MODIFICATION FOR MERCURY AND AIR TOXICS STANDARD COMPLIANCE WITH A SELECTIVE NON-CATALYTIC REDUCTION (SNCR) SYSTEM

Prepared for:

Morgantown Energy Associates
555 Beechurst Avenue
Morgantown, West Virginia 26505

Prepared by:

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Charleston, West Virginia 25304
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Project No. 0101-14-0438-001

November 2015

POTESTA

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Attachments not applicable to and not included in this application: Q and R

SECTION I - III

GENERAL APPLICANT INFORMATION

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):*
Morgantown Energy Associates

2. Federal Employer ID No. *(FEIN):*
550688011

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

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

5A. Applicant's mailing address:
555 Beechurst Avenue
Morgantown, WV 26505

5B. Facility's present physical address:
555 Beechurst Avenue
Morgantown, WV 26505

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: Not Applicable (NA)

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: Own
- ➪ 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.): Fossil Fuel Fired Cogeneration Facility

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

11A. DAQ Plant ID No. (for existing facilities only):
03-054-061-00027

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R13-1085B/R14-7B and R30-06100027-2014

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 Charleston, take Interstate 79 North to Exit 152. Bear right onto Fairmont Road (US-19) approximately 1.9 miles. Turn right onto Holland Avenue (US-19) approximately 1.4 miles to University Avenue. Turn left onto Beechurst Avenue and the facility is located on the left approximately 0.8 miles.

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
NA	Morgantown	Monongalia
12.E. UTM Northing (KM): 4,388.10	12F. UTM Easting (KM): 589.20	12G. UTM Zone: 17

13. Briefly describe the proposed change(s) at the facility:
Process adjustments and Selective Non-Catalytic Reduction (SNCR) system to meet Mercury and Air Toxics Standards (MATS) (40CFR63, Subpart UUUUU) requirements.

14A. Provide the date of anticipated installation or change: 11/1/2015 – 2/28/2016 ➪ If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: Project commenced in accordance with WVDEP MATS extension dated 12/15/2014 and related MEA correspondence.	14B. Date of anticipated Start-Up if a permit is granted: 1/5/2016 – 2/28/2016

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:
24 Hours Per Day 7 Days Per Week 52 Weeks Per Year

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.
MEA is not currently, and with the proposed permit modifications will not be, subject to RMP.

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	☐ Storage Tanks
☐ Grey Iron and Steel Foundry	☐ Indirect Heat Exchanger	
☒ General Emission Unit, specify		

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 SNCR. See information in Appendix 2.

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 Todd Shirley *(Please use blue ink)* DATE: 11/19/2015 *(Please use blue ink)*

35B. Printed name of signee: Todd Shirley		35C. Title: Projects General Manager
35D. E-mail: tshirley@ppmsllc.com	36E. Phone: (704) 815-8022	36F. FAX: (704) 815-8062
36A. Printed name of contact person (if different from above): Josh Manley		36B. Title: Environmental Specialist
36C. E-mail: josh.manley@morgantownenergy.com	36D. Phone: (304) 284-2518	36E. FAX: (304) 284-2509

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.

ATTACHMENT A

BUSINESS CERTIFICATE

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
MORGANTOWN ENERGY ASSOCIATES
555 BEECHURST AVE
MORGANTOWN, WV 26505-4906

BUSINESS REGISTRATION ACCOUNT NUMBER: **1040-5448**

This certificate is issued on: **06/11/2010**

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with W.Va. Code § 11-12.

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

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

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

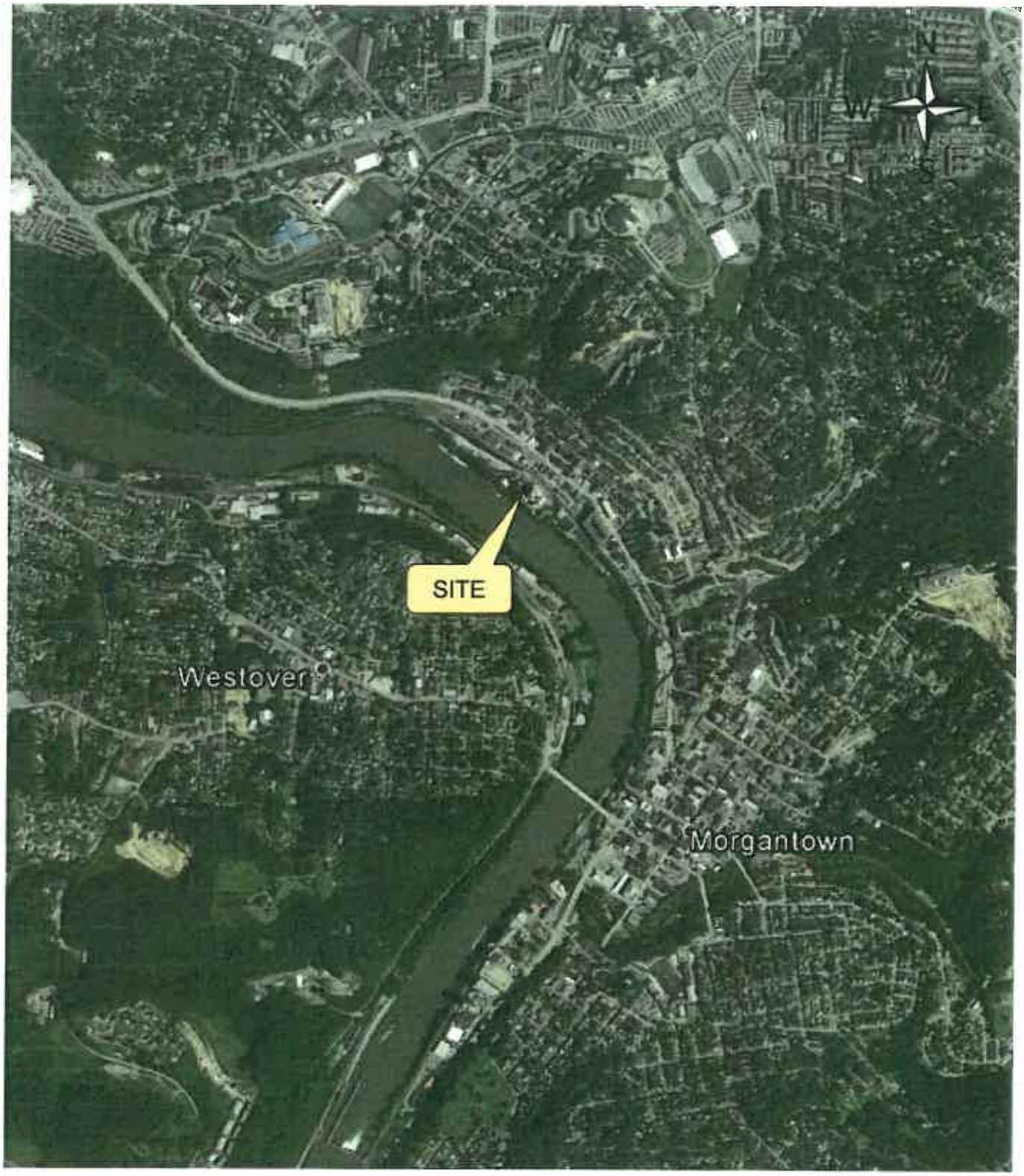
Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

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

atL006 v.1
L1371413248

ATTACHMENT B

AREA MAP



POTESTA
Engineering and Environmental Consultants

DATE: August 2015

PROJECT NO. 0101-14-0438-001

MAPPING FOR VISUAL REPRESENTATION ONLY

SITE LOCATION MAP
MORGANTOWN ENERGY ASSOCIATES
MORGANTOWN, MONONGALIA COUNTY, WV

NOT TO SCALE

ATTACHMENT C

INSTALLATION AND STARTUP SCHEDULE

ATTACHMENT C

INSTALLATION AND STARTUP SCHEDULE

The installation associated with this application is for the addition of a control device, selective non-catalytic reduction (SNCR) system, to control nitrogen oxide emissions. The installation is being driven by requirements under the Mercury and Air Toxics Standard, 40CFR63, Subpart UUUUU. Installation needs to proceed as soon as possible in the beginning of the fourth quarter of 2015. Startup of the SNCR system will occur immediately following installation and receipt of the approvals and or permits.

ATTACHMENT D

REGULATORY DISCUSSION

ATTACHMENT D

REGULATORY DISCUSSION

The revision to the permit being required herein is to make a control device federally enforceable which will allow Morgantown Energy Associates (MEA) to utilize the control of, and take credit for, the reduction in emissions. The addition of the selective non-catalytic reduction system (SNCR) is being driven in part by the requirements of *40CFR60, Part 63, Subpart UUUUU – National Emissions Standards for Hazardous Air Pollutants: Coal and Oil Fired Electric Utility Steam Generating Units* also known as the "Utility MATS" or "MATS". The fluid bed combustors at MEA are subject to the standard. In order to comply with the lower SO2 limits under MATS, the facility will increase limestone injection rates. This increase in limestone feed results in a catalytic increase in nitrogen oxide emissions. The SNCR system will allow the facility to comply with the combination of the lower SO2 emissions limit and the existing NOx emissions limit.

Prevention of Significant Deterioration (PSD)

There is no physical change to any of the plant systems except the addition of the SNCR. We reviewed the possibility that the addition of the SNCR system and change in the method of operation could trigger PSD and the results are attached as an appendix to this application. The result was that the revisions did not trigger PSD. This review was on a past actual (with emissions that could have been accommodated) to future actuals over a 5-year period. We are requesting the emissions limits, except for SO2, remain at the current limits and the future actuals that are projected will be tracked as needed.

40CFR60, Part 63, Subpart UUUUU – National Emissions Standards for Hazardous Air Pollutants: Coal and Oil Fired Electric Utility Steam Generating Units (MATS)

MEA is a West Virginia General Partnership with one location in Morgantown, West Virginia. The facility provides cogeneration services (steam and electric production) that supply steam to West Virginia University and the WVU medical center facilities and electric energy to MonPower, a subsidiary of FirstEnergy. The facility has two circulating fluidized bed (CFB) boilers identified as S009J and S009K which meet the definition of a source under the MATS regulation. The boilers are:

Ahlstrom Pyroflow CFB Boiler/Cyclone #1 S009J, 375 MMBTU/hr
Ahlstrom Pyroflow CFB Boiler/Cyclone #2 S009K, 375 MMBTU/hr

These boilers are considered existing units under the MATS regulation as construction commenced prior to May 3, 2011 and the boilers have not been reconstructed. Although these are separate CFB boilers, they have a common discharge stack which is identified as Stack 1.

The MATS compliance strategy has been selected on the basis of Filterable Particulate Matter (PM), Sulfur Dioxide (SO2), and Mercury (Hg). We have evaluated the facility and determined that the compliance strategy will include complying with the following standards:

- Filterable Particulate Matter (PM) – 0.015 lb/MMBtu (40 CFR 63.10005 (h)(1)(i)) using low emitting electric utility steam generating units (LEE) testing in lieu of Total non-Hg HAP metals or Individual HAP metals. If the units meet LEE, then the LEE compliance track will be followed. If the units do not meet the LEE requirement, then the facility will need to demonstrate compliance with the PM limit which must be demonstrated through continuous monitoring performance through the use of particulate matter continuous parametric monitoring system, or a PM CEMS, or compliance performance testing which is repeated on a quarterly basis and 0.03 lb/MMBtu.
- Sulfur dioxide (SO2) – 0.20 lb/MMBtu (40 CFR Table 2 to Subpart UUUUU of Part 63) using an existing continuous emissions monitoring system along with a flue gas desulfurization system. This control strategy includes the existing limestone injection system for flue gas desulfurization which requires compliance/adherence to §63.9991(c)(1) and (2).
- Mercury (Hg) – 0.12 lb/TBtu or PTE ≤29.0 lb/yr (per unit) and 1.2 lb/TBtu using LEE testing (40 CFR 63.10005 (h)(1)(ii)(B)). The mercury limit under MATS is 1.2 lb/TBtu. If the units do not meet LEE requirements, then the facility will have to install and operate Hg CEMS or a sorbent trap monitoring system.
- Work Practices and Standards for Tune-up of Burner and Combustion Controls – the facility is required to tune up the EGU (Electric Generating Unit) burner and the combustion controls. The initial tune-up is required by October 12, 2016 with subsequent tune-ups each 36 months. The site obtained a one year extension.
- Work Practice Standards for Startups and Shutdowns – the facility has to operate the continuous monitoring systems for the CFB boilers during periods of startups and shutdowns. The startup is on natural gas; once coal is fired all of the required controls must be engaged after permissive temperatures are achieved.

