Received
February 24, 2025
WV DEP/Div of Air Quality

# Division of Air Quality Permit Application Submittal

Please find attached a permit application for : MGS CNP 1, LLC;BECCS Plant
[Company Name; Facility Location]

- DAQ Facility ID (for existing facilities only):
- Current 45CSR13 and 45CSR30 (Title V) permits associated with this process (for existing facilities only):

- Type of NSR Application (check all that apply):
  - ☑ Construction
  - ☐ Modification
  - ☐ Class I Administrative Update
  - ☐ Class II Administrative Update
  - ☐ Relocation
  - ☐ Temporary
  - ☐ Permit Determination

- Type of 45CSR30 (TITLE V) Application:
  - ☐ Title V Initial
  - ☐ Title V Renewal
  - ☐ Administrative Amendment**
  - ☐ Minor Modification**
  - ☐ Significant Modification**
  - ☐ Off Permit Change

****If the box above is checked, include the Title V revision information as ATTACHMENT S to the combined NSR/Title V application.**

- Payment Type:
  - ☑ Credit Card (Instructions to pay by credit card will be sent in the Application Status email.)
  - ☐ Check (Make checks payable to: WVDEP – Division of Air Quality)
    Mail checks to:
    WVDEP – DAQ – Permitting
    Attn: NSR Permitting Secretary
    601 57th Street, SE
    Charleston, WV 25304

**Please wait until DAQ emails you the Facility ID Number and Permit Application Number. Please add these identifiers to your check or cover letter with your check.**

- If the permit writer has any questions, please contact (all that apply):
  - ☐ Responsible Official/Authorized Representative
    - Name:
    - Email:
    - Phone Number:
  - ☑ Company Contact
    - Name: Jack Calhoun
    - Email: jack.calhoun@fidelisinfra.com
    - Phone Number:
  - ☑ Consultant
    - Name: Michael Dearing
    - Email: michael.dearing@erm.com
    - Phone Number:

February 20, 2025

Ms. Laura M. Crowder, Director
WVDEP – Division of Air Quality
601 57th Street SE
Charleston, WV 25304

*RE: MGS CNP 1, LLC – R13 Air Permit Application*

Dear Director Crowder:

MGS CNP 1, LLC herein submits the enclosed Minor Source Air Permit Application for the proposed Biomass Energy with Carbon Capture and Sequestration (BECCS) Plant to be located in Mason County, West Virginia. Section 2 of the application provides a detailed description of the project process. Based on the project emissions estimation, the facility will be considered a minor source. Therefore, MGS CNP 1, LLC is submitting this application to obtain a Permit to Construct for the BECCS Plant in accordance with West Virginia Code of State Rules (CSR), Title 45, Series 13 (45CSR13).

If you have any questions or comments regarding this air permit application, please contact Michael Dearing at michael.dearing@erm.com.

Sincerely,

Jack Calhoun
Vice President

cc: Michael Dearing, ERM (michael.dearing@erm.com)

# Minor Source Air Quality Permit Application

For

## MGS CNP 1, LLC
## Biomass Energy and Carbon Capture and Sequestration Plant

Submitted to:
West Virginia Department of Environmental Protection
Division of Air Quality – Permitting Section
601 57th Street SE
Charleston, WV 25304

Submitted by
MGS CNP 1, LLC
109 North Post Oak Lane, Suite 140
Houston, TX 77024

February 2025

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# 1 Application Overview

MGS CNP 1, LLC (MGSCNP1) is planning to build and operate a greenfield biomass energy with carbon capture and sequestration (BECCS) facility located in Point Pleasant, Mason County, West Virginia. With this application, MGSCNP1 is requesting a Permit to Construct for the BECCS facility in accordance with West Virginia Code of State Rules (CSR), Title 45, Series 13 (45CSR13).

Mason County is currently designated as "attainment" or "unclassified" for all regulated New Source Review (NSR) pollutants. As provided in the facility-wide emissions summary in Section 3 of this application, the BECCS facility will be a minor source with respect to the NSR permit program and the Title V operating permit program.

Section 2 of this application contains a process description. Section 4 contains a state and federal regulatory applicability analysis for the proposed project.

The WVDAQ R13 application form and required Attachments A-S in the application form are included in Appendices A and B, respectively, at the end of the application. Appendix B contains the following WVDAQ application components:

Attachment A: West Virginia Business Certificate
Attachment B: Maps
Attachment C: Installation and Start Up Schedule
Attachment D: Regulatory Discussion
Attachment E: Plot Plan
Attachment F: Detailed Block 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 (Not Applicable)
Attachment R: Authority Forms (Not Applicable)
Attachment S: Title V Permit Revision Information (Not Applicable)

# 2 Detailed Description of Proposed Operations

This section includes a detailed process description of the proposed BECCS facility. Appendix B provides a process flow diagram, as shown in Attachment F, for reference. The fluidized bed boiler in this BECCS facility will use clean woodchips as fuel during normal operation and burn natural gas during start up process. MGSCNP1 intends to commence construction of the BECCS facility in 2026 with startup operations in 2029. The proposed plant will include the following major processes:

- Receiving, storing, and handling raw materials such as wood chips, sand and sodium bicarbonate
- Biomass boiler and environmental train
- Post-combustion carbon capture unit (PCCU)
- Power generation
- Storage and handling of fly ash and bottom ash
- Balance of Plant (BoP) facilities including, but not limited to:
    - Raw Water / Utility Water
    - NG Startup Generator
    - Electric and Diesel Driven Fire Water Pumps
    - Cooling Tower
    - Storage Tanks
    - Wastewater Treatment

The major emission sources that will be present on-site include:

- Hoppers, Bins and Conveyors in Material Handling
- One Wood Chip Fired Bubbling Fluidized Bed (BFB)Boiler
- One Mechanical Draft Evaporative Cooling Tower
- Trucks Traveling on Paved In-plant Road
- Storage Silos for Fly Ash and Bottom Ash
- Equipment Leaks
- One NG Startup Generator
- One Fire Water Diesel Engine Pump
- Two Storage Tanks – an amine makeup tank, and a lean amine tank. The facility will also have two additional tanks, a diesel tank and a biodegraded amine tank, but according to Table 45-13B in 45CSR13, these two tanks are de minimis sources and do not need to be included in this permit application.

## 2.1 Raw Material Receiving and Transfer

### 2.1.1 Truck Traffic

Raw material used as fuel will be clean wood chips. The wood chips will be delivered to the site by trucks. The wood chips will be stored outdoor in piles until burned as fuel in the fluidized bed boiler. Other materials trucked to the facility include sand, sodium bicarbonate ($NaHCO_3$), ammonia and amine solutions. The substances trucked out of the facility include fly ash, bottom ash, and degraded amine.

The only emissions generated from truck traffic are particulate matters (PM, $PM_{10}$, and $PM_{2.5}$).

### 2.1.2 Raw Material Receiving and Handling

Biomass will be unloaded from the trucks by truck tippers which dump the biomass into two receiving hoppers. Dust is controlled by a slight negative pressure in the receiving hoppers. The extracted dust laden air will be directed through a baghouse before discharge to the atmosphere.

The only emissions generated from truck loading chips into the hopper are particulate matters (PM, $PM_{10}$, and $PM_{2.5}$).

### 2.1.3 Conveying and Processing

From the hoppers, biomass is conveyed via covered conveyors to an uncovered chip pile, which is large enough for at least 14 days of storage. From the storage pile, front end loaders will be used to load the biomass into a biomass receiving hopper and the subsequent conveyors will transport the material to the day bins at the biomass boiler for feed loading.

The chip pile will be surrounded by a drainage trench to catch storm water runoff for treatment and disposal.

## 2.2 Combustion Process

MGSCNP1 will construct one bubbling fluidized bed (BFB) boiler. BFB boiler has been proven to efficiently combust wood biomass. MGSCNP1 proposes to fuel the new boiler with woody biomass under normal operation. Natural gas will be used for startup operation of the boiler only.

As discussed in this section, the boiler will be capable of accommodating the following:

1) Natural gas for boiler startup; and
2) wood biomass for normal operation.

The boiler is not being designed to combust natural gas as a secondary fuel for power generation. The boiler heat input capacity for natural gas will be rated at 180 million British thermal units per hour (MMBtu/hr). The anticipated maximum design heat input of the boiler while combusting woody biomass will be 944 MMBtu/hr.

BFB boilers are capable of efficiently combusting woody biomass. A fluid-like mixture of solid fuel and other solids (such as sand) is suspended in the BFB boiler's combustion chamber by a turbulent upward air flow. The turbulent mixing provides for greater combustion efficiency in the BFB boiler.

Combustion of woody biomass (in normal operation) and natural gas (at startup only) in the proposed BFB boiler accounts for most of the potential to emit regulated air pollutants from the proposed facility. A discussion of the control technology and methods to be used and the associated estimates of air pollutant emission rates are discussed below.

Attachment F in Appendix B shows a detailed process flow diagram of the major equipment, control technologies, and material flows for the BFB boiler system. As depicted in the figures, natural gas will be provided via pipeline, woody biomass will be provided by wood suppliers via incoming trucks and stored on-site. Also, as part of the process, MGSCNP1 will be installing silos to store materials required to support the proposed woody biomass boilers. The silos anticipated to be installed are as follows:

- Sand storage silo with breather vent to support boiler operation; and
- Sorbent (Sodium Bicarbonate ($NaHCO_3$)) storage silo to support as needed dry in-duct sorbent injection.

  Both silos will vent to the boiler with particulate emissions controlled by the boiler PJFF.

- Fly ash silos with filters for storing the fly ash and economizer ash from biomass combustion.

### 2.2.1 Proposed Air Pollution Control Technologies / Techniques

The proposed boiler will utilize a combination of state-of-the-art control devices/techniques to minimize potential emissions of regulated air pollutants. A discussion of these devices/techniques, along with the air pollutant being controlled is provided below.

#### *2.2.1.1 Pulse Jet Fabric Filter (Baghouse): Particulate Matter Control*

Emissions of particulate matter (PM) will be controlled by a Pulse Jet Fabric Filter (PJFF) commonly referred to as a baghouse. Modern baghouses can provide a high level of control efficiency, in excess of 99% reduction of particulate emissions.

The fabric filter proposed for this project is a self-cleaning dry filtration system. Dust is collected on the external surface of the filter, where it commonly forms into a cake. When the dust cake is at an appropriate thickness (based on time) a pulse of compressed air is pushed through the interior of the filter, knocking the dust cake free to fall into the hopper below for removal. The dust from the pulse jet fabric filter is combined with the economizer ash for removal.

Emission factors for uncontrolled emissions of trace elements (metals) come from AP-42 Section 1.6. It is conservative to assume that baghouses will not control emissions of these compounds since some are in the gas phase in the flue gas.

#### *2.2.1.2 Dry In-Duct Sorbent Injection: Hydrogen Chloride and Acid Gas Control*

HCl is formed from the presence of chlorine in the wood. MGSCNP1 will be installing a dry in-duct sorbent injection system, which will utilize $NaHCO_3$ as the injection sorbent material. The dry sorbent is typically injected as a powder into the flue between the furnace of the boiler and baghouse. The dry sorbent reacts with the targeted air pollutants (i.e., hydrogen chloride (HCl) and other acid gases) and removes them from the flue gas before such pollutants are subsequently being filtered from the flue gas by the baghouse. The system is designed to reduce acid gases such as HCl and is also effective at reducing sulfur dioxide and sulfuric acid mist. Initial engineering estimates indicate that the incorporation of the BFB boiler design, baghouse, and the dry in-duct sorbent injection is sufficient to maintain HCl and other acid gases to minor source levels.

#### *2.2.1.3 Selective Catalytic Reduction (SCR): Nitrogen Oxides ($NO_X$) Control*

An SCR system will be utilized for controlling $NO_X$ emissions. The SCR process chemically reduces the $NO_X$ molecule into molecular nitrogen and water vapor. A nitrogen-based reactant such as ammonia is injected into the ductwork, downstream of the combust unit. The waste gas mixes with the reagent and enters a reactor module containing a catalyst. The hot flue gas reagent diffuses through the catalyst. The reagent reacts selectively with the $NO_X$ within a specific temperature range and in the presence of the catalyst and oxygen.

A small amount of the ammonia will “slip” through the process without reacting and be emitted in the boiler’s exhaust. This emission of ammonia is termed “ammonia slip.”

#### *2.2.1.4 Oxidation Catalyst: Carbon Monoxide (CO) and Volatile Organic Compounds (VOCs) Control*

A properly designed firebox and burner coupled with effective operating controls will minimize CO and VOC generation by providing the proper residence time, temperature and combustion zone turbulence, as well as the proper air-to-fuel ratio. In addition to combustion controls such as proper boiler design and operation, CO oxidation catalyst will be applied to the BFB to control the CO and VOC emissions. The

oxidation catalyst is typically a precious metal catalyst (e.g. platinum), which has been applied over a metal or ceramic substrate. The catalyst lowers the activation energy required for the oxidation of CO to temperatures between 400 and 1100 °F. No chemical reagent addition is required.

#### *2.2.1.5 Injection of Caustic (Wet Flue Gas Desulfurization): Sulfur Oxides ($SO_X$) Control*

Caustic will be injected into the boiler flue gas to remove $SO_X$ in a process known as wet flue gas desulfurization. The aqueous caustic solution is sprayed from the top of the polishing scrubber column. Blowdown from the wash water / caustic solution is sent to the wastewater treatment plant.

## 2.3 Ash Handling, Storage and Shipment Process

The combustion of biomass in the proposed boiler will result in the formation of bottom ash and fly ash. The resultant amount of ash is reflection of the ash in the fuel.

The fly ash is the particulates captured by the high efficiency baghouse. The generated fly ash will be transferred to two ash storage silos via two PJFF Ash Collection Drag Chain Conveyors, two PJFF Ash Collection Surge Bins, two PJFF Ash Transport Drag Chain Conveyors, an Ash Bucket Elevator, and an Ash Distribution Drag Chain Conveyor. Each fly ash storage silo will be equipped with a pulse jet filter to minimize any PM from the storage silo. When a sufficient volume has been collected, the fly ash will be mixed with utility water and then trucked off site. The fly ash will have a minimum moisture content of 10 wt% when loaded into trucks. The chute used to dispense fly ash into the truck will be designed to minimize PM emissions.

Bottom ash along with heavy non-combustible material will be collected in two metering conveyors and transferred to two vibrating conveyors. The bottom ash is separated from sand on the vibrating conveyor, after which it is moved outside of the boiler island and cooled. This material will be delivered to enclosed bins for storage and to be trucked away and disposed of.

## 2.4 Post-Combustion Carbon Capture

The Post-Combustion Carbon Capture Unit (PCCU) is designed to remove greater than 95% of the $CO_2$ in the combustion flue gas from the biomass boiler. This process description is for a generic amine carbon capture unit. Depending on the carbon capture licensor that is selected to move forward in the project, there may be slight modifications in the operation. The $CO_2$ that is captured is dehydrated and compressed to pipeline specifications prior to being permanently sequestered offsite of the BECCS facility.

### 2.4.1 Absorber

In the absorber, flue gas from the direct contact cooler containing $CO_2$ is fed to an absorption column where it's contacted with a downflowing amine-based solvent. The amine removes the $CO_2$ from the flue gas. The amine which contains the captured $CO_2$ exits the absorption column as rich amine bottoms liquid. The produced flue gas free of $CO_2$ is vented from the top of the absorber column to atmosphere.

### 2.4.2 Amine Regenerator

The rich amine stream leaving the amine absorber is routed to the regenerator column to regenerate amine. This is achieved by the regenerator column being operated at conditions that separate the $CO_2$ vapor from the liquid amine.

The amine feed flows to the top of the regenerator column. Separation of the $CO_2$ and amine occurs by a stripping effect created as amine comes in contact with the up-flowing $CO_2$ vapor. The heat required for regeneration will be supplied by low pressure (LP) Steam to a reboiler. The LP steam is provided from the biomass boiler steam system. The regenerated lean amine from the regenerator is pumped to the absorber column as feed to complete the cycle of $CO_2$ removal from the flue gas.

$CO_2$ vapors rise to the top of the column, where they are passed through a condenser. A reflux drum after the condenser separates the liquid amine from the $CO_2$ vapor. The liquid amine from the condenser is sent back to the regenerator column as reflux while the $CO_2$ vapor is sent to compression.

### 2.4.3 Reclaimed Amine

Degradation of amine solvents occurs over time due to the presence of oxygen and other impurities in the flue gas, resulting in deterioration of long-term performance. Purification of the amine solvent is therefore required to maintain operating efficiency. Reclamation includes both neutralization and regeneration steps. The contaminated amine solution is first mixed with a strong base, such as caustic, to reform the amine and separate it from degradation products. Heat is then applied to boil off the free amine and water and leaving behind sludge of degradation products. The degradation products are removed periodically from site by trucks. Reclaimed amine is sent to the lean amine tank for recirculation. Makeup amine will be brought to site using trucks, stored in the Amine Makeup Tank and then supplied to the amine absorber system to account for losses to the degradation products.

### 2.4.4 $CO_2$ Compression

$CO_2$ product from the reflux drum of amine stripper is dehydrated and compressed to 1,850 psig and 100°F for sequestration via an external pipeline.

### 2.4.5 Amine Storage

One Lean Amine Tank and one Amine Makeup Tank will be installed to store lean amine and makeup amine, respectively. Makeup amine will be delivered to the makeup amine tank by truck, while makeup demineralized water is provided from the demineralized water system for diluting the solvent.

## 2.5 Power Generation

### 2.5.1 Steam Turbine Generator

The steam turbine generator (STG) extracts the thermal energy from the superheated, pressurized steam produced by the biomass boiler and uses it to perform mechanical work. The mechanical work is then converted to electrical power by the generator. The resulting steam exhaust from the STG is then cooled in a surface condenser with cooling water. The steam condensate from the surface condenser is recirculated back to the deaerator.

### 2.5.2 Start-up Generator

A start-up generator is provided to support the Boiler and steam turbine start-up. Electrical power, generated by the start-up generator, is required to run various Boiler and steam turbine auxiliaries, such as boiler feedwater pumps, air compressors, cooling equipment, etc. and controls.

## 2.6 Auxiliary Processes and Balance of the Plant (BoP) Facilities

### 2.6.1 Emergency Engine

The proposed plant will require an emergency fire water pump. This piece of emergency equipment will be fueled with ultra-low sulfur distillate fuel oil (diesel) and operate only a limited number of hours (100 hours per year or less) for testing purposes under normal conditions. To support this emergency equipment, an above-ground tank with a maximum capacity of 1292 gallons (gal) will be installed. This tank will be designed to store the ultra-low sulfur distillate fuel oil. According to Table 45-13B in 45CSR13, the diesel tank is a de minimis source and does not need to be included in this permit application.

