GDF SUEZ

RECEIVED
JUN 25 2015
WV DEP / DIV OF AIR QUALITY

June 24, 2015

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

Re: Minor Source Air Permit Application for Addition of TurboPhase Engines at Pleasants Energy Facility

Dear Ms. McKeone:

Pleasants Energy, LLC (Pleasants Energy) is submitting this Minor Source Air Permit Application for the construction of two TurboPhase systems to increase output the existing two combustion turbines at the Pleasants Energy facility, located near Waverly, West Virginia. As a result of the addition of the two TurboPhase systems, the two existing combustion turbines will increase pound per hour (lb/hr) emissions. Additionally, the project includes changing the status of the five 3-megawatt (MW) emergency generators permitted in 2015 to non-emergency generators. The previously permitted maximum hours of generator operation (500 hours per generator per year) will not change.

Introduction

The existing Pleasants Energy facility is a 300-MW simple-cycle electric generating peaking station operating under standard industrial classification (SIC) code 4911 and Title V permit number R30-07300022-2014. The Pleasants Energy facility includes two General Electric (GE) 7FA class simple cycle combustion turbines, each nominally rated at 167.8 MW (while firing natural gas at an ambient temperature of 59 degrees Fahrenheit [°F] and 60 percent relative humidity). The combustion turbines' primary fuel is natural gas, and low sulfur distillate fuel oil is utilized as a backup fuel.

The existing Pleasants Energy facility is a minor source for Prevention of Significant Deterioration (PSD) purposes (less than 250 tons per year for all criteria pollutants). After the Project is completed, the site will become a PSD major facility. This project includes the addition of emissions that are less than the PSD significance levels and major source thresholds, therefore is a minor modification at a minor source facility and is not subject to PSD regulations.

Pleasants Energy installed five 3-MW diesel generators in 2015. These generators were permitted under the G-60 Class II General Permit and were considered emergency generators for the purposes of the G-60 and the New Source Performance Standards (40 Code of Federal Regulations [CFR] Part 60, Subpart IIII). In the permit, each of the generators is limited to 500 hours per year of operation for emergency use and for testing and maintenance. As part of this project, the status of the generators is changing from emergency to non-emergency status while keeping the maximum hours of operation at 500 hours per year per engine.

Project Description

The project will include the addition of TurboPhase systems to increase the output of each of the existing combustion turbines up to approximately 18 MW. The project will consist of two TurboPhase systems: one system for each combustion turbine. The TurboPhase system injects externally supplied air into the combustion turbine after compressor discharge at the inlet to the combustor. This increases mass flow through the turbines and generator output. The air will be supplied by multistage compressors driven by internal combustion engines. Each combustion turbine will have one TurboPhase system, consisting of four 2,750-horsepower (hp) spark ignition (SI) engines designed to burn only natural gas (each engine is also referred to as a TurboPhase Module or TPM). In total, eight 2,750-hp TPM engines will be added to the site for the Project. Each of the TurboPhase systems will be limited to 3,250 hours of operation per year. Table 1 displays the total Project increase in emissions from the TurboPhase systems. See Attachment N of the application for full calculations, including total facility emissions after the Project is constructed.

Table 1 – Emissions from TurboPhase Systems – Total Project Emissions Increase

	Emissions (per engine or TurboPhase Module)		One TurboPhase System Emissions (4 engines, 1 stack)		Two TurboPhase System Emissions (8 engines, 2 stacks)
Pollutant[a,b]	lb/hr[b]	tpy[b]	lb/hr[b]	tpy[b]	tpy[b]
NO_x	3.03	4.93	12.13	19.70	39.41
CO	0.67	1.08	2.67	4.33	8.67
$PM/PM_{10}/PM_{2.5}$	0.20	0.33	0.80	1.30	2.60
VOC	0.18	0.30	0.73	1.18	2.36
SO_2	0.01	0.02	0.04	0.06	0.13
H_2SO_4 Mist	1.53E-03	2.49E-03	0.01	9.95E-03	1.99E-02
CO_2e	1,990.67	3,234.84	7,962.67	12,939.34	25,878.68

(a) Emissions based on vendor data or AP-42 Section 3.4 (7/00) Table 3.2-1 and CO_2e emissions are based on Greenhouse Gas Reporting Rule- Subpart C of Part 98

(b) NO_x = nitrogen oxides; CO = carbon monoxide; PM= total particulate matter; PM_{10} = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; VOC = volatile organic carbons; SO_2 = sulfur dioxide; H_2SO_4 Mist = sulfuric acid mist; CO_2e = carbon dioxide equivalent (greenhouse gases); lb/hr = pound per hour; tpy = tons per year

As a result of the addition of TurboPhase systems to the combustion turbines, the maximum hourly emission rates from the combustion turbines while operating on natural gas will be increasing. Table 2 displays the current permitted maximum lb/hr emission rates for the combustion turbines while operating on natural gas and the new lb/hr emission rates while the TurboPhase system is operating. Pleasants Energy requests that the maximum lb/hr rates for the combustion turbines be increased while operating on natural gas. Note that neither the tons per year limits nor the fuel limitation will be increased for the combustion turbines for any pollutant.

Table 2 – Maximum Hourly Emission Rates for Combustion Turbines with and without TurboPhase While Combusting Natural Gas

Pollutant[a]	Current Permitted Emission Rate without TurboPhase (lb/hr[a])	Emission Rate with TurboPhase (lb/hr[a])
NO_x	65	75
CO	32	36
$PM/PM_{10}/PM_{2.5}$	18	20.2
VOC	3	3.4
SO_2	2.5	2.8

(a) NO_x = nitrogen oxides; CO = carbon monoxide; PM= total particulate matter; PM_{10} = particulate matter less than 10 microns in diameter; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; VOC = volatile organic carbons; SO_2 = sulfur dioxide; lb/hr = pound per hour

The existing Pleasants Energy facility is an area source of hazardous air pollutants (HAPs). With this project, the facility will continue to be an area source of HAP emissions. See Attachment N for HAPs emissions calculations. Note that the combustion turbine HAP emissions estimates were updated using a more recent formaldehyde emission factor that has become available since the original construction permit application.

The Application for New Source Review (NSR) Permit forms are attached to this letter. Additionally, the requested information and attachments in the application forms are also included. After the first form, a table of contents is included that outlines the attachments to the application forms. The permit application fee of $2,000 is also included with this submittal. As West Virginia Department of Environmental Protection proceeds with the evaluation process, please contact the following persons with questions or for additional information:

Bruce Birbeck
GDF Suez North America
1990 Post Oak Blvd, Suite 1900
Houston, TX 77056
Phone: 713-636-1133
Adam.Birbeck@gdfsuezna.com

Mary Hauner-Davis
Burns & McDonnell
9400 Ward Parkway
Kansas City, MO 64114
Phone: 816-822-4252
mhauner@burnsmcd.com

If we can be of any assistance to facilitate your staff's efforts, please do not hesitate to contact me or either of the two contacts listed above. Thank you for your time and efforts on our Project.

Sincerely,

Gerald M. Gatti
Plant Manager
Pleasants Energy, LLC
10319 South Pleasants Highway
St. Marys, WV 26170
Direct 304-665-4201
Fax 304-665-4218
gerald.gatti@gdfsuezna.com

Attachments

cc: Don Stacey, GDF Suez
Bruce Birbeck, GDF Suez
Mary Hauner-Davis, Burns & McDonnell

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

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

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

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

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

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

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

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

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

Section I. General

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

2. Federal Employer ID No. ***(FEIN):***
26-3603167

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

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

5A. Applicant's mailing address:
10319 South Pleasants Highway, St. Mary's, WV 26170

5B. Facility's present physical address:
10319 South Pleasants Highway, St. Mary's, WV 26170

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☐ **YES** ☒ **NO**
- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

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

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**
- If **YES,** please explain: Applicant leases site
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.):
Electric generating peaking station

10. North American Industry Classification System **(NAICS)** code for the facility:
221112

11A. DAQ Plant ID No. (for existing facilities only):
073 – 00022

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R30-07300022-2014 (Title V)

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

12A.

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

From 1st Street in Waverly, head east on Highway 2 approximately 1 mile. The Pleasants Energy facility entrance is on the south side of the highway.

12.B. New site address (if applicable):	12C. Nearest city or town: Waverly	12D. County: Pleasants
12.E. UTM Northing (KM): 4353.573	12F. UTM Easting (KM): 468.629	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
The Project consists of construction of two TurboPhase systems to increase combustion turbine output, as well as increase maximum lb/hr emissions from the combustion turbines. Additionally, the five 2-MW emergency generators will be changed to non-emergency but will not increase their maximum operating hours.

14A. Provide the date of anticipated installation or change: 10/01/2015 – If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /	14B. Date of anticipated Start-Up if a permit is granted: 04/01/2016

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

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day Days Per Week 3,250 hours per year for each TurboPhase system

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

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

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

Section II. Additional attachments and supporting documents.