LEE for Filterable Particulate Matter (PM) and Mercury

It is anticipated that the facility as it operates will qualify as LEE for filterable Particulate Matter (PM) and Mercury. Therefore, there are no changes in the control strategy to meet these limits.

MATS Sulfur Dioxide Limit

Meeting the MATS sulfur dioxide (SO2) limit of 0.20 lb/MMbtu will require operational changes. To meet the SO2 requirement, the feed of the limestone needs to increase by 10 to 30%. The limestone system is currently designed and permitted for the anticipated feed rates. This adjustment requires the fuel feed to increase by an estimated 1 to 3% to allow for the calcination of the limestone.

With the increase in limestone and fuel feed, the fuel nitrogen will increase and the emissions of nitrogen oxides. These emissions will fluctuate based on fuel composition and ambient

conditions. To meet the MATS specified permit limits for SO2 emissions and the existing NOx emissions limits, a SNCR system is being proposed. The historical NOx emissions rates vary due to the non-homogenous nature of waste coal and or coal fuel source; therefore, the SNCR system is not anticipated to be required during all operating hours.

Cross State Air Pollution Rule (CSAPR)

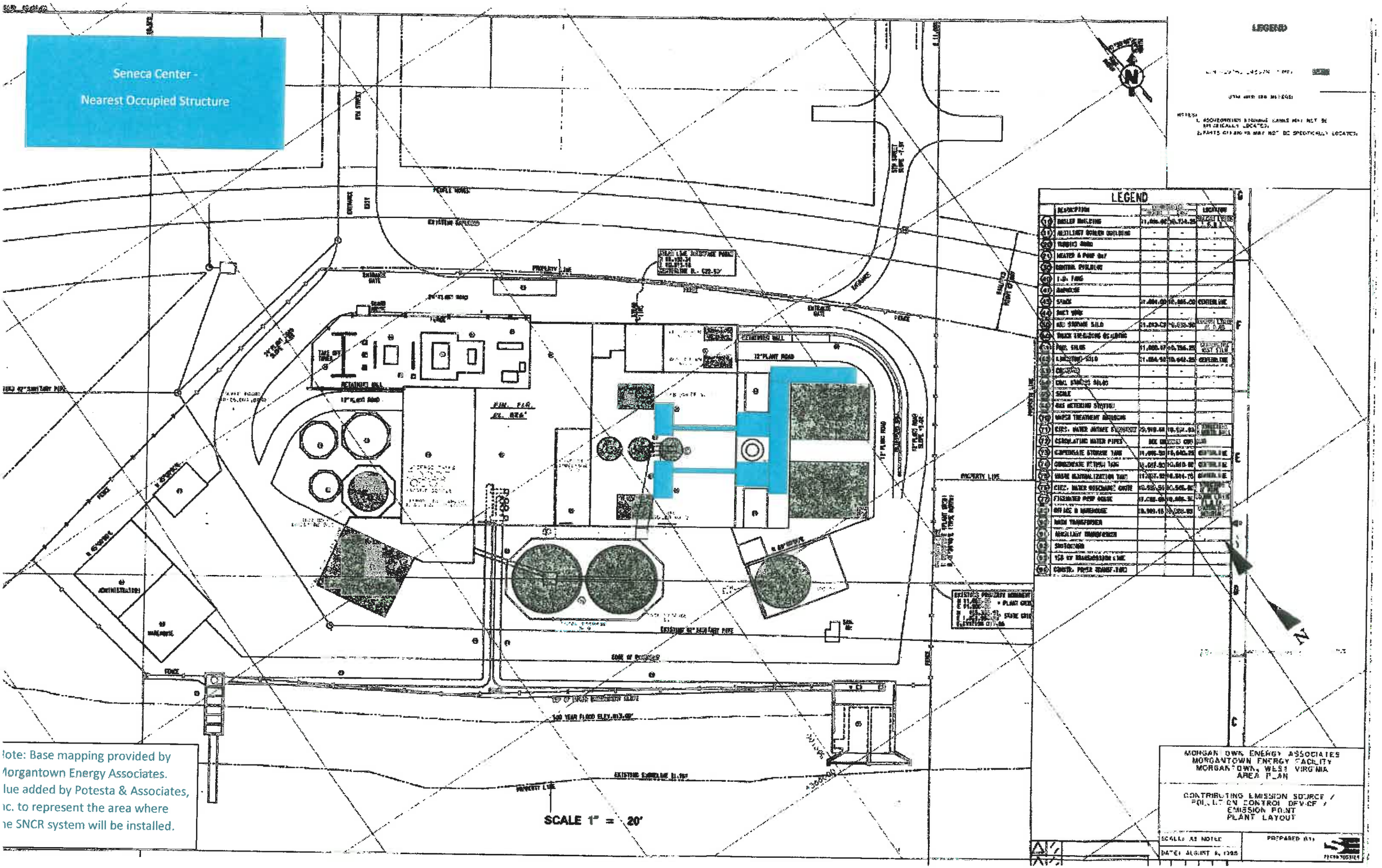
The Cross State Air Pollution Rule (CSAPR) replaced the Clean Air Interstate Rule (CAIR) under which we were subject to the CAIR NOx Annual Trading Program, the CAIR NOx Ozone Season Trading Program, and the CAIR SO2 Trading Program. With this application we are requesting that the change from CAIR to CSAPR be made within the Title V permit when the permit is updated for the installation of the SNCR system.

ATTACHMENT E

PLOT PLAN

Seneca Center -

Nearest Occupied Structure

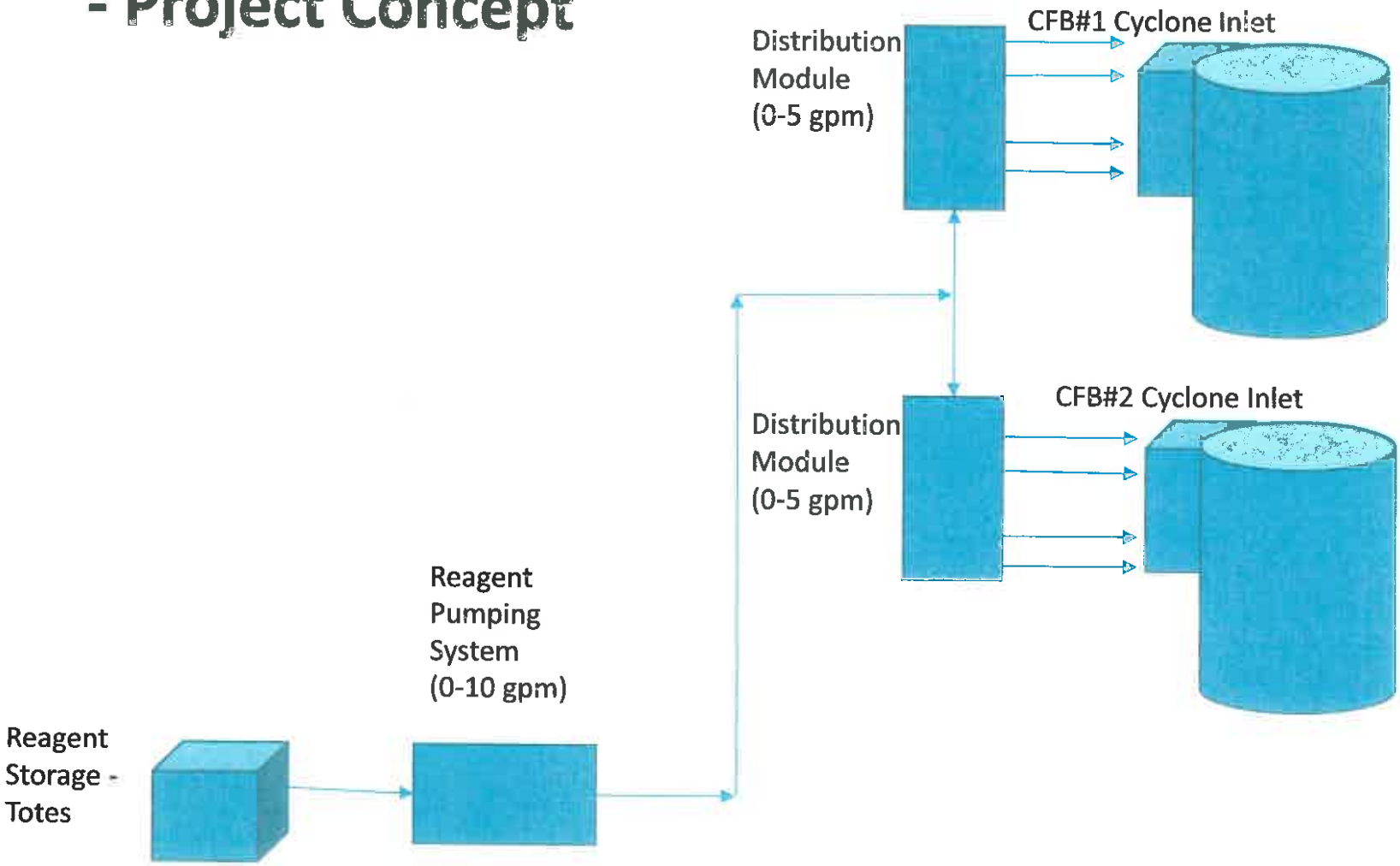


Note: Base mapping provided by Morgantown Energy Associates. Blue added by Potesta & Associates, Inc. to represent the area where the SNCR system will be installed.

ATTACHMENT F

DETAILED PROCESS FLOW DIAGRAM

Morgantown SNCR - Project Concept



ATTACHMENT G

PROCESS DESCRIPTION

ATTACHMENT G

PROCESS DESCRIPTION

MEA will continue operations at the facility as they currently exist. The only physical change at the facility is the installation of an additional control device. A selective non-catalytic reduction system (SNCR) has been designed to aid in maintaining compliance with the nitrogen oxide emission. The system will utilize either urea or aqueous ammonia and will inject into the Circulating Fluidized Bed (CFB) flue gas. As stated in the regulatory section, the SNCR system is being installed due to two factors: (1) increased limestone feed to the system to meet the MATS requirements and (2) natural fluctuation of nitrogen in the feed. The SNCR will be used in conjunction with the NOx CEMS to trim NOx emissions to the permit limit.

The system is a simple injection system. Storage of urea or aqueous ammonia is estimated to be less than 1500 gallons. Injection portals will be installed in the flue. The urea or aqueous ammonia will be pumped from storage into the injection portals at a rate required to trim the NOx emissions below the permit limits.

Additionally, there is more limestone and coal gob being fed into the system to meet the MATS SO2 limit. This is being accomplished within the existing feed rates of the equipment and the total feed tonnage to the plant; therefore, there is no increase in potential emissions associated with these activities.

Emissions limits for CFB #1 and #2 need to be adjusted to meet the MATS requirements as follows:

Pollutant	Requirement
Sulfur Dioxide (SO_2)	0.20 lb/MM Btu
Filterable Particulate Matter (FPM)	0.03 lb/MM Btu
Mercury	1.2 lb/T Btu

ATTACHMENT H

MATERIAL SAFETY DATA SHEETS

1. **Aqueous Ammonia (less than 19%)**
2. **Urea**

CDI
Cervantes~Delgado, Inc.

MATERIAL SAFETY DATA SHEET

Product Name: CDI-High Purity Urea Solution, 50% (CDI HP-50)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	CDI-High Purity Urea Solution, 50% (CDI HP-50)
Generic Name:	Urea, Aqueous Solution
Chemical Family:	Organic Salt Solution

Responsible Party: Cervantes~Delgado, Inc.
P.O. Box 9083
Brea, California 92822

For further information contact MSDS Coordinator
8am -4pm Pacific Time, Mon- Fri: 714-990-3940

EMERGENCY OVERVIEW

24 Hour Emergency Telephone Numbers:

For Chemical Emergencies:
Spill, Leak, Fire or Accident
Call CHEMTREC
North America: (800)424-9300
Others: (703)527-3887 (collect)

For Health Emergencies:
California Poison
Control System
Cont. US: (800)356-3129
Outside US: (415)821-5338

Health Hazards: Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.

Physical Hazards: None Anticipated
Physical Form: Liquid
Appearance: Colorless, clear
Odor: None to slight ammonia
Hazard Rating NFPA 704M / HMIS:

Health:	1 / 1
Flammability:	0 / 0
Reactivity:	0 / 0
Other:	0/

0 = Insignificant, 1= Slight, 2 = Moderate, 3 = High, 4 = Extreme

2. COMPOSITION/INFORMATION ON INGREDIENTS

No hazardous components identified per 29 CFR 1910.1200.