### 2.6.2 Cooling Tower

A dedicated cooling tower will be installed to supply cooling water to all plant users. The Cooling Tower makeup is supplied using Utility Water (Raw water that has been treated).

### 2.6.3 Storage Tanks

As described in sections 2.4.5, two storage tanks will be installed to support the operation of the facility – a lean amine tank and an amine makeup tank.

### 2.6.4 Waste Water Treatment Plant

The wastewater treatment plant will receive water from the direct contact cooler/polishing scrubber system. The scrubbing liquid will have direct contact with the flue gas exhaust from the boiler. The scrubber solution will adsorb ammonia, sulfuric acid and hydrochloric acid that could be present in the flue gas. The scrubbing solution will be sent to the Wastewater Treatment Plant for further processing before it is discharged to the outfall. It is conservatively assumed that 10% of the ammonia, sulfuric acid and hydrochloric acid in the flue gas could be emitted from the Wastewater Treatment plant. The wastewater treatment plant will also receive water from the demineralized water system, raw water treatment, flush pond water, cooling tower water and boiler blowdown water. These streams are not expected to contribute emissions from the wastewater treatment plant.

### 2.6.5 Others

To support the operation of the facility, other facilities will also be installed such as raw water/utility water, fire water, demineralized water generation, natural gas system, storm water pond, first flush pond, buildings, etc. These facilities are not expected to generate any air emissions.

# 3 Emission Sources and Emission Calculations

## 3.1 Emission Source Description

MGSCNP1 plans to install the following air emission units during the construction of the proposed BECCS facility. Please note that the design information discussed in this application is based on best available information provided by vendors at the time of this application. A process flow diagram is included in Appendix B that identifies each emission source. Table 3-1 below summarizes emission points at the proposed facility.

**Table 3-1 Facility Emission Source ID and Description**

| Emission Source | Source ID | Type | Emission Source Description |
|---|---|---|---|
| Truck Traffic | PM-PlantRd | Fugitive | Paved Roads – Receiving wood chips, sand, sodium bicarbonate, and chemicals (ammonia and amine). Disposal of degraded amine and ash. |
| Bag House on Biomass Receiving Hoppers | 121-PKG-1001 | Point | Bag house on wood chips receiving hoppers (121-LS-1001 and 121-LS-1002) to control particulate matter emissions |
| Uncovered Wood Chip Pile | CHIP-1<br><br>CHIP-2 | Fugitive | Wood chips storage pile loading fugitives (CHIP-1) and wind erosion emissions (CHIP-2) |
| Biomass Feed Hopper | 121-S-1001 | Fugitive | Emissions due to loading wood chips into the uncovered open hopper |
| Biomass Metering Bins<br><br>Biomass Transfer System | 121-S-2001 A/B<br><br>121-CV-1001<br><br>121-CV-1002<br><br>121-CV-1003<br><br>121-CV-2001 A/B | Point<br><br>Fugitive | Venting due to loading wood chips into the bins<br><br>Conveying of biomass from the biomass hoppers to the BFB Boiler |
| BFB Boiler Stack | 121-PKG-3001 | Point | BFB boiler stack used for boiler startup and when CCS is not in operation |
| $CO_2$ Absorber | 122-T-1001 | Point | Stack on the top of the $CO_2$ Absorber, through which $CO_2$-controlled biomass boiler flue gas is released to the atmosphere when CCS is operating |
| Fly Ash Storage Silos | 121-S-4001 A/B | Point | Silo for storing economizer ash and fly ash captured by the Boiler PJFF (baghouse) |
| Fly Ash Truck Loading | 121-TL-0001 | Point | Venting due to loading the captured fly ash into trucks |
| Fly Ash Transfer System | 121-CV-4001 A/B<br><br>121-CV-4002<br><br>121-CV-4003 | Fugitive | Conveying of fly ash from the fly ash hoppers to enclosed storage silos |

| Emission Source | Source ID | Type | Emission Source Description |
|---|---|---|---|
| | 121-CV-4004<br><br>121-CV-4005<br><br>121-CV-4006 A/B<br>121-CV-4007 A/B | | |
| Cooling Tower | 129-CT-9301 | Fugitive | 6-Cell mechanical draft cooling tower |
| Sand Transfer System | 121-S-1002<br><br>121-CV-1004<br><br>121-CV-5001 A/B<br><br>121-CV-5002 A/B<br><br>121-CV-5003 A/B<br><br>121-CV-5004 A/B | Fugitive | Conveying of fresh sand from the uncovered open sand receiving hopper and the recycled sand from the recovering process to the BFB boiler |
| Sodium Bicarbonate Vent Hoppers | 121-S-9902 A/B | Point | Hoppers with filters in $NaHCO_3$ transfer process |
| Start-up Generator | 129-PKG-0001 | Point | NG-fired generator used during facility startup |
| Fire Water Pump | 129-P-9402 | Point | Diesel-driven pump for emergency use |
| Truck Loading | VOC-Amine-Load | Point | Venting from truck during loading of biodegraded amine |
| Amine Makeup Tank | 122-TK-9902 | Point | Storage tank for storing makeup amine for the CCS process |
| Lean Amine Tank | 122-TK-9901 | Point | Storage tank for storing the regenerated lean amine in the CCS process |
| Waste Water Treatment | 127-WTP-00 | Fugitive | Treatment of water on site from various processes. |

## 3.2 Emissions Rates and Calculation Methods

This section provides a project emission summary table and describes the method for determining the emissions. In all cases, air emissions were estimated by one of the following methods: emission factors from U.S. EPA Compilation of Emission Factors AP-42, vendor data, engineering calculations, engineering process knowledge. All emissions are based on maximum design capacity and operating 8760 hours per year. The detailed emission calculations are included in Appendix B, Attachment N.

### 3.2.1 Proposed Project Emissions

Table 3-1 provides a summary of the potential annual emissions including particulate matter, particulate matter with an aerodynamic diameter of 10 microns or less, and particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM/PM_{10}/PM_{2.5}$), nitrogen oxides ($NO_X$), sulfur dioxide ($SO_2$), carbon

monoxide (CO), volatile organic compounds (VOC), and total hazardous air pollutants (HAPs). As mentioned above, the detailed emission calculations and supporting documentation is provided in Appendix B, Attachment N.

**Table 3-2 Summary of Facility-Wide Potential Emissions in Tons Per Year**

| $NO_X$ | CO | $SO_2$ | VOC | PM | $PM_{10}$ | $PM_{2.5}$ | $NH_3$ | Total HAPs |
|---|---|---|---|---|---|---|---|---|
| 90.95 | 46.48 | 50.78 | 55.27 | 98.51 | 83.35 | 75.28 | 25.72 | 24.00 |

### 3.2.2 Emission Calculation Methods

Haul Road Traffic Fugitives

Emissions from haul roads due to traffic were estimated using the paved roads, size-specific emission calculation equation below:

$$E = k \times (sL)^{0.91} \times W^{1.02}$$

Where:

E = pounds per vehicle mile traveled (lb/VMT)

sL = silt loading grams per square meter ($g/m^2$) = 2.4 $g/m^2$

W = mean vehicle weight (tons)

k = constant (AP-42 Table 13.2-1.1)

The mean vehicle weight is calculated by averaging the loaded and unloaded vehicle weights. The "ubiquitous baseline" of 0.6 $g/m^2$ was selected from the less than 500 average daily traffic category in AP-42 Table 13.2.1-2; and the ubiquitous winter baseline multiplier during months with frozen precipitation (x4) was applied to this value to obtain a silt loading value of 2.4 $g/m^2$ for all paved roads. For paved roads, vehicle miles traveled (VMT) is calculated as follows:

$$VMT = length\ of\ path\ haul\ road\ vehicle\ travels * maximum\ trips\ (hourly\ or\ annual)$$

The estimate of the maximum hourly emission rate conservatively assumes 203 trucks (vehicles) each traveling 0.63 miles in a 10-hour workday, so the base for hourly emissions due to raw material vehicle traffic is 12.79 vehicle miles traveled per hour (VMT/hr). The estimate of the maximum annual emission rate conservatively assumes 107 trucks (vehicles) each traveling 0.63 miles in a 24-hour workday, so the base for annual emissions due to raw material vehicle traffic is 2.81 VMT/hr.

Detailed calculations of haul road emissions are provided in Tables N-10a and N-10b in Appendix B, Attachment N.

Biomass Receiving and Handling

Emission estimates for the biomass fuel receiving, handling and storage operations was based on US EPA established emission factors and methodologies and vendor estimates.

All conveyor systems in the fuel receiving, handling, storage, and processing system will be designed to minimize fugitive dust emissions by using best management practices, including covers and hoods of conveyors and, to the extent physically possible, enclosed chutes for dropping fuel to and from conveyors. Drop height will be minimized when dropping wood chips onto the outdoor storage areas to minimize excessive dust.

Due to the nature of fuel handling process, potential emissions may occur in the form of particulate matter (PM). However, the PM emissions will be kept to a minimum as the conveyors and drop points associated with this process will be covered to the extent physically possible. Pile drop points cannot be enclosed; however, due to the moisture content of the wood chips, fugitive dust should be minimal. Emission estimates have been performed for each individual drop points.

Potential fugitive dust emission rates were estimated using the methods developed by U.S. EPA (i.e., AP-42) and engineering design parameters. Details of the calculations and the resulting emission estimates can be found in Tables N-2 through N-5 in Appendix B, Attachment N.

Biomass Boiler

MGSCNP1 will construct a bubbling fluidized bed (BFB) boiler, which has been proven to efficiently combust woody biomass. MGSCNP1 proposes to fuel the new boiler with only woody biomass under normal operation. Natural gas will be used for startup operation only. The boiler will not be designed to combust natural gas as a secondary fuel for power generation. The boiler heat input capacity for natural gas will be rated at 180 million British thermal units per hour (MMBtu/hr). The anticipated maximum design heat input of the boiler while combusting woody biomass will be 944 MMBtu/hr.

Combustion of woody biomass (normal operation) and natural gas (startup only) in the proposed BFB boiler will produce regulated air pollutant emissions. To estimate the emissions from the biomass boiler, the emission calculation methodology involving emission factors in AP-42, engineering estimate, vendor guaranteed emissions rates and prior experience were utilized. MGSCNP1 obtained confirmation from boiler vendor on their commitment to specific air pollutant emission levels for the proposed biomass boiler. Potential Organic HAP emission rates were estimated based on U.S. EPA's AP-42 emission factors in Table 1.6-3 but were adjusted by multiplying them by the ratio of vendor guaranteed VOC emission factor to the AP-42 VOC emission factor. Potential metallic HAP emissions were estimated based on U.S. EPA's AP-42 emission factors in Table 1.6-4.

The operating scenarios defined for the boiler are based on the maximum number of hours annually which the boiler could operate in startup mode burning natural gas and normal mode burning woody mass. Estimate emission rates for the boiler combusting woody biomass were based on the vendor guaranteed emission factors, anticipated maximum design heat input of the boiler and maximum operating hours per year (i.e., 8760 hrs/yr minus the hours per year in startup mode). $NO_X$, CO, filterable $PM/PM_{10}/PM_{2.5}$, VOC emissions during startup were estimated based on vendor's guarantees. Condensable $PM/PM_{10}/PM_{2.5}$ emissions were estimated using an adjusted emission factor based on the condensable PM emission factor in Tale 1.6-1 of AP-42. The flue gas from the proposed boiler will pass through the amine absorber and the wash water column. These steps will reduce the temperature of the flue gas to approximately 110 °F before it is discharged to the atmosphere. Therefore, the data entries for stokers using a wet scrubber as PM control and with complete test data records were used to derive the average emissions factor of condensable PM.

Potential emissions of regulated HAPs, as defined under Section 112(b) of the Clean Air Act, were also estimated. Potential HAP emissions from combustion of woody biomass are based on emission factors for wood residue combustion in Section 1.6 of EPA AP-42. The annual HAPs emissions were conservatively estimated using the anticipated maximum design heat input of the boiler and maximum operating hours per year (i.e., 8760 hrs/yr). The organic HAPs emission factors in AP-42 are adjusted by multiplying the ratio of vendor guaranteed VOC emission factor to the AP-42 VOC emission factor. These adjusted emission factors are used to calculate the proposed boiler's organic HAP emissions.

The estimated PTE of regulated air pollutant emission rates are calculated in Table N-1.

Ash Handling, Storage and Shipment Process

The combustion of biomass in the proposed boiler will result in formation of bottom ash and fly ash. The resultant amount of ash is reflection of the ash in the fuel. Emission estimates for ash handling and storage, and shipment operations was based on US EPA established emission factors and methodologies, and engineering estimates.

The fly ash refers to the particulates captured by the high efficiency pulse jet fabric filter. The collected fly ash will be mechanically transferred to and held in two fly ash storage silos. The economizer ash will also be sent to the same ash storage silos. Each ash storage silo will be equipped with a filter on the vent designed to minimize particulate emissions. Potential PM emissions from the fly ash transfer conveyors and the storage silos are estimated using the amount of fly ash generated and the emissions factors calculated based on equation (1) in Section 13.2.4.3 of AP-42 V5 (November 2006).

When a sufficient volume has been collected, the ash will be mixed with utility water before being trucked offsite for disposal. The chute used to dispense fly ash into the trucks will be designed to minimize PM emissions. Potential PM emission rates from the truck loading operation are also estimated using the amount of fly ash generated and the emissions factors calculated based on equation (1) in Section 13.2.4.3 of AP-42 V5 (November 2006).

Details of the calculations and the resulting emission estimates can be found in Table N-6 in Appendix B, Attachment N.

Bottom ash will be in the form of large solid particles and be collected from the boiler in two metering conveyors and then transferred to two vibrating conveyors before being stored in enclosed bins to be trucked away and disposed of. The bottom ash is separated from sand on the vibrating conveyor, after which it is moved outside of the boiler island and cooled.

Due to the size of the bottom ash particles, no PM emissions are expected from the storage bins before removal and disposal off-site by truck.

Sodium Bicarbonate Receiving and Handling

Sodium Bicarbonate ($NaHCO_3$) will be delivered in bulk pneumatic tanker with a sealed pneumatic transfer mechanism. The $NaHCO_3$ will be pneumatically conveyed to a storage silo via a sealed pipe system. 4 full loads will be required per year, so this is a batch operation.

The storage silo will vent to the boiler flue gas system and the particulate emissions will be captured by the boiler PJFF.

From the storage silo, the $NaHCO_3$ will be gravity fed into two vent hoppers and subsequently into the grinding mills. Each vent hopper will be equipped with a filter and the grinding mills will be located in a building. Potential PM emissions from the two vent hoppers are estimated based on emission factors in Section 11.19.2 of AP-42 V5 (August 2004) and the amount of $NaHCO_3$ to be fed to the boiler flue gas.

Details of the calculations and the resulting emission estimates can be found in Table N-8 in Appendix B, Attachment N.

Sand Receiving and Handling

Sand will be used to help fluidize the biomass and acts as a heat transfer medium in the BFB. Bulk deliveries of fresh sand will be stored in an uncovered open sand receiving hopper. From the hopper, the sand will be conveyed to a storage silo that will discharge to the boiler and the particulate matter will be captured by the boiler PJFF. Fresh sand from the storage silo is transported to the boiler along with the recycled sand via conveyors and bucket elevators.

The recycled sand is recovered from the under-bed discharge. The underbed discharge contains sand and bottom ash. After separation, the recovered sand will be returned to the boiler along with the replenished fresh sand.

The uncontrolled emission factors for aggregate transfer in Table 11.12-2 of AP-42 are used to estimate particulate emissions from sand handling. Details of the calculations and the resulting emission estimates can be found in Table N-7 in Appendix B, Attachment N.

Cooling Tower

Emissions of total particulate matter were estimated using design circulation and drift elimination rates, as well as a worst-case Total Dissolved Solids (TDS) value for the water. Proposed emissions of PM are based on the expected TDS concentrations in the circulating cooling water and a design drift rate of 0.001% of the circulating water. Emissions of respirable and fine particulates ($PM_{10}$, $PM_{2.5}$) are not expected to be equal to total PM and were calculated based on the methodology by Reisman and Frisbie [1] for determining particulate size profiles from cooling towers.

The annual emissions for the cooling tower are based on operating service of 8,760 hours per year.

Details of the calculations and the resulting emission estimates can be found in Table N-9 in Appendix B, Attachment N.

Fixed Roof Tanks

Annual emissions from fixed roof storage tanks were estimated using equations and methodology in EPA Publication AP-42, Chapter 7[2]. AP-42 emission calculations require as inputs the physical properties of the material stored (i.e., molecular weight, vapor pressure function, and vapor phase molecular weight), meteorological conditions of the site, and the characteristics of the tank construction (e.g., paint color).

[1] Joel Reisman and Gordon Frisbie, Calculating Realistic $PM_{10}$ Emissions from Cooling Towers. July 2002. Environmental Progress 21(2): 127-130.
[2] US EPA, AP-42 Section 7.1, Organic Liquid Storage Tanks. June 2020.

Maximum hourly emissions are determined based on TCEQ's guidelines for the use of AP-42 methodology to estimate short-term emissions from storage tanks.[3] The guideline generally requires the use of a maximum ambient temperature of 95 °F, which is conservative for this application. The calculations follow the TCEQ guideline in estimating emissions from storage tanks.

Detailed emission calculations are included in Appendix B Attachment N as Table N-11.

Fire Water Diesel Engine Pump

Emissions will occur from weekly testing of one 600-hp diesel-fired water pumps (129-P-9402). Maximum hourly emissions were calculated based on testing at the maximum engine capacity. Annual emissions were based on the maximum number of hours per year of operation (100 hrs/yr). Emissions for air contaminants other than $SO_2$ are calculated based on emission factors applying to diesel fire water pump engines after 2008 (Table 4 to 40 CFR 60 Subpart IIII (40 CFR § 60.4202(d) and § 60.4205(c)) and the rated brake horsepower of the engine. Emissions of $SO_2$ are estimated based on the use of Ultra-low Sulfur Diesel (ULSD) (40 CFR §60.4207 and 40 CFR §1090.305(b)) and the assumed brake-specific fuel consumption of the engine.

Detailed emission calculations are included in Appendix B Attachment N as Tables N-12.

Natural Gas (NG) Startup Generator

There will be a 3000-hp NG - fired startup generator. Since there is no grid power to start the process, the NG startup generator will provide the required power to run various boiler and steam turbine auxiliaries such as boiler feedwater pumps, air compressors, cooling equipment, etc. and controls before the BECCS plant can operate properly. This generator will only run 100 hours per year.

Maximum hourly emissions were calculated based on operating/testing at the maximum engine capacity. Annual emissions were based on the maximum number of hours per year of operation (100 hrs/yr). Emissions for air contaminants other than $SO_2$ are calculated based on emission factors applying to NG fire engines (Table 1 to 40 CFR 60 Subpart JJJJ (40 CFR § 60.4233(e)) and the rated brake horsepower of the engine. Emissions of $SO_2$ are estimated based on the sulfur content of the natural gas and the assumed brake-specific fuel consumption of the engine.