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

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

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

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

23. Provide a **Process Description** as **Attachment G.**
– Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

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

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

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

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

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

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

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

☐ Bulk Liquid Transfer Operations	☐ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☐ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	☐ Storage Tanks

☒ General Emission Unit, specify TurboPhase Engines, Generators, Combustion Turbines

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

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

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

☒ Other Collectors, specify SCR (generators) and Oxidation Catalyst (TurboPhase)

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

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

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

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

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

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

☐ **YES** ☒ **NO**

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

Section III. Certification of Information

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

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

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

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

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

Certification of Truth, Accuracy, and Completeness

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

Compliance Certification

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

SIGNATURE _____ DATE: 6/24/15
(Please use blue ink) *(Please use blue ink)*

35B. Printed name of signee: Gerald Gatti		35C. Title: Plant Manager
35D. E-mail: Gerald.Gatti@gdfsuezna.com	36E. Phone: 304-665-4201	36F. FAX: 304-665-4218
36A. Printed name of contact person (if different from above):		36B. Title:
36C. E-mail:	36D. Phone:	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

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

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

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

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

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

TABLE OF CONTENTS

APPLICATION FOR NSR (45CSR13) PERMIT TO CONSTRUCT

ATTACHMENT A – CURRENT BUSINESS CERTIFICATE

ATTACHMENT B – MAP

ATTACHMENT C – INSTALLATION AND STARTUP SCHEDULE

ATTACHMENT D – REGULATORY DISCUSSION

ATTACHMENT E – PLOT PLAN

ATTACHMENT F – PROCESS FLOW DIAGRAM

ATTACHMENT G – PROCESS DESCRIPTION

ATTACHMENT I – EMISSIONS UNITS TABLE

ATTACHMENT J – EMISSION POINTS DATA SUMMARY SHEET

ATTACHMENT L – EMISSIONS UNIT DATA SHEET

ATTACHMENT M – CONTROL DEVICE SHEETS

ATTACHMENT N – SUPPORTING EMISSIONS CALCULATIONS

ATTACHMENT O – MONITORING-RECORDKEEPING-REPORTING-TESTING

ATTACHMENT P – PUBLIC NOTICE

ATTACHMENT R – AUTHORITY FORM

ATTACHMENT A –
CURRENT BUSINESS CERTIFICATE

State of West Virginia

Certificate

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

PLEASANTS ENERGY, LLC

was duly authorized under the laws of this state to transact business in West Virginia as a foreign limited liability company on December 17, 1999.

The company is filed as an at-will company, for an indefinite period.

I further certify that the LLC (PLLC) has not been revoked by the State of West Virginia nor has a Certificate of Cancellation been issued.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORIZATION

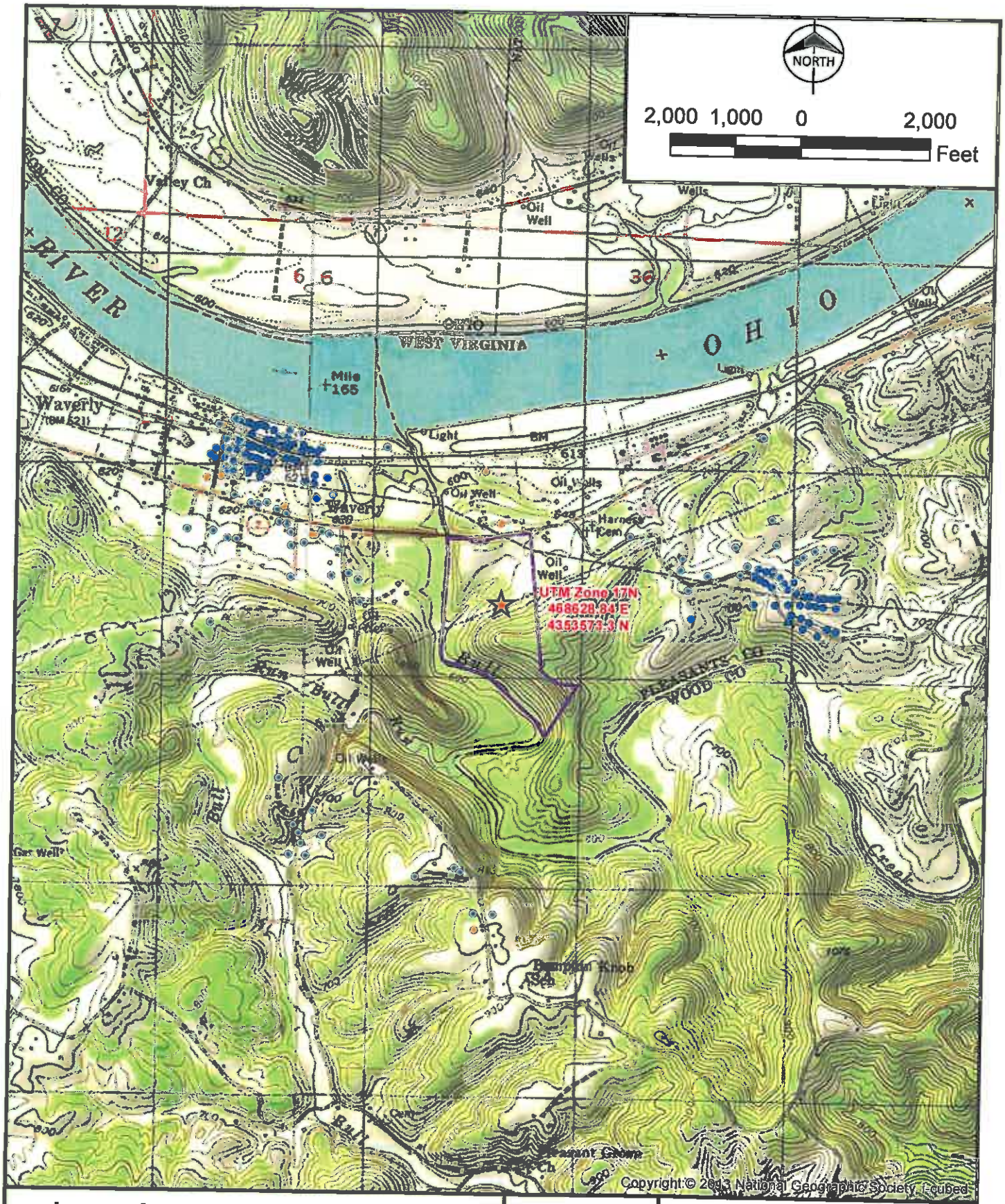
Validation ID:0WV1X_44545

Given under my hand and the Great Seal of the State of West Virginia on this day of June 22, 2015

Secretary of State

Notice: A certificate issued electronically from the West Virginia Secretary of State's Web site is fully and immediately valid and effective. However, as an option, the issuance and validity of a certificate obtained electronically may be established by visiting the Certificate Validation Page of the Secretary of State's Web site, http://apps.wv.gov/sos/businessregistration/validatecertificate.aspx entering the validation ID displayed on the certificate, and following the instructions displayed. Confirming the issuance of a certificate is merely optional and is not necessary to the valid and effective issuance of a certificate.

ATTACHMENT B –
MAP



Legend

- Business
- House
- Cemetery
- Project Location
- Property Boundary

BURNS McDONNELL

Attachment B
Area Map
Pleasants Energy, LLC

Source: 2013 National Geographic Society, i-cubed, Burns & McDonnell

Issued: 6/17/2015

Path: R:\GDF_Sue...\9835_Pleasants_Engr\Air\2015 Minor Source Permit\Draft Application\Attachment B - Map\Attachm...d.mxd ecrobbins 6/17/2015

COPYRIGHT © 2015 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Attachment C – Installation and Startup Schedule

Construction of the TurboPhase Systems will start October 1, 2015 or 1 month after receiving the construction permit, whichever occurs last.

Commissioning and startup of the TurboPhase Project is planned for April 2016.

ATTACHMENT D –
REGULATORY DISCUSSION

Attachment D: Regulatory Discussion

New Source Performance Standards (NSPS)

NSPS for Stationary Spark Ignition Internal Combustion Engines (Subpart JJJJ)

The TurboPhase engines will be new (manufacture date 2015 or later) spark ignition, natural gas-fired, internal combustion engines rated at 2,750 HP each. The TurboPhase engines will be subject to the New Source Performance Standards (NSPS) (40 CFR 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines).

Based on horsepower rating and manufacture date, the engines will be required to meet the following emission limits as per §60.4233(e) - Table 1:

- NOx: 1.0 g/HP-hr
- CO: 2.0 g/HP-hr
- VOC: 0.7 g/HP-hr

The manufacturer of the engines has stated that the engines will not be certified. Pleasants Energy, LLC (Pleasants Energy) will demonstrate compliance with these limitations by keeping a maintenance plan and records of conducted maintenance, maintain and operate the engine in a manner consistent with good air pollution practice for minimizing emissions and by conducting an initial performance test and conducting subsequent performance testing every 8,760 hours or 3 years, whichever comes first. (§60.4243(b)(2))

Pleasants Energy, LLC will perform all required monitoring, recordkeeping and reporting requirements as specified by 40 CFR 60 Subpart JJJJ. These requirements are discussed in further detail in Attachment O – Monitoring, Recordkeeping, Reporting, Testing.