OTHER COMPONENTS	% Weight	EXPOSURE GUIDELINE Limits	Agency	Type
Urea CAS# 57-13-6	49-51	Not Established		
Water CAS# 7732-18-5	49-51	Not Established		
Methylenediurea* CAS# 13547-17-6	0.5-1.25	Not Established		

*Methylenediurea is in the class of materials known as Urea, reaction products (CAS# 68611-64-3).

Note: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

3. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS:

Eye: Contact may cause mild eye irritation including stinging, watering, and redness.

Skin: Contact may cause mild skin irritation including redness and burning. No harmful effects from skin absorption have been reported.

Inhalation (Breathing): No information available. Studies by other exposure routes suggest a low degree of toxicity by inhalation.

Ingestion (Swallowing): No harmful effects reported from ingestion.

Signs and Symptoms: Effects of overexposure may include irritation of the nose, throat and digestive tract, headaches, coughing, nausea, vomiting, and transient disorientation.

Cancer: Inadequate evidence available to evaluate the cancer hazard of this material.

Target Organs: No data available.

Developmental: Inadequate evidence available for this material.

Pre-Existing Medical Conditions: None known.

4. FIRST AID MEASURES

Eye: If irritation or redness develops, move victim away from exposure and into fresh air. Flush eyes with clean water. If symptoms persist, seek medical attention.

Skin: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with mild soap and water. If irritation or redness develops and persists, seek medical attention.

Inhalation (Breathing): If respiratory develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention. If victim is not breathing, clear airway and immediately begin artificial respiration. If breathing difficulties develop, oxygen should be administered by qualified personnel. Seek immediate medical attention.

Ingestion (Swallowing): First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

5. FIRE FIGHTING MEASURES

Flammable Properties: Flash Point: None to boiling
OSHA Flammability Class: Not applicable
LEL/UEL: No data
Autoignition Temperature: No data

Unusual Fire & Explosion Hazards: Closed containers exposed to extreme heat can rupture due to pressure buildup.

Extinguishing Media: Use extinguishing agent suitable for type of surrounding fire.

Fire Fighting Instructions: For fires beyond the incipient stage, emergency responders in the immediate hazard area should wear bunker gear. When the potential chemical hazard is unknown, in enclosed or confined spaces, or when explicitly required by DOT, a self-contained breathing apparatus should be worn. In addition, wear other appropriate protective equipment as conditions warrant (see Section 8). Isolate immediate hazard area and keep unauthorized personnel out. Stop spill/release if it can be done with minimal risk. Move undamaged containers from immediate hazard area if it can be done with minimal risk. Water spray may be useful in minimizing or dispersing vapors. Cool equipment exposed to fire with water, if it can be done with minimal risk.

6. ACCIDENTAL RELEASE MEASURES

Stop the source of the release if it can be done without risk. Immediately isolate the hazard area and restrict access to authorized personnel only. Wear appropriate protective equipment including respiratory protection as conditions warrant (see Section 8). To prevent spilled material from entering sewers, storm drains or natural watercourses, contain material with a dike or with appropriate absorbent materials such as sand, clay, soil or commercially available absorbent. Place reclaimed liquid and absorbent into recovery or salvage drums for disposal. Refer to Section 12 for appropriate disposal.

7. HANDLING AND STORAGE

Handling: Do not enter confined spaces such as tanks or pits without following proper entry procedures such as ASTM D-4276 and 29CFR 1910.146. The use of appropriate respiratory protection is advised when concentrations exceed any established exposure limits (see Section 2 and 8). Wash thoroughly after handling. Do not wear contaminated clothing or shoes. Use good personal hygiene practice.

Storage: Keep container(s) tightly closed. Do not heat or contact with strong oxidizers. Use and store this material in cool, dry, well- ventilated areas. Do not store at temperatures below 40°F. Store only in approved containers. Keep away from any incompatible material (see Section 10). Protect container(s) against physical damage.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: If current ventilation practices are not adequate to minimize exposure, additional ventilation or exhaust systems may be required.

Personal Protective Equipment (PPE):

Respiratory: Respiratory protection is not usually required. If significant spray or mist occurs, wear a NIOSH approved or equivalent dust respirator.

Skin: The use of gloves impermeable to the specific material handled is advised to prevent skin contact, possible irritation, and absorption (see glove manufacturer for information on permeability)

Eye/Face: Approved eye protection to safeguard against potential eye contact, irritation, or injury is recommended. Depending on conditions of use, a face shield may be necessary.

Other Protective Equipment: A source of clean water should be available in the work area for flushing eyes and skin. Impervious clothing should be worn as needed.

9. PHYSICAL AND CHEMICAL PROPERTIES

Note: Unless otherwise stated, values are determined at 20°C (68°F) and 760 mm Hg (1 atm).

Flash Point:	None to boiling
Flammable/Explosive Limits (%):	Not Applicable
Autoignition Temperature:	Not Applicable
Appearance:	Colorless, Clear Physical State: Liquid
Odor:	None to slight ammonia
pH:	7.5 - 9.5
Vapor Pressure (mm Hg):	Not Applicable
Vapor Density (air=1):	0.6 H_2O, >1
Aerosol Boiling Point:	>212°F
Freezing/Melting Point:	No data
Solubility in Water:	100%
Specific Gravity:	1.14
Evaporation Rate (nBuAc=1):	<1
Bulk Density:	9.5 lb/gal

10. STABILITY AND REACTIVITY

Chemical Stability: Stable under normal conditions of storage and handling.

Conditions To Avoid: None known

Incompatible Materials: Avoid contact with strong oxidizing agents such as chlorine (bleach), peroxides, chromates, nitric acid, perchlorates, concentrated oxygen or permanganates. Contact can generate heat, fires, explosions and release toxic fumes.

Hazardous Decomposition Products: If involved in a fire, oxides of carbon and nitrogen may be generated; exposure to heat may generate ammonia fumes.

Hazardous Polymerization: will not occur.

11. TOXICOLOGICAL INFORMATION

No definitive information available on carcinogenicity, mutagenicity, target organs or developmental toxicity.

12. DISPOSAL CONSIDERATIONS

This material, if discarded as produced, is not a RCRA "listed" or "characteristic" hazardous waste. Use resulting in chemical or physical change or contamination may subject it to regulation as a hazardous waste. Along with properly characterizing all waste materials consult state and local regulations regarding the proper disposal of this material.

Disposal: If this product becomes a waste, it does not meet the criteria of a hazardous waste as defined under the Resource Conservation and Recovery Act (RCRA) 40 CFR 261, since it does not have the characteristics of Subpart C, nor is it listed under Subpart D. As a non-hazardous liquid waste, it should be solidified with stabilizing agents such as sand, fly ash, or clay absorbent, so that no free liquid remains before disposal to an industrial waste landfill.

13. TRANSPORT INFORMATION

Hazard Class or Division: Not classified as hazardous

14. REGULATORY INFORMATION

This material contains the following chemicals subject to the reporting requirements of **SARA 313** and **40 CFR 372.**

--None--

Warning: This material contains the following chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm, and are subject to the requirements of **California Proposition 65** (CA Health & Safety Code Section 25249.5)

--None Known—

This material has not been identified as a carcinogen by NTP, IARC, or OSHA.

EPA (CERCLA) Reportable Quantity: --None--

15. DOCUMENTARY INFORMATION

Issue Date: 12/15/05
Previous Issue Date: 02/01/04

16. DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

The information in this document is believed to be correct as of the date issued. **HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY OTHER WARRANTY IS EXPRESSED OR IS TO BE IMPLIED REGARDING THE ACCURACY OR COMPLETENESS OF THIS INFORMATION, THE RESULTS TO BE OBTAINED FROM THE USE OF THIS INFORMATION OR THE PRODUCT, THE SAFETY OF THIS PRODUCT, OR THE HAZARDS RELATED TO ITS USE.** This information and product are furnished on the condition that the person receiving them shall make his own determination as to the suitability of the product for his particular purpose and on the condition that he assume the risk of his use thereof.

Tanner Industries, Inc.

SAFETY DATA SHEET

Section 1. Identification

Product Name:	**Ammonium Hydroxide**
Synonyms:	Ammonium Hydroxide Solutions, Aqua Ammonia, Aqua Ammonia Solutions, Ammonia Solutions, Ammonia Aqueous, Ammonia Water
CAS REGISTRY NO:	1336-21-6
Supplier:	Tanner Industries, Inc. 735 Davisville Road, Third Floor Southampton, PA 18966
Website:	www.tannerind.com
Telephone (General):	215-322-1238
Corporate Emergency Telephone Number:	**800-643-6226**
Emergency Telephone Number:	**Chemtrec: 800-424-9300**
Recommended Use:	Various Industrial

Section 2. Hazard(s) Identification

Hazard: Acute Toxicity, Corrosive, Acute Aquatic Toxicity

Classification: Acute Toxicity, Inhalation (Category 4)
Acute Toxicity, Oral (Category 4)
Skin Corrosion (Category 1B)
Serious Eye Damage / Irritation (Category 1)
Acute Aquatic Toxicity (Category 1)

Note: (1 - Most Severe / 4 - Least Severe)

Pictogram:

Signal word: **Danger**

Hazard statements:
Harmful if inhaled.
Harmful if swallowed.
Causes severe skin burns and eye damage.
Very toxic to aquatic life.

Precautionary statements:
Avoid breathing mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Do not eat, drink or smoke when using this product.
Wear protective gloves, protective clothing, eye protection, face protection.

Precautionary statements (continued):

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a doctor/physician and seek medical attention for severe exposure or if symptoms persist. Specific treatment, see supplemental first aid instructions in Section 4 (First Aid Measures).
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. Call a poison center/doctor/physician. See supplemental first aid instructions in Section 4 (First Aid Measures).
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower (minimum of 20 minutes). See supplemental first aid instructions in Section 4 (First Aid Measures).
IF IN EYES: Immediately call a doctor/physician and seek medical attention. Rinse continuously with water for several minutes (minimum of 20 minutes). Specific treatment, see supplemental first aid instructions in Section 4 (First Aid Measures).
Wash contaminated clothing before reuse.
Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Dispose of contents/container in accordance with local, regional, national regulations as applicable. See section 13 (Disposal Considerations).

NFPA Rating:

NFPA Numbering System:
0 = Least Hazardous / 4 = Most Hazardous

HMIS Classification:

AMMONIUM HYDROXIDE	
HEALTH	3
FLAMMABILITY	1
REACTIVITY	0
PERSONAL PROTECTION	H

HMIS Hazard Index:
0 = Minimal, 1 = Slight, 2 = Moderate, 3 = Serious, 4 = Severe

Section 3. Composition / Information on Ingredients

CHEMICAL NAME: Ammonium Hydroxide (Ammonium Hydroxide Solutions 10% to 30%)
CAS REGISTRY NO: 1336-21-6
SYNONYMS: Ammonium Hydroxide Solutions, Aqua Ammonia, Aqua Ammonia Solutions, Ammonia Solutions, Ammonia Aqueous, Ammonia Water.
CHEMICAL FAMILY: Inorganic nitrogen compounds.
COMPOSITION: Solutions: Anhydrous Ammonia (10% to 30%); Water (90% to 70%); Density: 16° Baume to 26° Baume.

Ammonia, Anhydrous: CAS # 7664-41-7; Water: CAS# 7732-18-5

Section 4. First Aid Measures

IF INHALED: Immediately remove person to fresh air and keep comfortable for breathing. In case of severe exposure or if irritation persists, breathing difficulties or respiratory symptoms arise, seek medical attention. If not breathing, administer artificial respiration. If trained to do so, administer supplemental oxygen, if required.
IF ON SKIN (or hair): Immediately take off all contaminated clothing. Flush skin with copious amounts of tepid water for a minimum of 20 minutes. Do not rub or apply topical, occlusive compounds, such as ointments, certain creams, etc., on affected area. For severe exposure or if irritation persists, seek medical attention. Wash contaminated clothing before reuse.
IF IN EYES: Immediately rinse continuously with copious amounts of tepid water for a minimum of 20 minutes. Eyelids should be held apart and away from eyeball for thorough rinsing. Seek medical attention.
IF SWALLOWED: Rinse mouth. Do not induce vomiting. If conscious, give large amounts of water to drink. May drink orange juice, citrus juice or diluted vinegar (1:4) to counteract ammonia. If unconscious, do not give anything by mouth. Seek medical attention.

NOTE TO PHYSICIAN: Respiratory injury may appear as a delayed phenomenon. Pulmonary edema may follow chemical bronchitis. Supportive treatment with necessary ventilation actions, including oxygen, may warrant consideration.

Section 5. Fire Fighting Measures

EXTINGUISHING MEDIA:
Water Spray, Water Fog for escaping ammonia gas.