Detailed emission calculations are included in Appendix B Attachment N as Tables N-13.

Equipment Leaks

Potential fugitive emissions were estimated using factors from US EPA, 1995 Protocol for Equipment Leak Emission Estimates.[4] Since there is no LDAR program applicable to the proposed facility, no control efficiency was applied to these calculations.

Hourly emissions were estimated by taking the emissions factor and multiplying it by the number of components of each type and the weight percentage of each compound of concern in the gas stream.

[3] Estimating Short Term Emissions Rates from Fixed Roof Tanks. February 2020. TCEQ Publication APDG 6250v3.

[4] https://www.epa.gov/sites/default/files/2020-09/documents/protocol_for_equipment_leak_emission_estimates.pdf

Annual emissions were estimated assuming that these small fugitive emissions would be always occurring during operation, i.e., 8760 hours per year.

Detailed emission calculations are included in Appendix B Attachment N as Table N-14.

Liquid Loading

Emissions from truck loading of the biodegraded amine were estimated using the loading loss emission factor and maximum estimated loading rates. The loading losses emission factor is based on the following equation from EPA's AP-42, Chapter 5, Section 5.2.2.1 (dated July 2008):

$$L_L = 12.46^* \text{ SPM/T}$$

Where $L_L$ is the loading losses (lb/Mgal), S is the saturation factor (dimensionless), P is the true vapor pressure of the liquid loaded (psia), M is the vapor molecular weight (lb/lbmol), and T is the absolute temperature of the liquid loaded (R). The saturation factors are found in Table 5.2-1 from EPA's AP-42, dated July 2008. The saturation factor for submerged loading of a dedicated normal service truck was used.

Table N-15 of Appendix B, Attachment N, provides detailed short-term and annual emission rate calculations for biodegraded amine truck loading.

Wastewater Treatment

The wastewater treatment plant will receive water from the direct contact cooler/polishing scrubber system. The scrubbing liquid will have direct contact with the flue gas exhaust from the boiler. The scrubber solution will adsorb ammonia, sulfuric acid and hydrochloric acid that could be present in the flue gas. The scrubbing solution will be sent to the Wastewater Treatment Plant for further processing before it is discharged to the outfall. It is conservatively assumed that 10% of the ammonia, sulfuric acid and hydrochloric acid in the flue gas could be emitted from the Wastewater Treatment plant. The wastewater treatment plant will also receive water from the demineralized water system, raw water treatment, flush pond water, cooling tower water and boiler blowdown water. These streams are not expected to contribute emissions from the wastewater treatment plant.

# 4 Regulatory Applicability

This section discusses the applicability of federal and state air permitting and regulatory requirements to the proposed BECCS plant. Specifically, this section discusses the applicability of Prevention of Significant Deterioration (PSD) Review, Nonattainment New Source Review (NNSR), New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), and relevant regulatory requirements in West Virginia 45 Code of State Rules (CSR).

## 4.1 Construction Permit Requirement

Construction permitting programs regulate new sources of pollutants under the New Source Review program. The biomass boiler of this BECCS Plant will use natural gas for boiler startup only and the burners that will only combust natural gas are being designed to have a maximum heat input of 180 MMBtu/hr. This maximum heat input rating will result in the boiler not being classified as one the 28 listed source categories in 45 CSR Series 14 Section 2.43.a. (45CSR14-2.43.a) with a 100 tons per year (tpy) major source threshold. The source categories contained in 45CSR14-2.43.a involves fossil fuel combustion are as follows:

- Fossil Fuel-fired Steam Electric Plants of More than 250 Million Btu/hour Heat Input, and
- Fossil-fuel boilers (or combination thereof) Totaling More than 250 Million Btu/hour Heat Input

Since the BECCS Plant is not one of the 28 listed source categories in 45 CSR Series 14 Section 2.43.a., the applicable major source threshold is 250 tpy. Since the quantified emissions of each regulated NSR pollutant are less than 250 tpy, the project is not subject to PSD review.

The proposed BECCS facility will be in Mason County, which is currently designated as “attainment” or “unclassified” for all regulated New Source Review (NSR) pollutants (see 40 CFR 81.349). Therefore, BECCS is not subject to NNSR review under 40 CFR 51.165 and 45CSR19.

## 4.2 Title V Operating Permit Requirement

40 CFR Part 70 establishes the federal Title V operating permit program. WVDAQ is delegated by U.S. EPA to implement a fully approved Part 70 operating permit program under 45CSR30 (see 40 CFR 70, Appendix A). In attainment area, the major source threshold for any air pollutant other than HAPs in the Title V permit program is 100 tpy. The major source threshold for HAPs is 10 tpy for a single HAP or 25 tpy for any combination of HAP. The potential emissions of all the regulated pollutants will not exceed the corresponding threshold(s) at this facility.

## 4.3 New Source Performance Standards (NSPS)

The federal NSPS requires new, modified, or reconstructed sources to control emissions to the level achieved by the best demonstrated technology as specified in the applicable provisions of the rule. NSPS standards have been adopted by reference in 45CSR16 for standards in effect as of June 1, 2016. This section describes the applicability and non-applicability of NSPS subparts relevant to the BECCS Plant.

### 4.3.1 NSPS Subpart A – General Provisions

Certain provisions of 40 CFR Part 60 Subpart A apply to the owner or operator of any stationary source subject to a NSPS. Since the biomass boiler (Subpart Db), the startup generator (Subpart JJJJ) and the fire water pump (Subpart IIII) will be subject to a NSPS, the Project will be required to comply with all applicable provisions of Subpart A.

### 4.3.2 NSPS Subpart D – Standards of Performance for Fossil-Fuel-Fired Steam Generators

The affected facilities of this subpart are each fossil-fuel-fired steam generating unit of more than 73 MW heat input rate (250 MMBtu/hr) and each fossil-fuel and wood-residual-fired steam generating unit capable of firing fossil fuel at a heat input rate of more than 73 MW (250 MMBtu/hr). The biomass boiler will only burn natural gas during startup and the max. heat input from burning natural gas will not exceed 250 MMBtu/hr. Therefore, the biomass boiler will not be subject to 40 CFR 60 Subpart D.

### 4.3.3 NSPS Subpart Da – Standards of Performance for Electric Utility Steam Generating Units

The affected facility of this subpart is each electric utility steam generating unit that is capable of combusting more than 73 megawatts (MW) (250 MMBtu/hr) heat input of fossil fuel (either alone or in combination with any fuel) and for which construction, modification, or reconstruction is commenced after September 18, 1978.

As stated above in section 4.3.2, the biomass boiler will only burn natural gas during startup and the max. heat input from burning natural gas will not exceed 250 MMBtu/hr. Therefore, the biomass boiler will not be subject to 40 CFR 60 Subpart Da.

### 4.3.4 NSPS Subpart Db – Standards of Performance for Industrial, Commercial, Institutional Steam Generating Units

Per 40 CFR 60.40b(a), 40 CFR Subpart Db applies to any industrial, commercial or institutional steam generating unit that commences construction, modification, or reconstruction after June 19, 1984, and that has a heat input capacity from fuels combusted in the steam generating unit of greater than 29 MW (100 MMBtu/hr). The proposed boiler will have a burner design heat input rate of 180 MMBtu/hr when combusting natural gas. The proposed boiler will also be capable of combusting wood at an estimated maximum design heat input rate of 944 MMBtu/hr. Based on the fuels to be combusted and maximum heat inputs, the proposed boiler will meet the applicability requirements of NSPS Subpart Db. The following Subpart Db requirements are applicable to the proposed boiler:

Emission Limitations:

**$SO_2$**: Units firing gaseous fuels, or a mixture of gaseous fuel with other fuels with a potential $SO_2$ emission rate of 0.32 lbs/MMBtu heat input or less, are exempt from the $SO_2$ emission limit of 0.2 lbs/MMBtu (40 CFR 60.42b(k)(2)). The proposed boiler will achieve an $SO_2$ rate of less than 0.32 lbs/MMBtu, thus will satisfy the exemption criteria.

**PM**: (Filterable portion only) shall not exceed 0.030 lb/MMBtu (13 ng/J) as stipulated in 60.43b(h)(1), except during periods of startup, shutdown or malfunction as provided by 40 CFR 60.2, 60.11(c), 60.43b(g) and 60.46b(a). The proposed boiler will achieve a PM rate (filterable portion only) of less than 0.030 lbs/MMBtu utilizing a baghouse.

**Opacity**: 20% (6-minute average), except for one 6-minute period per hour of not more than 27% opacity pursuant to 40 CFR 60.43b(f). This standard shall apply at all times, except during periods of startup, shutdown or malfunction as provided by 40 CFR 60.2, 60.11(c), 60.43b(g) and 60.46b(a). The proposed boiler will achieve 20% opacity through good combustion practices and utilization of a baghouse.

**$NO_X$**: 0.30 lbs/MMBtu (130 ng/J) heat input on a 30-day rolling average, pursuant to 40 CFR 60.44b(d) and 40.44b(i). This $NO_X$ limit has been determined to apply because during combustion of woody biomass, natural gas will be co-fired as the boiler goes through startup. MGSCNP1 is not proposing to

take a limitation to restrict natural gas to an annual capacity factor of 10 percent (0.10) or less. The $NO_X$ standard applies at all times including periods of startup, shutdown, or malfunction (60.44b(h))

After February 27, 2006, an alternative output-based emission limit of 270 ng/J (2.1 lb/KWh) gross energy output based on a 30-day rolling average can be selected for units where more than 10% of total annual output is electrical or mechanical. (60.44b(l)(3)). Units complying with this output-based limit must demonstrate compliance according to the procedures of 40 CFR § 60.48Da(i), and must monitor emissions according to 40 CFR § 60.49Da(c), (k), through (n).

The fluidized bed boiler design in conjunction with a SCR system will achieve this $NO_X$ limitation.

Monitoring

**$SO_2$** – Since the boiler will be demonstrating compliance under 60.45b(k), it is not subject to the emission monitoring requirements under 60.47b(a) if the owner or operator maintains fuel records as described in 60.49b(r) (60.47b(f)).

**PM** - Compliance with the PM emission standards under 60.43b shall be determined through performance testing (60.46b(b)). Performance testing is required within 60 days after achieving maximum output and no later than 180 days after commencing operation of the boiler.

Performance testing shall be performed for PM using EPA Reference Method 5, 5B, or 17 of appendix A (60.46b(d) (2).

**Opacity** – MGSCNP1 will use a bag-leak detection system to monitor the performance of the fabric filter (baghouse) according to the most current requirements in 40 CFR 60.48Da; therefore, a CEMS is not mandatory. MGSCNP1 will conduct initial performance test as required under 40 CFR 60.8 and will conduct subsequent performance test as requested (60.46b(d)). According to 40 CFR 60.46b(d)(7), Method 9 of Appendix A of 40 CFR Part 60 will be used for determining the opacity of stack emissions.

**$NO_X$** - To determine compliance with the emission limits for $NO_X$ required under 60.44b, the owner or operator shall conduct performance test as required under 60.8 using the continuous system for monitoring $NO_X$ under 60.48b (60.46b(c) and (e)).

Affected facilities subject to $NO_X$ standards under 60.44b shall install, calibrate, maintain and operate CEM for measuring $NO_X$ and $O_2$ (or $CO_2$) emission discharged to the atmosphere (60.48b (b)(1)).

MGSCNP1 will install CEMS for measuring $NO_X$ and $O_2$ (or $CO_2$).

Compliance Testing

60.46b(d) - To determine compliance with the PM emission limits and opacity limits under 60.43b, the owner or operator of an affected facility shall conduct an initial performance test as required under 60.8, and shall conduct subsequent performance tests as requested by the Administrator.

60.46b(c) and 60.46b(e) - To determine compliance with the emission limit for $NO_X$ required under 60.44b, the owner or operator of an affected facility shall conduct the performance test as required under 60.8 using the continuous system for monitoring $NO_X$ under 60.48(b).

Recordkeeping

60.45b(k) and 60.49b(r) – record from fuel supplier certifying gaseous fuel meets the definition of natural gas as defined in 60.41b and applicable sulfur limit. Reports shall be submitted to Administrator certifying that only natural gas and wood were combusted in the boiler during the reporting period.

60.49b(d) - Record and maintain records of the amounts of each fuel combusted during each day and calculate the annual capacity factor.

60.49b(f) - Maintain records of opacity.

60.49b(g) – maintain records of the information for each steam generating unit operating day listed in 40 CFR 60.49b(g).

60.49b(o) - All records required under this section shall be maintained by the owner or operator of the affected facility for a period of 2 years following the date of such record.

Reporting

60.49b(a) - Submit notification of the date of initial startup.

60.49b(b) - Submit to the Administrator the performance test data from the initial performance test and the performance evaluation of the CEMS using the applicable performance specifications in appendix B of 40 CFR Part 60. Submit to the Administrator the maximum heat input capacity data from the demonstration of the maximum heat input capacity of the affected facility.

60.49b(h) - Submit excess emission reports for any excess emissions (i.e., opacity and $NO_X$ emissions) that occurred during the reporting period.

60.49b(w) - The reporting period for the reports required under this subpart is each 6 month period. All reports shall be submitted to the Administrator and shall be postmarked by the 30th day following the end of the reporting period.

### 4.3.5 NSPS Subpart Kc – Performance Standards for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced After October 4, 2023

This subpart applies to each storage vessel with a capacity greater than or equal to 20,000 gallons (gal) (75.7 cubic meters ($m^3$)) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after October 4, 2023. Of the storage tanks to be installed at this facility, only the Lean Amine Tank (122-TK-9901) will have a capacity greater than 20,000 gal and may potentially be subject to this subpart. However, the Lean Amine Tank will store a VOL with a maximum true vapor pressure less than 0.25 psia (1.7 kPa absolute). Therefore, it will not be subject to any requirements of 40 CFR Subpart Kc, pursuant to 40 CFR 60.110c(b)(8).

Based on the above, NSPS Subpart Kc does not apply to the facility.

### 4.3.6 NSPS Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants

As part of the proposed in-duct sorbent injection system, milling of the sorbent may be required prior to injection into the biomass combustion system. The type of sorbent to be used could meet the definition of a nonmetallic mineral as defined in 40 CFR Part 60.671.

Applicability of Subpart OOO applies to affected facilities in fixed or portable nonmetallic processing plants, including each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, and enclosed truck or railcar loading station. Nonmetallic mineral processing plant means any combination of equipment that is used to crush or grind any nonmetallic mineral at any type of plant.

This subpart contains standards for particulate matter, monitoring of operations, test methods and procedures as well as reporting and recordkeeping requirements.

Based on the design of the proposed in-duct sorbent injection system, the sodium bicarbonate storage silo appears to be subject to a 7% opacity limitation (40 CFR 60.672(f)). Since the storage silo will discharge into the boiler flue gas system and the particulates will be captured by the PJFF, the 7% opacity limitation will apply to the boiler stack 121-PKG-3001 and the absorber stack 122-T-1001. Since the milling operation will be totally enclosed within a building, it will also be subject to a 7% opacity limitation (40 CFR 60.672(e)).

MGSCNP-1 is aware of the requirements contained in Subpart OOO and will meet these requirements. The storage silo will vent to the boiler flue gas system which will be controlled by the PJFF. The use of the PJFF and enclosure of the milling operation should easily satisfy the 7% opacity limitation.

### 4.3.7 NSPS Subpart IIII – Performance Standards for Stationary Compression Ignition Internal Combustion Engines

This subpart applies to stationary compression ignition (CI) internal combustion engines (ICE) that commence construction after July 11, 2005, where the CI ICE are manufactured after April 1, 2006 (and are not fire pump engines), or manufactured after July 1, 2006 (for certified National Fire Protection Association fire pump engines).

NSPS Subpart IIII specifies emission limitations, monitoring, reporting, and recordkeeping requirements for NOX, CO, nonmethane hydrocarbons (NMHC), and PM.

Applicable NSPS IIII emission standards for the firewater pump CI ICEs are summarized as follows:

• 40 FR 60.4205(c) - Owners and operators of fire pump engines with a displacement of less than 30 liters per cylinder must comply with the emission standards in Table 4 to NSPS Subpart IIII, for all pollutants. The applicable emission limits are:

  - NMHC + $NO_X$: 4.0 g/kW-hr (3.0 g/hp-hr)
  - CO: 3.5 g/kW-hr (2.6 g/hp-hr)
  - $PM/PM_{10}/PM_{2.5}$: 0.2 g/kW-hr (0.15 g/hp-hr)

- 40 CFR 60.4207 - NSPS Subpart IIII also stipulates specific sulfur requirements for diesel fuels. Beginning October 1, 2010, engines with a displacement of less than 30 liters/cycle and use a diesel fuel must meet a sulfur content of 0.0015% by weight.

MGSCNP1 will be utilizing a diesel fuel with a sulfur content of 0.0015 % by weight or less.

The proposed emergency engines must also meet the operating hour requirements of 40 CFR 60.4211(f) which include:

- No time limit on use in emergency situations
- Up to 100 hours per year for maintenance checks / readiness testing
- 50 hours (of the 100) per year can be for non-emergency operation. The 50 hours per calendar year for non-emergency situations cannot be used for peak shaving or non-emergency demand response, or to generate income for a facility to an electric grid or otherwise supply power as part of a financial arrangement with another entity. Detailed requirements on use of the 50 hours for non-emergency operation is contained in 40 CFR 60.4211(f)(3)(i).

The firewater pump CI ICE will comply with the applicable requirements of NSPS Subpart IIII.

### 4.3.8 NSPS Subpart JJJJ – Performance Standards for Stationary Spark Ignition Internal Combustion Engines

40 CFR 60 Subpart JJJJ applies to stationary spark ignition (SI) internal combustion engines. The provisions of this subpart are applicable to a SI ICE with a maximum engine power greater than or equal to 500 HP manufactured on or after July 1, 2007. The startup generator is driven by a 3000-hp natural gas engine.

40 CFR 60.4233(e) – Owners and operators of stationary SI ICE with a maximum engine power greater or equal to 75 kW (100 HP) must comply with the emission standards in Table 1 to 40 CFR 60 Subpart JJJJ for their stationary SI ICE. The applicable emission limits are:

| Engine Type and Fuel | Emission Standards | | | | | |
|---|---|---|---|---|---|---|
| | g/HP-hr | | | ppmvd at 15% $O_2$ | | |
| Non-Emergency SI Natural Gas | $NO_X$ | CO | VOC [1] | $NO_X$ | CO | VOC |
| | 1.0 | 2.0 | 0.7 | 82 | 270 | 60 |

[1] As indicated in *40 CFR 60 Subpart JJJJ, Table 1, Note d,* the VOC in 40 CFR 60 Subpart JJJJ does not include formaldehyde. However, as shown in Table N-5 in Appendix B, for completeness, the VOC emissions from NG starter generators do include formaldehyde.