NSPS for Station Compression Ignition Internal Combustion Engines (Subpart IIII)

The five diesel generators installed in 2015 under the G-60 Class II General Permit as emergency generators will now be required to meet the NSPS requirements for non-emergency diesel generators under 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

Based on horsepower rating and manufacture date (2014), the engines will meet the following emission limits as per §60.4204(b) and 40 CFR 1039.102 Table 7:

- NOx: 0.67 g/kW-hr
- CO: 3.5 g/kW-hr
- PM: 0.1 g/kW-hr
- NMHC: 0.4 g/kW-hr

The diesel generators have been certified (Tier IV) to these emission levels by the EPA.

Owners and operators of non-emergency stationary compression ignition (CI) internal combustion engines (ICE) that are greater than 2,237 kW must submit an initial notification including the following information per §60.4214(a)(1):

- Name and address of the owner or operator;
- The address of the affected source;
- Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;
- Emission control equipment; and
- Fuel used.

Pleasants Energy will perform all required monitoring, recordkeeping and reporting requirements as specified by 40 CFR 60 Subpart IIII. These requirements are discussed in further detail in Attachment O – Monitoring, Recordkeeping, Reporting, Testing.

National Emission Standards for Hazardous Air Pollutants

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

Because Pleasants Energy is an area source of HAPS, the five diesel generators and eight TurboPhase engines are subject to the provisions of 40 CFR 63 Subpart ZZZZ. As per §63.6590(c), the generators and TurboPhase units will comply with the requirements of Subpart ZZZZ by meeting the requirements of 40 CFR 60 Subpart IIII and Subpart JJJJ.

West Virginia Regulatory Requirements

45CSR10 To Prevent and Control Air Pollution of Sulfur Oxides

Pleasants Energy will meet all applicable requirements of 45CSR10. The TurboPhase engines and diesel generators are classified as Type 'b' units under this rule. Pleasants Energy is located in Pleasants County, WV and is therefore located in Priority Region II. They will meet the following sulfur dioxide weight emission standard as per §45-10-3.1.e:

- Type 'b' fuel burning units must not discharge sulfur dioxide from all stacks located at one plant, measured in terms of pounds per hour, in excess of the product of 3.1 and the total design heat inputs for such units in million BTU's per hour.

Pleasants Energy will meet all testing, monitoring, recordkeeping and reporting requirements as per §45-10-8.

45CSR13 Permits for Construction, Modification, Relocation, and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedures for Evaluation

Pleasants Energy will meet all requirements of 45CSR13 in order to obtain a construction permit for this project.

45CSR16 Standards of Performance for New Stationary Sources

Pleasants Energy will meet all standards for new stationary sources as described above by meeting all applicable requirements of 40 CFR 60 Subpart JJJJ and Subpart IIII.

45CSR20 Good Engineering Practice as Applicable to Stack Heights

Pleasant Energy will construct all stacks in accordance with good engineering practice according to 45CSR20.

45CSR22 Air Quality Management Fee Program

Pleasants Energy will submit all fees required by 45CSR22 in order to obtain a minor source construction permit.

45CSR34 Emission Standards for Hazardous Air Pollutants

Pleasants Energy is currently an area source of HAPs and will remain an area source of HAPs with the addition of the TurboPhase systems. Pleasants Energy will meet all requirements of 45CSR34 as detailed above by meeting the requirements of 40 CFR 63 Subpart ZZZZ.

ATTACHMENT E –
PLOT PLAN

Path: R:\GDF_Sue[illegible]835_Pleasants_Engn\Air\2015 Minor Source Permit\Draft Application\Attachment E - Plot Plan\Atta[illegible]ent E-1.mxd ecrobbins 6/19/2015
COPYRIGHT © 2015 BURNS & McDONNELL ENGINEERING COMPANY, INC.

Legend

- Turbophase System
- Fence Line
- Generator Building
- Property Boundary
- Combustion Turbine
- Emergency Generator
- TurboPhase Stack

NORTH

100 50 0 100

Scale in Feet

BURNS McDONNELL

Attachment E-1
Facility Plot Plan
Pleasants Energy, LLC

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors and Burns & McDonnell

Issued: 6/19/2015

Legend

Property Boundary

NORTH

350 175 0 350

Scale in Feet

BURNS McDONNELL

Attachment E-2
Property Boundary
Pleasants Energy, LLC

Source: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors and Burns & McDonnell

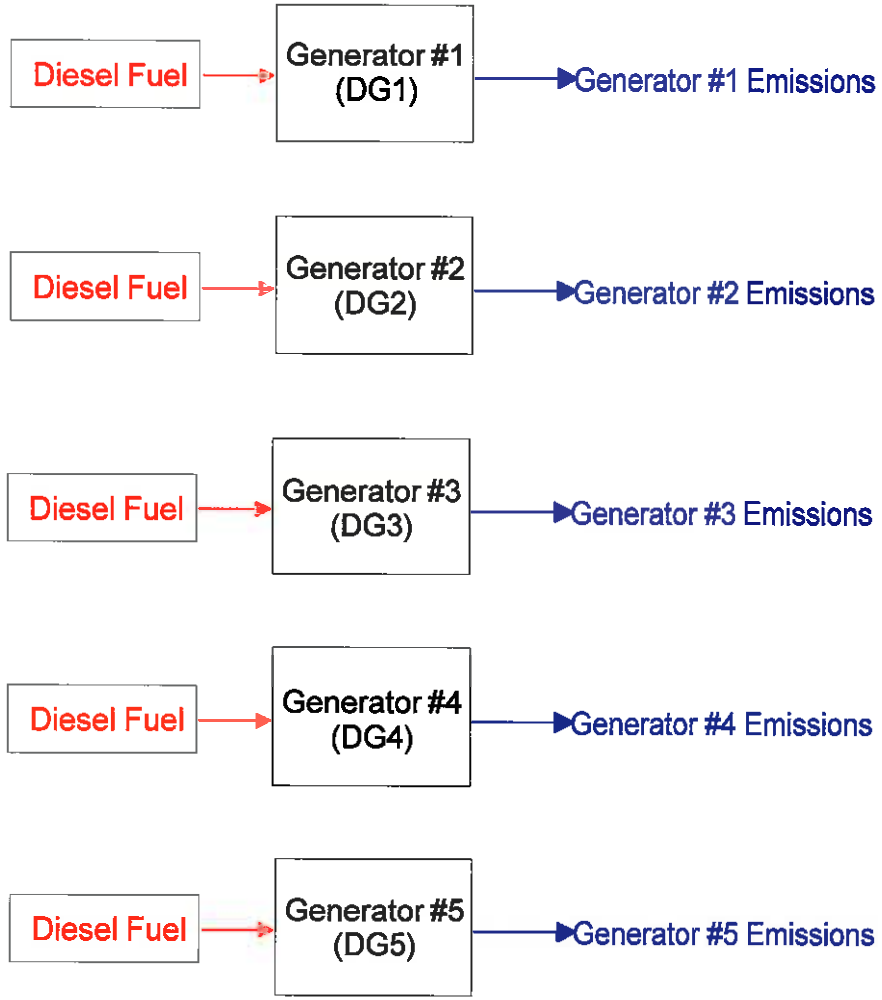
Issued: 6/19/2015

Path: R:\GDF_Sue...\835_Pleasants_Engn\Air\2015 Minor Source Permit\Draft Application\Attachment E - Plot Plan\Att...ment E-2.mxd ecrobbins 6/19/2015

COPYRIGHT © 2015 BURNS & McDONNELL ENGINEERING COMPANY, INC.