SPECIAL FIRE FIGHTING PROCEDURES:
Must wear protective clothing and a positive pressure SCBA.
Stop flow of liquid if possible.
Use water spray to keep fire-exposed containers cool.
If a portable container (such as a drum, Intermediate Bulk Container [IBC] or trailer) can be moved from the fire area without risk to the individual, do so to prevent the pressure relief valve from discharging or the container from failing.
Stay upwind when containers are threatened.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
When heated, product will give off ammonia vapor, which is a strong irritant to the eye, skin and respiratory tract.
Outdoors, ammonia is not generally a fire hazard. Indoors, in confined areas, ammonia vapors may be a fire hazard, especially if oil or other combustible materials are present.
Combustion may form toxic nitrogen oxides (NOx).

Section 6. Accidental Release Measures

GENERAL:
Only properly trained and equipped persons should respond to an ammonium hydroxide release.
Wear eye, hand and respiratory protection and protective clothing; see Section 8, Exposure Controls / Personal Protection.
Stop source of leak if possible, provided it can be done in a safe manner.
Leave the area of a spill by moving laterally and upwind.
Isolate the affected area. Non-responders should evacuate the area, or shelter in place.

SPECIFIC STEPS TO BE TAKEN:
For a hazardous material release response, Level A and/or Level B ensemble including positive-pressure SCBA should be used. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm (IDLH).
Stay upwind and use water spray downwind of container to absorb the evolved gas.
Contain spill and runoff from entering drains, sewers, streams, lakes and water systems by utilizing methods such as diking, containment, and absorption.

Section 7. Handling and Storage

SPECIAL PRECAUTIONS:
Only trained persons should handle ammonium hydroxide.
Store in cool, dry and well-ventilated areas, with containers tightly closed.
Keep out of direct sunlight and away from heat sources.
Do not use any non-ferrous metals such as copper, brass, bronze, aluminum, tin, zinc or galvanized metals.
Protect containers from physical damage.
Closed storage tanks should be provided with safety relief valves and vacuum breakers as necessary.

VENTILATION:
Local exhaust should be sufficient to keep ammonia vapor below applicable exposure standards.

WORKPLACE PROTECTIVE EQUIPMENT:
Protective equipment should be stored near, but outside of ammonium hydroxide area. Water for first aid, such as an eyewash station and safety shower should be kept available in the immediate vicinity.

Section 8. Exposure Controls / Personal Protection

EXPOSURE LIMITS FOR AMMONIA: (Vapor)

OSHA	50 ppm,	35 mg / m^3 PEL	8 hour TWA
NIOSH	35 ppm,	27 mg / m^3 STEL	15 minutes
	25 ppm,	18 mg / m^3 REL	10 hour TWA
	300 ppm,	IDLH	
ACGIH	25 ppm,	18 mg / m^3 TLV	8 hour TWA
	35 ppm,	27 mg / m^3 STEL	15 minutes

PROTECTIVE EQUIPMENT:

EYE/FACE PROTECTION: Chemical splash goggles should be worn when handling ammonium hydroxide (aqua ammonia). A face shield can be worn over chemical splash goggles as additional protection. Do not wear contact lenses when handling ammonium hydroxide. Refer to 29 CFR 1910.133 for OSHA eye protection requirements.

SKIN PROTECTION: Ammonia impervious gloves and clothing (such as neoprene, butyl and Teflon) should be worn to prevent contact during normal operations, such as loading/unloading, transfers, and handling small spills.
Chemical boots can be worn as additional protection.

RESPIRATORY PROTECTION: Respiratory protection approved by NIOSH for ammonia must be used when applicable safety and health exposure limits are exceeded. For escape in emergencies, NIOSH approved respiratory protection should be used, such as a full-face gas mask and canisters/cartridges approved for ammonia or SCBA. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm (IDLH).
Refer to 29 CFR 1910.134 and ANSI: Z88.2 for OSHA respiratory protection requirements.

VENTILATION: Local exhaust should be sufficient to keep ammonia vapor below applicable exposure standards.

FOR A HAZARDOUS MATERIAL RELEASE RESPONSE: Level A and/or Level B ensemble including positive-pressure SCBA should be used. A positive pressure SCBA is required for entry into ammonia atmospheres at or above 300 ppm (IDLH).

Section 9. Physical and Chemical Properties

APPEARANCE AND ODOR:	Colorless liquid with a pungent odor.
ODOR THRESHOLD:	2 - 5 ppm
SOLUBILITY IN WATER:	Miscible
SPECIFIC GRAVITY OF VAPOR (air = 1):	0.596 at 32 °F
WEIGHT (per gallon):	7.46 pounds to 7.99 pounds
EVAPORATION RATE (water = 1):	Similar
PH:	13+
FORMULA:	NH_4OH ($NH_3 + H_2O$)
MOLECULAR WEIGHT:	35.05 (NH_4OH)
VISCOSITY:	1.7 40 °F (26% solution)
PARTITION COEFFIENT:	Not applicable.
DECOMPOSITION TEMPERATURE:	Not applicable.
FLAMMABILITY:	
FLASHPOINT:	Not applicable.
FLAMMABLE LIMITS OF AMMONIA VAPOR IN AIR:	LEL/UEL 16% to 25% (listed in the *NIOSH Pocket Guide to Chemical Hazards* 15% to 28%).
AUTO-IGNITION TEMPERATURE (ammonia vapors):	1,204 °F (If catalyzed). 1,570 °F (If un-catalyzed).

SOLUTION-SPECIFIC PHYSICAL DATA:

	20.5° Baume	25° Baume	26° Baume
AMMONIA PERCENTAGE:	18.5% to 19.5%	26.5% to 27.5%	29.4% to 30.0%
WATER PERCENTAGE:	81.5% to 80.5%	73.5% to 72.5%	70.6 % to 70.0%
SPECIFIC GRAVITY (water = 1):	0.9309 to 0.9278 at 60 °F	0.9060 to 0.9030 at 60 °F	0.8974 to 0.8957 at 60 °F
APPROXIMATE BOILING POINT:	120 °F at 14.7 psia	88 °F at 14.7 psia	84.9 °F at 14.7 psia
VAPOR PRESSURE:	3.9 psia at 60 °F	6.9 psia at 60 °F	9.1 psia at 60 °F
APPROXIMATE FREEZING POINT:	-31 °F	-89 °F	-110 °F

Section 10. Stability and Reactivity

REACTIVITY:
Avoid ammonium hydroxide contact with chemicals such as mercury, chlorine, iodine, bromine, silver oxide or hypochlorites; they can form explosive compounds. Ammonia reacts with strong oxidizers, acids, halogens (including chlorine bleach), and salts of silver, zinc, copper, and other heavy metals.

CHEMICAL STABILITY:
Stable under normal ambient conditions of temperature and pressure.
Will not polymerize.

POSSIBILITY OF HAZARDOUS REACTIONS:
Ammonium hydroxide will react exothermically with acids.
Ammonia vapors are released when heated.

CONDITIONS TO AVOID:
Avoid ammonium hydroxide contact with chlorine, which forms a chloramine gas, which is a primary skin irritant and sensitizer.

INCOMPATIBLE MATERIALS:
Ammonium hydroxide has a corrosive reaction with galvanized surfaces, copper, brass, bronze, aluminum alloys, mercury, gold and silver.

HAZARDOUS DECOMPOSITION PRODUCTS:
Ammonia will be liberated if heated. Hydrogen will be released on heating ammonia above 450 °C (842 °F).

Section 11. Toxicological Information

Potential health effects: Ammonia is an irritant and corrosive to the skin, eyes, respiratory tract and mucous membranes. May cause severe chemical burns to the eyes, lungs and skin. Skin and respiratory related diseases could be aggravated by exposure. The extent of injury produced by exposure to ammonia depends on the duration of the exposure, the concentration of the liquid or vapor and the depth of inhalation.

Exposure Routes: Inhalation (vapors), skin and/or eye contact (vapors, liquid), ingestion (liquid).

Symptoms of acute exposure:

Inhalation:	Acute exposure to vapor may result in severe irritation of the respiratory tract. May cause dyspnea (breathing difficulty), wheezing, chest pain, bronchospasm, pink frothy sputum, pulmonary edema or respiratory arrest. Respiratory injury may appear as a delayed phenomenon. Pulmonary edema may follow chemical bronchitis.
Eyes:	Vapors may cause irritation. Effects of direct contact may range from irritation and lacrimation (tearing) to severe corrosive injury and blindness.
Skin:	Irritation, corrosive burns, blister formation (vesiculation) may result. Contact with liquid may produce caustic burns.
Ingestion:	May cause corrosion to the mouth, throat, esophagus and stomach with perforation and peritonitis. Extreme exposure may result in death from spasm, inflammation or edema.

Chronic Exposure: Repeated exposure to ammonia may cause chronic irritation of the eyes and respiratory tract.

Toxicity:
LC_{50} - 5131 mg/m^3 (7338 ppm) to 11,592 mg/m^3 (16,600 ppm), 60 minute exposure, Rat.
LD_{50} - 350 mg / kg (Oral / Rat).

Not listed in the National Toxicology Program (NTP).
Not recognized by OSHA as a carcinogen.
Not listed as a carcinogen by the International Agency for Research on Cancer (IARC monograph).
Germ cell mutagenicity information is not available. Reproductive toxicity information is not available.

Section 12. Ecological Information

Ammonia is harmful to aquatic life at very low concentrations. Notify local health and wildlife officials and operators of any nearby water intakes upon contamination of surface water.

Toxicity:
Terrestrial plants: LOEC = 3-250 ppm NH_3.
Aquatic plants: LOEC = 0.5-500 mg NH_3-N/L.
Acute toxicity to invertebrates: 48 h LC50 = 2.94 mg un-ionized NH3-N/L.
Chronic toxicity to invertebrates: NOEC = 0.163- 0.42 mg un-ionized NH3/L.
Acute toxicity to fish: 96-h: LC50= 0.09 – 3.51 mg un-ionized NH_3/L.
Chronic toxicity to fish: NOEC=0.025-1.2 mg un-ionized NH3/L.

Environmental Fate Information: Ammonia dissipates relatively quickly in ambient air and rapidly returns to the soil via combination with sulfate ions or washout by rainfall. Ammonia strongly adsorbs to soil, sediment particles and colloids in water under aerobic conditions. Biodegradation of ammonia to nitrate occurs in water under aerobic conditions resulting in a biological oxygen demand (BOD).

Persistence/Degradability:
Biodegradable in soil. Ozonation in the air. Soluble in water.
Bioaccumulative Potential:
Not applicable.
Mobility in Soil:
No additional information available.
Other Adverse Effects:
No additional information available.

Section 13. Disposal Considerations

Dispose of unused contents/container in accordance with local/regional/national regulations as applicable.
Listed as hazardous substance under Clean Water Act (CWA) (40 CFR 116.4 and 40 CFR 117.3).
Classified as hazardous waste under Resource Conservation and Recovery Act (RCRA) (40 CFR 261.22 Corrosive #D002) if disposed of in original form.
Suitably diluted product may be utilized as fertilizer on agricultural land.
For hazardous waste regulations information call the RCRA Hotline (800) 424-9346, or visit the US EPA website.

Section 14. Transport Information

US Department of Transportation

HAZARD CLASS:	8 (Corrosive Material)
PROPER SHIPPING DESCRIPTION:	UN2672, Ammonia Solutions, 8, PG III, RQ
PLACARD:	Corrosive

IDENTIFICATION NUMBER: UN 2672

ENVIRONMENTAL HAZARDS:
IMDG, Known Marine Pollutant: No
United Nations Model Regulations, Environmentally Hazardous: No

Section 15. Regulatory Information

The material is subject to the reporting requirements of Section 304, Section 312 and Section 313, Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR 372.
Under Section 313, as of June 30, 1995, this material is reportable with the following qualifications: 10% of total aqueous ammonia is reportable as Ammonia (CAS #: 7664-41-7) under this listing.

Under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Section 103, any environmental release of this chemical equal to or over the reportable quantity of 1,000 pounds (as NH_4OH) must be reported promptly to the National Response Center, Washington, D.C. (1-800-424-8802).

Toxic Substances Control Act (TSCA): This material and its components are listed in the TSCA Inventory.

EPA Hazard Categories – Immediate: Yes; Delayed: No; Fire: No; Sudden Release: No; Reactive: No

Clean Air Act – Section 112(r): Material is listed under EPA's Risk Management Program (RMP), 40 CFR Part 68 at concentrations greater than 20% and storage/process amounts greater than the Threshold Quantity (TQ) of 20,000 pounds of contained ammonia (CAS #: 7664-41-7).

