES Project No.:	14-051

SAMPLE COLLECTION INFORMATION

Client:	National Fuel and Gas	Sample Date:	10/28/2014
Sample Location:	Clermont West	Sample Time:	2:54 PM
Sample Collection Source:	Pipeline	Collected By:	JNR
MSES Sample Number:	NF-16-10-28-14	Sample Pressure:	682
Date Received at Lab:	10/30/2014	Sample Temp. (°F):	68
Collection Remarks:	Before Dehy	Sample Container Type:	Cylinder
		MSES/CPD ID#	058
		Client ID #:	N/A

ANALYSIS REPORT

COMPONENTS	UNITS	ANALYTICAL METHODS	RESULTS
C_6H_6 BENZENE	ppmV	GPA 2286-95	<0.1
C_7H_8 TOLUENE	ppmV	GPA 2286-95	<0.1
C_8H_{10} ETHYLBENZENE	ppmV	GPA 2286-95	<0.1
C_8H_{10} XYLENE	ppmV	GPA 2286-95	<0.1

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mxitures by Temperature Programmed Gas Chromatography

(2) Limit of Detection = 0.1 ppmV

(3) Gas sampling was performed following procedures outlined in GPA 2166-05: Obtaining Natural Gas Samples for Analysis by Gas Chromatography

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Extended Fractional Analysis

National Fuel and Gas

Analysis No:	1
Analysis Date:	11/05/2014
MSES Project No.:	14-051

SAMPLE COLLECTION INFORMATION

Client:	National Fuel and Gas	Sample Date:	10/28/2014
Sample Location:	Clermont West	Sample Time:	2:54 PM
Sample Collection Source:	Pipeline	Collected By:	JNR
MSES Sample Number:	NF-16-10-28-14	Sample Pressure:	682
Date Received at Lab:	10/30/2014	Sample Temp. (°F):	68
Collection Remarks:	Before Dehy	Sample Container Type:	Cylinder
		MSES/CPD ID#	058
		Client ID #:	N/A

ANALYSIS REPORT

FRACTIONAL ANALYSIS

COMPONENTS	MOLE PERCENT	GPM
NITROGEN	0.3679	
CARBON DIOXIDE	0.0321	
METHANE	95.3694	
ETHANE	3.9638	1.06
PROPANE	0.2343	0.06
I-BUTANE	0.0079	0.00
N-BUTANE	0.0208	0.01
I-PENTANE	0.0018	0.00
N-PENTANE	0.0015	0.00
I-HEXANES	<0.0001	0.00
N-HEXANE	0.0005	0.00
I-HEPTANES	<0.0001	0.00
N-HEPTANE	<0.0001	0.00
I-OCTANES	<0.0001	0.00
N-OCTANE	<0.0001	0.00
I-NONANES	<0.0001	0.00
N-NONANE	<0.0001	0.00
DECANES +	<0.0001	0.00
TOTAL	100.000	

ANALYTICAL RESULTS

REAL VALUES ARE CALCULATED AT 14.696 PSI AND 60° F

BTU/SCF (DRY):	1042.62
BTU/SCF (WET):	1039.31
SUM. FACTOR (DRY):	0.9978
SUM. FACTOR (WET):	0.9974
ETHANE + GPM:	1.1347
REAL DENSITY:	0.5787

COMMENTS

ANALYTICAL METHODS AND VALUES

(1) Extended analysis and reporting performed following procedures outlined in GPA 2286-95: Tentative Method of Extended Analysis for Natural Gas and Similar Mxitures by Temperature Programmed Gas Chromatography

(2) Physical properties and values used in calculations were acquired from GPA 2145-09: Table of Physical properties for Hydrocarbons and Other Compounds of Interest to the Natural Gas Industry

(3) Limit of Detection = 0.0001 Mole Percent

(4) Gas sampling was performed following procedures outlined in GPA 2166-05: Obtaining Natural Gas Samples for Analysis by Gas Chromatography

ATTACHMENT D
Wheatfield Dehydration Facility

GLYCalc 4.0 Output Files

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Wheatfield - Controlled PTE Emissions
File Name: S:\National Fuel Gas\Supply Facilities - NY\Wheatfield\GlyCALC Files\PTE\Wheatfield - Controlled PTE Emissions.ddf
Date: March 23, 2016

DESCRIPTION:

Description: Throughput = 442 MMscfd
Pressure = 1100
Temp = 100 deg F
with elec pump, therm oxid, flash tank

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	<0.0001	<0.001	<0.0001
Methane	0.0026	0.062	0.0113
Ethane	0.0015	0.035	0.0065
Propane	0.0002	0.005	0.0009
Isobutane	<0.0001	<0.001	0.0001
n-Butane	0.0001	0.002	0.0003
Isopentane	<0.0001	<0.001	<0.0001
n-Pentane	<0.0001	<0.001	<0.0001
Cyclopentane	<0.0001	<0.001	<0.0001
n-Hexane	<0.0001	<0.001	<0.0001
Cyclohexane	<0.0001	<0.001	<0.0001
Other Hexanes	<0.0001	<0.001	<0.0001
Heptanes	<0.0001	0.001	0.0001
Methylcyclohexane	<0.0001	0.001	0.0001
2,2,4-Trimethylpentane	<0.0001	<0.001	<0.0001
Benzene	0.0001	0.002	0.0003
Toluene	<0.0001	<0.001	0.0001
Ethylbenzene	<0.0001	<0.001	0.0001
Xylenes	<0.0001	0.001	0.0001
C8+ Heavies	0.0014	0.033	0.0059
Total Emissions	0.0059	0.142	0.0259
Total Hydrocarbon Emissions	0.0059	0.142	0.0259
Total VOC Emissions	0.0019	0.045	0.0082
Total HAP Emissions	0.0001	0.003	0.0006
Total BTEX Emissions	0.0001	0.003	0.0005

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	0.0001	0.002	0.0003
Methane	2.5709	61.701	11.2604
Ethane	1.4764	35.432	6.4664
Propane	0.2086	5.007	0.9137
Isobutane	0.0171	0.409	0.0747

n-Butane	0.0633	1.520	0.2773
Isopentane	0.0086	0.207	0.0378
n-Pentane	0.0106	0.254	0.0463
Cyclopentane	0.0037	0.088	0.0161
n-Hexane	0.0104	0.249	0.0455
Cyclohexane	0.0077	0.184	0.0336
Other Hexanes	0.0086	0.207	0.0377
Heptanes	0.0267	0.640	0.1169
Methylcyclohexane	0.0335	0.803	0.1465
2,2,4-Trimethylpentane	0.0012	0.029	0.0052
Benzene	0.0713	1.711	0.3122
Toluene	0.0115	0.276	0.0504
Ethylbenzene	0.0152	0.364	0.0664
Xylenes	0.0211	0.507	0.0926
C8+ Heavies	1.3571	32.571	5.9442
Total Emissions	5.9234	142.161	25.9445
Total Hydrocarbon Emissions	5.9233	142.160	25.9441
Total VOC Emissions	1.8761	45.026	8.2173
Total HAP Emissions	0.1307	3.136	0.5723
Total BTEX Emissions	0.1191	2.858	0.5216

FLASH GAS EMISSIONS

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	<0.0001	<0.001	0.0001
Methane	52.8382	1268.118	231.4315
Ethane	8.1744	196.187	35.8041
Propane	0.5396	12.950	2.3633
Isobutane	0.0282	0.678	0.1237
n-Butane	0.0793	1.902	0.3472
Isopentane	0.0092	0.222	0.0405
n-Pentane	0.0089	0.214	0.0391
Cyclopentane	0.0008	0.018	0.0034
n-Hexane	0.0047	0.112	0.0205
Cyclohexane	0.0008	0.020	0.0037
Other Hexanes	0.0052	0.124	0.0226
Heptanes	0.0056	0.135	0.0247
Methylcyclohexane	0.0028	0.067	0.0122
2,2,4-Trimethylpentane	0.0005	0.012	0.0022
Benzene	0.0011	0.026	0.0047
Toluene	0.0001	0.003	0.0005
Ethylbenzene	0.0001	0.002	0.0003
Xylenes	0.0001	0.002	0.0003
C8+ Heavies	0.0236	0.567	0.1035
Total Emissions	61.7233	1481.359	270.3480
Total Hydrocarbon Emissions	61.7233	1481.359	270.3480
Total VOC Emissions	0.7106	17.054	3.1124
Total HAP Emissions	0.0065	0.157	0.0286
Total BTEX Emissions	0.0013	0.032	0.0059