60.4243(b) – demonstrate compliance according to one of the methods specified in paragraphs (b)(1) and (2).

(1) Purchasing an engine certified according to procedures for the same model year and demonstrating compliance according to one of the methods specified in 60.4243(a).

(2) Purchasing a non-certified engine and demonstrate compliance with the applicable emission standards and according to the requirements specified in 60.4244, as applicable, and must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, must conduct an initial performance test within 1 year of

engine startup and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first.

MGSCNP1 will purchase an engine certified engine to comply with 40 CFR 60 Subpart JJJJ.

## 4.4 National Emission Standards for Hazardous Air Pollutants

NESHAP promulgated prior to the Clean Air Act Amendments (CAAA) of 1990, found in 40 CFR Part 61, apply to specific compounds emitted from specific processes. None of the pollutant specific Part 61 NESHAPs apply to the Project.

Maximum achievable control technology (MACT)-based NESHAPs contained in 40 CFR Part 63 require sources that are "major" for HAPs to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. A major source is defined in 40 CFR 63.2 as follows,

"…any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants…"

Generally available control technology (GACT)-based NESHAPs contained in 40 CFR Part 63 require area (i.e., non-major) sources to control emissions to the level achievable using generally available control technologies or management practices to reduce HAPs emissions.

As demonstrated in Section 3 above, the BECCS Plant does not have the potential to emit more than ten (10) tpy of a single HAP or 25 tpy of combined HAPs. As such, the BECCS Plant is considered an area source of HAPs. Therefore, MGSCNP1 has evaluated the potential applicability of GACT requirements for area sources for the proposed BECCS Plant.

### 4.4.1 40 CFR 63 Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE)

40 CFR 63 Subpart ZZZZ applies to facilities that operate stationary reciprocating internal combustion engines (RICE). The natural gas startup generator (129-PKG-0001) and the emergency diesel fire water pump (129-P-9402) at the BECCS Plant will satisfy the requirements of Subpart ZZZZ by complying with the applicable requirements of NSPS Subparts IIII and JJJJ. No other requirements apply under this subpart.

### 4.4.2 40 CFR 63 Subpart JJJJJJ – Area Sources: Industrial, Commercial, and Institutional Boilers

40 CFR 63 Subpart JJJJJJ applies to industrial, commercial, and institutional boilers located at area sources of HAP emissions. The proposed boiler will burn natural gas during startup and will burn biomass during normal operation. The boiler will be subject to 40 CFR 63 Subpart JJJJJJ.

According to 40 CFR 63.11201 and Table 1 of Subpart JJJJJJ, for new biomass-fired boilers with heat input capacity of 30 MMBtu/hr or greater that do not meet the definition of seasonal or limited-use boiler, the applicable filterable PM emission limit is 0.03 lb/MMBtu.

## 4.5 Compliance Assurance Monitoring (CAM)

Pursuant to requirements concerning enhanced monitoring and compliance certification under the Clean Air Act Amendments of 1990, the EPA promulgated regulations codified at 40 CFR Part 64 to implement

compliance assurance monitoring (CAM) for major stationary air pollution sources. The proposed BECCS Plant is a minor stationary air pollution source; therefore, the CAM requirements do not apply. Cross-State Air Pollution Rule (CSAPR) – 40 CFR Part 97

The CSAPR replaced EPA's 2005 Clean Air Interstate Rule (CAIR), following the direction of a 2008 court decision that required EPA to issue a replacement regulation. CSAPR implementation began on January 1, 2015. On September 7, 2016, the EPA revised the CSAPR ozone season $NO_X$ program by finalizing an update to CSAPR for the 2008 ozone National Ambient Air Quality Standards, known as the CSAPR Update. The CSAPR Update ozone season $NO_X$ program will largely replace the original CSAPR ozone season $NO_X$ program starting on May 1, 2017.

The CSAPR requires fossil fuel-fired electric generating units at coal-, gas-, and oil-fired facilities in 27 states to reduce $SO_2$ and $NO_X$ emissions to help downwind areas attain fine particle and/or ozone NAAQS. West Virginia is required to reduce emissions of $NO_X$ during the ozone season for 2008 Ozone NAAQS and is required to reduce annual emissions of $SO_2$ and $NO_X$ for both 1997 annual $PM_{2.5}$ NAAQS and 2006 24-hr $PM_{2.5}$ NAAQS).

According to 40 CFR 97.702, a fossil-fuel-fired unit means a unit combusting any amount of fossil fuel in 2005 or any calendar year thereafter. The BECCS Plant will be subject to the requirements listed under the CSAPR program. MGSCNP1 will hold enough allowances to cover emissions and comply with the permitting, monitoring, recordkeeping and reporting requirements set forth by CSAPR, including the installation and certification of continuous emission monitors.

## 4.6 Chemical Accident Prevention Provisions – 40 CFR Part 68

EPA has promulgated specific regulations to prevent chemical accidents from occurring at industrial type facilities. These regulations are contained in 40 CFR Part 68 of the Code of Federal Regulations.

This regulation applies to any owner or operator of a stationary source that has more than a threshold quantity of a regulated substance in a process. The threshold quantity is listed in 40 CFR 68.130. A process is defined as any activity involving a regulated substance including any use, storage, manufacturing, handling, or on-site movement of such substances, or combination of these activities. Compliance with the requirements established by the regulation must be achieved by the date on which a regulated substance is first present above a threshold quantity in a process.

MGSCNP1 is proposing to use the following chemicals that are listed substances in this regulation:

- Ammonia will be utilized in the SCR control technology system being proposed for the biomass boiler. MG will be utilizing an aqueous ammonia which will contain greater than 20 % ammonia. Subsequently, use of the aqueous ammonia will meet the applicability requirements of this regulation.

**Table 4-1 Accidental Release Program Threshold Quantities**

| Compound | Threshold Quantity (lbs) |
|---|---|
| Ammonia, aqueous (conc. ≥ 20% by wt.) | 20,000 |

## 4.7 Greenhouse Gas Reporting Program

The Greenhouse Gas Reporting Program (GHGRP), codified in 40 CFR Part 98, requires facilities belonging to certain source categories to report their annual GHG emissions to EPA. Such affected facilities must report their annual GHG emissions from all stationary fuel combustion sources (excluding portable and emergency equipment) located at the facility.

## 4.8 State of West Virginia Regulatory Applicability

The facility is required to comply with the requirements contained in the applicable provisions of the following regulations.

### 4.8.1 45CSR2 – To Prevent and Control Particulate Matter Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

45CSR2 establishes emission limitations for smoke and particulate matter which are discharged from fuel burning units. "Fuel Burning Unit" means and includes any furnace, boiler apparatus, device, mechanism, stack or structure used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer. The biomass boiler is categorized as a type 'a' fuel burning unit because its primary purpose is to generate steam to produce electric power for sale. Emission of smoke and/or particulate matter into the open air from the biomass boiler will not exceed ten (10) percent opacity based on a six-minute block average. Per §45-2-4.1.1, 47.20 lb/hr (0.05 * 944 MMBtu/hr) of particulate matter is allowed to be discharged to the open air. This limit represents filterable PM only and does not include condensable PM. The biomass boiler will be controlled by pulse jet fabric filters (PJFF) with a proposed filterable particulate matter emission rate of 7.99 lb/hr, which is well below the amount allowed by this rule.

MGSCNP1 will comply with all the applicable monitoring, reporting, recordkeeping and testing requirements contained in this rule and 45CSR2A. Furthermore, the boiler must also meet the requirements for start-ups, shutdowns, and malfunction provided in 45CSR2-9.2.

### 4.8.2 45CSR4 – To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors.

45 CSR 4 prohibits the discharge of air pollutants that cause or contribute to an objectionable odor at any location occupied by the public. The Project will comply with the provisions of this regulation through good operating practices.

### 4.8.3 45CSR7- To Prevent and Control Particulate Matter Air Pollution from Manufacturing Processes and Associated Operations.

45CSR7 sets state-imposed opacity and particulate matter mass emission standards for manufacturing process and associated operations. "Manufacturing Process" means any action, operation or treatment, embracing chemical, industrial or manufacturing efforts … that may emit smoke, particulate matter or gaseous matter.

The boiler-related process at the facility does not meet the definition of "source operation" contained in 45CSR7-2.40. The biomass is used as fuel and 45CSR2 already establishes an opacity limit for the biomass boiler. Therefore, the boiler-related process is not subject to the standards provided in 45CSR7-3 and 45CSR7-4 for opacity and emissions of particulate matter.

The requirements of 45CSR7-5 apply to sources of fugitive particulate matter, including the paved/unpaved roadways and the cooling tower. MGSCNP1 complies with the requirements of 45CSR7-5.2 by applying appropriate control measures (i.e., paving and/or water/chemical dust suppressants) to plant roadways to minimize particulate emissions. MGSCNP1 will also comply with the requirements of 45CSR7 for the cooling tower. 45CSR7-5.1 stipulates that the cooling tower is equipped with a system (which may include process equipment design, control equipment design, or operation and maintenance procedures) to minimize emissions of fugitive particulate emissions. MGSCNP1 will utilize drift eliminator installed on the cooling tower to minimize the particulate emissions.

### 4.8.4 45CSR10 – Prevention and Control of Sulfur Oxide Emissions

45 CSR 10 establishes emission standards for sulfur oxides from fuel burning units and sets forth the registration, permitting, reporting, testing, recordkeeping and exemption requirements. “Fuel Burning Unit” means and include any furnace, boiler apparatus, device, mechanism, stack or structure used in the process of burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer.

The primary fuel burning unit at the proposed Project is the biomass boiler. The primary purpose of the biomass boiler is to generate steam to produce electricity for sale which defines the biomass boiler as type ‘a’ fuel burning units under 45 CSR 10. For type ‘a’ units, 45 CSR 10 lists $SO_2$ limits for specific existing units but does not have a generic limit for new units. Therefore, there is no $SO_2$ mass emission standard for the biomass boiler under 45 CSR 10.

### 4.8.5 45CSR11 – Prevention of Air Pollution Emergency Episodes

45 CSR 11 sets forth actions that must be taken in the event of air pollution episodes. Because the project will not emit 100 tpy or more of any pollutant, the Project will, if requested by the Director, prepare a Standby Plan, that will outline procedures to be taken to comply with the provisions of this regulation.

### 4.8.6 45CSR13 – Permitting Requirements for the Construction, Modification, Relocation and Operation of Minor Stationary Sources

45 CSR 13 sets forth the criteria and procedures for obtaining an air permit for a minor modification or relocation of an existing stationary source or for the construction of a new minor stationary source of air pollutants. This regulation does not apply to “de minimis” sources identified in Table 45-13B or sources which have emissions of regulated air pollutants below the thresholds established in 45-13-2.24. The Project is submitting this permit application pursuant to the permitting provisions of 45CSR13 because emissions of all NSR pollutants are below the major source thresholds.

As required under 45CSR45-13-8.3 (“Notice Level A”), MGSCNP1 will place a Class I legal advertisement in a “newspaper of general circulation in the area where is the source is … located.” The advertisement shall contain at a minimum, the name of the applicant, the type and location of the source, the type and amount of air pollutants that will be discharged, the nature of the permit being sought, the proposed start-up date for the source and a contact telephone number for more information.

### 4.8.7 45CSR14- Prevention of Significant Deterioration Permitting Requirements for the Construction of a Major Stationary Source

The proposed Project is not a "major stationary source" since it potentially emits of all regulated air pollutant less than 100 tons per year. As a result, the Project is not subject to PSD requirements under 45CSR14.

### 4.8.8 45 CSR16- Standards of Performance for New Stationary Sources

45CSR16 adopts the federal emission standards for new stationary sources (40 CFR Part 60) by reference. As stated in section 4.3, the Project's biomass boiler, NG startup generator and emergency firewater pump engine will be subject to Subparts Db, IIII and JJJJ, respectively.

### 4.8.9 45CSR17 – Fugitive Emissions from Material Handling / Fugitive Sources

The purpose of the rule is to prevent and control particulate matter air pollution from material handling, preparation, storage and other sources of fugitive particulate matter. Sources that are subject to the fugitive particulate matter emission requirements of 45CSR2, 45CSR3, 45CSR5 and 45CSR7 shall be exempt from the provisions of this rule, provided that such sources shall not be exempt from the provisions of W. Va. Code §§22-5-1 et seq., including the provisions of §22-5-3 relating to statutory air pollution.

Since 45CSR2 and 45CSR7 apply to the facility, the facility is exempt from 45CSR17.

### 4.8.10 45CSR19- Permits for Construction and Major Modification of Major Stationary Sources Which Cause or Contribute to Nonattainment Areas

The proposed facility will be located in Mason County, which is designated attainment for all criteria pollutants. Therefore, the proposed project is not subject to NA-NSR for any pollutants.

### 4.8.11 45CSR22 – Air Quality Management Fee Program

45 CSR 22 specifies a program to collect fees for certificates to operate and for permits to construct, modify or relocate sources. The fees are assessed based on to which regulations the new or modified source is subject. According to the requirements of 45-22-3, the fee for the permit-to-construct is $4,500 which includes 45CSR13, NSPS and NESHAPS fee requirements (Application fee $1,000, NSPS Requirements $1,000, and NESHAPS Requirements $2,500).

### 4.8.12 45CSR27 – To Prevent and Control the Emissions of Toxic Air Pollutants

The facility will not have a chemical processing unit that will discharge an air toxic pollutant in excess of the amount listed on Table A, therefore Best Available Technology (BAT) does not apply.

### 4.8.13 45CSR30 – Title V Operating Permit Requirements

45CSR30 applies to the requirements of the federal Title V operating permit program (40 CFR 70). The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any combination of HAP, and 100 tpy of all other regulated pollutants. The facility is not a major source with respect to Title V Operating Permit Program.

### 4.8.14 45CSR34 – Emission Standards for Hazardous Air Pollutants

45 CSR 34 adopts the federal emission standards for hazardous air pollutants (40 CFR Parts 61 and 63 and Section 112 of the Clean Air Act) by reference. Please see Section 4.4 for the MACT standards that may apply to the BECCS Plant.

# Appendix A WVDAQ Application Form for NSR Permit

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):*
MGS CNP 1, LLC

2. Federal Employer ID No. ***(FEIN):***
92 0923775

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

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

5A. Applicant's mailing address:
109 N. Post Oak Ln,
Ste 140
Houston TX, 77024

5B. Facility's present physical address:
5801 Ohio River Rd
Point Pleasant WV, 25550

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: Fidelis New Energy, LLC

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: The site is under option to buy

- 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.): biomass electric power generation with carbon capture and sequestration.

10. North American Industry Classification System **(NAICS)** code for the facility:
221117

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

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

***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**.

The site can be reached by heading north on WV-62 N / Jefferson Blvd and turning left on the access road for Steel Specialties approximately 0.79 miles north of the armory at University Ln. The entrance of the site is located on the right of the access road.

| 12.B. New site address (if applicable): | 12C. Nearest city or town: | 12D. County: |
|---|---|---|
| 5801 Ohio River Rd<br>Point Pleasant WV, 25550 | Point Pleasant | Mason County |
| 12.E. UTM Northing (KM): 4308.982 | 12F. UTM Easting (KM): 403.934 | 12G. UTM Zone: 17 |

13. Briefly describe the proposed change(s) at the facility:
NA

| 14A. Provide the date of anticipated installation or change: 08/01/2026<br>– If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / / | 14B. Date of anticipated Start-Up if a permit is granted:<br>11/01/2029 |
|---|---|

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

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

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

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

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

## *Section II. Additional attachments and supporting documents.*

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

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

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

– Indicate the location of the nearest occupied structure (e.g. church, school, business, residence). 0.05 miles Business
0.1 miles 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 Biomass storage and handling, biomass electric power generation, emergency generator, fire water pump

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

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

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

☒ Other Collectors, specify SCR System, CO Oxidation Catalyst, Wet Flue Gas Desulfurization, and bin vent filters.

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

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

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

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

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

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

☐ **YES** ☐ **NO**

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

## *Section III. Certification of Information*

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

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

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

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

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

***Certification of Truth, Accuracy, and Completeness***

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

***Compliance Certification***

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

SIGNATURE _____ DATE: 2/7/2025

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

| | | |
|---|---|---|
| 35B. Printed name of signee: William D. Calhoun | | 35C. Title: Vice President HSE |
| 35D. E-mail: jack.calhoun@fidelisinfra.com | 36E. Phone: 2819178571 | 36F. FAX: |
| 36A. Printed name of contact person (if different from above): | | 36B. Title: |
| 36C. E-mail: | 36D. Phone: | 36E. FAX: |

**PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:**

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

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

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

☐ *Forward 1 copy of the application to the Title V Permitting Group and:*
☐ *For Title V Administrative Amendments:*
- ☐ *NSR permit writer should notify Title V permit writer of draft permit,*

☐ *For Title V Minor Modifications:*
- ☐ *Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,*
- ☐ *NSR permit writer should notify Title V permit writer of draft permit.*

☐ *For Title V Significant Modifications processed in parallel with NSR Permit revision:*
- ☐ *NSR permit writer should notify a Title V permit writer of draft permit,*
- ☐ *Public notice should reference both 45CSR13 and Title V permits,*
- ☐ *EPA has 45 day review period of a draft permit.*

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

# Appendix B West Virginia Permit Application Attachments

**Attachment A: West Virginia Business Certificate**

**Attachment B: Maps**

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

**Attachment D: Regulatory Discussion**

**Attachment E: Plot Plan**

**Attachment F: Detailed Block Flow Diagrams**

**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: Emission Unit Data Sheets**

**Attachment M: Air Pollution Control Device Sheets**

**Attachment N: Supporting Emission Calculations**

**Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**

**Attachment P: Public Notice**

**Attachment Q: Business Confidential Claims (Not Applicable)**

**Attachment R: Authority Forms (Not Applicable)**

**Attachment S: Title V Permit Revision Information (Not Applicable)**

**Attachment A: West Virginia Business Certificate**

# State of West Virginia

# Certificate

*I, Mac Warner, Secretary of State of the State of West Virginia, hereby certify that*

**MGS CNP 1, LLC**

**Control number: 9B6C8**

a limited liability company formed under the laws of Delaware

has filed its "Application for Certificate of Authority" in my office according to the provisions of West Virginia Code §31B-10-1002. I hereby declare the organization to be registered as a foreign limited liability company from its effective date of August 31, 2023 until the expiration of the term or dissolution of the company.