The chemical is listed under Department of Homeland Security regulation 6 CFR Part 27, Chemical Facility Anti-Terrorism Standards at storage / process amounts greater than the threshold quantity of 20,000 pounds (ammonia concentration 20% or greater).

OSHA (Occupational Safety & Health Administration): This material is considered to be hazardous as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200. This material is subject to Process Safety Management requirements of 29 CFR 1910.119 if maintained on-site, including storage and process, in quantities of 15,000 pounds or greater (>44% ammonia by weight).

Section 16. Other Information

Preparation Information: Revision Date May 1, 2015 Prepared by: HJS
Replaces all previously dated versions.

Revisions to this Safety Data Sheet have been created to comply with the requirements of the OSHA Hazard Communication Final Rule issued in 2012 (HazCom 2012).

Acronyms:
ACGIH: American Conference of Governmental Industrial Hygienists
ANSI: American National Standards Institute
CAS: Chemical Abstracts Service
CFR: Code of Federal Regulations
DHS: Department of Homeland Security
DOT: Department of Transportation
EPA: Environmental Protection Agency
HMIS: Hazardous Materials Identification System
IARC: International Agency for Research on Cancer
IDLH: Immediately Dangerous to Life or Health
IMDG: International Maritime Dangerous Goods
NFPA: National Fire Protection Association
NIOSH: National Institute for Occupational Safety and Health
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
PEL: Permissible Exposure Limit
PPM: Parts Per Million
RCRA: Resource Conservation and Recovery Act
REL: Recommended Exposure Limit
SCBA: Self Contained Breathing Apparatus

STEL: Short Term Exposure Limit
TLV: Threshold Limit Value
TWA: Time Weighted Average

Disclaimer:
The information, data, and recommendations in this safety data sheet relate only to the specific material designated herein and do not relate to use in combination with any other material or in any process. To the best of our knowledge, the information, data, and recommendations set forth herein are believed to be accurate. We make no warranties, either expressed or implied, with respect thereto and assume no liability in connection with any use of such information, data, and recommendations. Judgements as to the suitability of the information contained herein for the party's own use or purposes are solely the responsibility of that party. Any party handling, transferring, transporting, storing, applying or otherwise using this product should review thoroughly all applicable laws, rules, regulations, standards and good engineering practices. Such thorough review should occur before the party handles, transfers, transports, stores, applies or otherwise uses this product.

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]
11 S009J*	43 Stack 1*	CFB #1	1989	375 MMBTU/HR	Change in Method of Operation and Control/4th Quarter 2015	1C-CFB
12 S009K*	43 Stack 1*	CFB #2	1989	375 MMBTU/HR	Change in Method of Operation and Control/4th Quarter 2015	1C-CFB

*Title V I.D. Numbers

[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			
43	Vertical	11 & 12	CFB #1 & #2	1C	SNCR	NA	NA	PM	1,002,000	4,388,760	22.5	98.55	Solid	Engineering Design	NA
								PM10	NA	NA	16.4	71.94	Solid		
								PM2.5	NA	NA	15.0	65.70	Solid		
								SO_2	6,377	27,931.26	150	657	Gas		
								NO_x	462.8	2,027.064	300	1,314	Gas		
								CO	231.4	1,013.532	117.5	514.65	Gas		
								VOC	7.5	32.85	5.55	24.31	Gas		
								Pb	0.13	0.57	0.13	0.57	Solid		
								HCL	NA	NA	5.475	24.0	Gas		
								HF	NA	NA	0.4	1.8	Gas		
								TOTAL METAL HAPS	NA	NA	0.028502	0.125	Solid		
								TOTAL ORGANIC HAPS	NA	NA	0.43	1.9	Gas		
NOTE: Emissions represented here are from CFB #1 and #2 and do not include the emissions from the Auxiliary Boiler.															

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
43	8*	420*	~318,000*	~105.47*	820	337.5	4,388.1008	589.10736
*Information is at the location of the CEMS Unit on the stack at 140 ft.								

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

ATTACHMENT K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

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

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

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

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr**	lb/hr	ton/yr**	
Haul Road/Road Dust Emissions Paved Haul Roads	PM-FIL PM10-FIL PM2.5-FIL	No Change No Change No Change	0.011 0.002 0.001	No Change No Change No Change	0.0056 0.0010 0.0003	*
Unpaved Haul Roads						
Storage Pile Emissions						
Loading/Unloading Operations						
Wastewater Treatment Evaporation & Operations						
Equipment Leaks		Does not apply		Does not apply		
General Clean-up VOC Emissions						
Other						

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

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

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

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

*Based on emission factor from Allegheny County Health Department, Table 1.2.5-5 which was utilized in the original permit application.

**Increase in truck emissions due to increased limestone usage.

ATTACHMENT L

EMISSION UNIT DATA SHEETS

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): CFB#1 and #2

Equipment Information

1. Manufacturer: Ahlstrom Pyropower	2. Model No. Pyroflow CFB Serial No. CFB#1: National Board No. 26 CFB#2: National Board No. 27
3. Number of units: 2	4. Use Cogeneration
5. Rated Boiler Horsepower: NA hp	6. Boiler Serial No.: CFB#1: National Board No. 26 CFB#2: National Board No. 27
7. Date constructed: 1989	8. Date of last modification and explain: NA
9. Maximum design heat input per unit: 375 (each) ×10⁶ BTU/hr	10. Peak heat input per unit: 375 (each) ×10⁶ BTU/hr
11. Steam produced at maximum design output: 280,000 lb/hr @1,500 psi and 950°F	12. Projected Operating Schedule: Hours/Day 24 Days/Week 7 Weeks/Year 52
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☐ Natural Gas Burner ☒ Others, specify - CFB	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☒ Others, specify Gas burners are used for startup. Solid fuel is normally injected into the CFB boiler at two (2) injection points on the rear wall. Combustion of fuel occurs throughout the CFB's recirculation path.
15. Type of draft: ☐ Forced ☐ Induced Other: Balanced Draft	16. Percent of ash retained in furnace: NA, CFB %
17. Will flyash be reinjected? ☒ Yes, CFB ☐ No	18. Percent of carbon in flyash: Less than 0.5% %

Stack or Vent Data

19. Inside diameter or dimensions: 8* ft.	20. Gas exit temperature: 420* °F
21. Height: 337.5 ft.	22. Stack serves: ☐ This equipment only ☒ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent) S009L, S009M, Zurn Auxiliary Boilers #1 and #2 (no information attached)
23. Gas flow rate: ~318,000* ft³/min	
24. Estimated percent of moisture: NA %	

*At CEMS location within the stack.

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	NA gph@60°F	Startup Only ft^3/hr	NA ft^3/hr	NA TPH	Blended Fuel* 23.35 each TPH
	Annually	$\times 10^3$ gal	7.0 $\times 10^6$ ft^3/yr	$\times 10^6$ ft^3/hr	tons	204,546 each at 8,760 hrs/yr
	Sulfur	Maximum: wt. % Average: NA wt. %	Trace gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	3.5 wt.% max
	Ash (%)		NA		Maximum	51.7% (design)
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	1,032 BTU/ft^3	BTU/ft^3	BTU/lb	7,775 Btu/lb
	Source		Pipeline			Various
	Supplier		Hope Gas Company			Various
	Halogens (Yes/No)		No			No
	List and Identify Metals	NA	NA	NA	NA	Antimony, Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Manganese, Mercury, Nickel and Selenium

26. Gas burner mode of control: NA
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture: NA

28. Oil burner manufacture: NA

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify NA

30. Fuel oil preheated: ☐ Yes ☐ No NA

31. If yes, indicate temperature: NA °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
77.6 @ 80 °F, 14.7 PSIA, 12 % moisture

33. Emission rate at rated capacity: lb/hr See No. 37 (Next Page)

34. Percent excess air actually required for combustion of the fuel described: 20 %

Coal Characteristics

35. Seams: Various: Coal and waste coal predominantly Upper Freeport.

36. Proximate analysis (dry basis): % of Fixed Carbon: 32.21 % of Sulfur: 2.90 (3.5 max)
% of Moisture: 0 % of Volatile Matter: 25.66
% of Ash: 42.13

*Blended Fuel up to 35% coal with the balance being a waste coal product.

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler(s) before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	231.4	NA	420 at the CEMS location	15.28
Hydrocarbons	NA	NA		
NO_x	462.8	NA		
Pb	0.13	NA		
PM	1,002,000	NA		
SO_2	6,377	NA		
VOCs	7.5	NA		
Other (specify)				
HCL/HF	NA	NA		
Total Metal HAPs	NA	NA		
Total Organic HAPs	NA	NA		

38. What quantities of pollutants will be emitted from the boiler(s) after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	117.5	NA	420 at the CEMS location	15.28
Hydrocarbons	NA	NA		
NO_x	300	NA		
Pb	0.13	NA		
PM	22.5	NA		
SO_2	150	NA		
VOCs	5.55	NA		
Other (specify				
HCL/HF	5.475/0.4	NA		
Total Metal HAPs	0.028502	NA		
Total Organic HAPs	0.43	NA		

39. How will waste material from the process and control equipment be disposed of?
This permit revision does not affect the disposal process. Any potential waste generated will be either reused or disposed of via an approved waste stream.

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.
Yes, see Attachment M and Appendix 2.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?
Yes

42. **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 PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
There are no requested revisions for monitoring.

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
There are no requested revisions for Testing.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
There are no requested revisions for Recordkeeping.

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
There are no requested revisions for Reporting.

43. **Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.**
None

ATTACHMENT M

AIR POLLUTION CONTROL DEVICE SHEETS

The additional control being added by this application is a selective non-catalytic reduction system (SNCR). The system will utilize aqueous ammonia or urea as an ammonia reagent for the reduction of nitrogen oxides in the combustion process. Once injected into the combustion process, the reagent provides a supply of ammonia (NH3) into the combustion flue gas. The combination of temperature, resonance time and mixing is typically optimized in the upper boiler elevations and or cyclones. The inherent design of the Circulating Fluidized Bed (CFB) system process promotes an efficient utilization of reagent in the reduction of nitrogen oxides. The reagents are most efficient in the 1400 to 1750 degree F range with aqueous ammonia being a preferred reagent at the lower end of this range. Outside of startup and shutdown transient conditions the CFB process typically operates in this temperature range. There is no permit application sheet for an SNCR system. The available design information is provided in the Appendix 2.

ATTACHMENT N

SUPPORTING EMISSIONS CALCULATIONS

See Appendix 1 for "MEA Final Baseline Emissions 2010 – 2015 and PSD Applicability Determination (PSD Not Applicable) Calculations". Morgantown Energy Associates has reviewed the applicability of Prevention of Significant Deterioration (PSD) versus projected actuals and is not requesting any changes to the potential to emit (PTE) of the source nor to the existing emissions limitation. Therefore, a PTE calculation is not presented here.

Yearly trucking will increase. The emissions estimate for the increased trucking is contained in Attachment N.

Morgantown Energy Associates
Fugitive Emissions
Attachment K calculations (based on 2014 ES)

I. Fugitive Road Dust (EU-015)

Number of trucks to tare weigh:	0
Number of coal trucks:	0
Number of coal waste trucks:	544
Number of limestone trucks:	1,278
Vehicle miles traveled (VMT)	419

Fugitive Road Dust Emissions				
Pollutant	Emission Factor[1]	Uncontrolled Emissions	Removal Efficiency	Controlled Emissions
	(lb/VMT)	(tons)	(percent)	(tons)
PM-FIL	0.053	0.011	50.0%	0.0056
PM10-FIL	0.01	0.002	50.0%	0.0010
PM25-FIL	0.0025	0.001	50.0%	0.0003

Footnotes:

[1] Source of emission factor: Allegheny County Health Department, Table 1.2.5-4 (Recommended Particulate Emission Factors for Specific Roadway Categories and Particle Size Fractions)

II. Fuel Receiving (EU-012)

Mean wind speed (U):	10	miles per hour
Material moisture content (M):	4.8	percent

Fuel Receiving Fugitive Emissions				
Pollutant	Emission Factor[2]	Uncontrolled Emissions	Removal Efficiency	Controlled Emissions
	(lb/ton)	(tons)	(percent)	(tons)
PM-FIL	0.00171	1.00	99.0%	9.96E-03
PM10-FIL	0.00081	0.47	99.0%	4.71E-03
PM25-FIL	0.00012	0.07	99.0%	7.14E-04

Footnotes:

[2] Source of emission factor: AP-42 (5th edition), Section 13.2.4-3 (Batch and continuous drop operations)

ATTACHMENT O

MONITORING/RECORDKEEPING/REPORTING/ TESTING PLANS

ATTACHMENT O

MONITORING/RECORDKEEPING/REPORTING/TESTING PLANS

Morgantown Energy Associates is not requesting any revisions to the existing monitoring, recordkeeping, reporting and testing requirements for the facility.