COMBINED REGENERATOR VENT/FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Hydrogen Sulfide	<0.0001	<0.001	<0.0001
Methane	0.0026	0.062	0.0113
Ethane	0.0015	0.035	0.0065
Propane	0.0002	0.005	0.0009
Isobutane	<0.0001	<0.001	0.0001
n-Butane	0.0001	0.002	0.0003
Isopentane	<0.0001	<0.001	<0.0001
n-Pentane	<0.0001	<0.001	<0.0001
Cyclopentane	<0.0001	<0.001	<0.0001
n-Hexane	<0.0001	<0.001	<0.0001
Cyclohexane	<0.0001	<0.001	<0.0001
Other Hexanes	<0.0001	<0.001	<0.0001
Heptanes	<0.0001	0.001	0.0001
Methylcyclohexane	<0.0001	0.001	0.0001
2,2,4-Trimethylpentane	<0.0001	<0.001	<0.0001
Benzene	0.0001	0.002	0.0003
Toluene	<0.0001	<0.001	0.0001
Ethylbenzene	<0.0001	<0.001	0.0001
Xylenes	<0.0001	0.001	0.0001
C8+ Heavies	0.0014	0.033	0.0059
Total Emissions	0.0059	0.142	0.0259
Total Hydrocarbon Emissions	0.0059	0.142	0.0259
Total VOC Emissions	0.0019	0.045	0.0082
Total HAP Emissions	0.0001	0.003	0.0006
Total BTEX Emissions	0.0001	0.003	0.0005

COMBINED REGENERATOR VENT/FLASH GAS EMISSION CONTROL REPORT:

Component	Uncontrolled tons/yr	Controlled tons/yr	% Reduction
Hydrogen Sulfide	<0.0001	<0.0001	99.92
Methane	242.6919	0.0113	100.00
Ethane	42.2705	0.0065	99.98
Propane	3.2771	0.0009	99.97
Isobutane	0.1984	0.0001	99.96
n-Butane	0.6245	0.0003	99.96
Isopentane	<0.0001	<0.0001	99.95
n-Pentane	<0.0001	<0.0001	99.95
Cyclopentane	<0.0001	<0.0001	99.92
n-Hexane	<0.0001	<0.0001	99.93
Cyclohexane	<0.0001	<0.0001	99.91
Other Hexanes	<0.0001	<0.0001	99.94
Heptanes	0.1415	0.0001	99.92
Methylcyclohexane	0.1588	0.0001	99.91
2,2,4-Trimethylpentane	<0.0001	<0.0001	99.93
Benzene	0.3170	0.0003	99.90
Toluene	0.0509	0.0001	99.90
Ethylbenzene	0.0668	0.0001	99.90
Xylenes	0.0929	0.0001	99.90
C8+ Heavies	6.0478	0.0059	99.90

Total Emissions	296.2925	0.0259	99.99
Total Hydrocarbon Emissions	296.2921	0.0259	99.99
Total VOC Emissions	11.3297	0.0082	99.93
Total HAP Emissions	0.6009	0.0006	99.90
Total BTEX Emissions	0.5275	0.0005	99.90

EQUIPMENT REPORTS:

COMBUSTION DEVICE

Ambient Temperature: 60.00 deg. F
Excess Oxygen: 5.00 %
Combustion Efficiency: 99.90 %
Supplemental Fuel Requirement: 8.14e-002 MM BTU/hr

Component	Emitted	Destroyed
Hydrogen Sulfide	0.10%	99.90%
Methane	0.10%	99.90%
Ethane	0.10%	99.90%
Propane	0.10%	99.90%
Isobutane	0.10%	99.90%
n-Butane	0.10%	99.90%
Isopentane	0.10%	99.90%
n-Pentane	0.10%	99.90%
Cyclopentane	0.10%	99.90%
n-Hexane	0.10%	99.90%
Cyclohexane	0.10%	99.90%
Other Hexanes	0.10%	99.90%
Heptanes	0.10%	99.90%
Methylcyclohexane	0.10%	99.90%
2,2,4-Trimethylpentane	0.10%	99.90%
Benzene	0.10%	99.90%
Toluene	0.10%	99.90%
Ethylbenzene	0.10%	99.90%
Xylenes	0.10%	99.90%
C8+ Heavies	0.10%	99.90%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages: 1.25
Calculated Dry Gas Dew Point: 2.26 lbs. H2O/MMSCF

Temperature: 100.0 deg. F
Pressure: 1250.0 psig
Dry Gas Flow Rate: 442.0000 MMSCF/day
Glycol Losses with Dry Gas: 9.7737 lb/hr
Wet Gas Water Content: Subsaturated
Specified Wet Gas Water Content: 10.00 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio: 10.53 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	22.62%	77.38%
Carbon Dioxide	99.91%	0.09%
Hydrogen Sulfide	99.43%	0.57%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.98%	0.02%
Propane	99.97%	0.03%
Isobutane	99.96%	0.04%
n-Butane	99.95%	0.05%
Isopentane	99.95%	0.05%
n-Pentane	99.94%	0.06%
Cyclopentane	99.74%	0.26%
n-Hexane	99.91%	0.09%
Cyclohexane	99.58%	0.42%
Other Hexanes	99.93%	0.07%
Heptanes	99.85%	0.15%
Methylcyclohexane	99.59%	0.41%
2,2,4-Trimethylpentane	99.94%	0.06%
Benzene	96.33%	3.67%
Toluene	94.81%	5.19%
Ethylbenzene	94.08%	5.92%
Xylenes	91.76%	8.24%
C8+ Heavies	99.62%	0.38%

FLASH TANK

Flash Control: Recycle/recompression
Flash Temperature: 120.0 deg. F
Flash Pressure: 40.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.97%	0.03%
Carbon Dioxide	38.00%	62.00%
Hydrogen Sulfide	80.37%	19.63%
Nitrogen	4.53%	95.47%
Methane	4.64%	95.36%
Ethane	15.30%	84.70%
Propane	27.88%	72.12%
Isobutane	37.66%	62.34%
n-Butane	44.41%	55.59%
Isopentane	48.59%	51.41%
n-Pentane	54.44%	45.56%
Cyclopentane	82.83%	17.17%
n-Hexane	69.08%	30.92%
Cyclohexane	90.43%	9.57%
Other Hexanes	62.86%	37.14%
Heptanes	82.66%	17.34%
Methylcyclohexane	92.61%	7.39%
2,2,4-Trimethylpentane	70.55%	29.45%
Benzene	98.59%	1.41%
Toluene	99.15%	0.85%
Ethylbenzene	99.53%	0.47%
Xylenes	99.69%	0.31%
C8+ Heavies	98.49%	1.51%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	59.71%	40.29%
Carbon Dioxide	0.00%	100.00%
Hydrogen Sulfide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	1.03%	98.97%
n-Pentane	0.92%	99.08%
Cyclopentane	0.60%	99.40%
n-Hexane	0.72%	99.28%
Cyclohexane	3.54%	96.46%
Other Hexanes	1.59%	98.41%
Heptanes	0.60%	99.40%
Methylcyclohexane	4.32%	95.68%
2,2,4-Trimethylpentane	2.13%	97.87%
Benzene	5.07%	94.93%
Toluene	7.97%	92.03%
Ethylbenzene	10.46%	89.54%
Xylenes	12.98%	87.02%
C8+ Heavies	12.21%	87.79%

STREAM REPORTS:

WET GAS STREAM

Temperature: 100.00 deg. F
Pressure: 1264.70 psia
Flow Rate: 1.84e+007 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.11e-002	1.84e+002
Carbon Dioxide	6.18e-002	1.32e+003
Hydrogen Sulfide	1.00e-006	1.65e-002
Nitrogen	2.88e-001	3.91e+003
Methane	9.64e+001	7.51e+005
Ethane	3.06e+000	4.47e+004
Propane	1.19e-001	2.54e+003
Isobutane	4.19e-003	1.18e+002
n-Butane	1.03e-002	2.89e+002
Isopentane	1.13e-003	3.96e+001
n-Pentane	9.50e-004	3.33e+001
Cyclopentane	5.00e-005	1.70e+000

n-Hexane	4.00e-004	1.67e+001
Cyclohexane	5.00e-005	2.04e+000
Other Hexanes	4.70e-004	1.97e+001
Heptanes	4.40e-004	2.14e+001
Methylcyclohexane	1.85e-004	8.82e+000
2,2,4-Trimethylpentane	5.00e-005	2.77e+000
Benzene	5.20e-005	1.97e+000
Toluene	5.00e-006	2.24e-001
Ethylbenzene	5.00e-006	2.58e-001
Xylenes	5.00e-006	2.58e-001
C8+ Heavies	4.40e-003	3.64e+002
Total Components	100.00	8.05e+005