Therefore, I hereby issue this

## CERTIFICATE OF AUTHORITY OF A FOREIGN LIMITED LIABILITY COMPANY

to the limited liability company authorizing it to transact business in West Virginia

*Given under my hand and the Great Seal of the State of West Virginia on this day of August 31, 2023*

Mac Warner

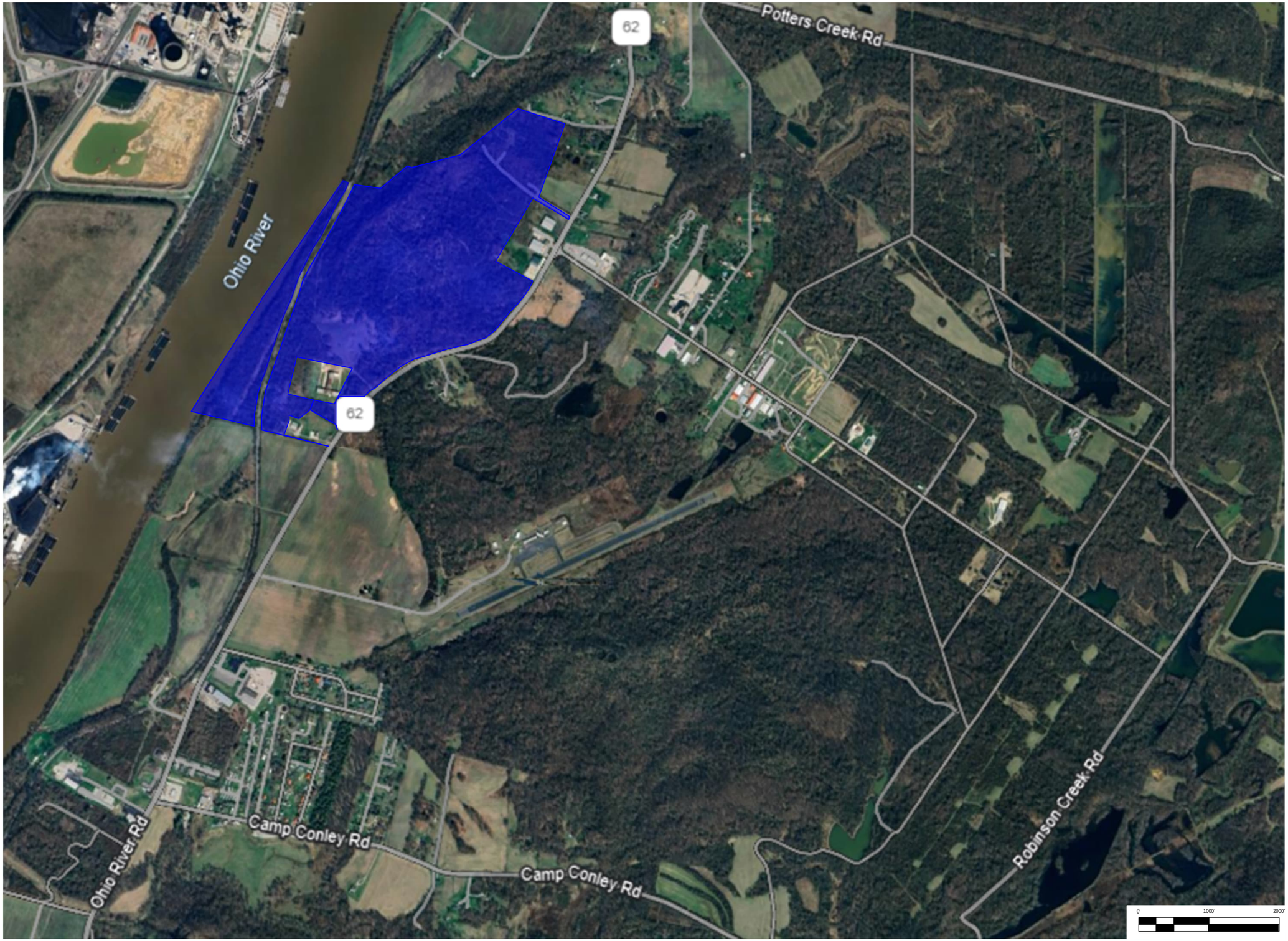
*Secretary of State*

565174

## Attachment B: Maps

**Figure on next page provides a general map of the proposed facility location, showing roads and major geographical features such as the Ohio River.**

NOTE: THIS DRAWING AND THE DATA CONTAINED HEREIN ARE OF A CONFIDENTIAL NATURE AND SHALL BE USED ONLY FOR THE ORIGINAL PURPOSE INTENDED. COPYING IN ANY FORM OR DISTRIBUTION OF THE ORINGIAL OR COPIES SHALL REQUIRE WRITTEN PERMISSION FROM THE DRAWING OWNER.




NOTES

1. The Unit spaces are approximate and based on earlier studies and will be checked and optimized in the next phase of the project after a site has been chosen.
2. Equipment shown within unit boxes are shown for illustrative purposes only. Equipment location / spacing within individual units have not been optimized.

Prevailing Wind


Graphic Legend

- Site Boundary
- Piperack
- Road

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X | | Draft (for Review) | DC | | | | | |
| | DATE | DESCRIPTION | BY | CHK | ENG | PEM | PM | |

DRAWN BY D. Contino DATE

CHECKED BY DATE

ENGINEER DATE

PROJECT ENGINEERING MANAGER DATE

PROJECT MANAGER DATE

CLIENT/PROJECT TILE

Mountaineer Gigasystem - Fidelis

PROJECT NO.

418162-47975

Site Boundary – BECCS Plant

SCALE

DWG.NO.

REVISION

X

## Attachment C: Installation and Start-up Schedule

Section 2 of the application narrative provides a summary of the proposed emission units with the proposed installation and start-up schedule for the BECCS Plant. Specifically, MGSCNP1 wishes/expects to obtain WVDAQ air permit approval by June 1, 2025 to provide sufficient/adequate time for financing, equipment ordering, fabrication, construction (2026), and installation, and to achieve commercial operation by 2029.

## Attachment D: Regulatory Discussion

Section 4 of the application narrative provides a federal and state regulatory applicability analysis and summary of regulatory requirements that will apply to the BECCS Plant.

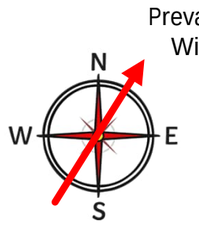
## Attachment E: Plot Plan

Figure E-1 BECCS Plant Plot Plan (Site Layout Plan)

NOTE: THIS DRAWING AND THE DATA CONTAINED HEREIN ARE OF A CONFIDENTIAL NATURE AND SHALL BE USED ONLY FOR THE ORIGINAL PURPOSE INTENDED. COPYING IN ANY FORM OR DISTRIBUTION OF THE ORINGIAL OR COPIES SHALL REQUIRE WRITTEN PERMISSION FROM THE DRAWING OWNER.


NOTES

1. The Unit spaces are approximate and and at the conceptual study level. Site and equipment locations will be optimized in the pre-FEED and FEED stages of the project.
2. Equipment shown within unit boxes are shown for illustrative purposes only. Equipment location / spacing within individual units have not been optimized.
3. Piping right of way has not been determined. Hydrogen, Carbon Dioxide, natural gas and raw water final disposition and source to be determined in the next phase of engineering.




## Graphic Legend

- Site Boundary
- Piperack
- Road

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| B1 | 17-Dec-24 | Re-Issued for Permit | DC | DM | | | AR |
| B | 30-Aug-24 | Issued for Permit | DC | DM | | | AR |
| A1 | 08-Aug-24 | Re-Issued for Review | DC | DM | | | AR |
| A | 26-Jun-24 | Issued for Review | DC | DM | | | AR |
| | DATE | DESCRIPTION | BY | CHK | ENG | PEM | PM |

DRAWN BY: D. Contino — DATE: 17-Dec-24
CHECKED BY: D. Minicucci — DATE: 17-Dec-24
ENGINEER — DATE:
PROJECT ENGINEERING MANAGER — DATE:
PROJECT MANAGER: A. Rockwell — DATE: 17-Dec-24

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THE MOUNTAINEER GIGASYSTEM

CLIENT/PROJECT TILE
Mountaineer Gigasystem

PROJECT NO.
418162-54129

Conceptual Plot Layout – BECCS Plant

SCALE

DWG.NO.
MNT1-MB1-120-PR-PLT-00-0101

REVISION
B1

**Attachment F: Detailed Block Flow Diagrams**

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# 1 x 572 klb/hr Steam Biomass Energy Plant

Sodium Bicarbonate Trucks / Truck Unloading (12110)
Sodium Bicarbonate Storage (12199)
Vent
Vent
Ammonia Storage (12199)
Caustic Solution Storage (12199)
To atm
Stack (12130)
To atm
DMW
Amine Sorage (12299)
Amine Scrubber Vent
Sand Trucks / Truck Unloading (12110)
Sand Storage and Filter (12150)
Pulse Jet Fabric Filter (12130)
SCR/CO Catalyst (12130)
Direct Contact Cooler/ Polishing Scrubber (12130)
318.2 MMSCFD
Amine Absorber / Stripper (12210 / 12220)
Flue Gas
To atm
Ash Storage and Filter (12140)
Ash Disposal (by truck)
Utility Water
Makeup Sand
Reclaimed Sand
Blowdown to WWTP
CO2 Compression (12230)
2,234 MTPD
CO2 to Pipeline
To atm
Receiving Hoppers / Baghouse (12110)
Fuel Screening (12110)
Biomass Storage (12110)
Biomass Feed (12110)
Conveyor
212.1 klb/hr
Air
Boiler (12120)
Steam
572 klb/hr
STG (12150)
Biomass Trucks / Truck Unloading (12110)
Blowdown to WWTP
Sand Reclaim (12150)
Bottom Ash (12160)
Ash Disposal (by truck)
Electrical Power
HPS
CWS
CWR
NNF
Amine Drain / Collection System (12299)
Condensate Polishing (HOLD 1) (12992)
Condensate
Chemical System (12999)
Potable Water (12994)
From H2 Plant ASU
Plant Nitrogen System (12997)
Plant / Instrument Air System (12996)
Clean Condensate
To atm
Natural Gas (81010)
Natural Gas System (12998)
Demineralized Water System (12991)
DMW
Treated Condensate
Deaerator (12992)
BFW
Steam Distribution (ISBL/OSBL) (12992)
Buildings
Sanitary Waste
Sanitary Water Treatment (12000)
Well Water (19991)
843 klb/h
Raw Water Treatment (12991)
To atm
Infrastructure (Roads, Fences, Lighting, etc) (12000)
Reject
Reject
Utility Water Distribution (12994)
Fire Water System / Diesel Pump (12994)
Cooling Water Tower (12993)
Blowdown
Wastewater Treatment (12700)
First Flush
First Flush Pond (12910)
Waste Oil (by truck)
To atm
To atm
Storm Water Sewers (12000)
Diversion Block (12000)
Storm Water Pond (12910)
To Outfall
322 klb/h
Water Return (19910)
Electrical Distribution (12900)
Startup Generator (11900)
MAC Contract / Automation (12900)
Telecommunication / Security System (12900)

BALANCE OF PLANT

Licensor Scope
Balance of Plant
Infrastructure
Buildings

NOTES:

HOLDS:

1. Condensate Polishing requirement to be confirmed in the next stage of engineering.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| B4 | 10-Dec-24 | Re-issued for Permit | DC | DM | | | AR |
| B3 | 24-Sep-24 | Re-issued for Permit | DC | DM | | | AR |
| B2 | 23-Aug-24 | Re-issued for Permit | DC | DM | | | AR |
| B1 | 14-Jun-24 | Re-issued for Permit | DC | DM | | | AR |
| B | 29-Apr-24 | Issued for Permit | DC | DM | | | AR |
| A | 17-Apr-24 | Issued for Review | AR | DM | | | AR |
| | DATE | DESCRIPTION | BY | CHK | ENG | REM | PM |

DRAWN BY D. Contino 10-Dec-24
CHECKED BY D. Minicucci 10-Dec-24
ENGINEER
PROJECT ENGINEERING MANAGER
PROJECT MANAGER A. Rockwell 10-Dec-24

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THE MOUNTAINEER GIGASYSTEM

CLIENT/PROJECT TILE
Mountaineer Gigasystem

PROJECT NO.
418162-54129

Block Flow Diagram
BECCS

SCALE

DWG.NO.
418162-54129-PR-DBD-20001
MNT1-MB1-120-PR-BFD-00-0101

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B4

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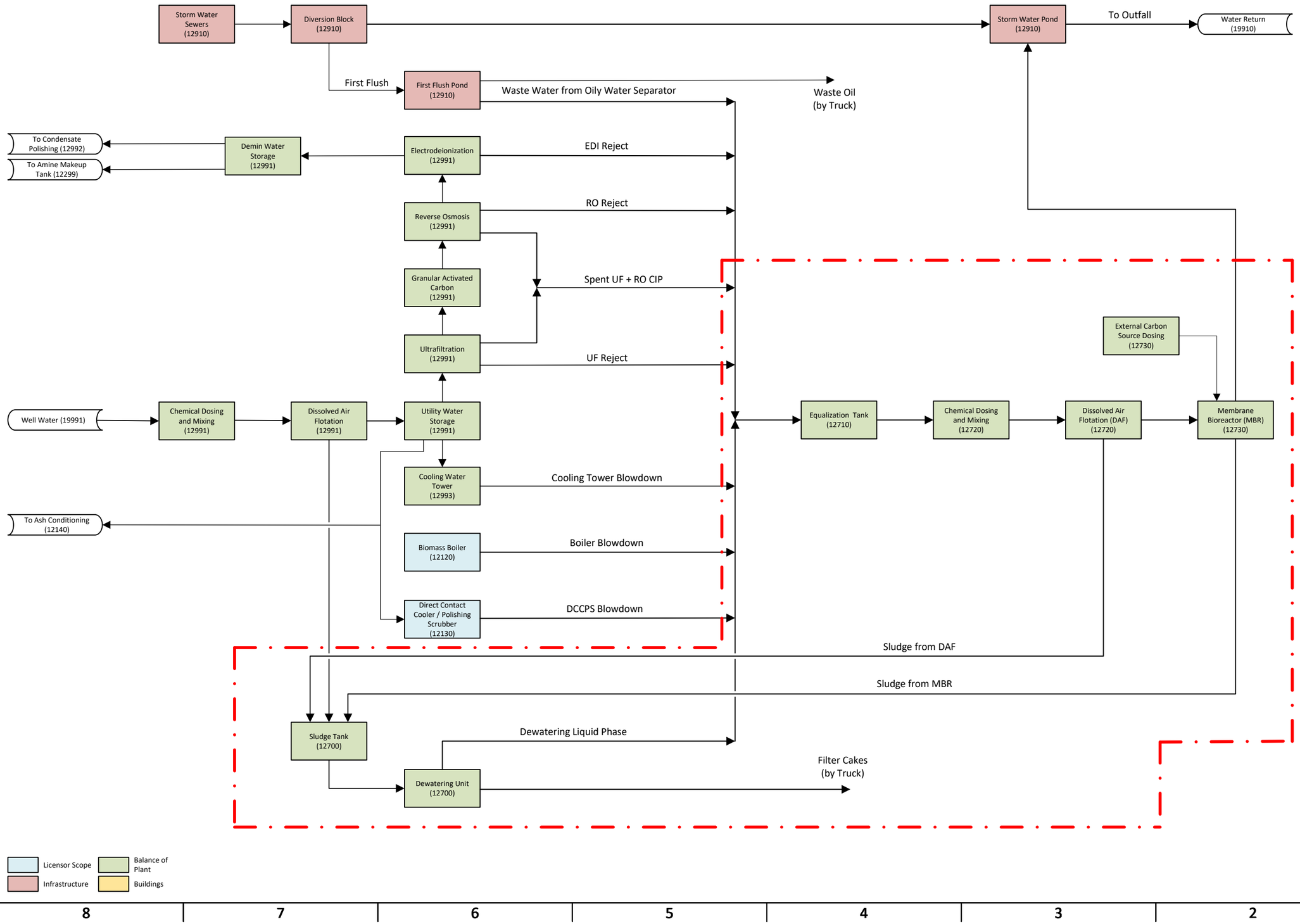
# BECCS WATER TREATMENT




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| B2 | 20-Sep-24 | Re-issued for Permit | AR | DC | | | AR |
| B1 | 23-Aug-24 | Re-issued for Permit | AR | DC | | | AR |
| B | 14-June-24 | Issued for Permit | AR | DC | | | AR |
| A | 24-May-24 | Issued for Review | AR | DC | | | AR |
| | DATE | DESCRIPTION | BY | CHK | ENG | PEM | PM |

| | |
|---|---|
| DRAWN BY | DATE |
| A. Rockwell | 20-Sep-24 |
| CHECKED BY | DATE |
| D. Contino | 20-Sep-24 |
| ENGINEER | DATE |
| | |
| PROJECT ENGINEERING MANAGER | DATE |
| | |
| PROJECT MANAGER | DATE |
| A. Rockwell | 20-Sep-24 |

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THE MOUNTAINEER GIGASYSTEM

CLIENT/PROJECT TILE

Mountaineer Gigasystem

PROJECT NO.

418162-54129

Block Flow Diagram
BECCS Water Treatment

SCALE

DWG.NO.

418162-54129-PR-DBD-20002
MNT1-MB1-127-PR-BFD-00-0101

REVISION

B2

## Attachment G: Process Description

Section 2 of the application narrative provides a detailed process description for each of the proposed BECCS Plant emission units.

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

**Diesel**

**NH3**

**NG**

**Amines used in PCCU**

# SAFETY DATA SHEET

Aqua Ammonia (20-30%)

Airgas
an Air Liquide company

## Section 1. Identification

**GHS product identifier** : Aqua Ammonia (20-30%)

**Other means of identification** : Aqua Ammonia, Ammonium Hydroxide

**Product type** : Liquid.

**Product use** : Synthetic/Analytical chemistry.

**Synonym** : Aqua Ammonia, Ammonium Hydroxide

**SDS #** : 001195

**Supplier's details** : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

**24-hour telephone** : 1-866-734-3438

## Section 2. Hazards identification

**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

**Classification of the substance or mixture** : SKIN CORROSION - Category 1B
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3
AQUATIC HAZARD (ACUTE) - Category 1

**GHS label elements**

**Hazard pictograms** :

**Signal word** : Danger

**Hazard statements** : May displace oxygen and cause rapid suffocation.
Causes severe skin burns and eye damage.
May cause respiratory irritation.
Very toxic to aquatic life.

**Precautionary statements**

**General** : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

**Prevention** : Wear protective gloves. Wear protective clothing. Wear eye or face protection. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Avoid breathing vapor.

**Response** : Collect spillage. Immediately call a POISON CENTER or doctor. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**Storage** : Store locked up. Store in a well-ventilated place. Keep container tightly closed.

**Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.

**Hazards not otherwise classified** : None known.

# Section 3. Composition/information on ingredients

**Substance/mixture** : Substance

**Other means of identification** : Aqua Ammonia, Ammonium Hydroxide

**Product code** : 001195

## CAS number/other identifiers

**CAS number** : Not available.

| Ingredient name | % | CAS number |
|---|---|---|
| ammonium hydroxide | 100 | 1336-21-6 |
| ammonia | 20-30 | 7664-41-7 |
| WATER | 70-80 | 7732-18-5 |

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.**

**Occupational exposure limits, if available, are listed in Section 8.**

# Section 4. First aid measures

## Description of necessary first aid measures

**Eye contact** : Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.

**Inhalation** : Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

**Skin contact** : Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

**Ingestion** : Get medical attention immediately. Call a poison center or physician. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

## Most important symptoms/effects, acute and delayed

### Potential acute health effects

**Eye contact** : No known significant effects or critical hazards.

**Inhalation** : May cause respiratory irritation.

**Skin contact** : Causes severe burns.

**Frostbite** : Try to warm up the frozen tissues and seek medical attention.

# Section 4. First aid measures

**Ingestion** : No known significant effects or critical hazards.

**Over-exposure signs/symptoms**

**Eye contact** : Adverse symptoms may include the following:, pain, watering, redness

**Inhalation** : Adverse symptoms may include the following:, respiratory tract irritation, coughing

**Skin contact** : Adverse symptoms may include the following:, pain or irritation, redness, blistering may occur

**Ingestion** : Adverse symptoms may include the following:, stomach pains

**Indication of immediate medical attention and special treatment needed, if necessary**

**Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

**Specific treatments** : No specific treatment.

**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

**See toxicological information (Section 11)**

# Section 5. Fire-fighting measures

**Extinguishing media**

**Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.

**Unsuitable extinguishing media** : None known.

**Specific hazards arising from the chemical** : In a fire or if heated, a pressure increase will occur and the container may burst. This material is very toxic to aquatic life. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

**Hazardous thermal decomposition products** : Decomposition products may include the following materials:
nitrogen oxides

**Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

**Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

# Section 6. Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

**For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

**Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

# Section 6. Accidental release measures

## Methods and materials for containment and cleaning up

**Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

**Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

# Section 7. Handling and storage

## Precautions for safe handling

**Protective measures** : Put on appropriate personal protective equipment (see Section 8). Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Avoid release to the environment. Do not ingest. Empty containers retain product residue and can be hazardous. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Do not reuse container. Do not breathe vapor or mist.

**Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

**Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

# Section 8. Exposure controls/personal protection

## Control parameters

### Occupational exposure limits

| Ingredient name | Exposure limits |
|---|---|
| ammonium hydroxide | None. |

**Appropriate engineering controls** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

**Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

## Individual protection measures

**Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

## Section 8. Exposure controls/personal protection

**Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

**Skin protection**

**Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

**Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

## Section 9. Physical and chemical properties

**Appearance**

**Physical state** : Liquid.

**Color** : Clear.

**Odor** : Pungent.

**Odor threshold** : 5 ppm

**pH** : Approx. 11.6 for 1 N Sol'n. in water

**Melting point** : -35ºF (20% solution) to -115ºF(30% solution)

**Boiling point** : Lowest known value: 38°C (100.4°F) (ammonium hydroxide).

**Critical temperature** : Not available.

**Flash point** : Not available.

**Evaporation rate** : Not available.

**Flammability (solid, gas)** : Extremely flammable in the presence of the following materials or conditions: Oxidizing

**Lower and upper explosive (flammable) limits** : Lower: 16%
Upper: 25%

**Vapor pressure** : 3-10 PSI @ 16 ◦C

**Vapor density** : Vapor density 0.6 (Air = 1) (ammonia)

**Specific Volume (ft $^3$/lb)** : 20.79

**Gas Density (lb/ft $^3$)** : 0.0481

**Relative density** : 0.6

**Solubility** : Soluble in water. Soluble in alcohol and ether.

**Solubility in water** : Complete 540 g/l

**Partition coefficient: n-octanol/water** : Not available.

**Auto-ignition temperature** : 651°C (1203.8°F)

**Decomposition temperature** : Not available.

**Viscosity** : Not available.

**Flow time (ISO 2431)** : Not available.

# Section 10. Stability and reactivity

**Reactivity** : No specific test data related to reactivity available for this product or its ingredients.

**Chemical stability** : The product is stable.

**Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.

**Conditions to avoid** : No specific data.

**Incompatible materials** : Yellow Metals (brass & copper)

**Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

**Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

# Section 11. Toxicological information

## Information on toxicological effects

### Acute toxicity

| Product/ingredient name | Result | Species | Dose | Exposure |
|---|---|---|---|---|
| ammonium hydroxide | LD50 Oral | Rat | 350 mg/kg | - |

### Irritation/Corrosion

| Product/ingredient name | Result | Species | Score | Exposure | Observation |
|---|---|---|---|---|---|
| ammonium hydroxide | Eyes - Severe irritant<br>Eyes - Severe irritant | Rabbit<br>Rabbit | -<br>- | 250 ug<br>0.5 minutes 1 mg | -<br>- |

### Sensitization

Not available.

### Mutagenicity

Not available.

### Carcinogenicity

Not available.

### Reproductive toxicity

Not available.

### Teratogenicity

Not available.

### Specific target organ toxicity (single exposure)

| Name | Category | Route of exposure | Target organs |
|---|---|---|---|
| ammonium hydroxide | Category 3 | - | Respiratory tract irritation |

### Specific target organ toxicity (repeated exposure)

Not available.

### Aspiration hazard

Not available.

# Section 11. Toxicological information

**Information on the likely routes of exposure** : Not available.

## Potential acute health effects

**Eye contact** : No known significant effects or critical hazards.

**Inhalation** : May cause respiratory irritation.

**Skin contact** : Causes severe burns.

**Ingestion** : No known significant effects or critical hazards.

## Symptoms related to the physical, chemical and toxicological characteristics

**Eye contact** : Adverse symptoms may include the following:, pain, watering, redness

**Inhalation** : Adverse symptoms may include the following:, respiratory tract irritation, coughing

**Skin contact** : Adverse symptoms may include the following:, pain or irritation, redness, blistering may occur

**Ingestion** : Adverse symptoms may include the following:, stomach pains

## Delayed and immediate effects and also chronic effects from short and long term exposure

### Short term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

### Long term exposure

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

### Potential chronic health effects

Not available.

**General** : No known significant effects or critical hazards.

**Carcinogenicity** : No known significant effects or critical hazards.

**Mutagenicity** : No known significant effects or critical hazards.

**Teratogenicity** : No known significant effects or critical hazards.

**Developmental effects** : No known significant effects or critical hazards.

**Fertility effects** : No known significant effects or critical hazards.

## Numerical measures of toxicity

### Acute toxicity estimates

Not available.

# Section 12. Ecological information

## Toxicity

| Product/ingredient name | Result | Species | Exposure |
|---|---|---|---|
| ammonium hydroxide | Acute LC50 37 ppm Fresh water | Fish - Gambusia affinis - Adult | 96 hours |

## Persistence and degradability

Not available.

## Bioaccumulative potential

# Section 12. Ecological information

Not available.

**Mobility in soil**

**Soil/water partition coefficient ($K_{OC}$)** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

# Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

# Section 14. Transport information

| | DOT | TDG | Mexico | IMDG | IATA |
|---|---|---|---|---|---|
| **UN number** | UN2672 | UN2672 | UN2672 | UN2672 | UN2672 |
| **UN proper shipping name** | Ammonium Hydroxide or Ammonia solutions | AMMONIA SOLUTION | AMMONIA SOLUTION | AMMONIA SOLUTION | Ammonia solution |
| **Transport hazard class(es)** | 8   | 8   | 8   | 8   | 8   |
| **Packing group** | III | III | III | III | III |
| **Environmental hazards** | No. | Yes. | Yes. The environmentally hazardous substance mark is not required. | Yes. | Yes. The environmentally hazardous substance mark is not required. |

**"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."**

**Additional information**

**DOT Classification** : **Reportable quantity** 1000 lbs / 454 kg [2493.4 gal / 9438.7 L]. Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.

**TDG Classification** : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.40-2.42 (Class 8), 2.7 (Marine pollutant mark).
The marine pollutant mark is not required when transported by road or rail.

**IMDG** : The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.

**IATA** : The environmentally hazardous substance mark may appear if required by other transportation regulations.

# Section 14. Transport information

**Special precautions for user** : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to IMO instruments** : Not available.

# Section 15. Regulatory information

**U.S. Federal regulations** : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

**Clean Water Act (CWA) 311**: ammonium hydroxide

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

## SARA 302/304

### Composition/information on ingredients

No products were found.

**SARA 304 RQ** : Not applicable.

## SARA 311/312

**Classification** : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

## SARA 313

| | Product name | CAS number | % |
|---|---|---|---|
| Form R - Reporting requirements | ammonium hydroxide | 1336-21-6 | 100 |
| Supplier notification | ammonium hydroxide | 1336-21-6 | 100 |

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

## State regulations

**Massachusetts** : The following components are listed: AMMONIUM HYDROXIDE; AMMONIUM WATER

**New York** : The following components are listed: Ammonium hydroxide

**New Jersey** : The following components are listed: AMMONIUM HYDROXIDE

**Pennsylvania** : The following components are listed: AMMONIUM HYDROXIDE

## California Prop. 65

This product does not require a Safe Harbor warning under California Prop. 65.

## International regulations

### Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

### Montreal Protocol

Not listed.

### Stockholm Convention on Persistent Organic Pollutants

# Section 15. Regulatory information

Not listed.

## Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

## UNECE Aarhus Protocol on POPs and Heavy Metals

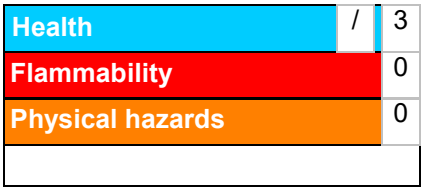
Not listed.

## Inventory list

| | | |
|---|---|---|
| **Australia** | : | All components are listed or exempted. |
| **Canada** | : | All components are listed or exempted. |
| **China** | : | All components are listed or exempted. |
| **Europe** | : | All components are listed or exempted. |
| **Japan** | : | **Japan inventory (ENCS)**: All components are listed or exempted.<br>**Japan inventory (ISHL)**: All components are listed or exempted. |
| **New Zealand** | : | All components are listed or exempted. |
| **Philippines** | : | All components are listed or exempted. |
| **Republic of Korea** | : | All components are listed or exempted. |
| **Taiwan** | : | All components are listed or exempted. |
| **Thailand** | : | Not determined. |
| **Turkey** | : | All components are listed or exempted. |
| **United States** | : | All components are active or exempted. |
| **Viet Nam** | : | All components are listed or exempted. |

# Section 16. Other information

## Hazardous Material Information System (U.S.A.)




**Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.**

**The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.**

## National Fire Protection Association (U.S.A.)


**Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.**

**Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.**

## Procedure used to derive the classification

# Section 16. Other information

| Classification | Justification |
|---|---|
| SKIN CORROSION - Category 1B<br>SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3<br>AQUATIC HAZARD (ACUTE) - Category 1 | Expert judgment<br>Calculation method<br><br>Calculation method |

## History

**Date of printing** : 1/14/2021

**Date of issue/Date of revision** : 1/14/2021

**Date of previous issue** : 2/15/2018

**Version** : 1

**Key to abbreviations** : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

**References** : Not available.

## Notice to reader

**To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.**
**Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.**

# SAFETY DATA SHEET

## SECTION 1) CHEMICAL PRODUCT AND SUPPLIER'S IDENTIFICATION

| | | | |
|---|---|---|---|
| **CAS Number:** | 105-59-9 | | |
| **Product Name:** | Methyldiethanolamine (MDEA) | | |
| **Revision Date:** | Apr 03, 2018 | **Date Printed:** | Apr 03, 2018 |
| **Version:** | 1.0 | **Supersedes Date:** | N.A. |
| **Manufacturer's Name:** | Thames River Chemical Corp. | | |
| **Address:** | 5230 Harvester Road Burlington, ON, CA, L7L 4X4 | | |
| **Emergency Phone:** | CHEMTREC (800) 424-9300 | | |
| **Information Phone Number:** | 905-681-5353 | | |
| **Fax:** | 905-681-5377 | | |

**Product/Recommended Uses:** Feed additive and diet supplement

## SECTION 2) HAZARDS IDENTIFICATION

### Classification

Eye Irritation - Category 2A

### Pictograms

### Signal Word

Warning

### Hazard Statements - Health

Causes serious eye irritation

### Precautionary Statements - General

If medical advice is needed, have product container or label at hand.

Keep out of reach of children.

Read label before use.

### Precautionary Statements - Prevention

Wash thoroughly/Wash hands thoroughly after handling.

Wear protective gloves/protective clothing/eye protection/face protection.

### Precautionary Statements - Response

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical advice/attention.

### Precautionary Statements - Storage

No precautionary statement available.

### Precautionary Statements - Disposal

No precautionary statement available.

### Physical Hazards Not Otherwise Classified

No Data Available

### Health Hazards Not Otherwise Classified

No Data Available

## SECTION 3) COMPOSITION/INFORMATION ON INGREDIENTS

| CAS | Chemical Name | % By Weight |
|---|---|---|
| 0000105-59-9 | METHYL DIETHANOLAMINE | 98% - 100% |

Specific chemical identity and/or exact percentage (concentration) of the composition has been withheld to protect confidentiality.

## SECTION 4) FIRST-AID MEASURES

### Inhalation

Remove source of exposure or move person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER/doctor.

### Eye Contact

Direct contact with liquid or vapor will cause serious eye irritation. Immediately flush the contaminated eye(s) with lukewarm, gently flowing water for several minutes, while holding the eyelid(s) open. Neutral saline solution may be used as soon as it is available. Take care not to rinse contaminated water into the unaffected eye or onto face. If irritation persists, obtain medical attention.

### Skin Contact

Take off contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Rinse/wash with lukewarm, gently flowing water and mild soap for 5 minutes or until product is removed. If skin irritation occurs or you feel unwell: Get medical advice/attention.
Wash contaminated clothing before re-use or discard.

### Ingestion

Swallowing can cause irritation of the digestive tract with abdominal and chest pain, nausea, vomiting and diarrhea.
Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water again. Immediately obtain medical advice.

### Most Important Symptoms and Effects, Both Acute and Delayed

No Data Available

### Indication of Any Immediate Medical Attention and Special Treatment Needed

No Data Available

## SECTION 5) FIRE-FIGHTING MEASURES

### Suitable Extinguishing Media

Small Fire : Dry chemical, foam, carbon dioxide, water-spray or alcohol-resistant foam. Carbon dioxide can displace oxygen. Use caution when applying carbon dioxide in confined spaces. Large Fire: Water spray, fog or alcohol-resistant foam.

### Unsuitable Extinguishing Media

Do not use straight stream of water. High pressure water streams may scatter hot liquid.

### Specific Hazards in Case of Fire

During a fire, the chemical components may vaporize; these components can be severely irritating to eyes and respiratory tract. Hazardous combustion products may include and are not limited to: nitrogen oxides, hydrogen cyanide, carbon monoxide, and carbon dioxide.

### Fire-fighting Procedures

Isolate immediate hazard area and keep unauthorized personnel out. Move undamaged containers from immediate hazard area if it can be done safely.

### Special Protective Actions

Wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

## SECTION 6) ACCIDENTAL RELEASE MEASURES

### Emergency Procedure

Isolate hazard area and keep unauthorized personnel away. Stay uphill and/or upstream. Do not touch damaged containers or spilled materials unless wearing appropriate protective clothing. Ventilate closed spaces before entering.

### Recommended Equipment

Wear chemical protective clothing.

### Personal Precautions

Avoid breathing vapor or mist. Avoid contact with skin, eye or clothing.

### Environmental Precautions

Stop spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems and natural waterways by using sand, earth, or other appropriate barriers. Dike far ahead of liquid spill for later disposal.

### Methods and Materials for Containment and Cleaning up

Absorb Liquids in vermiculite, dry sand, earth, or similar inert material and deposit in sealed containers for disposal.

## SECTION 7) HANDLING AND STORAGE

### General

Avoid contact with eyes, skin and clothing. Avoid generating mists and vapors. Avoid breathing vapors. Ensure that engineering controls are operating and that protective equipment requirements are being followed.

Inspect containers for leaks before handling. Prevent damage to containers. Keep containers closed when not in use. Assume that empty containers contain residues which are hazardous.

Discard all contaminated leather items such as watchbands, shoes and belts.
Never perform any welding, cutting, soldering, drilling or other hot work on an empty vessel, container or piping until all liquid and vapors have been cleared.

### Ventilation Requirements

Use only with adequate ventilation to control air contaminants to their exposure limits.

### Storage Room Requirements

Store in dry, cool areas, out of direct sunlight and away from other sources of heat. Empty container retain residue and may be dangerous.

Keep containers tightly closed.

## SECTION 8) EXPOSURE CONTROLS/PERSONAL PROTECTION

### Eye protection

Wear indirect-vent, impact and splash resistant goggles when working with liquids

### Skin Protection

Use of gloves approved to relevant standards made from the following materials may provide suitable chemical protection: PVC, neoprene or nitrile rubber gloves. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

### Respiratory Protection

If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker, a respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 should be followed. Check with respiratory protective equipment suppliers.

### Appropriate Engineering Controls

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

| Chemical Name | CANsmg | CANsppm | CANtmg | CANtppm | OSHA STEL (mg/m3) | OSHA STEL (ppm) | OSHA TWA (mg/m3) | OSHA TWA (ppm) | OSHA Carcinogen | OSHA Tables (Z1, Z2, Z3) | OSHA Skin designation | ACGIH STEL (mg/m3) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No applicable chemical | - | - | - | - | - | - | - | - | - | - | - | - |

| Chemical Name | ACGIH STEL (ppm) | ACGIH TWA (mg/m3) | ACGIH TWA (ppm) | ACGIH TLV Basis | ACGIH Carcinogen | ACGIH Notations |
|---|---|---|---|---|---|---|
| No applicable chemical | - | - | - | - | - | - |

## SECTION 9) PHYSICAL AND CHEMICAL PROPERTIES

### Physical and Chemical Properties

| | |
|---|---|
| Density | 8.66 lb/gal |
| Specific Gravity | 1.04 |

| | |
|---|---|
| Appearance | pale yellow viscous liquid |
| Odor Description | amine odor |
| Odor Threshold | N/A |
| pH | strong base |
| Melting Point | No Data Available |
| Low Boiling Point | 240 °C |
| High Boiling Point | N/A |
| Flash Point | 131 °C |
| Vapor Pressure | 0.000262 (25°C) hPa |
| Vapor Density | 4 |
| Evaporation Rate | N/A |
| Upper Explosion Level | N/A |
| Lower Explosion Level | N/A |
| Water Solubility | completely soluble |
| Coefficient Water/Oil | Kow = -1.08 (25°C) |
| Viscosity | No Data Available |

## SECTION 10) STABILITY AND REACTIVITY

### Reactivity

No Data Available

### Stability

Stable under normal storage and handling conditions.