ATTACHMENT P

PUBLIC NOTICE

NOTE: Affidavit of Publication will be submitted separately after the public notice has been published

LEGAL ADVERTISEMENT

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Morgantown Energy Associates has applied to the West Virginia Department of Environmental Protection, Division of Air Quality (DAQ), for a Modification for the installation of a selective non-catalytic reduction (SNCR) system to aid in meeting the requirements of the 40CFR63, Subpart UUUUU, Mercury and Air Toxics Standards (MATS) for the Morgantown Energy Facility, a cogeneration facility, located on Beechurst Avenue, in Morgantown, Monongalia County, West Virginia. The latitude and longitude coordinates of the facility are: 39.640234 and -79.961871.

The applicant estimates that there is no increase in emission from the change in the method of operations and additional control being applied to the source. The MATS requirements mandate a reduction in sulfur dioxides. Meeting the MATS sulfur dioxide requirements requires a limestone addition to the Circulating Fluidized Bed (CFB) system and increases the heat required for limestone calcination to activate for sulfur dioxide control. The SNCR system is being added to allow flexibility in meeting nitrogen oxide emissions from the CFB system. These changes trigger a regulatory definition of a change in the method of operation and require a permit revision for the change and to make the control requirements enforceable by the West Virginia Department of Environmental Protection under the Division of Air Quality and the United States Environmental Protection Agency.

Installation of the SNCR system will proceed upon issuance of the revised permit and is anticipated to start in fourth quarter 2015 and begin operating in January 2016. Written comments will be received by the West Virginia Department of Environmental Protection, DAQ, 601 57th Street, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

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

Dated this the (PLEASE INSERT DATE) day of November, 2015.

By: Morgantown Energy Associates
Todd Shirley
Projects General Manager
555 Beechurst Avenue
Morgantown, West Virginia 26505

ATTACHMENT S

TITLE V PERMIT REVISION INFORMATION

Attachment S

Title V Permit Revision Information

1. New Applicable Requirements Summary	
Mark all applicable requirements associated with the changes involved with this permit revision:	
☐ SIP	☐ FIP
☐ Minor source NSR (45CSR13)	☐ PSD (45CSR14)
☐ NESHAP (45CSR15)	☐ Nonattainment NSR (45CSR19)
☐ Section 111 NSPS (Subpart(s)_____)	☒ Section 112(d) MACT standards (Subpart(s) UUUUU)
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ Compliance Assurance Monitoring (40CFR64) (1)
☐ NO_x Budget Trading Program Non-EGUs (45CSR1)	☐ NO_x Budget Trading Program EGUs (45CSR26)

(1) If this box is checked, please include **Compliance Assurance Monitoring (CAM) Form(s)** for each Pollutants Specific Emission Unit (PSEU) (See Attachment H to Title V Application). If this box is not checked, please explain why **Compliance Assurance Monitoring** is not applicable:

We are not requesting any change to CAM.

2. Non Applicability Determinations
List all requirements, which the source has determined not applicable to this permit revision and for which a permit shield is requested. The listing shall also include the rule citation and a rationale for the determination. Permit shields are not available for minor modification.
☐ **Permit Shield Requested** *(not applicable to Minor Modifications)*
All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

3. Suggested Title V Draft Permit Language

Are there any changes involved with this Title V Permit revision outside of the scope of the NSR Permit revision? ☐ Yes ☒ No If Yes, describe the changes below.

Also, please provide **Suggested Title V Draft Permit language** for the proposed Title V Permit revision (including all applicable requirements associated with the permit revision and any associated monitoring /recordkeeping/ reporting requirements), OR attach a marked up pages of current Title V Permit. Please include appropriate citations (Permit or Consent Order number, condition number and/or rule citation (e.g. 45CSR§7-4.1)) for those requirements being added / revised.

4. Active NSR Permits/Permit Determinations/Consent Orders Associated With This Permit Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
Permit # R13-1085B/R14-7B	04/20/1993	None
	/ /	
	/ /	

5. Inactive NSR Permits/Obsolete Permit or Consent Orders Conditions Associated With This Revision

Permit or Consent Order Number	Date of Issuance	Permit/Consent Order Condition Number
None	MM/DD/YYYY	
	/ /	
	/ /	

6. Change in Potential Emissions

Pollutant	Change in Potential Emissions (+ or -), TPY
SO_2	-591 (1,248 tpy down to 657 tpy)
PM/PM10/PM2.5 (trucking)	+0.0056/+0.0010/+0.0003

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

7. Certification For Use Of Minor Modification Procedures *(Required Only for Minor Modification Requests)*

Note:	*This certification must be signed by a responsible official. Applications without a signed certification will be returned as incomplete. The criteria for allowing the use of Minor Modification Procedures are as follows:*

i. Proposed changes do not violate any applicable requirement;

ii. Proposed changes do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit;

iii. Proposed changes do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient air quality impacts, or a visibility increment analysis;

iv. Proposed changes do not seek to establish or change a permit term or condition for which there is no underlying applicable requirement and which permit or condition has been used to avoid an applicable requirement to which the source would otherwise be subject (synthetic minor). Such terms and conditions include, but are not limited to a federally enforceable emissions cap used to avoid classification as a modification under any provision of Title I or any alternative emissions limit approved pursuant to regulations promulgated under § 112(j)(5) of the Clean Air Act;

v. Proposed changes do not involve preconstruction review under Title I of the Clean Air Act or 45CSR14 and 45CSR19;

vi. Proposed changes are not required under any rule of the Director to be processed as a significant modification;

Notwithstanding subparagraph 45CSR§30-6.5.a.1.A. (items i through vi above), minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in rules of the Director which are approved by the U.S. EPA as a part of the State Implementation Plan under the Clean Air Act, or which may be otherwise provided for in the Title V operating permit issued under 45CSR30.

Pursuant to 45CSR§30-6.5.a.2.C., the proposed modification contained herein meets the criteria for use of Minor permit modification procedures as set forth in Section 45CSR§30-6.5.a.1.A. The use of Minor permit modification procedures are hereby requested for processing of this application.

(Signed): Todd Shirley *(Please use blue ink)* Date: 11 / 19 / 2015 *(Please use blue ink)*

Named (typed): Todd Shirley Title: Projects General Manager

Note: Please check if the following included (if applicable):

☐	Compliance Assurance Monitoring Form(s)
☐	Suggested Title V Draft Permit Language

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

APPENDICES

ADDITIONAL INFORMATION

APPENDIX 1

MEA FINAL NSR BASELINE EMISSIONS 2010 – 2015
AND
PSD APPLICABILITY DETERMINATION
(PSD NOT APPLICABLE)
CALCULATIONS

24 month Annualized Parameters

Date		HI (MMBTU)	Op Hrs	NOx (Tons)	SO2 (Tons)	CO (Tons)	PM (Tons)	PM10 (Tons)	VOC (Tons)	Pb (Tons)	PM2.5 (Tons)
Jan-10	Dec-11	6,579,878	8,127.50	803.99	1,003.99	189.55	22.54	69.87	3.71	0.0075	63.51
Feb-10	Jan-12	6,578,438	8,127.50	806.77	997.17	190.06	22.63	70.01	3.72	0.0075	63.63
Mar-10	Feb-12	6,571,817	8,131.50	808.57	990.32	190.35	22.68	70.07	3.71	0.0075	63.69
Apr-10	Mar-12	6,572,704	8,131.50	811.50	984.19	190.90	22.77	70.22	3.72	0.0075	63.83
May-10	Apr-12	6,583,315	8,127.50	815.50	979.87	191.70	22.89	70.47	3.72	0.0076	64.06
Jun-10	May-12	6,604,893	8,127.00	820.92	977.14	192.82	23.04	70.84	3.74	0.0076	64.40
Jul-10	Jun-12	6,623,021	8,131.00	825.88	973.94	193.84	23.19	71.17	3.75	0.0076	64.70
Aug-10	Jul-12	6,617,608	8,123.00	827.79	967.34	194.16	23.25	71.25	3.75	0.0077	64.77
Sep-10	Aug-12	6,619,222	8,123.00	830.64	961.70	194.70	23.33	71.40	3.75	0.0077	64.91
Oct-10	Sep-12	6,631,827	8,140.00	833.72	960.29	195.34	23.42	71.61	3.76	0.0077	65.10
Nov-10	Oct-12	6,800,120	8,362.00	857.37	980.38	200.67	24.07	73.54	3.86	0.0079	66.85
Dec-10	Nov-12	6,800,642	8,362.00	860.20	974.30	201.20	24.16	73.69	3.86	0.0079	66.99
Jan-11	Dec-12	6,791,002	8,362.00	861.86	966.43	201.45	24.21	73.73	3.85	0.0079	67.03
Feb-11	Jan-13	6,762,667	8,358.50	870.02	958.01	200.22	24.20	73.41	3.83	0.0079	66.61
Mar-11	Feb-13	6,787,830	8,401.00	883.69	957.98	200.57	24.37	73.65	3.84	0.0079	66.72
Apr-11	Mar-13	6,795,794	8,401.00	896.85	954.79	200.36	24.49	73.71	3.84	0.0079	66.64
May-11	Apr-13	6,779,870	8,377.50	905.24	948.69	199.53	24.51	73.52	3.82	0.0078	66.36
Jun-11	May-13	6,773,131	8,390.50	915.37	943.74	198.95	24.57	73.42	3.82	0.0078	66.15
Jul-11	Jun-13	6,760,109	8,390.50	924.69	937.87	198.19	24.61	73.26	3.80	0.0078	65.89
Aug-11	Jul-13	6,752,273	8,389.00	934.48	932.83	197.58	24.66	73.15	3.79	0.0078	65.68
Sep-11	Aug-13	6,757,454	8,393.00	946.20	929.62	197.33	24.76	73.19	3.79	0.0078	65.59
Oct-11	Sep-13	6,890,739	8,554.00	972.83	945.89	200.79	25.30	74.57	3.86	0.0079	66.73
Nov-11	Oct-13	6,758,248	8,429.00	963.66	923.50	196.73	24.90	73.16	3.78	0.0077	65.38
Dec-11	Nov-13	6,755,851	8,436.00	974.67	919.08	196.26	24.97	73.11	3.78	0.0077	65.21
Jan-12	Dec-13	6,732,285	8,436.00	983.51	911.34	195.16	24.98	72.83	3.76	0.0077	64.84
Feb-12	Jan-14	6,713,473	8,436.00	990.19	914.48	191.51	25.05	72.74	3.74	0.0076	64.61
Mar-12	Feb-14	6,696,426	8,432.00	996.04	917.20	188.27	25.12	72.65	3.73	0.0076	64.41
Apr-12	Mar-14	6,703,373	8,432.00	1,006.46	923.97	185.31	25.29	72.85	3.73	0.0076	64.45
May-12	Apr-14	6,698,678	8,436.00	1,014.54	928.70	182.25	25.41	72.91	3.72	0.0076	64.38
Jun-12	May-14	6,683,488	8,436.50	1,021.03	931.91	178.94	25.49	72.85	3.71	0.0076	64.19
Jul-12	Jun-14	6,662,252	8,422.00	1,026.43	934.14	175.53	25.54	72.71	3.69	0.0076	63.95
Aug-12	Jul-14	6,669,401	8,429.50	1,036.15	940.49	172.82	25.70	72.90	3.69	0.0076	63.99
Sep-12	Aug-14	6,689,707	8,429.50	1,048.23	948.96	170.31	25.92	73.25	3.70	0.0076	64.17
Oct-12	Sep-14	6,811,064	8,577.50	1,073.19	970.55	171.10	26.50	74.71	3.77	0.0077	65.37
Nov-12	Oct-14	6,715,920	8,450.00	1,066.30	961.42	166.24	26.24	73.73	3.71	0.0076	64.39
Dec-12	Nov-14	6,716,285	8,450.00	1,075.49	967.10	163.19	26.39	73.85	3.71	0.0076	64.36
Jan-13	Dec-14	6,701,942	8,450.00	1,082.58	970.72	159.74	26.47	73.80	3.70	0.0076	64.18