DRY GAS STREAM

Temperature: 100.00 deg. F
Pressure: 1264.70 psia
Flow Rate: 1.84e+007 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.77e-003	4.17e+001
Carbon Dioxide	6.17e-002	1.32e+003
Hydrogen Sulfide	9.94e-007	1.64e-002
Nitrogen	2.88e-001	3.91e+003
Methane	9.64e+001	7.51e+005
Ethane	3.06e+000	4.47e+004
Propane	1.19e-001	2.54e+003
Isobutane	4.19e-003	1.18e+002
n-Butane	1.03e-002	2.89e+002
Isopentane	1.13e-003	3.96e+001
n-Pentane	9.49e-004	3.33e+001
Cyclopentane	4.99e-005	1.70e+000
n-Hexane	4.00e-004	1.67e+001
Cyclohexane	4.98e-005	2.03e+000
Other Hexanes	4.70e-004	1.96e+001
Heptanes	4.39e-004	2.14e+001
Methylcyclohexane	1.84e-004	8.78e+000
2,2,4-Trimethylpentane	5.00e-005	2.77e+000
Benzene	5.01e-005	1.90e+000
Toluene	4.74e-006	2.12e-001
Ethylbenzene	4.70e-006	2.42e-001
Xylenes	4.59e-006	2.36e-001
C8+ Heavies	4.38e-003	3.62e+002
Total Components	100.00	8.04e+005

LEAN GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 2.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	1.39e+004
Water	1.50e+000	2.11e+002
Carbon Dioxide	8.81e-013	1.24e-010

Hydrogen Sulfide	6.65e-017	9.35e-015
Nitrogen	2.42e-013	3.40e-011
Methane	1.32e-017	1.86e-015
Ethane	3.24e-008	4.56e-006
Propane	2.16e-010	3.05e-008
Isobutane	9.65e-012	1.36e-009
n-Butane	2.51e-011	3.54e-009
Isopentane	6.38e-007	8.98e-005
n-Pentane	6.96e-007	9.80e-005
Cyclopentane	1.59e-007	2.23e-005
n-Hexane	5.37e-007	7.57e-005
Cyclohexane	2.00e-006	2.81e-004
Other Hexanes	9.88e-007	1.39e-004
Heptanes	1.15e-006	1.62e-004
Methylcyclohexane	1.07e-005	1.51e-003
2,2,4-Trimethylpentane	1.84e-007	2.59e-005
Benzene	2.71e-005	3.81e-003
Toluene	7.08e-006	9.97e-004
Ethylbenzene	1.26e-005	1.77e-003
Xylenes	2.24e-005	3.15e-003
C8+ Heavies	1.34e-003	1.89e-001
Total Components	100.00	1.41e+004

RICH GLYCOL STREAM

Temperature: 100.00 deg. F
Pressure: 1264.70 psia
Flow Rate: 2.54e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.70e+001	1.39e+004
Water	2.48e+000	3.54e+002
Carbon Dioxide	8.68e-003	1.24e+000
Hydrogen Sulfide	6.55e-007	9.35e-005
Nitrogen	2.38e-003	3.40e-001
Methane	3.88e-001	5.54e+001
Ethane	6.75e-002	9.65e+000
Propane	5.24e-003	7.48e-001
Isobutane	3.17e-004	4.53e-002
n-Butane	9.98e-004	1.43e-001
Isopentane	1.26e-004	1.80e-002
n-Pentane	1.37e-004	1.96e-002
Cyclopentane	3.13e-005	4.47e-003
n-Hexane	1.06e-004	1.51e-002
Cyclohexane	6.15e-005	8.79e-003
Other Hexanes	9.74e-005	1.39e-002
Heptanes	2.27e-004	3.25e-002
Methylcyclohexane	2.64e-004	3.78e-002
2,2,4-Trimethylpentane	1.21e-005	1.73e-003
Benzene	5.33e-004	7.62e-002
Toluene	8.83e-005	1.26e-002
Ethylbenzene	1.19e-004	1.70e-002
Xylenes	1.71e-004	2.44e-002
C8+ Heavies	1.10e-002	1.57e+000
Total Components	100.00	1.43e+004

FLASH TANK OFF GAS STREAM

Temperature: 120.00 deg. F
Pressure: 54.70 psia
Flow Rate: 1.37e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.79e-001	1.17e-001
Carbon Dioxide	4.83e-001	7.69e-001
Hydrogen Sulfide	1.49e-005	1.84e-005
Nitrogen	3.21e-001	3.25e-001
Methane	9.11e+001	5.28e+001
Ethane	7.52e+000	8.17e+000
Propane	3.38e-001	5.40e-001
Isobutane	1.34e-002	2.82e-002
n-Butane	3.77e-002	7.93e-002
Isopentane	3.54e-003	9.24e-003
n-Pentane	3.42e-003	8.93e-003
Cyclopentane	3.03e-004	7.67e-004
n-Hexane	1.50e-003	4.68e-003
Cyclohexane	2.76e-004	8.41e-004
Other Hexanes	1.66e-003	5.17e-003
Heptanes	1.55e-003	5.63e-003
Methylcyclohexane	7.85e-004	2.79e-003
2,2,4-Trimethylpentane	1.23e-004	5.09e-004
Benzene	3.81e-004	1.08e-003
Toluene	3.22e-005	1.07e-004
Ethylbenzene	2.06e-005	7.92e-005
Xylenes	1.99e-005	7.64e-005
C8+ Heavies	3.84e-003	2.36e-002
Total Components	100.00	6.29e+001

FLASH TANK GLYCOL STREAM

Temperature: 120.00 deg. F
Flow Rate: 2.53e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.75e+001	1.39e+004
Water	2.49e+000	3.54e+002
Carbon Dioxide	3.31e-003	4.71e-001
Hydrogen Sulfide	5.29e-007	7.52e-005
Nitrogen	1.08e-004	1.54e-002
Methane	1.81e-002	2.57e+000
Ethane	1.04e-002	1.48e+000
Propane	1.47e-003	2.09e-001
Isobutane	1.20e-004	1.71e-002
n-Butane	4.45e-004	6.33e-002
Isopentane	6.14e-005	8.73e-003
n-Pentane	7.50e-005	1.07e-002
Cyclopentane	2.60e-005	3.70e-003
n-Hexane	7.35e-005	1.05e-002
Cyclohexane	5.59e-005	7.95e-003

Other Hexanes	6.15e-005	8.74e-003
Heptanes	1.89e-004	2.68e-002
Methylcyclohexane	2.46e-004	3.50e-002
2,2,4-Trimethylpentane	8.56e-006	1.22e-003
Benzene	5.28e-004	7.51e-002
Toluene	8.79e-005	1.25e-002
Ethylbenzene	1.19e-004	1.69e-002
Xylenes	1.71e-004	2.43e-002
C8+ Heavies	1.09e-002	1.55e+000
Total Components	100.00	1.42e+004

FLASH GAS EMISSIONS

Control Method: Recycle/recompression
Control Efficiency: 100.00

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 3.09e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.71e+001	1.42e+002
Carbon Dioxide	1.32e-001	4.71e-001
Hydrogen Sulfide	2.71e-005	7.52e-005
Nitrogen	6.75e-003	1.54e-002
Methane	1.97e+000	2.57e+000
Ethane	6.03e-001	1.48e+000
Propane	5.81e-002	2.09e-001
Isobutane	3.60e-003	1.71e-002
n-Butane	1.34e-002	6.33e-002
Isopentane	1.47e-003	8.64e-003
n-Pentane	1.80e-003	1.06e-002
Cyclopentane	6.44e-004	3.68e-003
n-Hexane	1.48e-003	1.04e-002
Cyclohexane	1.12e-003	7.67e-003
Other Hexanes	1.23e-003	8.60e-003
Heptanes	3.27e-003	2.67e-002
Methylcyclohexane	4.18e-003	3.35e-002
2,2,4-Trimethylpentane	1.28e-004	1.19e-003
Benzene	1.12e-002	7.13e-002
Toluene	1.53e-003	1.15e-002
Ethylbenzene	1.75e-003	1.52e-002
Xylenes	2.44e-003	2.11e-002
C8+ Heavies	9.78e-002	1.36e+000
Total Components	100.00	1.49e+002

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia

Flow Rate: 8.58e-002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Hydrogen Sulfide	9.76e-004	7.52e-008
Methane	7.09e+001	2.57e-003
Ethane	2.17e+001	1.48e-003
Propane	2.09e+000	2.09e-004
Isobutane	1.30e-001	1.71e-005
n-Butane	4.82e-001	6.33e-005
Isopentane	5.30e-002	8.64e-006
n-Pentane	6.48e-002	1.06e-005
Cyclopentane	2.32e-002	3.68e-006
n-Hexane	5.33e-002	1.04e-005
Cyclohexane	4.03e-002	7.67e-006
Other Hexanes	4.42e-002	8.60e-006
Heptanes	1.18e-001	2.67e-005
Methylcyclohexane	1.51e-001	3.35e-005
2,2,4-Trimethylpentane	4.62e-003	1.19e-006
Benzene	4.04e-001	7.13e-005
Toluene	5.52e-002	1.15e-005
Ethylbenzene	6.32e-002	1.52e-005
Xylenes	8.80e-002	2.11e-005
C8+ Heavies	3.52e+000	1.36e-003
Total Components	100.00	5.92e-003

ATTACHMENT E
Wheatfield Dehydration Facility

Frederic Logan Co.
Dehydrator and Thermal Oxidizer
Specification Sheets

NA2016 Dehydration Units BUDGET Proposal

FREDERICK LOGAN COMPANY, INC

Typical Regenerator, Contactor, and Thermal Oxidizer, manufactured by Frederick Logan Company, Inc.