ATTACHMENT F –
PROCESS FLOW DIAGRAMS

Pleasants Energy, LLC
Generators Process Flow Diagram



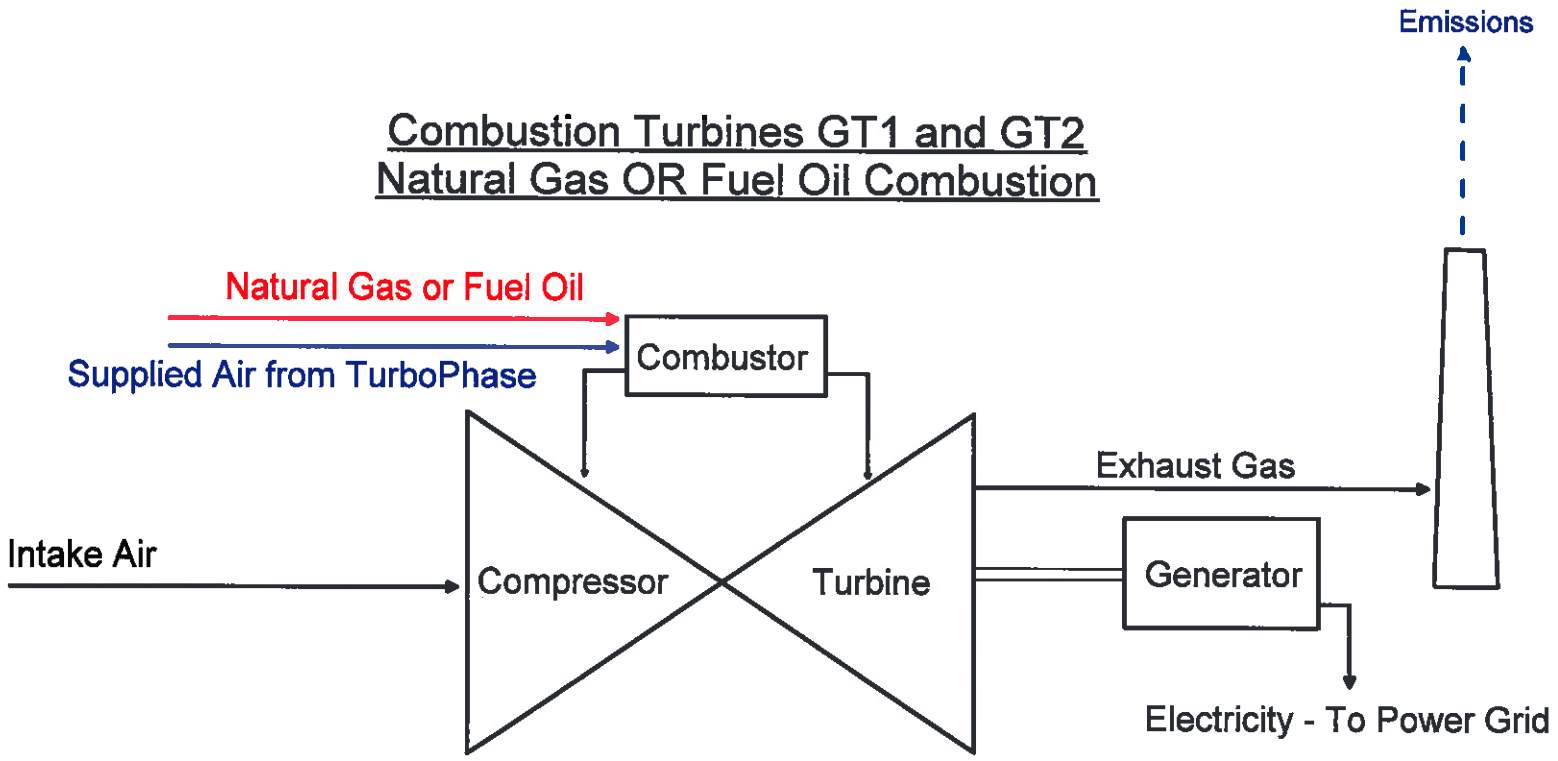
Diesel Fuel

Emissions

BURNS McDONNELL

Attachment F-1
Generators
Process Flow Diagram

Pleasants Energy, LLC
Combustion Turbine Process Flow Diagram



Natural Gas or Fuel Oil

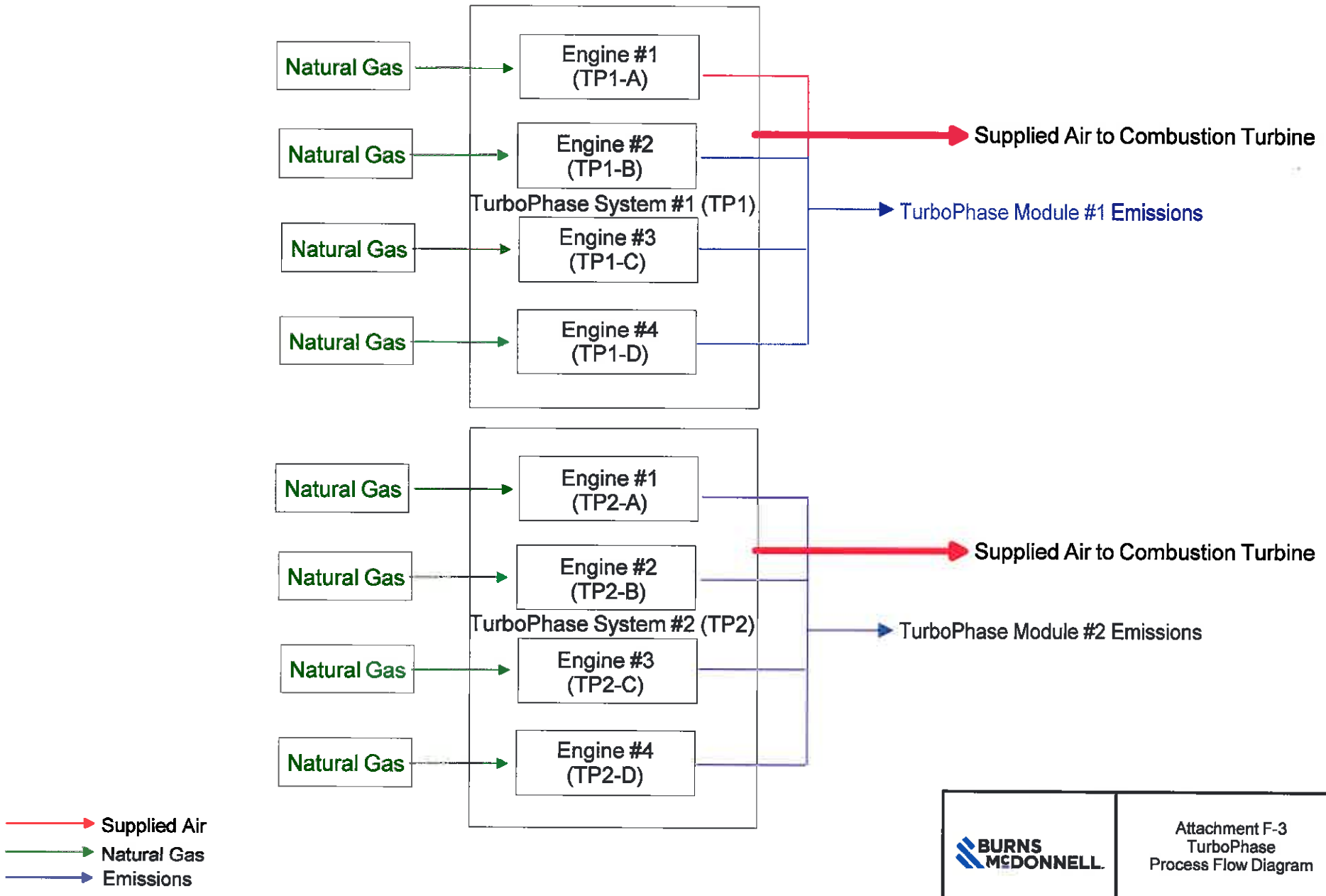
Supplied Air from TurboPhase

Emissions

BURNS McDONNELL

Attachment F-2
Combustion Turbine
Process Flow
Diagram

Pleasants Energy, LLC
TurboPhase Process Flow Diagram



BURNS McDONNELL

Attachment F-3
TurboPhase
Process Flow Diagram

ATTACHMENT G –
PROCESS DESCRIPTION

Attachment G – Process Description

The existing Pleasants Energy facility is a 300-MW simple-cycle electric generating peaking station operating under standard industrial classification (SIC) 4911 and Title V permit number R30-07300022-2014. The Pleasants Energy facility includes two General Electric (GE) 7FA class simple cycle combustion turbines, each nominally rated at 167.8 MW (while firing natural gas at an ambient temperature of 59 degrees Fahrenheit (°F) and 60 percent relative humidity). The primary fuel is natural gas and low sulfur distillate fuel oil is utilized as a backup fuel.

This project will consist of installation of two TurboPhase systems; one for each combustion turbine, to increase output. The TurboPhase system injects externally supplied air into the combustion turbine after compressor discharge at the inlet to the combustor. This increases mass flow through the turbine and generator output. The air will be supplied by multistage compressors driven by internal combustion engines. Each combustion turbine will have one TurboPhase system, consisting of four 2,750-hp spark ignition (SI) engines designed to burn natural gas only. In total, eight 2,750-hp engines will be constructed for the project. The TurboPhase system will provide an 18-MW incremental power increase to each combustion turbine. With the addition of TurboPhase to the combustion turbines, the permitted hourly emission rates for the combustion turbines operating on natural gas will increase but the overall tons per year limitations for the combustion turbines will remain the same.

The project also includes changing the status of the five 3.0-MW emergency generators installed in 2015 to non-emergency generators. The maximum hours of operation permitted previously (500 hours maximum per generator) will not change. These engines are Tier IV-certified Caterpillar engines designed to burn ultra-low sulfur diesel fuel only.