### Conditions to Avoid

Avoid high temperatures and contact with sources of ignition. Avoid direct sunlight.

### Hazardous Reactions/Polymerization

Contact with nitrosating agents, under acidic conditions such as nitrous acid, nitrite or nitrogen oxides, can form nitrosamines some of which are potent carcinogens.

Alkanolamine substances are oxidized by air slowly with evolution of heat. This reaction may lead to spontaneous combustion if the substance is on an adsorbent or on a high surface area material (e.g. absorbent material or thermal insulation).

### Incompatible Materials

Avoid contact with strong acids, strong oxidizing agents, halogenated hydrocarbons and nitrating agents.

### Hazardous Decomposition Products

Decomposition products may include nitrogen oxides, ammonia, irritating aldehydes and ketones. Hazardous decomposition products depend upon temperature, air supply and the presence of other materials.

## SECTION 11) TOXICOLOGICAL INFORMATION

### Likely Route of Exposure

Inhalation, ingestion, skin absorption

### Acute Toxicity

LD50 Oral(rat): 1945 mg/kg
LD50 Dermal(rabbit): 6230 mg/kg
LC50 Inhalation(4 hrs.): Not available

### Aspiration Hazard

No Data Available

### Carcinogenicity

No Data Available

### Germ Cell Mutagenicity

No Data Available

### Reproductive Toxicity

No Data Available

### Respiratory/Skin Sensitization

No Data Available

### Serious Eye Damage/Irritation

Causes serious eye irritation

### Skin Corrosion/Irritation

No Data Available

### Specific Target Organ Toxicity - Repeated Exposure

No Data Available

### Specific Target Organ Toxicity - Single Exposure

No Data Available

## SECTION 12) ECOLOGICAL INFORMATION

### Toxicity

Algae:

72 Hr EC50 Desmodesmus subspicatus: 37 mg/L
96 Hr EC50 Desmodesmus subspicatus: 20 mg/L
Freshwater fish:
96 Hr LC50 Leusciscus idus: 1000-2200 mg/L
96 Hr LC50 Pimephales promelas: >1000 mg/L
48 Hr EC50 Daphnia magna: 230 mg/L

### Mobility in Soil

Henry's Law Constant (H) is estimated to be 3.38E-19 atm m^3/mole at 25°C.
Potential for mobility in soil is very high (Koc between 0 and 50).
Log soil organic carbon partition coefficient (log Koc) is estimated to be 0.48.

### Bio-accumulative Potential

Bioconcentration potential is low (BCF <100; and log Pow <3). Log Pow is estimated using the Pomona-MedChem structural fragment method to be -1.202.

### Persistence and Degradability

Product is expected to biodegrade readily under aerobic conditions.

### Other Adverse Effects

No Data Available

## SECTION 13) DISPOSAL CONSIDERATIONS

### Waste Disposal

Empty Containers retain product residue which may exhibit hazards of material, therefore do not pressurize, cut, glaze, weld or use for any other purposes. It is the responsibility of the user of the product to determine at the time of disposal whether the product meets local criteria for hazardous waste. Waste management should be in full compliance with national, provincial and local laws.

## SECTION 14) TRANSPORT INFORMATION

### Transport Canada Information

UN number: Not Regulated

Proper shipping name: N/A

Hazard class: N/A

Packaging group: N/A

### U.S. DOT Information

UN number: Not Regulated

Proper shipping name: N/A

Hazard class: N/A

Packaging group: N/A

## SECTION 15) REGULATORY INFORMATION

| CAS | Chemical Name | % By Weight | Regulation List |
|---|---|---|---|
| 0000105-59-9 | METHYL DIETHANOLAMINE | 98% - 100% | DSL,TSCA |

## SECTION 16) OTHER INFORMATION

### Glossary

ACGIH- American Conference of Governmental Industrial Hygienists; ANSI- American National Standards Institute; Canadian TDG- Canadian Transportation of Dangerous Goods; CANsmg or CANsppm - Canadian Short Term Exposure Level in mg/L or in ppm; CANtmg or CANtppm - Canadian Time Weighted Average in mg/L or in ppm; CAS- Chemical Abstract Service; Chemtrec- Chemical Transportation Emergency Center(US); CHIP- Chemical Hazard Information and Packaging; DSL- Domestic Substances List; EC- Equivalent Concentration; EH40 (UK)- HSE Guidance Note EH40 Occupational Exposure Limits; EPCRA- Emergency Planning and Community Right-To-Know Act; ESL Effects screening levels; HMIS- Hazardous Material Information Service; LC- Lethal Concentration; LD- Lethal Dose; NFPA- National Fire Protection Association; OEL- Occupational Exposure Limits; OSHA- Occupational Safety and Health Administration, US Department of Labor; PEL- Permissible Exposure Limit; SARA (Title III)- Superfund Amendments and Reauthorization Act; SARA 313- Superfund Amendments and Reauthorization Act, Section 313; SCBA- Self Contained Breathing Apparatus; STEL-Short Term Exposure Limit; TCEQ Texas Commission on Environmental Quality; TLV- Threshold Limit Value; TSCA- Toxic Substances Control Act Public Law 94-469; TWA Time Weighted Value; US DOT- US Department of Transportation; WHMIS- Workplace Hazardous Materials Information System.

### Version 1.0:

Revision Date: Oct 04, 2017

Version 1.0

## DISCLAIMER

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist. The above information pertains to this product as currently formulated, and is based on the information available at this time. Addition of reducers or other additives to this product may substantially alter the composition and hazards of the product. Since conditions of use are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information.

[redacted]

**SAFETY DATA SHEET**

**Natural Gas (Sweet)**

Date of Preparation: March 8, 2022

## Section 1: IDENTIFICATION

**Product Name:** Natural Gas (Sweet)

**Synonyms:** Marsh Gas; Methane (CH4); Fuel Gas.

**Product Use:** Fuel Gas.

**Restrictions on Use:** Not available.

[redacted]

**Manufacturer/Supplier:**

**Emergency Phone:**

[redacted]

**Date of Preparation of SDS:** March 8, 2022

## Section 2: HAZARD(S) IDENTIFICATION

### GHS INFORMATION

**Classification:**
Flammable Gases, Category 1
Gases Under Pressure - Compressed Gas
Simple Asphyxiant, Category 1

### LABEL ELEMENTS

**Hazard Pictogram(s):**

**Signal Word:** Danger

**Hazard Statements:**
Extremely flammable gas.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

**Precautionary Statements**

**Prevention:** Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

**Response:** Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
In case of leakage, eliminate all ignition sources.

**Storage:** Store in a well-ventilated place.
Protect from sunlight.

**Disposal:** Not applicable.

**Hazards Not Otherwise Classified:** Not applicable.

**Ingredients with Unknown Toxicity:** None.

This material is considered hazardous by the OSHA Hazard Communication Standard, (29 CFR 1910.1200). This material is considered hazardous by the Hazardous Products Regulations.



[redacted]

## Section 3: COMPOSITION / INFORMATION ON INGREDIENTS

| Hazardous Ingredient(s) | Common name / Synonyms | CAS No. | % vol./vol. |
|---|---|---|---|
| Natural gas | Not available. | 8006-14-2 | 100 |
| Methane | Not available. | 74-82-8 | 90 - 99 |
| Ethane | Not available. | 74-84-0 | 0 - 6 |
| Propane | Not available. | 74-98-6 | 0 - 3 |
| Butane | Not available. | 106-97-8 | 0 - 3 |
| Propane, 2-methyl- | Isobutane | 75-28-5 | 0 - 3 |
| Pentane | Not available. | 109-66-0 | 0 - 3 |
| Butane, 2-methyl- | Isopentane | 78-78-4 | 0 - 3 |
| Nitrogen | Not available. | 7727-37-9 | 0 - 3 |
| Carbon dioxide | Not available. | 124-38-9 | 0 - 3 |
| Helium | Not available. | 7440-59-7 | 0 - 3 |

## Section 4: FIRST-AID MEASURES

**Inhalation:**

If inhaled: Call a poison center or doctor if you feel unwell.

**Acute and delayed symptoms and effects:** May displace oxygen and cause rapid suffocation. Central nervous system depression can occur if product is present in concentrations that will reduce the oxygen content of air below 18 % (vol). Symptoms may include headache, lightheadedness, drowsiness, disorientation, vomiting and seizures. Unconsciousness and death may occur with severe oxygen deprivation. May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

**Eye Contact:**

If in eyes: Rinse cautiously with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor.

**Acute and delayed symptoms and effects:** Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. The pain after contact with liquid can quickly subside. Permanent eye damage or blindness could result.

**Skin Contact:**

Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. If on skin: Wash with plenty of water. Get immediate medical advice/attention. Thaw frosted parts with lukewarm water. Do not rub affected area. Remove non-adhering contaminated clothing. Do not remove adherent material or clothing.

**Acute and delayed symptoms and effects:** Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

**Ingestion:**

Not a normal route of exposure.

**General Advice:**

**Acute and delayed symptoms and effects:** Not a normal route of exposure. In case of accident or if you feel unwell, seek medical advice immediately (show the label or SDS where possible).

**Note to Physicians:** Symptoms may not appear immediately.

## Section 5: FIRE-FIGHTING MEASURES

**FLAMMABILITY AND EXPLOSION INFORMATION**

Extremely flammable gas. Contains gas under pressure; may explode if heated. Will be easily ignited by heat, sparks or flames. Will form explosive mixtures with air. Vapors from liquefied gas are initially heavier than air and spread along ground. Methane is lighter than air and will rise. Vapors may travel to source of ignition and flash back. Cylinders exposed to fire may vent and release flammable gas through pressure relief devices. Containers may explode when heated. Ruptured cylinders may rocket. DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.

If tank, rail car or tank truck is involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

Fire involving Tanks: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

**Sensitivity to Mechanical Impact:** This material is not sensitive to mechanical impact.
**Sensitivity to Static Discharge:** This material is sensitive to static discharge.

**MEANS OF EXTINCTION**

**Suitable Extinguishing Media:** Small Fire: Dry chemical or $CO_2$.

Large Fire: Water spray or fog. Move containers from fire area if you can do it without risk.

**Unsuitable Extinguishing Media:** Not available.

**Products of Combustion:** Oxides of carbon.

**Protection of Firefighters:** Leaking gas fire: Do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources. Vapors may cause dizziness or asphyxiation without warning. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Fire may produce irritating and/or toxic gases. Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.

## Section 6: ACCIDENTAL RELEASE MEASURES

**Emergency Procedures:** As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Keep out of low

| | |
|---|---|
| | areas. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. |
| **Personal Precautions:** | Do not touch or walk through spilled material. Use personal protection recommended in Section 8. |
| **Environmental Precautions:** | Not normally required. |
| **Methods for Containment:** | Stop leak if you can do it without risk. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material. Do not direct water at spill or source of leak. |
| **Methods for Clean-Up:** | Prevent spreading of vapors through sewers, ventilation systems and confined areas. Isolate area until gas has dispersed. |
| **Other Information:** | See Section 13 for disposal considerations. |

## Section 7: HANDLING AND STORAGE

**Handling:**
Avoid breathing gas. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not pierce or burn, even after use. See Section 8 for information on Personal Protective Equipment.

**Storage:**
Store in a well-ventilated place. Protect from sunlight. Store away from incompatible materials. See Section 10 for information on Incompatible Materials. Keep out of the reach of children.

## Section 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

**Exposure Guidelines**
**Component**

Natural gas [CAS No. 8006-14-2]
**ACGIH:** Simple asphyxiant; Explosion hazard
**OSHA:** No PEL established.

Methane [CAS No. 74-82-8]
**ACGIH:** Simple asphyxiant; Explosion hazard
**OSHA:** No PEL established.

Ethane [CAS No. 74-84-0]
**ACGIH:** Simple asphyxiant; Explosion hazard
**OSHA:** No PEL established.

Propane [CAS No. 74-98-6]
**ACGIH:** Simple asphyxiant; Explosion hazard
**OSHA:** 1000 ppm (TWA), 1800 mg/m³ (TWA);

Butane [CAS No. 106-97-8]

**ACGIH:** 1000 ppm (STEL); Explosion hazard (2012)

**OSHA:** 800 ppm (TWA) [Vacated];

Isobutane [CAS No. 75-28-5]

**ACGIH:** 1000 ppm (STEL); Explosion hazard (2012)

**OSHA:** No PEL established.

Pentane [CAS No. 109-66-0]

**ACGIH:** 1000 ppm (TWA); (2013)

**OSHA:** 1000 ppm (TWA), 2950 mg/m³ (TWA); 600 ppm (TWA); 750 ppm (STEL) [Vacated];

Isopentane [CAS No. 78-78-4]

**ACGIH:** 1000 ppm (TWA); (2013)

**OSHA:** No PEL established.

Nitrogen [CAS No. 7727-37-9]

**ACGIH:** Simple asphyxiant

**OSHA:** No PEL established.

Carbon dioxide [CAS No. 124-38-9]

**ACGIH:** 5000 ppm (TWA); 30000 ppm (STEL); (1983)

**OSHA:** 5000 ppm (TWA), 9000 mg/m³ (TWA);

Helium [CAS No. 7440-59-7]

**ACGIH:** Simple asphyxiant

**OSHA:** No PEL established.

**PEL:** Permissible Exposure Limit
**TLV:** Threshold Limit Value
**TWA:** Time-Weighted Average
**STEL:** Short-Term Exposure Limit

**Engineering Controls:** Use ventilation adequate to keep exposures (airborne levels of dust, fume, vapour, gas, etc.) below recommended exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT (PPE)**

**Eye/Face Protection:** Wear safety glasses. Use equipment for eye protection that meets the standards referenced by CSA Standard CAN/CSA-Z94.3:20 and OSHA regulations in 29 CFR 1910.133 for Personal Protective Equipment.

**Hand Protection:** Wear protective gloves. Wear cold insulating gloves. Consult manufacturer specifications for further information.

**Skin and Body Protection:** Wear protective clothing. Flame resistant clothing that meets

| | |
|---|---|
| | the NFPA 2112 and CAN/CGSB 155.20-2017 standards is recommended in areas where material is stored or handled. |
| **Respiratory Protection:** | If engineering controls and ventilation are not sufficient to control exposure to below the allowable limits then an appropriate NIOSH/MSHA approved air-purifying respirator that meets the requirements of CSA Standard CAN/CSA-Z94.4-18, or self-contained breathing apparatus must be used. Supplied air breathing apparatus must be used when oxygen concentrations are low or if airborne concentrations exceed the limits of the air-purifying respirators. |
| **General Hygiene Considerations:** | Handle according to established industrial hygiene and safety practices. Consult a competent industrial hygienist to determine hazard potential and/or the PPE manufacturers to ensure adequate protection. |

## Section 9: PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| **Appearance:** | Colourless gas. |
| **Colour:** | Colourless. |
| **Odour:** | Slight hydrocarbon odour not detectable by all people. |
| **Odour Threshold:** | Not available. |
| **Physical State:** | Gas. |
| **pH:** | Not available. |
| **Melting Point / Freezing Point:** | -187 to -182 °C (-304.6 to -295.6 °F) |
| **Initial Boiling Point:** | Not available. |
| **Boiling Range:** | -162 °C (-259.6 °F) |
| **Flash Point:** | Not available. |
| **Evaporation Rate:** | > 1 (n-BuAc = 1) at 20 °C (68 °F) |
| **Flammability (solid, gas):** | Extremely flammable gas. |
| **Lower Flammability Limit:** | 4.4 % (Natural Gas)<br>5% (Methane)<br>3% (Ethane)<br>2.1% (Propane)<br>1.8% (Butane & Isobutane) |
| **Upper Flammability Limit:** | 16.4 % (Natural Gas)<br>15% (Methane)<br>12.5% (Ethane)<br>9.5% (Propane)<br>8.4% (Butane & Isobutane) |
| **Vapor Pressure:** | > 1000 mmHg at 20 °C (68 °F) |

| | |
|---|---|
| **Vapor Density:** | 0.6 (Air = 1) at 20 °C (68 °F) (Methane) |
| **Relative Density:** | Not available. |
| **Solubilities:** | Negligible solubility in water. |
| **Partition Coefficient: n-Octanol/Water:** | Not available. |
| **Auto-ignition Temperature:** | 537 °C (998.6 °F) |
| **Decomposition Temperature:** | Not available. |
| **Viscosity:** | Not available. |
| **Percent Volatile, wt. %:** | 100 |
| **VOC content, wt. %:** | Not available. |
| **Density:** | Not available. |
| **Coefficient of Water/Oil Distribution:** | Not available. |

## Section 10: STABILITY AND REACTIVITY

| | |
|---|---|
| **Reactivity:** | Contact with incompatible materials. Sources of ignition. Exposure to heat. |
| **Chemical Stability:** | Stable under normal storage conditions. |
| **Possibility of Hazardous Reactions:** | None known. |
| **Conditions to Avoid:** | Contact with incompatible materials. Sources of ignition. Exposure to heat. |
| **Incompatible Materials:** | Strong oxidizers. |

**Hazardous Decomposition Products:** Not available.

## Section 11: TOXICOLOGICAL INFORMATION

**EFFECTS OF ACUTE EXPOSURE**

**Product Toxicity**

**Oral:** Not available.

**Dermal:** Not available.

**Inhalation:** Not available.

**Component Toxicity**

| Component | CAS No. | $LD_{50}$ oral | $LD_{50}$ dermal | $LC_{50}$ |
|---|---|---|---|---|
| Natural gas | 8006-14-2 | Not available. | Not available. | Not available. |
| Methane | 74-82-8 | Not available. | Not available. | Not available. |
| Ethane | 74-84-0 | Not available. | Not available. | Not available. |
| Propane | 74-98-6 | Not available. | Not available. | Not available. |
| Butane | 106-97-8 | Not available. | Not available. | 658000 mg/m³ (rat); 4H |
| Isobutane | 75-28-5 | Not available. | Not available. | 570000 ppm (rat); 15M |

| | | | | |
|---|---|---|---|---|
| Pentane | 109-66-0 | 400 mg/kg (rat) | Not available. | 364000 mg/m³ (rat); 4H |
| Isopentane | 78-78-4 | Not available. | Not available. | Not available. |
| Nitrogen | 7727-37-9 | Not available. | Not available. | Not available. |
| Carbon dioxide | 124-38-9 | Not available. | Not available. | Not available. |
| Helium | 7440-59-7 | Not available. | Not available. | Not available. |

**Likely Routes of Exposure:** Eye contact. Skin contact. Inhalation.

**Target Organs:** Skin. Eyes. Respiratory system. Cardiovascular system. Bone marrow. Liver. Kidneys. Central nervous system.