FREDERICK LOGAN COMPANY, INC. - 140 COMMONWEALTH DR. - WARRENDALE, PA. 15086
Phone: 724-776-9300 Fax: 724-776-0355 E-mail: Info@FrederickLoganCo.com

November 18, 2014

National Fuel Gas Supply Corp.
6363 Main Street
Williamsville, NY 14221

Attention: Mr. John Joy

Reference: NA2016 Dehydration Units BUDGET Proposal

File: 10-0456-0

Dear Mr. Joy,

In reference to the RFQ and subsequent discussions, we are pleased to propose the following equipment for your application:

Note: *We are bidding (2) identical systems, to be run in parallel. A single unit for this flowrate would be too large to be practical. We have also sized the units at the worst case conditions, listed below.*

442 MMSCFD TEG Dehydration System

Process Fluid	Natural Gas
Process Flow	442 MMSCFD
Operating Temperature	100°F
Process Design Temperature	110°F
Operating Pressure	1250 PSIG
Specific Gravity	0.57
Inlet Water Content	10 lbs H20 / MMSCF Max, subsaturated
Outlet Water Content	<= 4 lbs H20 / MMSCF
Electrical Service Available at Site	3PH/480VAC/60Hz
Electrical Classification	Class I Div. II

Based upon the design conditions stated on the previous page, we are pleased to offer as follows:

VERTICAL REVERSE FLOW COALESCER

Model # CSA-T-16F1440V36-47Q

Specifications:

Connection Size	24” 600 ANSI RFWN
Housing Size	33” ID Nominal Shell, 47” ID Baffle Chamber
Seam to Seam Length	96” approx.
Design Pressure	1440 PSIG
Design Temperature	120 DEG F
Design Code	ASME Section VIII, Div. I
National Board Registration	Yes
Closure Type	Quick Opening Spin-Off, Yale, 36”
Filter Element Quantity	(13)
Filter Element P/N	2-06460
Element Dimensions	6” OD x 60” L
Element Efficiency	99.9% at 0.3 micron
Arm Reach to Element	Patent Pending, Easy Reach

Connections:

Inlet / Outlet Gas Connections	24” 600 ANSI RF
Liquid Level Control Quantity / Size	(2) / 2” 6000# THD
Sight Glass Quantity	(3) / ¾” 6000# THD
Drain Quantity / Size	(2) / 1” 6000# THD
Thermal Relief Size	(1) / 1” 6000# THD
High Level Switch Quantity / Size	(2) / 2” 6000# THD
Vent	(1) / 1” 6000# THD
Differential Pressure Gauge	(2) / ½” 6000# THD

Paint:

1st Coat	Sherwin Williams Epoxy Mastic Aluminum II
2nd Coat	Sherwin Williams Hi-Solids Polyurethane
3rd Coat	Sherwin Williams Diamond Clad Clear Coat Urethane

VERTICAL COALESCER CONTROLS AND ACCESSORIES

1. One (1) Thermal relief valve (set: 1440 PSIG @ 120 DEG F) – Anderson Greenwood
2. Two (2) Sight glasses – Penberthy RH with 330J gauge cocks
3. Two (2) Liquid level controls – Murphy LS200NDVOR
4. Two (2) Snap acting dump valves - Norriseal 2220
5. Two (2) High Level Switches - Murphy LS1200
6. One (1) Differential pressure gauge, Orange Research 1201PG

Note: Controls shipped loose for field installation by others. Ball valves, tubing, fittings, pipe are not included.

1.5MM BTU/HR GLYCOL REGENERATOR

Specifications:

Shell Size	48" OD x 23'-6" Long
Stack Downdraft Protection	Yes
Still Column Size (insulated, removable)	20" OD x 8' Long
Still Column Reflux Loop	Yes
Ceramic Packing Size	1" Saddles
Design Pressure / M.A.W.P.	0 PSIG / 0 PSIG
Corrosion Allowance	N/A
Stripping Gas Assembly with flow meter	Yes
Glycol Flowmeter	Yes (1)
Carbon Filter	Yes (1), with 3 valve bypass
Size	24" OD
Design Pressure	125 PSIG
Design Code	ASME Section VIII, Div. I
Fuel Gas Scrubber	Yes (1)
Size	10" OD x 1'-7 1/4" S/S
Design Pressure	125 PSIG
Design Code	ASME Section VIII, Div. I
Glycol Pump Suction Bag Filter	Yes (1) with 3 valve bypass
Size	8.625" OD x 24"
Three Phase Vertical Separator	Yes (1), with 3 valve bypass
Size	36" OD x 10' S/S
Design Pressure	125 PSIG
Design Code	ASME Section VIII, Div. I
High Pressure Glycol Return Filters	Yes (2), with 3 valve bypass
Size	3.5" OD x 34" OAL
Design Pressure	1440 PSIG
Glycol/Glycol Heat Exchanger	Yes (1)
Type	Fin Tube (16 pass)
Details	2" Sch 80 Fin Tube in 4" Sch 80 Pipe (2"x 4")
Lifting Lugs	Yes (4) on skid
Bath Fluid	Inhibited Triethylene Glycol (99.5% Lean TEG)
Primer	Sherwin Williams Industrial Macropoxy
Paint	Sherwin Williams Industrial Enamel

GLYCOL PUMP(S)

Specifications:

Electric / Energy Exchange	RotorTech Electric
Quantity	(1)
Electrical Classification	Class I Div. II
Horsepower	25 hp
Variable Frequency Drive	Yes, (1)

DEHYDRATOR/REGENERATOR CONTROL SYSTEM AND ACCESSORIES

1. One (1) burner assembly with flame arrestor
2. One (1) fuel gas manifold, complete with:
   a. one (1) Y type strainer with valve
   b. two (2) Fisher pressure regulators or equal
   c. two (2) manual isolation valves
   d. one (1) 0-200 psig pressure gauge with isolation valve
   e. one (1) 0-30 psig pressure gauges with isolation valve
   f. One (1) Temperature control valve

3. One (1) pilot gas manifold, complete with:
   a. one (1) 1/4" manual isolation valve
   b. one (1) 1/4" Fisher pressure regulator or equal
   c. one (1) 0-30 psig pressure gauge with isolation valve

4. One (1) sparging gas assembly complete with pneumatic flow meter
5. One (1) 2" diameter fill port
6. One (1) 3/4” XH fuel gas preheat coil
7. One (1) 2" drain valve with plug
8. One (1) bath thermometer, 50°F- 550°F, with stainless steel thermowell
9. One (1) Kimray T12 process temperature controller with stainless steel thermowell
10. One (1) Kimray T12M high temperature shutdown with stainless steel thermowell
11. One (1) 1/4" Fisher instrument pressure regulator with isolation valve or equal
12. Stainless steel tubing and fittings
13. One (1) thermal relief valve for fuel gas scrubber set @ 125 PSIG
14. One (1) thermal relief valve for the 3phase separator, set @ 125 PSIG
15. One (1) 5/8” sight glass with gage cocks
16. One (1) Process Solutions auto-ignition system with pilot loss shutdown sequencing

SHUTDOWNS/ALARMS

Instrument Location	Instrument Description	I/O Type	Make
Reboiler	Rich Glycol Low Level	Discrete Input	Murphy
Reboiler	Reboiler Bath Temperature	Analog Input	Omega
Reboiler	Stack Temperature	Analog Input	Omega
Reboiler	Lean Glycol Low	Discrete Input	Murphy
Reboiler	Lean Glycol High	Discrete Input	Murphy
Reboiler	Flame Failure Detection	Discrete Input	Honeywell
3 Phase Separator	3 Phase low Level	Discrete Input	Murphy
3 Phase Separator	3 Phase High Level	Discrete Input	Murphy
Glycol Pumps	Pressure Switch Low	Discrete Input	UE
Glycol Pumps	Glycol Flow Transmitter	Analog Input	Hedland
Sock Filter	Differential Pressure Switch	Discrete Input	Orange Research
Carbon Filter	Differential Pressure Switch	Discrete Input	Orange Research
Glycol Contactor	High Glycol Level Sump	Discrete Input	Murphy
Glycol Contactor	High Glycol Level Hat Tray	Discrete Input	Murphy
Reboiler Fuel Train	Safety Shutoff Valve to burner	Pnematic	TBD
Glycol Rich Return	Glycol Safety shutoff valve	Pnematic	Norriseal
Programmable Logic Controller			ICLinks
Human/Machine Interface	Class I Div II rated		Proface
Nema 7 Enclosure	For PLC and associated components		Adalet
Nema 4 Enclosure	For HMI		Adalet
Nema 7 JB	Junction Box		Adalet

CONTROL DESCRIPTION

As discussed, this control system will be the same as what was provided for Hagerman Station Phase 1.