ATTACHMENT I –
EMISSION UNITS TABLE

Attachment I

Emission Units Table

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

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
DG1	EP3	Caterpillar C175-16 Tier IV Certified Diesel Generator	2015	3 MW	Modification, date TBD	SCR1
DG2	EP4	Caterpillar C175-16 Tier IV Certified Diesel Generator	2015	3 MW	Modification, date TBD	SCR2
DG3	EP5	Caterpillar C175-16 Tier IV Certified Diesel Generator	2015	3 MW	Modification, date TBD	SCR3
DG4	EP6	Caterpillar C175-16 Tier IV Certified Diesel Generator	2015	3 MW	Modification, date TBD	SCR4
DG5	EP7	Caterpillar C175-16 Tier IV Certified Diesel Generator	2015	3 MW	Modification, date TBD	SCR5
TP1A - TP1D	EP8	TurboPhase System for GT1, consists of four TurboPhase modules (engines), each rated at 2,750 HP	TBD	2,750 HP x 4 engines	New, date TBD	OxCat1A - OxCat1D
TP2A - TP2D	EP9	TurboPhase System for GT2, consists of four TurboPhase modules (engines), each rated at 2,750 HP	TBD	2,750 HP x 4 engines	New, date TBD	OxCat2A - OxCat2D
GT1	EP1	General Electric Model 7FA Turbine	2001	1,571 MMBtu/hr	Modification, date TBD	None
GT2	EP2	General Electric Model 7FA Turbine	2001	1,571 MMBtu/hr	Modification, date TBD	None

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

ATTACHMENT J –
EMISSION POINTS DATA SUMMARY SHEET

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] (ppmv or mg/m^4)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
EP1	Vertical stack	GT1						NOx, CO, PM/PM_{10}/$PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations						
EP2	Vertical stack	GT2						NOx, CO, PM/PM_{10}/$PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations						
EP3	Vertical stack	DG1		SCR1	Selective Catalytic Reduction			NOx, CO, PM/PM_{10}/$PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations						
EP4	Vertical stack	DG2		SCR2	Selective Catalytic Reduction			NOx, CO, PM/PM_{10}/$PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations						
EP5	Vertical stack	DG3		SCR3	Selective Catalytic Reduction			NOx, CO, PM/PM_{10}/$PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations						
EP6	Vertical stack	DG4		SCR4	Selective Catalytic Reduction			NOx, CO, PM/PM_{10}/$PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations						
EP7	Vertical stack	DG5		SCR5	Selective Catalytic Reduction			NOx, CO, PM/PM_{10}/$PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations						

EP8	Vertical stack	TP1A – TP1D		OxCat1A - OxCat1D	Oxidation Catalyst			NOx, CO, $PM/PM_{10}/PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations
EP9	Vertical stack	TP2A- TP2D		OxCat2A - OxCat2D	Oxidation Catalyst			NOx, CO, $PM/PM_{10}/PM_{2.5}$, VOC, SO_2, H_2SO_4, CO_2, N_2O, CH_4, CO_2e, HAPs	See Attachment N – Supporting Emission Calculations

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

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

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

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

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

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

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

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

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
EP1[3]	18	1,131	2,540,552	166.6	650	114.5	4,353.8100	468.6270
EP2[3]	18	1,131	2,540,552	166.6	650	114.5	4,353.8142	468.6810
EP1[4]	18	1,131	2,260,000	148.2	650	114.5	4,353.8100	468.6270
EP2[4]	18	1,131	2,260,000	148.2	650	114.5	4,353.8142	468.6810
EP3	2	882.2	23,557	125.0	650	45	4,353.7659	468.5882
EP4	2	882.2	23,557	125.0	650	45	4,353.7600	468.5889
EP5	2	882.2	23,557	125.0	650	45	4,353.7539	468.5900
EP6	2	882.2	23,557	125.0	650	45	4,353.7480	468.5910
EP7	2	882.2	23,557	125.0	650	45	4,353.7410	468.5920
EP8	2.5	482	41,902	150.0	650	114.5	4,353.8133	468.6269
EP9	2.5	482	41,902	150.0	650	114.5	4,353.8182	468.6809

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.
[3] 100% load operation, with TurboPhase operation
[4] 100% load operation, without TurboPhase operation

ATTACHMENT L –
EMISSION UNIT DATA SHEETS

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.
Identification Number (as assigned on *Equipment List Form*):

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

   General Electric Model 7FA Turbines (GT1 and GT2) (Natural gas combustion when TurboPhase is operating)
   Note: Fuel oil operation in the combustion turbines is not changing as part of this application, only natural gas maximum lb/hr emission rates are increasing.

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

   See Process Flow Diagram in Attachment F

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

   N/A

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

   N/A

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

   Combustion of natural gas

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

6. Combustion Data (if applicable):

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

Natural gas

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

Annual average sulfur content of the natural gas shall not exceed 0.5 grains per 100 scf

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

@ °F and psia.

(d) Percent excess air:

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

N/A

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

N/A

(g) Proposed maximum design heat input: 1,571 × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	Fuel Limitation in Title V Permit	Days/Week	Fuel Limitation in Title V Permit	Weeks/Year	Fuel Limitation in Title V Permit

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: **Emissions are per combustion turbine.*

@ 1,131 °F and psia

a.	NO_X	75	lb/hr	grains/ACF
b.	SO_2	2.8	lb/hr	grains/ACF
c.	CO	36	lb/hr	grains/ACF
d.	PM_{10}	20.2	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	3.4	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	H_2SO_4	0.43	lb/hr	grains/ACF
	CO_2e	212,296	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
CEMS for NOx emissions. Fuel monitors for natural gas and fuel oil.	Records of fuel usage (natural gas and fuel oil) as well as tons per year NOx emissions.
REPORTING	TESTING

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

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

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

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

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

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.
Identification Number (as assigned on *Equipment List Form*):

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

   TurboPhase System #1 and Turbophase System #2 (TP1, TP2). Each TurboPhase system consists of four natural gas-fired engines (TurboPhase modules, designated as TP1A – TP1D and TP2A – TP2D). Each engine is 2,750 hp.

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

   See Process Flow Diagram in Attachment F

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

   N/A

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

   N/A

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

   Combustion of natural gas.

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

6. Combustion Data (if applicable):

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

Natural gas, 17 MMBtu/hr per TurboPhase module (engine). Each TurboPhase system consists of four engines for a total of 68 MMBtu/hr per TurboPhase system.

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

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

@ °F and psia.

(d) Percent excess air:

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

17 MMBtu/hr per TurboPhase module (engine). Each TurboPhase system consists of four TurboPhase modules (engines) for a total of 68 MMBtu/hr per TurboPhase system.

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

N/A

(g) Proposed maximum design heat input: 68 × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week		Hours/Year	3,250

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: **All emissions are based on four TurboPhase modules (engines).*

@ 482 °F and psia

a.	NO_X	12.13	lb/hr	grains/ACF
b.	SO_2	0.04	lb/hr	grains/ACF
c.	CO	2.67	lb/hr	grains/ACF
d.	PM_{10}	0.80	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	0.73	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	H_2SO_4	0.01	lb/hr	grains/ACF
	CO_2e	7,963	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING Hours of operation records will be kept for each TurboPhase system.
REPORTING Reporting per NSPS Subpart A and JJJJ will be performed.	TESTING NSPS Subpart JJJJ testing requirements will be followed.

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

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

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

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

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

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.
Identification Number (as assigned on *Equipment List Form*):

1. Name or type and model of proposed affected source: Caterpillar C175-16 Tier IV Certified Diesel Generator (DG1, DG2, DG3, DG4, DG5)
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants. See Process Flow Diagram in Attachment F
3. Name(s) and maximum amount of proposed process material(s) charged per hour: N/A
4. Name(s) and maximum amount of proposed material(s) produced per hour: N/A
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: Combustion of diesel fuel.

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

6. Combustion Data (if applicable):

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

208.8 gal/hour diesel fuel

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

0.0015% sulfur (Ultra low sulfur diesel fuel)

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

@ °F and psia.

(d) Percent excess air:

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

28.61 MMBtu/hr

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

(g) Proposed maximum design heat input: 28.61 × 10^6 BTU/hr.

7. Projected operating schedule:

Hours/Day	24	Days/Week		Hours/Year	500

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

@ 882.2 °F and psia

a.	NO_X	4.82	lb/hr	grains/ACF
b.	SO_2	0.05	lb/hr	grains/ACF
c.	CO	25.18	lb/hr	grains/ACF
d.	PM_{10}	0.72	lb/hr	grains/ACF
e.	Hydrocarbons		lb/hr	grains/ACF
f.	VOCs	2.88	lb/hr	grains/ACF
g.	Pb		lb/hr	grains/ACF
h.	Specify other(s)			
	H_2SO_4	8.13×10^{-3}	lb/hr	grains/ACF
	CO_2e	4,680	lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF
			lb/hr	grains/ACF

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

(2) Complete the Emission Points Data Sheet.

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

MONITORING	RECORDKEEPING
	Hours of operation records will be kept for each generator.
REPORTING	TESTING
Reporting as required by the applicable sections in the NSPS, Subparts A and IIII will be completed.	No performance testing is required per NSPS Subpart IIII, as the engines are certified by the EPA.