Date	HI (MMBTU)	Op Hrs	NOx (Tons)	SO2 (Tons)	CO (Tons)	PM (Tons)	PM10 (Tons)	VOC (Tons)	Pb (Tons)	PM2.5 (Tons)
MAX 12 Month BASELINE	6,890,738.50	8,577.50	1,082.58	1,003.99	201.45	26.50	74.71	3.86	0.01	67.03
MONTH (from 5Year Total Plant Tons Baseline)	655,788.00	744.00	102.00	99.06	19.45	2.56	7.14	0.37	0.00	6.47
ANNUALIZED SINGLE MONTH			1,224.02	1,188.75	233.40	30.74	85.72	4.48	0.0092	77.60
Emissions That Could Have Been Accommodated			141.44	184.75	31.95	4.25	11.01	0.62	0.0012	10.57

PROJECTED ACTUAL EMISSIONS

Date	HI (MMBTU)	Op Hrs	NOx (Tons)	SO2 (Tons)	CO (Tons)	PM (Tons)	PM10 (Tons)	VOC (Tons)	Pb (Tons)	PM2.5 (Tons)
2016	6,233,021	8,301	993.31	732.41	189.41	24.95	69.56	3.63	0.01	62.98
2017	5,956,839	7,884	958.25	616.08	182.73	24.07	67.11	3.50	0.01	60.75
2018	6,217,996	8,278	1000.46	643.21	190.77	25.13	70.06	3.66	0.01	63.43
2019	6,217,996	8,278	1000.46	643.21	190.77	25.13	70.06	3.66	0.01	63.43
2020	6,233,021	8,301	1002.89	644.77	191.24	25.19	70.23	3.67	0.01	63.58
MAX VALUE	6,233,021	8,301	1,002.89	732.41	191.24	25.19	70.23	3.67	0.01	63.58

APPLICABILITY DETERMINATION

	NOx (Tons)	SO2 (Tons)	CO (Tons)	PM (Tons)	PM10 (Tons)	VOC (Tons)	Pb (Tons)	PM2.5 (Tons)
PSD Threshold (Tons/Year)	40	40	100	25	15	40	0.6	10
Net Emission Change (PAE-BA-ECBA)	(221.14)	(456.33)	(42.17)	(5.55)	(15.49)	(0.81)	(0.002)	(14.02)
SUBJECT TO PSD	NO	NO	NO	NO	NO	NO	NO	NO

Notes

The facility is in an Attainment area for all pollutants therefore NNSR doesn't apply.

ANNUALIZED SINGLE MONTH: Max Single Month times 12 (as compared to annual lbs/hr limit except for PM10 and PM2.5, which do not have limits)

Emissions That Could Have Been Accommodated = ANNUALIZED SINGLE MONTH - MAX 12 Month BASELINE

PSD threshold see 40 CFR 52.21 (b)(23)(i), which is also captured on "Pollutant and Emission Rate" tab in this workbook

Net Emission Change (PAE-BA-ECBA)= Projected Actual Emissions - MAX 12 Month BASELINE - Emissions That Could Have Been Accommodated

Facility Total tons from the Emission Statement

	NOx (Tons)	SO2 (Tons)	CO (Tons)	PM (Tons)	PM-10 (Tons)	VOC (Tons)	Pb (tons)	PM2.5 (Tons)
2010	794.28	983.87	183.12	21.50	67.95	3.69	0.01	61.76
2011	813.70	1,024.12	195.98	23.58	71.79	3.74	0.01	65.26
2012	910.03	908.75	206.92	24.84	75.67	3.97	0.01	68.80
2013	1,056.98	913.92	183.41	25.11	69.99	3.55	0.01	60.88
2014	1,108.18	1,027.52	136.06	27.84	77.61	3.85	0.01	67.49

Total plant air emissions from air emission inventories

Morgantown Energy Associates
Annual Emissions (excluding HAP)
Calendar Year 2010

Pollutant	CFB1 (tons)	CFB2 (tons)	AUX1 (tons)	AUX2 (tons)	Material Handling (tons)	FugitiveEmissions (tons)	Emissions (tons)	Consumed (tons)
PM-FIL	10.81	10.56	0.04	0.04	0.88	0.07	21.50	
PM10-FIL	10.81	10.55	0.04	0.04	0.88	0.02	22.34	
PM2.5-FIL	7.87	7.68	0.04	0.04	0.52	0.00	16.15	
PM-CON	23.00	22.45	0.13	0.03			45.61	
VOC	1.70	1.66	0.18	0.16			3.69	
NOX	395.57	388.99	5.03	4.69			794.28	
SO2	496.40	487.47	0.00	0.00			983.87	
CO	92.47	90.26	0.21	0.19			183.12	
NH3	0.05	0.05					0.10	
Radionuclides	0.00	0.00					0.00	
Limestone								84,543

Morgantown Energy Associates
Annual Emissions (excluding HAP)
Calendar Year 2011

Pollutant	CFB1 (tons)	CFB2 (tons)	AUX1 (tons)	AUX2 (tons)	Material Handling (tons)	FugitiveEmissions (tons)	Emissions (tons)	Consumed (tons)
PM-FIL	11.41	11.14	0.03	0.03	0.96	0.08	23.58	
PM10-FIL	11.41	11.14	0.03	0.03	0.96	0.02	23.58	
PM2.5-FIL	8.31	8.12	0.03	0.03	0.55	0.00	17.05	
PM-CON	24.29	23.72	0.10	0.10			48.21	
VOC	1.79	1.75	0.10	0.10			3.74	
NOX	409.45	401.65	1.30	1.30			813.70	
SO2	517.10	507.00	0.01	0.01			1,024.12	
CO	97.63	95.37	1.49	1.49			195.98	
NH3	0.06	0.05	0.06	0.06			0.22	
Radionuclides	0.00	0.00					0.00	
Limestone								94,242

Morgantown Energy Associates
Annual Emissions (excluding HAP)
Calendar Year 2012

Pollutant	CFB1 (tons)	CFB2 (tons)	AUX1 (tons)	AUX2 (tons)	Material Handling (tons)	FugitiveEmissions (tons)	Emissions (tons)	Consumed (tons)
PM-FIL	11.85	11.91	0.04	0.04	1.00	0.08	24.84	
PM10-FIL	11.85	11.91	0.04	0.04	1.00	0.02	24.84	
PM2.5-FIL	8.64	8.68	0.04	0.04	0.57	0.00	17.97	
PM-CON	25.23	25.36	0.12	0.12			50.83	
VOC	1.86	1.87	0.11	0.12			3.97	
NOX	453.10	454.20	1.35	1.38			910.03	
SO2	453.65	455.08	0.01	0.01			908.75	
CO	101.42	101.94	1.75	1.80			206.92	
NH3	0.06	0.06					0.11	
Radionuclides	0.00	0.00					0.00	
Limestone								103,382

Morgantown Energy Associates
Annual Emissions (excluding HAP)
Calendar Year 2013

Pollutant	CFB1 (tons)	CFB2 (tons)	AUX1 (tons)	AUX2 (tons)	Material Handling (tons)	FugitiveEmissions (tons)	Emissions (tons)	Consumed (tons)
PM-filterable	11.96	12.03	0.04	0.04	0.95	0.08	25.11	
PM10-filterable	11.96	12.03	0.04	0.04	0.95	0.02	25.05	
PM2.5-filterable	7.63	7.67	0.04	0.04	0.55	0.00	15.93	
PM-condensable	22.28	22.40	0.12	0.13			44.94	
Volatile organic compou	1.65	1.65	0.12	0.13			3.55	
Nitrogen oxides	525.84	528.26	1.41	1.47			1,056.98	
Sulfur dioxide	455.82	458.08	0.01	0.01			913.92	
Carbon monoxide	89.58	90.07	1.84	1.92			183.41	
Ammonia	0.06	0.06					0.11	
Radionuclides	0.00	0.00					0.00	
Limestone								102,713

Morgantown Energy Associates
Annual Emissions (excluding HAP)
Calendar Year 2014

Pollutant	CFB1 (tons)	CFB2 (tons)	AUX1 (tons)	AUX2 (tons)	Material Handling (tons)	FugitiveEmissions (tons)	Emissions (tons)	Consumed (tons)
PM-filterable	13.40	13.26	0.03	0.03	1.03	0.08	27.84	
PM10-filterable	13.40	13.26	0.03	0.03	1.03	0.02	27.77	
PM2.5-filterable	8.54	8.45	0.03	0.03	0.59	0.00	17.65	
PM-condensable	24.96	24.70	0.10	0.09			49.84	
Volatile organic compou	1.84	1.82	0.10	0.08			3.85	
Nitrogen oxides	555.96	550.24	1.06	0.93			1,108.18	
Sulfur dioxide	516.33	511.17	0.01	0.01			1,027.52	
Carbon monoxide	66.99	66.30	1.48	1.30			136.06	
Ammonia	0.06	0.06					0.12	
Radionuclides	0.00	0.00					0.00	
Limestone								103,740

5 Year Baseline Emissions

Date	HI (MMBTU)	MMBTU allocation	Op Hrs	NOx (Tons)	SO2 (Tons)	CO (Tons)	PM (Tons)	PM-10 (Tons)	VOC (Tons)	Pb (tons)	PM2.5 (Tons)
Jan-10	641,150	10.1%	744	80.0	99.1	18.44	2.16	6.84	0.37	0.00073	6.22
Feb-10	577,896	9.1%	672	72.1	89.3	16.62	1.95	6.17	0.33	0.00066	5.60
Mar-10	603,730	9.5%	744	75.3	93.3	17.36	2.04	6.44	0.35	0.00069	5.86
Apr-10	556,198	8.7%	720	69.4	85.9	15.99	1.88	5.94	0.32	0.00064	5.39
May-10	543,532	8.5%	744	67.8	84.0	15.63	1.84	5.80	0.31	0.00062	5.27
Jun-10	544,286	8.5%	712	67.9	84.1	15.65	1.84	5.81	0.32	0.00062	5.28
Jul-10	568,197	8.9%	744	70.9	87.8	16.34	1.92	6.06	0.33	0.00065	5.51
Aug-10	566,260	8.9%	744	70.6	87.5	16.28	1.91	6.04	0.33	0.00065	5.49
Sep-10	299,796	4.7%	390	37.4	46.3	8.62	1.01	3.20	0.17	0.00034	2.91
Oct-10	235,883	3.7%	300	29.4	36.4	6.78	0.80	2.52	0.14	0.00027	2.29
Nov-10	595,037	9.3%	720	74.2	91.9	17.11	2.01	6.35	0.34	0.00068	5.77
Dec-10	635,834	10.0%	744	79.3	98.2	18.28	2.15	6.78	0.37	0.00073	6.17
Jan-11	655,788	9.7%	744	78.6	98.9	18.92	2.28	6.93	0.36	0.00075	6.30
Feb-11	502,291	7.4%	587	60.2	75.7	14.49	1.74	5.31	0.28	0.00057	4.83
Mar-11	617,290	9.1%	744	74.0	93.1	17.81	2.14	6.52	0.34	0.00070	5.93
Apr-11	566,221	8.3%	720	67.8	85.4	16.34	1.97	5.98	0.31	0.00064	5.44
May-11	580,836	8.6%	718	69.6	87.6	16.76	2.02	6.14	0.32	0.00066	5.58
Jun-11	590,176	8.7%	720	70.7	89.0	17.03	2.05	6.24	0.32	0.00067	5.67
Jul-11	572,350	8.4%	717	68.6	86.3	16.52	1.99	6.05	0.32	0.00065	5.50
Aug-11	565,021	8.3%	735	67.7	85.2	16.30	1.96	5.97	0.31	0.00064	5.43
Sep-11	286,860	4.2%	398	34.4	43.3	8.28	1.00	3.03	0.16	0.00033	2.76
Oct-11	612,275	9.0%	744	73.4	92.3	17.67	2.13	6.47	0.34	0.00070	5.88
Nov-11	591,118	8.7%	706	70.8	89.1	17.06	2.05	6.25	0.33	0.00067	5.68
Dec-11	651,731	9.6%	744	78.1	98.3	18.81	2.26	6.89	0.36	0.00074	6.26
Jan-12	638,269	9.4%	744	85.5	85.4	19.45	2.34	7.11	0.37	0.00076	6.47
Feb-12	564,655	8.3%	680	75.7	75.6	17.21	2.07	6.29	0.33	0.00068	5.72
Mar-12	605,504	8.9%	744	81.2	81.0	18.45	2.22	6.75	0.35	0.00073	6.13
Apr-12	577,419	8.5%	712	77.4	77.3	17.60	2.11	6.43	0.34	0.00069	5.85
May-12	586,689	8.6%	743	78.6	78.5	17.88	2.15	6.54	0.34	0.00070	5.94
Jun-12	580,541	8.5%	720	77.8	77.7	17.69	2.12	6.47	0.34	0.00070	5.88
Jul-12	557,371	8.2%	728	74.7	74.6	16.99	2.04	6.21	0.33	0.00067	5.65
Aug-12	569,489	8.4%	744	76.3	76.2	17.35	2.08	6.35	0.33	0.00068	5.77
Sep-12	325,006	4.8%	424	43.6	43.5	9.90	1.19	3.62	0.19	0.00039	3.29
Oct-12	572,469	8.4%	744	76.7	76.6	17.45	2.09	6.38	0.33	0.00069	5.80
Nov-12	596,080	8.8%	720	79.9	79.8	18.16	2.18	6.64	0.35	0.00071	6.04
Dec-12	616,554	9.1%	744	82.6	82.5	18.79	2.26	6.87	0.36	0.00074	6.25
Jan-13	599,119	9.0%	737	94.9	82.0	16.46	2.25	6.28	0.32	0.00065	5.46
Feb-13	552,616	8.3%	672	87.5	75.7	15.19	2.08	5.80	0.29	0.00060	5.04
Mar-13	633,218	9.5%	744	100.3	86.7	17.40	2.38	6.64	0.34	0.00068	5.78
Apr-13	534,374	8.0%	673	84.6	73.2	14.68	2.01	5.60	0.28	0.00058	4.87
May-13	567,357	8.5%	744	89.8	77.7	15.59	2.13	5.95	0.30	0.00061	5.17
Jun-13	564,133	8.5%	720	89.3	77.2	15.50	2.12	5.92	0.30	0.00061	5.15
Jul-13	556,678	8.3%	714	88.2	76.2	15.30	2.09	5.84	0.30	0.00060	5.08
Aug-13	575,382	8.6%	743	91.1	78.8	15.81	2.16	6.03	0.31	0.00062	5.25
Sep-13	553,430	8.3%	720	87.6	75.8	15.21	2.08	5.80	0.29	0.00060	5.05
Oct-13	347,293	5.2%	494	55.0	47.6	9.54	1.31	3.64	0.18	0.00037	3.17
Nov-13	586,324	8.8%	720	92.9	80.3	16.11	2.21	6.15	0.31	0.00063	5.35
Dec-13	604,600	9.1%	744	95.7	82.8	16.61	2.27	6.34	0.32	0.00065	5.51
Jan-14	600,644	8.9%	744	98.9	91.7	12.14	2.48	6.93	0.34	0.00071	6.02
Feb-14	530,561	7.9%	672	87.4	81.0	10.73	2.19	6.12	0.30	0.00063	5.32
Mar-14	619,399	9.2%	744	102.0	94.6	12.52	2.56	7.14	0.35	0.00073	6.21
Apr-14	568,028	8.4%	720	93.5	86.7	11.49	2.35	6.55	0.32	0.00067	5.70
May-14	556,309	8.3%	744	91.6	84.9	11.25	2.30	6.42	0.32	0.00066	5.58
Jun-14	538,070	8.0%	691	88.6	82.2	10.88	2.23	6.21	0.31	0.00064	5.40
Jul-14	571,669	8.5%	743	94.1	87.3	11.56	2.36	6.59	0.33	0.00068	5.73
Aug-14	610,100	9.1%	744	100.5	93.2	12.34	2.52	7.04	0.35	0.00072	6.12
Sep-14	567,721	8.4%	720	93.5	86.7	11.48	2.35	6.55	0.32	0.00067	5.69
Oct-14	382,180	5.7%	489	62.9	58.4	7.73	1.58	4.41	0.22	0.00045	3.83
Nov-14	596,811	8.9%	720	98.3	91.1	12.07	2.47	6.88	0.34	0.00071	5.99
Dec-14	587,868	8.7%	744	96.8	89.8	11.89	2.43	6.78	0.34	0.00070	5.90
Max Monthly	655,788		744.0	102.0	99.1	19.5	2.6	7.1	0.4	0.0	6.5