The pricing at the end of this document includes all instruments listed, programming, electrical drawings, conduit, fittings, wiring of devices, and testing of the system, except the gas flowmeter & the moisture meter. Those will be by others.

All of the items that can be installed on the reboiler skid will be done so in the shop. A junction box will be installed on the skid to terminate off-skid devices. A price adder for field installation can be provided once the relative distances between the equipment are known.

SHOP ASSEMBLY

Complete fuel gas and instrument gas system will be fully shop assembled and tested prior to shipment. Various items may be disassembled and shipped separately to prevent damage in shipment. Reassembly of these items in the field is to be done by others.

INSULATION

Reboiler shell to be insulated with 1-1/2" thick fiberglass insulation and covered with 0.019" thick embossed aluminum jacketing and banded with 1/2" wide stainless steel bands.

BURNER

A nominal 1.5MM BTU/Hr burner with flame arrestor will be provided. With the standard burner, the approximate sounds levels at 3’ will be 85-90 dba. An adder for acoustical insulation will be provided at the end of the proposal to go to < 85 dba @ 3’.

SKID

Approx. 30’ Long x 8’ Wide , with full drip pan

TESTING

- Firetube welds to be tested with air and soap at 5 psig internal pressure for 10 minutes.
- Assembled unit will be pressured to insure all devices function properly. The main burner will not be ignited during this testing.
- Fuel train to be pressurized at 125 PSIG and leak tested

NEW 84” ID STRUCTURED PACKING CONTACTOR W/O INLET SEPARATOR

Specifications:

Structured Packing	Structured Packing
Diameter	84" ID
Seam to Seam Length	22’-6”’
Design Pressure	1440 PSIG
Design Temperature	120 DEG F
MDMT	14 DEG F @ 1440 PSIG
Design Code	ASME Section VIII, Div. I
National Board Registration	Yes
Glycol/Gas Heat Exchanger	Yes, Split Pass Fin Tube HEX
Manway / Size	Yes (1) Upper, 24”
Hat Tray	No
Inlet Integral Separator	No
Demister Sections / Quantity / Size	Yes / (1) / 10” Thick
Lifting Lugs / Quantity	Yes / (3)
Turndown	10:1 or more

Connections:

Inlet / Outlet Gas Connections	24” 600 ANSI RF
Liquid Level Control Quantity / Size	(1) / 2”
LCV connection	(1) / 1”
Sight Glass	(2) ¾” on sump
High Level Switch	(1), 2”
Glycol In	(1), 1.5”
Glycol Out	(1), 1.5”
Upper Manway	(1), 24” with blind & davit
Manual Sump Drain	(1), 1”
Thermal Relief	(1), 1”
Pressure Gauge	(1), ½”
Temperature Gauge	(1), ¾”

Note: Threaded connections for controls

Paint:

1st Coat	Sherwin Williams Epoxy Mastic Al II Primer #B62S100
2nd Coat	Sherwin Williams H.S. Polyurethane B65W300
Top Coat	Sherwin Williams Diamond Clear Clad Urethane

84" ID CONTACT TOWER CONTROLS AND ACCESSORIES

1. One (1) Thermal relief valve (set: 1100 PSIG @ 110 DEG F), Anderson Greenwood
2. One (1) Sight glasses, Mallard
3. One (1) Pressure gauge, Marsh
4. One (1) Temperature gauge with thermowell, Marsh
5. Two (2) Liquid Level Controller, Mallard
    a. One as primary glycol control valve, during electric pump operation
    b. One as safetly shutdown valve for rich glycol return
6. One (1) Throttling Control Valve, Mallard

Note: Controls shipped loose for field installation by others. Ball valves, tubing, fittings, pipe are not included.

DOCUMENTATION

- Three (3) project data books & instruction manuals with CDs
- Three (3) sets of approval drawings
- Manufacturer's data reports (pressure vessels only)

START-UP

Start-up of the above described unit by a Frederick Logan Company, Inc. technician can be provided. This is listed in the optional pricing section, as requested.

TERMS & CONDITIONS OF SALE

Please see attached document.

WARRANTY

All equipment will be fully warrantied for 12 months after the start date or 18 months after the ship date, whichever is shorter.

DELIVERY

The firm delivery date will be determined at time of order. 42-46 weeks is the lead time as of right now.

Note: This can be modified to meet your exact needs.

Contactor FOB – OH
Regenerator Skid FOB – Ambridge, PA

NFG Wheatfield Thermal Oxidizer Proposal, R2

FREDERICK LOGAN COMPANY, INC

Typical Regenerator, Contactor, and Thermal Oxidizer, provided by Frederick Logan Company, Inc.

FREDERICK LOGAN COMPANY, INC. - 140 COMMONWEALTH DR. - WARRENDALE, PA. 15086
Phone: 724-776-9300 Fax: 724-776-0355 E-mail: Info@FrederickLoganCo.com

June 8, 2015

National Fuel Gas Supply Corp.
6363 Main Street
Williamsville, NY 14221

Attention: Mr. John Joy

Reference: Wheatfield Thermal Oxidizer Proposal, REV2

File: 10-0456-TO-2

Dear Mr. Joy,

In reference to the RFQ, we are pleased to propose the following equipment for your application:

Thermal Oxidizer Unit

Process Fluid	Natural Gas
Process Flow	884 MMSCFD
Operating Temperature	100°F
Process Design Temperature	110°F
Operating Pressure	1250 PSIG
Specific Gravity	0.57
Inlet Water Content	10 lbs H20 / MMSCF Max, subsaturated
Outlet Water Content	<= 4 lbs H20 / MMSCF
Electrical Service Available at Site	3PH/480VAC/60Hz
Electrical Classification	Class I Div. II

Note: The above process conditions are for (2) dehydrators (process flow divided evenly between the two). The Thermal Oxidizer is designed to take streams (still column overheads & flash gas) from both reboilers.

Based upon the design conditions stated on the previous page, we are pleased to offer as follows:

(1) NEW 48" DIA SKID MOUNTED THERMAL OXIDIZER

Process inlet stream:

Overhead Inlet Temperature:	212.0°F
Overhead Stream Flow:	5,845 SCFH
Overhead Stream BTU	136.69 BTU/FT
Flash Gas Temperature:	120.0°F
Flash Gas Stream Flow:	1954 SCFH
Flash Gas Stream BTU	1010.17 BTU/FT
Combustion Chamber Temp:	1450 – 1600 deg F
Residence Time:	≥1.77 Sec.
Destruction Efficiency:	≥99.9%
Max Design Loading:	5.0 MMBTU/HR
Turn Down	10 : 1
Combustion Chamber ID	40"
Chamber Mass Flow	355,672 ACFH @ 1450°F
Combustion Chamber Velocity	11.33 FT/SEC

Site Conditions:

Wind Speed	90 MPH
Seismic Zone	1
Elevation	1500 ft.
Humidity	High
Temp.	0°F to 100°F

Utilities:

Gas Service Required for Pre-Heat	2000 SCFH – Natural Gas @ 20 – 150 PSIG
Gas Service Required at full load	1000 SCFH – Natural Gas for Pilot
Electrical Service Required	480 VAC, 3Ø, 60 Hz, 60 Amps
Compressed Air if available or Clean dry fuel gas	80 – 120 PSIG Intermittent use to operate valves

Scope of Supply

- Engineering and design of equipment
- Procurement, Fabrication, and assembly of equipment
- Inspection and testing of package at factory.
- Surface prep and painting of equipment.
- Packaging for shipment
- Manuals and supporting documentation

Exclusions

- Anchoring hardware
- Field process hook ups
- Field electrical hook ups
- Third party inspections
- Post weld heat treatment
- Hydro-testing
- Start up or Commissioning (Available for additional charge)
- Heat tracing and insulating.