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

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

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

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

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

ATTACHMENT M –
CONTROL DEVICE SHEETS

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): SCR1, SCR2, SCR3, SCR4, SCR5

Equipment Information

1. Manufacturer: TBD Model No. TBD	2. Control Device Name: SCR System Type: Selective Catalytic Reduction
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency. TBD	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device. TBD	
5. Provide a scale diagram of the control device showing internal construction. TBD	
6. Submit a schematic and diagram with dimensions and flow rates. TBD	
7. Guaranteed minimum collection efficiency for each pollutant collected: TBD	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: TBD SCFM	10. Capacity: TBD
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. N/A	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal. N/A	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☒ Yes	☐ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	Maximum	Typical
Pressure (mmHg):	TBD	TBD
Heat Content (BTU/scf):	TBD	TBD
Oxygen Content (%):	TBD	TBD
Moisture Content (%):	TBD	TBD
Relative Humidity (%):	TBD	TBD

16. Type of pollutant(s) controlled: ☐ Particulate (type): ☐ SO_x	☐ Odor ☒ Other: NOx
17. Inlet gas velocity: TBD ft/sec	18. Pollutant specific gravity:
19. Gas flow into the collector: TBD ACF @ °F and PSIA	20. Gas stream temperature: Inlet: TBD °F Outlet: TBD °F
21. Gas flow rate: Design Maximum: 23,557 ACFM Average Expected: 23,557 ACFM	22. Particulate Grain Loading in grains/scf: Inlet: N/A Outlet: N/A

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant lb/hr	IN Pollutant grains/acf	Emission Capture Efficiency %	OUT Pollutant lb/hr	OUT Pollutant grains/acf	Control Efficiency %
A NOx				0.5 g/hp-hr		
B						
C						
D						
E						

24. Dimensions of stack: Height 45 ft. Diameter 2 ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table: Particulate Size Range (microns)	Particle Size Distribution at Inlet to Collector: Weight % for Size Range	Fraction Efficiency of Collector: Weight % for Size Range
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16	N/A	
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): N/A

28. Describe the collection material disposal system: N/A

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet?

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

MONITORING:	RECORDKEEPING:
See Attachment O for monitoring, recordkeeping, reporting and testing.	
REPORTING:	TESTING:

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

The generators are certified to meet the NSPS, Subpart IIII standard of 0.50 g/hp-hr with the SCR.

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant. TBD

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

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): OXCAT1, OXCAT2

Equipment Information

1. Manufacturer: TBD Model No. TBD	2. Control Device Name: OXCAT Type: Oxidation Catalyst
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency. TBD	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device. TBD	
5. Provide a scale diagram of the control device showing internal construction. TBD	
6. Submit a schematic and diagram with dimensions and flow rates. TBD	
7. Guaranteed minimum collection efficiency for each pollutant collected: TBD	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: TBD SCFM	10. Capacity: TBD
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. N/A	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal. N/A	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☒ Yes	☐ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	Maximum	Typical
Pressure (mmHg):	TBD	TBD
Heat Content (BTU/scf):	TBD	TBD
Oxygen Content (%):	TBD	TBD
Moisture Content (%):	TBD	TBD
Relative Humidity (%):	TBD	TBD

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Particulate (type):	☐ Odor ☒ Other: CO, VOC and HAPs
17. Inlet gas velocity: TBD ft/sec	18. Pollutant specific gravity:
19. Gas flow into the collector: TBD ACF @ °F and PSIA	20. Gas stream temperature: Inlet: TBD °F Outlet: TBD °F
21. Gas flow rate: Design Maximum: 41,902 ACFM Average Expected: 41,902 ACFM	22. Particulate Grain Loading in grains/scf: Inlet: N/A Outlet: N/A

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	IN Pollutant lb/hr	IN Pollutant grains/acf	Emission Capture Efficiency %	OUT Pollutant lb/hr	OUT Pollutant grains/acf	Control Efficiency %
A CO				2 g/hp-hr		
B VOC				0.7 g/hp-hr		
C HAPs				See Attachment N		50%
D						
E						

24. Dimensions of stack: Height 114.5 ft. Diameter 2.5 ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table: Particulate Size Range (microns)	Particle Size Distribution at Inlet to Collector: Weight % for Size Range	Fraction Efficiency of Collector: Weight % for Size Range
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16	N/A	
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification): N/A

28. Describe the collection material disposal system: N/A

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet?

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

MONITORING:	RECORDKEEPING:
See Attachment O for monitoring, recordkeeping, reporting and testing	
REPORTING:	TESTING:

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant. TBD

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant. TBD

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

ATTACHMENT N –
SUPPORTING EMISSIONS CALCULATIONS

Pleasants Energy, LLC TurboPhase Project

Overall Project Emissions Increase and Post-Project Facility Total Emissions

Pollutant	Project Emissions	Existing Emissions			Facility Total After Project
	Project Emissions from Turbophase Systems (8 Engines Total)[a] (tpy)	Diesel Generators (Five Generators)[b] (tpy)	Diesel Storage Tank (tpy)	Combustion Turbines (GT1 & GT2)[c] (tpy)	Total Emissions (tpy)
NOx	39.41	6.03	--	241.00	286.43
CO	8.67	31.47	--	116.00	156.14
PM	2.60	0.90	--	75.00	78.50
PM_{10}	2.60	0.90	--	75	78.50
$PM_{2.5}$	2.60	0.90	--	75	78.50
VOC	2.36	3.60	6.85E-04	12.00	17.96
SO2	0.13	6.64E-02	--	53.00	53.20
Lead	--	--	--	1.10E-02	0.01
H_2SO_4	1.99E-02	1.0E-02	--	3.39	3.42
CO2e	25,879	5,850	--	896,919	928,648
Total HAPs	7.94	0.16	--	11.80	19.90

(a) Emissions based on 2 TurboPhase systems with 4 engines each, limited to 3,250 hours per year per engine.

(b) Emissions based on 5 diesel generators limited to 500 hours each.

(c) Emissions based on current permit limits for combustion turbines which are not changing.

Pleasants Energy, LLC - TurboPhase Project

TurboPhase Engines Emissions Estimate

Natural Gas Engines for TurboPhase

Heat Input per TurboPhase Module (TPM) (Each Engine)	17.00 MMBtu/hr
Engine Size	2,750 hp
Engine Size	2,000 kW
Displacement	<10 L/cylinder
Annual Operation (per Engine)	3,250 hours/year

TPM Engine Stack Running Beside CT Stack- Stack Parameters

Number of Stacks	Height (ft)	Exhaust Temp. (F)	Exit Velocity (ft/sec)	Stack Diameter (ft)	ACFM	Stack Discharge Type	Fuel
2 (4 TPM Modules per Stack)	114.5	482	150.00	2.50	41,902	Vertical	Natural Gas

Pollutant	Emission Factors (Controlled, no SCR)			Emissions (per engine or TPM))		One TurboPhase System Emissions (4 engines, one stack)		Two TurboPhase Systems Emissions (8 TPM, two stacks)
	g/hp-hr	lb/MMBtu	Source	lb/hr	tpy	lb/hr	tpy	tpy
NOx	0.50	--	Vendor	3.03	4.93	12.13	19.70	39.41
CO	0.11	--	Vendor	0.67	1.08	2.67	4.33	8.67
$PM/PM_{10}/PM_{2.5}$	--		Vendor	0.20	0.33	0.80	1.30	2.60
VOC	0.03	--	Vendor	0.18	0.30	0.73	1.18	2.36
SO_2	--	5.88E-04	AP-42[A]	0.01	1.62E-02	0.04	0.06	0.13
H_2SO_4	--	--	Mass Balance	1.53E-03	2.49E-03	0.01	9.95E-03	1.99E-02
CO_2e	--	--	40 CFR Part 98[B]	1,990.67	3,234.84	7962.67	12,939.34	25,878.68

[A] AP-42 Section 3.4 (7/00) Table 3.2-1

[B] Greenhouse Gas Reporting Rule- Subpart C of Part 98

NSPS Limits: 40 CFR Part 60, Subapart JJJJ, (40 CFR 60.4233(e) and Table 1)

NOx g/hp-hr	CO g/hp-hr	VOC g/hp-hr
1.00	2.00	0.70

Pleasants Energy, LLC - TurboPhase Project
Blackstart Generators Emissions Estimate

Tier IV Diesel Generators (5)

Fuel Consumption, Each Generator (100% load)	208.8	Gal/hr
Heat Input, Each Generator	28.61	MMBtu/hr
Power Output, hp	4,376	hp
Power Output, kW	3000	kW
Sulfur Content of Fuel	0.0015	%
Displacement	5.29	L/cylinder
Annual Operation (per Engine)	500	hours/year (per engine)

Stack Parameters

Height (ft)	Temp. (F)	Velocity (ft/sec)	Diameter (ft)	ACFM	Stack Discharge Type	Fuel
45	882.2	124.98	2.00	23557.40	Vertical	Diesel