Notes:

Heat Input and Operating hours were obtained from CEMs data
All Pollutants were obtained from their respective annual Emission Inventory
CO2 was not included as a pollutants. See 40 CFR 52.21 (b)(49)(i) or "Defns" tab in this workbook.
PM is TSP or total particulate, PM10 and PM2.5 are filterable and condensibles.

NOTES: 1. Pink Fill indicates for Max Value for 5 year baseline

PROJECTED OPERATION & EMISSIONS					
YEAR	2016	2017	2018	2019	2020
Capacity (%)	94%	90%	94%	94%	94%
Heat Input (MMBtu)	6,233,021	5,956,839	6,217,996	6,217,996	6,233,021
Heat Input from Additional Limestone (MMBtu)	153,108	203,921	214,117	214,117	214,703
Hours of Operation	8,301	7,884	8,278	8,278	8,301
NOX (Tons)	993.3	958.3	1000.5	1000.5	1002.9
SO2 (Tons)	732.4	616.1	643.2	643.2	644.8
CO (Tons)	189.4	182.7	190.8	190.8	191.2
PM (Tons)	24.9	24.1	25.1	25.1	25.2
PM10 (Tons)	69.6	67.1	70.1	70.1	70.2
VOC (Tons)	3.6	3.5	3.7	3.7	3.7
Lead (Pb) (Tons)	0.007	0.007	0.008	0.008	0.008
PM2.5 (Tons)	63.0	60.8	63.4	63.4	63.6

Notes

Heat Input and capacity obtained from financial proforma

Limestone Heat Input contribution calculated

2016 and 2020 are Leap years, and include the extra 24 hrs in the projection

The pollutants are calculated from lb/mmbtu (See Projected Actual Calcs Spreadsheet) and the respective heat input

	NOx	SO2	CO	PM	PM10	VOC	Pb	PM2.5
lbs/mmbtu	0.311	0.302	0.059	0.008	0.022	0.001	0.000002	0.020
lbs/hr	274.199	266.296	52.286	6.887	19.203	1.002	0.00206	17.384
MATS lb/mmbtu limit 2017-2020		0.20						
partial MATS lb/mmbtu 2016		0.23						

Note basis for lb/mmbtu is maximum value of the Baseline Emission
2016 was calculated to reflect a partial year under the new MATS SO2 limit (0.2 lb/mmbtu)
Limestone injection will increase 30% to achieve lower SO2, based on historical vs. proforma numbers
Fuel usage will increase 3% due to need to calcine additional limestone, per published document

PROJECTED OPERATION & EMISSIONS

YEAR	2016	2017	2018	2019	2020	Average	
Limestone Consumed (tons)	118,257	122,386	127,832	127,832	128,145		126,549

YEAR	2010	2011	2012	2013	2014	Average	
Limestone Consumed (tons)	84,543	94,242	103,382	102,713	103,740		97,724

29%

Additional MMBtu needed for Calcination 226,584 MMBtu
it take 8.3 GJ of energy to calcine 1 ton of CaCO3 (see ref document below)

Note
2016-2020 limestone consumption comes from financial proforma
2016 limestone consumption from financial proforma but prorated for MATS
2010-2014 limestone consumption comes from annual emission inventory calculations

EUR 14828

ISSN 1018-5593

Commission of the European Communities

energy

Calcination of limestone in a circulating fluidized bed with coal residues as fuel

THERMIE

Report

EUR 14828 EN

Citation	Topic
40 CFR 52.21 (a)(2)	Applicability
40 CFR 52.21 (a)(2)(iv)(c)	Actual-to-projected-actual applicability test
40 CFR 52.21 (b)(2)(ii)	Ozone: VOC and NOx
40 CFR 52.21 (b)(23)(i)	Pollutant and Emissions Rate
40 CFR 52.21 (b)(40)	Significant emissions increase
40 CFR 52.21 (b)(41)(i)	Projected actual emissions
40 CFR 52.21 (b)(43)	Prevention of Significant Deterioration (PSD) program
40 CFR 52.21 (b)(48)(i)	Baseline actual emissions
40 CFR 52.21 (b)(49)(i)	Greenhouse Gas (CO2)

Morgantown meets the definition of a major stationary source with respect to the Federal PSD rules because it is a fossil-fuel fired steam electric plant and has the potential to emit several criteria pollutants at greater than 100 tpy. Therefore, the project must be evaluated for PSD-significance. A PSD applicability evaluation involves a two (2)-step process as specified in 40 CFR §52.21(a)(2)(iv)(a) to determine whether there is a net significant emission increase that will trigger NSR permitting requirements. "Step 1" in the applicability evaluation involves determining whether the project emissions increases alone exceed the PSD significance thresholds for each of the NSR regulated pollutants emitted. If any of the pollutants exceed a significance level, then a "Step 2" analysis is required to determine if a "net" emissions increase in the significant pollutant(s) will also result in emissions in excess of the significance levels. Net emissions increases are determined by looking at the project-specific emission increases along with all other increases and decreases in the emissions of the pollutant that occurred at the facility during the five (5)-year contemporaneous period for the project and that are otherwise creditable as defined by the rules. To trigger PSD, there must be both a significant emission increase (Step 1) and a significant net emission increase (Step 2).

40 CFR 52.21(a)(2)(iii)

No new major stationary source or major modification to which the requirements of paragraphs (j) through (r)(5) of this section apply shall begin actual construction without a permit that states that the major stationary source or major modification will meet those requirements. The Administrator has authority to issue any such permit.

40 CFR 52.21 (a)(2)(iv)(c)

Actual-to-projected-actual applicability test for projects that only involve existing emissions units. A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the projected actual emissions (as defined in paragraph (b)(41) of this section) and the baseline actual emissions (as defined in paragraphs (b)(48)(i) and (ii) of this section), for each existing emissions unit, equals or exceeds the significant amount for that pollutant (as defined in paragraph (b)(23) of this section).

40 CFR 52.21 (b)(23)(i)

Significant means, in reference to a net emissions increase or the potential of a source to emit any of the following pollutants, a rate of emissions that would equal or exceed any of the following rates:

Pollutant and Emissions Rate

Carbon monoxide: 100 tons per year (tpy)
Nitrogen oxides: 40 tpy
Sulfur dioxide: 40 tpy
Particulate matter: 25 tpy of particulate matter emissions
PM_{10}: 15 tpy
$PM_{2.5}$: 10 tpy of direct $PM_{2.5}$ emissions; 40 tpy of sulfur dioxide emissions; 40 tpy of nitrogen oxide emissions unless demonstrated not to be a PM2.5 precursor under paragraph (b)(50) of this section
Ozone: 40 tpy of volatile organic compounds or nitrogen oxides
Lead: 0.6 tpy
Fluorides: 3 tpy
Sulfuric acid mist: 7 tpy
Hydrogen sulfide (H_2S): 10 tpy
Total reduced sulfur (including H_2S): 10 tpy
Reduced sulfur compounds (including H_2S): 10 tpy

40 CFR 52.21 (b)(2)(ii)

Any significant emissions increase (as defined at paragraph (b)(40) of this section) from any emissions units or net emissions increase (as defined in paragraph (b)(3) of this section) at a major stationary source that is significant for volatile organic compounds or NO_x shall be considered significant for ozone.

40 CFR 52.21 (b)(40)

Significant emissions increase means, for a regulated NSR pollutant, an increase in emissions that is significant (as defined in paragraph (b)(23) of this section) for that pollutant.

40 CFR 52.21 (b)(41)(i)

Projected actual emissions means the maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a regulated NSR pollutant in any one of the 5 years (12-month period) following the date the unit resumes regular operation after the project, or in any one of the 10 years following that date, if the project involves increasing the emissions unit's design capacity or its potential to emit that regulated NSR pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source.

40 CFR 52.21 (b)(43)

Prevention of Significant Deterioration (PSD) program means the EPA-implemented major source preconstruction permit programs under this section or a major source preconstruction permit program that has been approved by the Administrator and incorporated into the State Implementation Plan pursuant to§51.166 of this chapter to implement the requirements of that section. Any permit issued under such a program is a major NSR permit.

40 CFR 52.21 (b)(48)(i)

For any existing electric utility steam generating unit, baseline actual emissions means the average rate, in tons per year, at which the unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 5-year period immediately preceding when the owner or operator begins actual construction of the project. The Administrator shall allow the use of a different time period upon a determination that it is more representative of normal source operation.

40 CFR 52.21 (b)(49)(i)

Greenhouse gases (GHGs), the air pollutant defined in §86.1818-12(a) of this chapter as the aggregate group of six greenhouse gases: Carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, shall not be subject to regulation except as provided in paragraphs (b)(49)(iv) through (v) of this section and shall not be subject to regulation if the stationary source maintains its total source-wide emissions below the GHG Plantwide Applicability Limitation level, meets the requirements in paragraphs (aa)(1) through (15) of this section, and complies with the Plantwide Applicability Limitation permit containing the GHG Plantwide Applicability Limitation.

APPENDIX 2

SNCR SYSTEM INFORMATION

Morgantown SNCR - Project Concept