Equipment Description

ITEM	QTY	DESCRIPTION
1	**1**	**48-5.0 Skid Mounted Thermal Oxidizer complete with:** ➢ 48” Dia. Combustion Chamber ➢ 48” x 20’ Tall Exhaust Stack ➢ (2) Type K thermocouples with Thermowell ➢ (2) 4” Flanged Sample Ports @ 90º Orientation ➢ Combustion Chamber and Exhaust Stack Lined with 4” 2300 deg. Folded Blank Refractory Modules ➢ (1) Sight Glass ➢ Stack Material – A-36 Carbon Steel ➢ Surface prep and paint: o Surface Prep – SSPC SP-6 Commercial Blast o Sherwin Williams Primer o Sherwin Williams Industrial Enamel o Color per Customer Req. ➢ (2) 4” RFSO flanged Overhead Still inlet. ➢ (2) 1” RFSO 150# Flash Gas Inlet ➢ (4) Lifting lugs on skid, (2) Lifting lug mounted on top stack section. ➢ Equipment is skid mounted. All conduit and wiring will be pre-installed on skid ➢ Area Electrical Classification Class 1, Div. 2

2 1 5.0 MMBTU/HR Burner

- Burner Tip Material Stainless Steel
- Direct Spark Ignition

3 1 Combustion Air Pressure Blower

- High Efficiency, 10 HP, Class 1 Div 2. Motor
- 480VAC, 3PH, 60Hz
- Direct Drive
- Inlet Guard
- 2050 SCFM

4 1 Burner Control Panel

- NEMA 7/4X Main Enclosure.
- PLC – AB MicroLogix
- Honeywell Flame Safety Controller
- Honeywell High Limit Controller
- VFD for Blower Motor
- NEMA 7/4X Enclosure for Ignition Transformer
- System shut down for the following events:
  - High Limit Temperature
  - Loss of Flame
  - Low/High Gas Pressure
  - Low Combustion Air Pressure
- Logic to interface with re-boiler

5 1 Inlet/Vent Valves

- (2) 4" Lug Style Butterfly valve C/W:
  - Pneumatic Actuator, Spring Return N.O.
  - N.O. / N.C. Limit Switch

- (2) 4" Lug Style Butterfly valve C/W:
  - Pneumatic Actuator, Spring Return N.C.
  - N.O. / N.C. Limit Switch

- (2) 1" NPT Ball valve C/W:
  - Pneumatic Actuator, Spring Return N.O.
  - N.O. / N.C. Limit Switch

- (2) 1" NPT Ball valve C/W:
  - Pneumatic Actuator, Spring Return N.C.
  - N.O. / N.C. Limit Switch

6 1 Burner Valve Train

- Double Block valve train design:
  - (2) Pneumatic Actuator, Spring Return N.C.
  - NEMA 7 Limit Switch Assembly

- High Gas pressure switch
- Low Gas pressure switch
- Fisher Regulator
- Pressure Relief Valve
- Pressure Gauges
- Manual block valves
- Y-Strainer
- Flow Control Valve C/W Electric Actuator
- All pneumatic control valves will be pre-tubed to a common pneumatic air header mounted to the control stand.

7 1 Flame Arrestor

- (2) 4" Enardo AL/AL 150# FF
- (2) 1" Enardo CS/AL NPT

8 1 Documentation

- (3) Hard Copies O&M Manual
- (3) CD Copies O&M Manual

9 1 FAT – Factory Acceptance Test

- Complete test of system at Fort Worth, TX

START-UP

Start-up of the above described unit by a Frederick Logan Company, Inc. technician is provided at our standard rate sheet.

TERMS & CONDITIONS OF SALE

Per agreement between NFG & FLOCO

DELIVERY

12-14 weeks ARO
Thermal Oxidizer FOB – TX

This can be modified to meet your needs

PRICE

Complete System as Described above --- $163,580.25 , EACH

TERMS OF PAYMENT & QUOTE VALIDITY

Payment Terms: 50% upon P.O.
50% upon ready for shipment

Net 30 days cash

Quote Validity: 30 days

We would be happy to discuss this proposal in detail at your convenience. We have many years experience designing and building these systems and we are confident the equipment offered will meet all your stated process conditions.

Please call or email Harley German or Charlie Logan to address any questions or concerns regarding this proposal.

We are looking forward to working with you on this project.

Best Regards,

F. Charles Logan
Harley German

F. Charles Logan
President
724-776-9300
FCLogan@FLOCO.Com

Harley German
Engineer
724-776-9300
HGerman@FLOCO.com

If equipment is not placed in service by 30 days after delivery, customer shall adequately seal openings and follow proper storage practices. The Frederick Logan Company is not liable for any physical damage or performance issues caused by the customer improper storage of equipment.

The technical documentation, pricing, drawings, and proposal language contained herein is considered commercial proprietary and shall not be disseminated to any third party without express written consent of the Frederick Logan Company, Inc.

Installation engineering services, start-up services, and commissioning of any equipment mentioned herein are not included unless specifically specified. If not included, these services can be provided. Please contact the Frederick Logan Company for more details.

ATTACHMENT F
Wheatfield Dehydration Facility

Kohler 250REZXB
Manufacturer Documentation

Model: 250REZXB

KOHLER. Power Systems

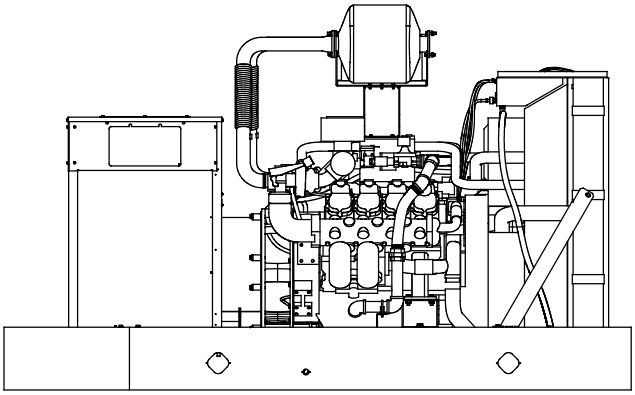
208–600 V **Gas**

ISO 9001 KOHLER POWER SYSTEMS NATIONALLY REGISTERED

EPA-Certified for Stationary and Mobile Emergency and Non-Emergency Applications

Ratings Range

		60 Hz
Standby:	**kW**	170–260
	kVA	213–325
Prime:	**kW**	225–235
	kVA	281–294



Standard Features

- Kohler Co. provides one-source responsibility for the generating system and accessories.
- The generator set and its components are prototype-tested, factory-built, and production-tested.
- The 60 Hz generator set offers a UL 2200 listing.
- The generator set accepts rated load in one step.
- The 60 Hz generator set meets NFPA 110, Level 1, when equipped with the necessary accessories and installed per NFPA standards.
- A one-year limited warranty covers all generator set systems and components. Two- and five-year extended limited warranties are also available.
- Alternator features:
  - The unique Fast-Response® II excitation system delivers excellent voltage response and short-circuit capability using a permanent magnet (PM)-excited alternator.
  - The brushless, rotating-field alternator has broadrange reconnectability.

Generator Set Ratings

				Rich-Burn Natural Gas				Rich-Burn LP Gas (Vapor)	
				130°C Rise Standby Rating		105°C Rise Prime Rating		130°C Rise Standby Rating	
Alternator	**Voltage**	**Ph**	**Hz**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**	**kW/kVA**	**Amps**
4UA10	120/208	3	60	260/325	902	230/288	798	170/213	590
	127/220	3	60	260/325	853	230/288	754	170/213	558
	120/240	3	60	260/325	782	230/288	692	170/213	511
	139/240	3	60	260/325	782	230/288	692	170/213	511
	220/380	3	60	250/313	475	225/281	427	170/213	323
	240/416	3	60	260/325	451	230/288	399	170/213	295
	277/480	3	60	260/325	391	230/288	346	170/213	256
	347/600	3	60	260/325	313	230/288	277	170/213	204
4UA13	120/208	3	60	260/325	902	235/294	815	170/213	590
	127/220	3	60	260/325	853	235/294	771	170/213	558
	120/240	3	60	260/325	782	235/294	707	170/213	511
	120/240	1	60	230/230	958	209/209	871	170/170	708
	139/240	3	60	260/325	782	235/294	707	170/213	511
	220/380	3	60	260/325	494	235/294	446	170/213	323
	240/416	3	60	260/325	451	235/294	408	170/213	295
	277/480	3	60	260/325	391	235/294	353	170/213	256
	347/600	3	60	260/325	313	235/294	283	170/213	204

RATINGS: All three-phase units are rated at 0.8 power factor. *Standby Ratings:* The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. *Prime Power Ratings:* At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528-1 and ISO-3046-1. For limited running time and continuous ratings, consult the factory. Obtain technical information bulletin (TIB-101) for ratings guidelines, complete ratings definitions, and site condition derates. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. For dual fuel engines, use the LP gas ratings for both the primary and secondary fuels.