Pollutant	Emission Factors				Emissions (One Engine)		Emissions (Five Engines)	
	lb/hp hr	g/hp-hr	lb/MMBtu	Source	lb/hr	tpy	lb/hr	tpy
NOx	1.10E-03	0.50	–	NSPS[C]	4.82	1.21	24.10	6.03
CO	5.75E-03	2.61	–	NSPS[C]	25.18	6.29	125.90	31.47
$PM/PM_{10}/PM_{2.5}$	1.6E-04	0.07		NSPS[C]	0.72	0.18	3.60	0.90
VOC	6.58E-04	0.30	–	NSPS[C]	2.88	0.72	14.39	3.60
SO_2	1.21E-05	0.01	–	AP-42[A]	0.05	1.33E-02	0.27	0.07
H_2SO_4	–	–	–	Mass Balance	8.13E-03	2.03E-03	0.04	0.01
CO_2	–	–	163.05	Part 98[B]	4,654.26	1,166.06	23,321.28	5,830.32
N_2O	–	–	1.32E-03	Part 98[B]	0.04	0.01	0.19	0.05
CH_4	–	–	6.61E-03	Part 98[B]	0.19	0.05	0.95	0.24
CO_2e	–	–	–		4,680.26	1,170.07	23,401.30	5850.33

[A] AP-42 Section 3.4 (10/96) Table 3.4-1

[B] Greenhouse Gas Reporting Rule- Subpart C of Part 98

[C] NSPS Subapart IIII Limits

NSPS Limits - 40 CFR Part 60, Subapart IIII, (40 CFR 60.4201(c) and 40 CFR 1039.102 - Table 7)

	NOx	CO	PM	NMHC
g/kW-hr	0.67	3.5	0.10	0.40
g/hp-hr	0.50	2.61	0.07	0.30

Pleasants Energy, LLC - Turbophase Project
Existing Combustion Turbines (GT1 & GT2)

GT01 & GT02 Combustion Turbine Size	1,571	MMBtu/hr
Number of Combustion Turbines (GT01 & GT02)	2	
Natural Gas Operation With Turbophase	3,250	Hours per turbine
Fuel Usage Limit	14,020,000,000	SCF/yr
Natural gas heating value	1,020	MMBtu/MMcf

Natural Gas Operation Emissions

Pollutant	100% Load Natural Gas Emission Rate[a] (lb/hr)	100% Load With TurboPhase Emission Rate[b] (lb/hr)	100% Load Fuel Oil Emission Rate[c] (lb/hr)	Total Natural Gas Emissions (Both Turbines)[c] (tpy)
NOx	65	75	470	241.00
CO	32	36	72	116.00
$PM/PM_{10}/PM_{2.5}$	18	20.20	39.00	75.00
VOC	3	3.40	8.00	12.00
SO_2	2.5	2.80	103	53.00
H_2SO_4	0.38	0.43	11.00	1.95
CO_2	183,775.58	212,077	256,153	830,430.40
CH_4	3.46	3.98	10.39	15.76
N_2O	0.35	0.40	2.08	1.53
CO_2e	183,965.38	212,295.70	257,036.73	837,294.24

(a) Current permitted lb/hr emission rates without TurboPhase.
(b) New lb/hr emission rates which include TurboPhase operation in combustion turbines.
(c) Current permit limits that will not change.

Stack Parameters

Scenario	Height (ft)	Temp. (F)	Velocity (ft/sec)	Diameter (ft)	ACFM	Stack Discharge Type	Fuel
100% Load Natural Gas Operation	114.5	1131	148.2	18.00	2,260,000	Vertical	Natural Gas
100% Load Natural Gas with TurboPhase Operation	114.5	1131	166.6	18.00	2,540,552	Vertical	Natural Gas
80% Load Natural Gas Operation[a]	114.5	1097	139.58	18		Vertical	Natural Gas

(a) 80% Load stack parameters are also used for Start-up stack parameters. 80% load stack parameters from original permit application

Greenhouse Gas Emission Factors

	Natural Gas lb/MMBtu	Fuel Oil lb/MMBtu
CO2	116.98	163.05
CH4	2.20E-03	7.61E-03
N2O	2.20E-04	1.32E-03

Pleasants Energy, LLC - Turbophase Project

HAPs Emissions - New and Existing Emission Sources

Hours of Operation

Combustion Turbine = Existing Emissions from Permit Application

Tier IV Diesel Generator (5) =	500	hours per year per generator
Turbophase Natural Gas Engine (8) =	3280	hours per year per engine

Fuel Usage

Generators - Diesel	hp	mmBtu/hr
Tier IV Diesel Generator =	4378	28.5

TurboPhase Module (Each Engine)	hp	mmBtu/hr
Gas engine (Each) =	2,750.00	17.0
Oxidation Catalyst =	50%	% Control
Number of gas engines=	8	Engines (4 per Turbophase Module)

Project HAPs		
HAP	Maximum Potential Emissions tpy	
Formaldehyde	5.83	Largest HAP
Acetaldehyde	0.92	2nd Largest
Acrolein	0.57	3rd Largest
TOTAL Project HAPs	7.84	

Total Facility HAPs (Existing + Project)		
HAP	Maximum Potential Emissions tpy	
Formaldehyde	5.46	Largest HAP
Acetaldehyde	1.42	2nd Largest
Acrolein	1.30	3rd Largest
TOTAL Facility HAPs	16.69	

			Project HAPs				Existing HAPs				Total Facility HAPs (Existing + Project)
							Fuel Oil - Diesel Generators			Combustion Turbines	
Chemical	CAS	POM?	Emission Factors[a] (lb/MMBTU)	Gas Engine (Each) (lb/hr)	Gas Engine (Each) (tpy)	Total (Eight Gas Engines) (tpy)	Emission Factor[b] (lb/MMBtu)	One Generator (lb/hr)	One Generator (tpy)	Total (5 Generators) (tpy)	Total (2 Combustion Turbines Combined)[c] (tpy)
2-Methylnaphthalene	91-57-6	POM	3.32E-05	2.82E-04	4.59E-04	3.67E-03					0.004
1,1,2,2-Tetrachloroethane	79-34-5		4.00E-05	3.40E-04	5.53E-04	4.42E-03					0.004
1,1,2-Trichloroethane	79-00-5		3.18E-05	2.70E-04	4.39E-04	3.51E-03					0.004
2,2,4-Trimethylpentane	540-84-1		2.50E-04	2.13E-03	3.46E-03	2.76E-02					0.028
Acenaphthene	83-32-9	POM	1.25E-06	1.06E-05	1.73E-05	1.38E-04					0.000
Acenaphthylene	208-96-8	POM	5.53E-06	4.70E-05	7.64E-05	6.11E-04					0.001
Acetaldehyde	75-07-0		8.36E-03	7.11E-02	1.15E-01	9.24E-01	2.52E-05	7.21E-04	1.80E-04	9.01E-04	1.425
Acrolein	107-02-8		5.14E-03	4.37E-02	7.10E-02	5.68E-01	7.88E-05	2.25E-03	5.64E-04	2.82E-03	0.571
Anthracene	120-12-7	POM					1.23E-06	3.52E-05	8.80E-06	4.40E-05	0.000
Arsenic											0.008
Benz(a)anthracene	56-55-3	POM					6.22E-07	1.78E-05	4.46E-06	2.22E-05	0.000
Benzene	71-43-2		1.95E-04	1.66E-03	2.69E-03	2.16E-02	7.76E-04	2.22E-02	5.55E-03	2.77E-02	0.976
Benzo(a)pyrene	50-32-8	POM	1.15E-07	9.83E-07	1.59E-06	1.28E-05	2.57E-07	7.36E-06	1.84E-06	9.19E-06	0.000
Benzo(b)fluoranthene	205-99-2	POM	1.66E-07	1.41E-06	2.29E-06	1.83E-05	1.10E-06	3.15E-05	7.87E-06	3.93E-05	0.000
Benzo(g,h,i)perylene	191-24-2	POM	4.14E-07	3.52E-06	5.72E-06	4.57E-05	3.56E-07	1.69E-06	3.96E-06	1.98E-05	0.000
Benzo(k)fluoranthene	205-82-3	POM					2.45E-07	6.91E-06	1.56E-06	7.80E-06	0.000
Beryllium											0.000
Biphenyl	92-51-3		2.12E-04	1.80E-03	2.92E-03	2.34E-02					0.023
1,3-Butadiene	106-99-0		3.97E-04	3.37E-03	5.46E-03	2.99E-02					0.030
Cadmium											0.003
Carbon Tetrachloride	56-23-5		3.67E-05	3.12E-04	5.07E-04	4.06E-03					0.004
Chlorobenzene	108-90-7		3.04E-05	2.58E-04	4.19E-04	3.35E-03					0.003
Chloroethane			1.87E-06								
Chloroform	67-66-3		2.85E-05	2.42E-04	3.94E-04	3.15E-03					0.003
Chromium			3.96E-06								
Chrysene	218-01-9	POM	6.93E-07	5.89E-06	9.55E-06	**7.66E-05**					0.077
Dibenzo(a,h)anthracene	53-70-3	POM					1.52E-06	4.38E-05	1.09E-05	5.47E-05	0.000
Dichlorobenzene	26321-22-8						3.85E-07	1.11E-05	2.47E-06	1.24E-05	0.000
1,3-Dichloropropene	542-75-6		2.64E-05	2.24E-04	3.65E-04	2.91E-03					0.000
Ethyl benzene	100-41-4		3.97E-05	3.37E-04	5.48E-04	4.39E-03					0.004
Ethylene Dibromide	106-93-4		4.43E-05	3.77E-04	6.12E-04	4.90E-03					0.005
Fluoranthene	206-44-0	POM	1.11E-06	9.44E-06	1.53E-05	1.23E-04					0.000
Fluorene	86-73-7	POM	5.67E-06	4.82E-05	7.83E-05	6.27E-04					0.001
Formaldehyde	500-00-0		5.28E-02	4.49E-01	7.29E-01	5.83	1.18E-03	3.33E-02	8.32E-03	4.16E-02	5.477
Hexane	110-54-3		1.11E-03	9.44E-03	1.53E-02	1.23E-01	8.71E-04	2.46E-02	6.15E-03	3.08E-02	0.123
Indeno(1,2,3-cd)pyrene	193-39-5	POM					1.88E-06	5.31E-05	1.33E-05	6.64E-05	0.000
Lead											0.011
Methanol	67-56-1		2.48E-03	2.11E-02	3.43E-02	2.75E-01					0.276
Methylene Chloride	75-09-2		2.00E-05	1.70E-04	2.76E-04	2.21E-03					0.002
Naphthalene	91-20-3		1.44E-05	8.32E-04	1.49E-03	8.22E-03					0.913
Nickel											0.088
PAH			2.69E-05	2.29E-04	3.72E-04	2.97E-03					1.203
Phenanthrene	85-01-8	POM	1.04E-05	8.84E-05	1.44E-04	1.15E-03					0.003
Phenol	108-95-2		3.44E-05	2.84E-04	3.32E-04	2.65E-03					0.003
Propylene											0.100
Pyrene	129-00-0	POM	1.36E-06	1.16E-05	1.88E-05	1.50E-04					0.000
Styrene	100-42-5		2.36E-05	2.01E-04	3.26E-04	2.61E-03					0.003
Tetrachloroethane	25322-20-7		2.48E-05	2.11E-04	3.43E-04	2.74E-03					0.000
Toluene	108-88-3		4.08E-04	3.47E-03	5.64E-03	4.51E-02					0.855
Vinyl Chloride	75-01-4		1.49E-05	1.27E-04	2.06E-04	1.65E-03					0.002
Xylene	1330-20-7		1.84E-04	1.56E-03	2.54E-03	2.03E-02					0.227
		TOTAL		6.14E-01	9.97E-01	7.94	6.52E-03	1.96E-03	6.90E-03	0.2	16.69
							0.13	0.03	0.16	7.6	