Alternator Specifications

Specifications	Alternator
Manufacturer	Kohler
Type	4-Pole, Rotating-Field
Exciter type	Brushless, Permanent-Magnet
Leads: quantity, type	12, Reconnectable
Voltage regulator	Solid State, Volts/Hz
Insulation:	NEMA MG1
Material	Class H
Temperature rise	130°C, Standby
Bearing: quantity, type	1, Sealed
Coupling	Flexible Disc
Amortisseur windings	Full
Voltage regulation, no-load to full-load	Controller Dependent
One-step load acceptance	100% of Rating
Unbalanced load capability	100% of Rated Standby Current
Peak motor starting kVA:	(35% dip for voltages below)
480 V 4UA10	790 (60Hz)
480 V 4UA13	990 (60Hz)

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting.
- Sustained short-circuit current of up to 300% of the rated current for up to 10 seconds.
- Sustained short-circuit current enabling downstream circuit breakers to trip without collapsing the alternator field.
- Self-ventilated and dripproof construction.
- Windings are vacuum-impregnated with epoxy varnish for dependability and long life.
- Superior voltage waveform from a two-thirds pitch stator and skewed rotor.
- Fast-Response® II brushless alternator with brushless exciter for excellent load response.

Application Data

Engine

Engine Specifications	
Manufacturer	Doosan
Engine model	D146L
Engine type	14.6 L, 4-Cycle, Turbocharged, Aftercooled
Cylinder arrangement	V-8
Displacement, L (cu. in.)	14.6 (892)
Bore and stroke, mm (in.)	128 x 142 (5.04 x 5.59)
Compression ratio	10.5:1
Piston speed, m/min. (ft./min.)	511 (1677)
Main bearings: quantity, type	10, Precision Half-Shell
Rated rpm	1800
Max. power at rated rpm, kWm (BHP)	300 (402)
Cylinder head material	Cast Iron
Piston: type, material	—
Crankshaft material	Forged Steel
Valve material	—
Governor: type	Electronic
Frequency regulation, no-load to full-load	Isochronous
Frequency regulation, steady state	±0.5%
Frequency	Fixed
Air cleaner type, all models	Dry

Exhaust

Exhaust System	
Exhaust manifold type	Wet
Exhaust flow at rated kW, kg/hr. (cfm)	1131 (1611)
Exhaust temperature at rated kW, dry exhaust, °C (°F)	600 (1112)
Maximum allowable back pressure overall, kPa (in. Hg)	10.2 (3)
Maximum allowable back pressure after catalyst, kPa (in. Hg)	5.1 (1.5)
Engine exhaust outlet size, mm (in.)	Flanged Outlet at Catalyst, see ADV drawing

Engine Electrical

Engine Electrical System	
Battery charging alternator:	
Ground (negative/positive)	Negative
Volts (DC)	24
Ampere rating	45
Starter motor rated voltage (DC)	24
Battery, recommended cold cranking amps (CCA):	
Qty., CCA rating each	Two, 1000
Battery voltage (DC)	12

Fuel

Fuel System - Rich Burn	
Fuel type	Natural Gas, LP Gas, or Dual Fuel
Fuel supply line inlet	2.0 NPTF
Natural gas fuel supply pressure, kPa (in. H_2O)	1.74–2.74 (7.0–11.0)
LPG vapor withdrawal fuel supply pressure, kPa (in. H_2O)	1.24–2.74 (5.0–11.0)
Dual fuel engine, LPG vapor withdrawal fuel supply pressure, kPa (in. H_2O)	1.24 (5.0)

Fuel supply pressure, measured at the generator set fuel inlet downstream of any fuel system equipment accessories.

Fuel Composition Limits *	Nat. Gas	LP Gas
Methane, % by volume	90 min.	—
Ethane, % by volume	4.0 max.	—
Propane, % by volume	1.0 max.	85 min.
Propene, % by volume	0.1 max.	5.0 max.
C_4 and higher, % by volume	0.3 max.	2.5 max.
Sulfur, ppm mass	25 max.	
Lower heating value, MJ/m^3 (Btu/ft^3), min.	33.2 (890)	84.2 (2260)

* Fuels with other compositions may be acceptable. If your fuel is outside the listed specifications, contact your local distributor for further analysis and advice.

Application Data

Lubrication

Lubricating System	
Type	Full Pressure
Oil pan capacity, L (qt.)	40 (42.3)
Oil pan capacity with filter, L (qt.)	47.1 (49.7)
Oil filter: quantity, type	2, Cartridge
Oil cooler	Water-Cooled

Cooling

Radiator System	
Ambient temperature, °C (°F) *	50 (122)
Engine jacket water capacity, L (gal.)	43.2 (9.5)
Radiator system capacity, including engine, L (gal.)	227.3 (50)
Engine jacket water flow, Lpm (gpm)	680 (180)
Heat rejected to cooling water at rated kW, dry exhaust, kW (Btu/min.)	284 (16189)
Heat rejected to air charge cooler at rated kW, dry exhaust, kW (Btu/min.)	35 (2000)
Water pump type	Centrifugal
Fan diameter, including blades, mm (in.)	1143 (45)
Fan, kWm (HP)	16 (22)
Max. restriction of cooling air, intake and discharge side of radiator, kPa (in. H_2O)	0.125 (0.5)

* Weather and sound enclosures with internal silencer reduce ambient temperature capability by 5°C (9°F).

Operation Requirements

Air Requirements	
Radiator-cooled cooling air, m^3/min. (scfm)†	638 (22500)
Combustion air, kg/hr. (cfm)	1064 (532)
Heat rejected to ambient air:	
Engine, kW (Btu/min.)	66 (3765)
Alternator, kW (Btu/min.)	23 (1309)

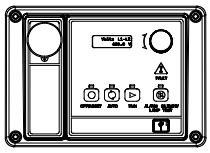
† Air density = 1.20 kg/m^3 (0.075 lbm/ft^3)

Fuel Consumption‡		
Natural Gas, m^3/hr. (cfh) at % load	**Standby Rating**	
100%	78.8	(2782)
75%	61.4	(2168)
50%	43.1	(1521)
25%	26.3	(928)
Natural Gas, m^3/hr. (cfh) at % load	**Prime Rating**	
100%	71.8	(2536)
75%	55.9	(1974)
50%	39.7	(1402)
25%	24.8	(876)
LP Gas, m^3/hr. (cfh) at % load	**Standby Rating**	
100%	26.2	(926)
75%	22.4	(789)
50%	15.1	(532)
25%	9.5	(335)

‡ Nominal fuel rating: Natural gas, 37 MJ/m^3 (1000 Btu/$ft.^3$)
LP vapor, 93 MJ/m^3 (2500 Btu/$ft.^3$)

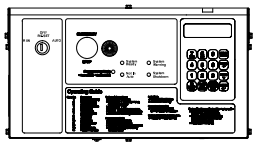
LP vapor conversion factors:
8.58 $ft.^3$ = 1 lb.
0.535 m^3 = 1 kg.
36.39 $ft.^3$ = 1 gal.

Controllers



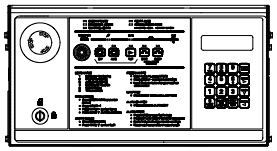
Decision-Maker® 3000 Controller
Provides advanced control, system monitoring, and system diagnostics for optimum performance and compatibility.
- Digital display and menu control provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or serial configuration
- Controller supports Modbus® protocol
- Integrated hybrid voltage regulator with ±0.5% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

Refer to G6-100 for additional controller features and accessories.



Decision-Maker® 550 Controller
Provides advanced control, system monitoring, and system diagnostics with remote monitoring capabilities.
- Digital display and keypad provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or modem configuration
- Controller supports Modbus® protocol
- Integrated voltage regulator with ±0.25% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

Refer to G6-46 for additional controller features and accessories.



Decision-Maker® 6000 Paralleling Controller
Provides advanced control, system monitoring, and system diagnostics with remote monitoring capabilities for paralleling multiple generator sets.
- Paralleling capability with first-on logic, synchronizer, kW and kVAR load sharing, and protective relays
- Digital display and keypad provide easy local data access
- Measurements are selectable in metric or English units
- Remote communication thru a PC via network or modem configuration
- Controller supports Modbus® protocol
- Integrated voltage regulator with ±0.25% regulation
- Built-in alternator thermal overload protection
- NFPA 110 Level 1 capability

Refer to G6-107 for additional controller features and accessories.

Modbus® is a registered trademark of Schneider Electric.

KOHLER CO., Kohler, Wisconsin 53044 USA
Phone 920-457-4441, Fax 920-459-1646
For the nearest sales and service outlet in the
US and Canada, phone 1-800-544-2444
KOHLERPower.com

Kohler Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65) 6264-6422, Fax (65) 6264-6455

Standard Features

- Alternator Protection
- Battery Rack and Cables
- Closed Crankcase Ventilation
- Integral Vibration Isolation
- Local Emergency Stop Switch
- Low Coolant Level Shutdown
- Oil Drain Extension
- Operation and Installation Literature
- Three-Way Exhaust Catalyst

Available Options

Approvals and Listings

- ❑ CSA Approval
- ❑ IBC Seismic Certification
- ❑ UL 2200 Listing

Enclosed Unit

- ❑ Sound Enclosure with Internal Silencer (Aluminum)
- ❑ Sound Enclosure with Internal Silencer (Steel)
- ❑ Weather Enclosure with Internal Silencer (Steel)

Open Unit

- ❑ Exhaust Silencer, Critical (kit: PA-324470)
- ❑ Flexible Exhaust Connector, Stainless Steel

Fuel System

- ❑ Dual Fuel, NG/LPG (Automatic Changeover)
- ❑ Flexible Fuel Lines
  (required when the generator set skid is spring mounted)
- ❑ Gas Filter
- ❑ Secondary Gas Solenoid Valve

Controller

- ❑ Common Failure Relay
- ❑ Communications Products and PC Software
- ❑ Customer Connection (Decision-Maker® 550 controller only)
- ❑ Decision-Maker® Paralleling System (DPS)
  (Decision-Maker® 6000 controller only)
- ❑ Dry Contact Kit (isolated alarm)
  (Decision-Maker® 550 and 6000 controllers only)
- ❑ Input/Output Module (Decision-Maker® 3000 controller only)
- ❑ Prime Power Switch (Decision-Maker® 550 and 6000 only)
- ❑ Remote Audiovisual Alarm Panel
  (Decision-Maker® 550 and 6000 controllers only)
- ❑ Remote Emergency Stop
- ❑ Remote Serial Annunciator Panel
- ❑ Run Relay

Cooling System

- ❑ Block Heater; 2500 W, 120 V, 1 Ph
- ❑ Block Heater; 6000 W, 208 V, 1 Ph
- ❑ Block Heater; 6000 W, 240 V, 1 Ph or 3 Ph
- ❑ Block Heater; 6000 W, 480 V, 1 Ph
  Recommended for ambient temperatures below 10°C (50°F)
- ❑ Radiator Duct Flange

Electrical System

- ❑ Alternator Strip Heater
- ❑ Battery
- ❑ Battery Charger, Equalize/Float Type
- ❑ Battery Heater
- ❑ Line Circuit Breaker (NEMA1 enclosure)
- ❑ Line Circuit Breaker with Shunt Trip (NEMA1 enclosure)

Miscellaneous

- ❑ Air Cleaner Restriction Indicator
- ❑ Certified Test Report
- ❑ Engine Fluids Added
- ❑ Rated Power Factor Testing
- ❑ Rodent Guards

Literature

- ❑ General Maintenance
- ❑ NFPA 110
- ❑ Overhaul
- ❑ Production

Warranty

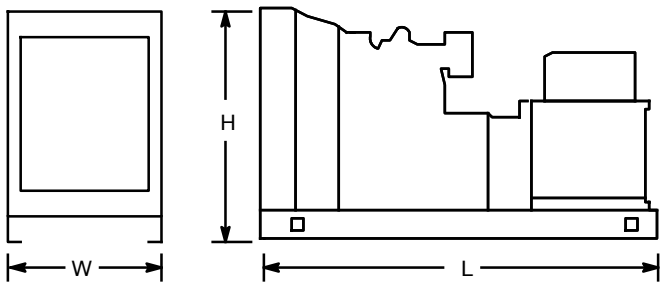
- ❑ 2-Year Basic Limited
- ❑ 2-Year Prime Limited
- ❑ 5-Year Basic Limited
- ❑ 5-Year Comprehensive Limited

Other Options

- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

Dimensions and Weights

Overall Size, L x W x H, max., mm (in.):	3500 x 1750 x 2148 (137.8 x 68.9 x 84.6)
Weight (radiator model), wet, max., kg (lb.):	3200 (7055)



NOTE: This drawing is provided for reference only and should not be used for planning installation. Contact your local distributor for more detailed information.

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	UNITED STATES ENVIRONMENTAL PROTECTION AGENCY **2016 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: GPSIB14.6NGP-018**	**Effective Date:** **12/04/2015** **Expiration Date:** **12/31/2016**	**Byron J. Bunker, Division Director** **Compliance Division**	**Issue Date:** **12/04/2015** **Revision Date:** **N/A**

Manufacturer: Power Solutions International, Inc.
Engine Family: GPSIB14.6NGP
Mobile/Stationary Certification Type: Mobile and Stationary
Fuel : LPG/Propane
Natural Gas (CNG/LNG)
Emission Standards :
Part 60 Subpart JJJJ Table 1
CO (g/Hp-hr) : 2
VOC (g/Hp-hr) : 0.7
NOx (g/Hp-hr) : 1
Mobile Part 1048
HC + 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 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.

KOHLER.
Power Systems

PSI 2016 Stationary & Mobile 60 Hz Certified Power Generation Rating Data																
Generator Model	**Engine**	**Speed**	**Freq**	**Fuel**	**Duty Cycle**	**BHP**	**KWm**	**Flywheel power [2,3]**		**Engine Family**	**C02[6]**	**NOx[6]**	**CO[6]**	**VOC[6,7]**	**bsfc[5]**	**Catalyst**
		RPM	**Hz**					**HP**	**kW**		**(g/KW-hr)**	**(g/KW-hr)**	**(g/kW-hr)**	**(g/kW-hr)**	**(g/kW-hr)**	
250REZXB	D146L, 14.6L	1800	60	NG	Emergency/Non-Emergency	402	300	449	334.8	GPSIB14.6NGP	952.04	0.10	0.08	0.06	0.24	Yes
	D146L, 14.6L	1800	60	LP	Emergency	402	300	319	237.9	GPSIB14.6NGP	647.93	0.04	0.15	0.06	0.32	Yes

[1] Standby and overload ratings based on ISO3046. Continuous ratings based on ISO 8528.
[2] All ratings are gross flywheel horsepower corrected to 77ºF at an altitude of 328 feet with no cooling fan or alternator losses using heating value for NG of 1015 BTU/SCF.
[3] Production tolerances in engines and installed components can account for power variations of +/- 5%. Altitude, temperature and excessive exhaust and intake restrictions should be applied to power calculations.
[4] Electrical ratings are an estimated based on assumed fan and generator losses and may vary depending on actual equipment losses.
[5] Bsfc is based on 100% gross flywheel power rating and does not include fan or generator losses.
[6] Emissions shown are certified third-party Zero-hour data points suitable for site permitting calculations
[7] For NG, NMHC is reported in place of VOC for this report

For additional questions contact:
Power Solutions International, Inc.
201 Mittel Drive, Wood Dale, IL 60191
630.350.9400 (Main) – 630.350.9900 (Fax)
www.psiengines.com info@psiengines.com

Table 9.1-6

Preliminary Summary[1] of PTE Emissions for Proposed Wheatfield Dehydration Facility

Proposed Emissions Sources	Potential Emissions (tpy)								
	NO_x	CO	VOC	PM_{10} and $PM_{2.5}$	SO_2	Total HAPs	Formal-dehyde	Benzene	GHG (CO_{2e})
Two TEG Dehydrators[2]: Still Emissions	-	-	37.90	-	-	1.954	-	1.250	1,593
Two TEG Dehydrators[2]: Reboiler Burner Emissions	1.20	1.08	0.07	0.098	0.008	0.020	0.001	<0.001	1,546
MTU 10V0068 GS7 4-Stroke Rich Burn Emergency Generator (100 HP)	0.11	0.22	0.06	0.005	<0.001	0.010	0.005	<0.001	28
Two Storage Tanks (1,000 gallon capacity each)[3]	-	-	0.71	-	-	0.026	-	-	-
Total Proposed Facility PTE Emissions	1.3	1.3	38.7	0.1	0.008	2.0	0.006	1.3	3,167
Major Source Thresholds (Title V)	100	100	50	100	100	25	10	10	N/A

1. This preliminary summary of PTE Emissions is based on proposed equipment information at the time of this submittal. If the type or configuration of equipment is updated, revised PTE calculations will be presented in the air permit application which will be provided to FERC following submittal to the NYSDEC.
2. A total of two (2) triethylene glycol (TEG) dehydrators are proposed at the Wheatfield Dehydration Facility. Each 442 MMSCFD dehydrator has a still equipped with a flash tank and a 1.5 MMBtu/hr reboiler burner.
3. Refer to Table 9.1-1 for a list of tank sizes and contents.