[a] Emission Factors from AP-42 Section 3.2, Updated 7/2000. Emissions per engine (4 engines per Turbophase Module)

[b] Emission factors from AP-42, Section 3.4, 6/1996, except where noted

[c] Emissions from the air permit application from 2001 for the combustion turbines. Worst-case HAPs from fuel oil and natural gas operation. Updated formaldehyde emission factor and emissions. See below.

Formaldehyde Emissions Calculations for GTs

Chemical	CAS	Hours Per Year Per GT[a]	Emission Factor[b] (lb/MMBtu)	Emissions per GT (lb/hr)	Emissions per GT (tpy)	2 GTs (tpy)
Formaldehyde	500-00-0	6310	2.0E-04	0.32	1.32	2.64

(a) Hours from original GT air construction permit application.

(b) Formaldehyde emission factor from Sims Roy EPA Memo "Hazardous Air Pollutant (HAP) Emission Control Technology for New Stationary Combustion Turbines" 8/21/2001.

ATTACHMENT O –
MONITORING – RECORDKEEPING – REPORTING - TESTING

Attachment O – Monitoring, Recordkeeping, Reporting, Testing

TurboPhase Engines

The TurboPhase engines will be required by NSPS, Subpart JJJJ to perform certain testing, recordkeeping, and reporting. In addition, other recordkeeping will be performed to determine compliance with expected permit conditions.

Testing:

Because the TurboPhase engines are not certified, Pleasants Energy, LLC (Pleasants Energy) will conduct an initial performance test and subsequent performance tests every 8,760 hours or 3 years, whichever comes first, to demonstrate compliance. (§60.4234(b)(2)(ii))

Pleasants Energy will conduct all performance tests according to the requirements in §60.4244.

Recordkeeping:

Pleasants Energy will keep a maintenance plan and records of conducted maintenance, and will to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions (§60.4234(b)(2)(ii)). Pleasants Energy will also keep the records required by §60.4245(a)(1)-(4).

In addition, records of hours of operation will be kept for each TurboPhase System to show compliance with the 3,250 hours per year limitation per TurboPhase.

Reporting:

Pleasants Energy will comply with the notification requirements of §60.4245(c) for engines that are not certified. Pleasants Energy will comply with the reporting requirement outlined in §60.4245(d), which requires the owner or operator to submit a copy of each performance test within 60 days after the test has been completed. In addition, the requirements for reporting in NSPS, Subpart A will be followed, as applicable.

Generators

The diesel generators will have new requirements since they are now non-emergency per NSPS, Subpart JJJJ. Subpart JJJJ requires certain testing, recordkeeping, and reporting as outlined below. In addition, other recordkeeping will be performed to determine compliance with expected permit conditions.

Monitoring:

Pleasants Energy will comply with the monitoring requirements of §60.4211(a).

Recordkeeping:

Pleasants Energy will keep records of the required information specified in §60.4214(a)(2).

Reporting:

Pleasants Energy will submit an initial notification for non-emergency stationary compression ignition (CI) internal combustion engines (ICE) with the required information as per §60.4214(a)(1). In addition, the applicable reporting requirements in NSPS, Subpart A will be followed.

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that **Pleasants Energy, LLC** has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a **45CSR13 Construction Permit** for the installation of eight natural gas-fired engines to power two TurboPhase systems to increase the output of the existing combustion turbines, an increase in the hourly emission limits for the simple cycle combustion turbines (but no overall annual emissions increase), and the status change of five diesel generators from emergency status to non-emergency status. The facility is located on **Latitude: 21.384, Longitude: 79.910**, **10319 South Pleasants Highway**, **St. Marys**, in **Pleasants** County, West Virginia.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be: **NO_X: 39.41 tpy, CO: 8.67 tpy, VOC: 2.36 tpy, SO_2: 0.13 tpy, PM_{10}: 2.60 tpy, Total HAPs: 7.94 tpy**

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

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

Dated this the **Twenty-second** day of **June**, **2015**.

By: **Pleasants Energy, LLC**
Gerald Gatti
Plant Manager
10319 South Pleasants Highway
St. Marys, WV 26170

ATTACHMENT R –
AUTHORITY FORM

AUTHORITY OF LIMITED LIABILITY COMPANY (LLC)

TO: The West Virginia Department of Environmental Protection, Division of Air Quality

DATE: June 22, 2015

ATTN: Director

LLC's Federal Employer I.D. Number 26-3603167

The undersigned hereby files with the West Virginia Department of Environmental Protection, Division of Air Quality, a permit application and hereby certifies that the said name is a trade name which we are using in the conduct of an unincorporated business.

Further, we have agreed or certified as follows:

(1) The undersigned is a member and in that capacity may represent the interests of the LLC and may obligate and legally bind all current or future members and the LLC.

(2) The LLC is authorized to do business in the State of West Virginia.

(3) The name and business address of each member:

Member: Herman Schopman
Address: 1990 Post Oak Blvd, Suite 1900
Houston, TX 77056
Telephone No.: 713-636-0000

Member: Stefaan Sercu
Address: 1990 Post Oak Blvd, Suite 1900
Houston, TX 77056
Telephone No.: 713-636-0000

Member: Patrick Gaussent
Address: 1990 Post Oak Blvd, Suite 1900
Houston, TX 77056
Telephone No.: 713-636-0000

(4) If any other persons become members of the undersigned or our relations as such be altered in any way or if the business should become incorporated, the undersigned will notify you promptly.

MEMBER OF LLC (Signature)

Address:
1990 Post Oak Blvd, Suite 1900
Houston, TX 77056
Telephone No.: 713-636-0000

Herman Schopman
MEMBER OF LLC (Typed)

Pleasants Energy, LLC

State of West Virginia

Certificate

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

PLEASANTS ENERGY, LLC

was duly authorized under the laws of this state to transact business in West Virginia as a foreign limited liability company on December 17, 1999.

The company is filed as an at-will company, for an indefinite period.

I further certify that the LLC (PLLC) has not been revoked by the State of West Virginia nor has a Certificate of Cancellation been issued.

Therefore, I hereby issue this

CERTIFICATE OF AUTHORIZATION

Validation ID:0WV1X_44545

Given under my hand and the Great Seal of the State of West Virginia on this day of June 22, 2015

Natalie E Tennant

Secretary of State

Notice: A certificate issued electronically from the West Virginia Secretary of State's Web site is fully and immediately valid and effective. However, as an option, the issuance and validity of a certificate obtained electronically may be established by visiting the Certificate Validation Page of the Secretary of State's Web site, https://apps.wv.gov/sos/businessentitysearch/validate.aspx entering the validation ID displayed on the certificate, and following the instructions displayed. Confirming the issuance of a certificate is merely optional and is not necessary to the valid and effective issuance of a certificate.