**Symptoms (including delayed and immediate effects)**

**Inhalation:** May displace oxygen and cause rapid suffocation. Central nervous system depression can occur if product is present in concentrations that will reduce the oxygen content of air below 18 % (vol). Symptoms may include headache, lightheadedness, drowsiness, disorientation, vomiting and seizures. Unconsciousness and death may occur with severe oxygen deprivation. May cause respiratory irritation. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

**Eye:** Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. The pain after contact with liquid can quickly subside. Permanent eye damage or blindness could result.

**Skin:** Contact with rapidly expanding or liquefied gas may cause irritation and/or frostbite. Symptoms of frostbite include change in skin color to white or grayish-yellow. The pain after contact with liquid can quickly subside.

**Ingestion:** Not a normal route of exposure.

**Skin Sensitization:** Not available.

**Respiratory Sensitization:** Not available.

**Medical Conditions Aggravated By Exposure:** Not available.

**EFFECTS OF CHRONIC EXPOSURE (from short and long-term exposure)**

**Target Organs:** Skin. Eyes. Respiratory system. Cardiovascular system. Bone marrow. Liver. Kidneys. Central nervous system.

**Chronic Effects:** Prolonged exposure to Natural gas can lead to hypoxia, bluish colouration to the skin, numbness, damage to the nervous system, heart sensitization, reduced consciousness and death. Prolonged or repeated inhalation of Isopentane may cause dizziness, weakness, weight loss, anemia, nervousness, pains in the limbs and peripheral numbness.

**Carcinogenicity:** This product does not contain any carcinogens or potential carcinogens above reportable thresholds as listed by ACGIH, IARC, OSHA, or NTP.

**Mutagenicity:** Not available.

**Reproductive Effects:** Not available.

**Developmental Effects**

**Teratogenicity:** Not available.

**Embryotoxicity:** Not available.

**Toxicologically Synergistic Materials:** Not available.

## Section 12: ECOLOGICAL INFORMATION

**Ecotoxicity:** Not available.

**Persistence / Degradability:** Not available.

**Bioaccumulation / Accumulation:** Not available.

**Mobility in Environment:** Not available.

**Other Adverse Effects:** Not available.

## Section 13: DISPOSAL CONSIDERATIONS

**Disposal Instructions:** Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

## Section 14: TRANSPORT INFORMATION

**U.S. Department of Transportation (DOT)**

**Proper Shipping Name:** UN1971, NATURAL GAS, COMPRESSED, 2.1

**Class:** 2.1

**UN Number:** UN1971

**Packing Group:** Not applicable.

**Label Code:**


**Canada Transportation of Dangerous Goods (TDG)**

**Proper Shipping Name:** UN1971, NATURAL GAS, COMPRESSED, 2.1

**Class:** 2.1

**UN Number:** UN1971

**Packing Group:** Not applicable.

**Label Code:**


## Section 15: REGULATORY INFORMATION

**Chemical Inventories**

**US (TSCA)**

The components of this product are in compliance with the chemical notification requirements of TSCA.

**Canada (DSL)**
The components of this product are in compliance with the chemical notification requirements of the NSN Regulations under CEPA, 1999.

**Federal Regulations**

**United States**
This SDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**SARA Title III**

| Component | Section 302 (EHS) TPQ (lbs.) | Section 304 EHS RQ (lbs.) | CERCLA RQ (lbs.) | Section 313 | RCRA CODE | CAA 112( r ) TQ (lbs.) |
|---|---|---|---|---|---|---|
| Methane | Not listed. | Not listed. | Not listed. | Not listed. | Not listed. | 10000 |
| Ethane | Not listed. | Not listed. | Not listed. | Not listed. | Not listed. | 10000 |
| Propane | Not listed. | Not listed. | Not listed. | Not listed. | Not listed. | 10000 |
| Butane | Not listed. | Not listed. | Not listed. | Not listed. | Not listed. | 10000 |
| Isobutane | Not listed. | Not listed. | Not listed. | Not listed. | Not listed. | 10000 |
| Pentane | Not listed. | Not listed. | Not listed. | Not listed. | Not listed. | 10000 |
| Isopentane | Not listed. | Not listed. | Not listed. | Not listed. | Not listed. | 10000 |

**State Regulations**
**Massachusetts**
US Massachusetts Commonwealth's Right-to-Know Law (Appendix A to 105 Code of Massachusetts Regulations Section 670.000)

| Component | CAS No. | RTK List |
|---|---|---|
| Natural gas | 8006-14-2 | Listed. |
| Methane | 74-82-8 | Listed. |
| Ethane | 74-84-0 | Listed. |
| Propane | 74-98-6 | Listed. |
| Butane | 106-97-8 | Listed. |
| Isobutane | 75-28-5 | Listed. |
| Pentane | 109-66-0 | Listed. |
| Isopentane | 78-78-4 | Listed. |
| Nitrogen | 7727-37-9 | Listed. |
| Carbon dioxide | 124-38-9 | Listed. |
| Helium | 7440-59-7 | Listed. |

**Note:** E = Extraordinarily Hazardous Substance

**New Jersey**
US New Jersey Worker and Community Right-to-Know Act (New Jersey Statute Annotated Section 34:5A-5)

| Component | CAS No. | RTK List |
|---|---|---|
| Methane | 74-82-8 | SHHS |
| Ethane | 74-84-0 | SHHS |
| Propane | 74-98-6 | SHHS |
| Butane | 106-97-8 | SHHS |
| Isobutane | 75-28-5 | SHHS |
| Pentane | 109-66-0 | SHHS |

| | | |
|---|---|---|
| Isopentane | 78-78-4 | SHHS |
| Nitrogen | 7727-37-9 | Listed. |
| Carbon dioxide | 124-38-9 | Listed. |
| Helium | 7440-59-7 | Listed. |

**Note:** SHHS = Special Health Hazard Substance

**Pennsylvania**

US Pennsylvania Worker and Community Right-to-Know Law (34 Pa. Code Chap. 301-323)

| Component | CAS No. | RTK List |
|---|---|---|
| Natural gas | 8006-14-2 | Listed. |
| Methane | 74-82-8 | Listed. |
| Ethane | 74-84-0 | Listed. |
| Propane | 74-98-6 | Listed. |
| Butane | 106-97-8 | Listed. |
| Isobutane | 75-28-5 | Listed. |
| Pentane | 109-66-0 | Listed. |
| Isopentane | 78-78-4 | Listed. |
| Nitrogen | 7727-37-9 | Listed. |
| Carbon dioxide | 124-38-9 | Listed. |
| Helium | 7440-59-7 | Listed. |

**California**

**California Prop 65:** This product does not contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

## Section 16: OTHER INFORMATION

**Disclaimer:**

The information contained in this document applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to satisfy oneself as to the suitability and completeness of this information for their own particular use.

**Date of Preparation of SDS:** March 8, 2022

**Version:** 2.1

**GHS SDS Prepared by:** [redacted]

## 1. IDENTIFICATION

| | |
|---|---|
| Product Identifier | Diesel Fuel |
| Synonyms: | Diesel Fuel, Motor Vehicle Diesel Fuel, Dyed Diesel, * DieselOne®, * DieselOne® w/Platinum Plus DFX, Low Sulfur Diesel (LSD), Ultra Low Sulfur Diesel (ULSD) |
| Intended use of the product: | Fuel |
| Contact: | Global Companies LLC<br>Water Mill Center<br>800 South St.<br>Waltham, MA 02454-9161<br>www.globalp.com |
| Contact Information: | EMERGENCY TELEPHONE NUMBER (24 hrs): CHEMTREC (800) 424-9300<br>COMPANY CONTACT (business hours): 800-542-0778 |

## 2. HAZARD IDENTIFICATION

**According to OSHA 29 CFR 1910.1200 HCS**

Classification of the Substance or Mixture

Classification (GHS-US):

| | | |
|---|---|---|
| Flam. Liquid | Category 3 | H226 |
| Skin Corrosion/Irritation | Category 2 | H315 |
| Aspiration Hazard | Category 1 | H304 |
| STOT SE | Category 3 | H336 |
| Carcinogenicity | Category 2 | H350 |
| Aquatic Chronic | Category 2 | H411 |
| Serious Eye Damage/ Irritation | Category 2B | H319 |

Labeling Elements

| | |
|---|---|
| Signal Word (GHS-US): | **Danger** |
| Hazard Statements (GHS-US): | H226 – Flammable liquid and vapor.<br>H315 – Causes Skin irritation.<br>H304 – May be fatal if swallowed and enters airways.<br>H336 – May cause drowsiness or dizziness.<br>H350 – May cause cancer.<br>H411 – Toxic to aquatic life with long lasting effects.<br>H319 – May cause eye damage/irritation. |
| Precautionary Statements (GHS-US): | P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking.<br>P233 - Keep container tightly closed.<br>P240 – Ground/bond container and receiving equipment. |

P241 – Use explosion-proof electrical/ventilating/lighting equipment pursuant to applicable electrical code.
P242 – Use only non-sparking tools.
P243 – Take precautionary measures against static discharge.
P261 – Avoid breathing dust/fume/gas/mist/vapors/spray.
P264 – Wash skin thoroughly after handling.
P271 – Use only outdoors or in a well-ventilated area.
P273 – Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P303+361+353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse with water/shower.
P308+311 - If exposed or concerned: Get medical advice/attention.
P301+310 - If swallowed: Immediately call a poison center/doctor/…
P331 - Do NOT induce vomiting.
P370+P378 – In case of fire use firefighting foam or other appropriate media for Class B fires to extinguish.
P403+235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 – Dispose of contents/container in accordance with local/regional/national/international regulation.

**Other information:**

NFPA 704
Health: 1
Fire: 2
Reactivity: 0


## 3. COMPOSITION / INFORMATION ON INGREDIENTS

**Chemical Composition Information**
Mixture

| Name | Product Identifier (CAS#) | % (w/w) | Classification |
|---|---|---|---|
| Diesel Fuel | 68476-34-6 | 100 | Flam Liq. 3, H226; Skin Irrit. 2, H315; Aspiration 1, H304; STOT SE 3, H336; Carc.2. H350; Aquatic chronic 2, H411 |
| Naphthalene | 91-20-3 | <0.1 | Carc. 2, H351; Acute Tox. 4, H302; Aquatic Acute 1, H400; Aquatic Chronic 1, H410 |

**Additional Formulation Information:**
Diesel Fuel consists of C9+ hydrocarbons resulting from distillation of crude oil.

Low Sulfur Diesel Fuel typically contains less than 500 ppm of sulfur

Ultra Low Sulfur Diesel Fuel typically contains less than 15 ppm of sulfur

## 4. FIRST AID MEASURES

| Route | Measures |
|---|---|
| Inhalation | Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately. |

| Route | Measures |
|---|---|
| Ingestion | Aspiration Hazard: DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Ingestion may cause gastrointestinal disturbances including irritation, nausea, vomiting, and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory failure, and death. |
| Eye Contact | In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention. In case of contact lenses, remove immediately. |
| Skin Contact | Remove contaminated clothing and shoes. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and of the area of the body burned. |

**Most Important Symptoms**
Contact with eyes and face may cause irritation. Long-term exposure may cause dermatitis (itching, irritation, pain and swelling).

Inhalation may cause irritation and significant or long term exposure could cause respiratory insufficiency and pulmonary edema.

Ingestion may cause aspiration, gastrointestinal disturbance, and CNS effects.

**Immediate Medical Attention and Special Treatment**
For contact with skin or eyes, immediately wash or flush contaminated eyes with gently flowing water. If possible, irrigate each eye continuously with 0.9% saline (NS). If ingested, rinse mouth. Do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs).

If inhaled, administer oxygen or establish a patent airway if breathing is labored. Suction if necessary. Monitor closely, anticipate seizures. Consider orotracheal or nostracheal intubation of airway control if patient is unconscious or is in severe respiratory distress.

Discard any clothing or shoes contaminated as they may be flammable.

## 5. FIRE-FIGHTING MEASURES

**Extinguishing Media**
Foam, carbon dioxide, dry chemical are most suitable

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, C02, water spray, firefighting foam, or Halon. Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other firefighting equipment.

LARGE FIRES: Foam, carbon dioxide, dry chemical. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

**Specific Hazards / Products of Combustion**
Moderate fire hazard when exposed to heat or flame with a very low flash point. Product is flammable and easily ignited when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Combustion may produce smoke, carbon monoxide and other products of incomplete combustion.

**Special Precautions and Protective Equipment for Firefighters**
Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied firefighting foam.

**Fighting Equipment/Instructions**
Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH- approved pressure-demand self-contained breathing apparatus with full face piece and protective clothing.

**Refer to Section 9 for fire properties of this chemical including flash point, auto ignition temperature, and explosive limits.**

## 6. ACCIDENTAL RELEASE MEASURES

**ACTIVATE FACILITY SPCC, SPILL CONTINGENCY or EMERGENCY PLAN.**

**Personal Precautions**
Due to high vapor density, flammable / toxic vapors may be present in low lying areas, dikes, pits, drains, or trenches. Vapors may accumulate in low lying areas and reach ignitable concentrations. Ventilate the area. Use of non-sparking tools and intrinsically safe equipment is recommended. Potential for flammable atmosphere should be monitored using a combustible gas indicator positioned downwind of the spill area. Refer to Sections 2 and 7 for further hazard warnings and handling instructions.

Use appropriate personal protective equipment to prevent eye/skin contact and absorption. Use NIOSH approved respiratory protection, if warranted, to prevent exposures above permissible limits. Refer to Section 8. Contaminated clothing should not be near sources of ignition.

**Emergency Measures**
As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions. Consider wind direction. Secure all ignition sources (flame, spark, hot work, hot metal, etc.) from area. Evaluate the direction of product travel, diking sewers, etc. to confirm spill areas. Do not touch or walk-through spilled material. For large spills, isolate initial action distance downwind 1,000 ft. (300 m).

**Environmental Precautions**
Stop the spill to prevent environmental release if it can be done safely. Product is toxic to aquatic life. Take action to isolate environmental receptors including drains, storm sewers and natural water bodies. Keep on impervious surface if at all possible. Use water sparingly to prevent product from spreading. Foam and absorbents may be used to reduce / prevent airborne release.

Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Follow federal, state or local requirements for reporting environmental release where necessary. Refer to Section 15 for further information.

**Containment and Clean-Up Methods**
Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of firefighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with dry earth, sand or other non-combustible, inert oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container with clean, non-sparking tools for reclamation or disposal. Response and cleanup crews must be properly trained and must utilize proper protective equipment. Refer to Section 8 for appropriate protective equipment.

## 7. HANDLING AND STORAGE

**USE ONLY AS A FUEL.**
**DO NOT SIPHON BY MOUTH.**

**Handling Precautions**
Handle as a flammable liquid. Keep away from heat, sparks, and open flame. No smoking. Electrical equipment should be approved for classified area. Bond and ground containers during product transfer pursuant to NFPA 70 and API RP 2003 to reduce the possibility of static-initiated fire or explosion. Follow precautions to prevent static initiated fire.

Use good personal hygiene practices. Use only with protective equipment specified in Section 8. Avoid repeated and/or prolonged skin exposure. Use only outdoors or in well ventilated areas. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this

product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves. Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API RP 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

**Storage**

Large quantities of diesel fuel are stored in tanks or portable containers at an ambient storage temperature. Separate from incompatible chemicals (Refer to Section 10) by distance or secondary containment. Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers that are clearly labeled. Label all secondary containers that this material is transferred into with the chemical name and associated hazard(s). Empty product containers or vessels may contain flammable vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Storage tanks should have a venting system. If stored in small containers, the area should be well ventilated, away from ignition sources and protected from potential damage or vehicular traffic. Post “No Smoking” signs in product storage areas. This storage area should comply with NFPA 30 “Flammable and Combustible Liquid Code” or applicable building code. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 “Cleaning Mobile Tanks in Flammable and Combustible Liquid Service” and API RP 2015 “Safe Entry and Cleaning of Petroleum Storage Tanks”.

**Incompatibles**

Keep away from strong oxidizers, ignition sources and heat.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Occupational Exposure Limits**

| Component | CAS # | List | Value |
|---|---|---|---|
| Diesel Fuel | 68476-34-6 | ACGIH TLV-TWA | 100 mg/m3* |
| Naphthalene | 91-20-3 | ACGIH TLV-TWA<br>OSHA PEL<br>ACGIH STEL | 10 ppm<br>10 ppm<br>15 ppm |

*Critical effects; Skin; A3; CNS impairment.

**Engineering Controls**

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Intrinsically safe equipment and non-sparking tools shall be used in circumstances where concentrations may exceed lower flammable limits. Grounding and bonding shall be used to prevent accumulation and discharge of static electricity. Emergency shower and eyewash should be provided in proximity to handling areas in the event of exposure to decontaminate.

**Personal Protective Equipment**

| Exposure | Equipment |
|---|---|
| Eye / Face | Wear appropriate chemical protective glasses or goggles or face shields to prevent skin and eye contact especially caused from splashing. |
| Skin | Wear appropriate personal protective clothing to prevent skin contact. Gloves constructed of nitrile, neoprene or PVC are recommended when handling this material. Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. |

| Exposure | Equipment |
|---|---|
| Respiratory | A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.<br><br>Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection. |
| Thermal | Product is stored at ambient temperature. No thermal protection is required except for emergency operations involving actual or potential for fire. Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| Property | Value | |
|---|---|---|
| Appearance | Clear or straw-colored liquid. May be dyed red for distribution. | |
| Odor | Mild characteristic petroleum distillate odor. | |
| Odor Threshold | <1 ppm | |
| pH | Not available | |
| Melting Point | -22 to -0.4 ˚F (-30 to -18 ˚C) | |
| Boiling Point Range | 320 to 690 ˚F (160 to 366 ˚C) | |
| Flash Point | > 125.6 ˚F (52 ˚C) PMCC | |
| Evaporation Rate | Slow, varies with conditions | |
| Flammability | Flammable liquid (OSHA defined) | |
| Flammable Limits | 0.6 % - 6.5% | |
| Vapor Pressure | 0.009 psia @ 70 ˚F | |
| Vapor Density | > 1 | (air=1) |
| Specific Gravity | 0.83-0.86 @ 60 ˚F (16 ˚C) | (water=1) |
| Solubility | Insoluble in water; miscible with other petroleum solvents. | |
| Partition Coefficient (N-octanol/water) | Log Kow range of 3.3 to >.6.0 | |
| Autoignition Temperature | 494 ˚F (257 ˚C) | |
| Decomposition Temperature | When heated it emits acrid smoke and irritating vapors. | |
| Viscosity | <3 cSt | |
| Percent Volatiles | 100 | |

## 10. STABILITY AND REACTIVITY

**Stability**
This is a stable material that is flammable liquid (OSHA/GHS hazard category 3). Stable during transport.

**Reactivity**
Material is not self-reacting. Flammable concentrations may be present in air. Compound can react with oxidizing materials.

**Possibility of Hazardous Reactions**
Hazardous polymerization will not occur.

**Incompatibility**
Keep away from strong oxidizers such as nitric and sulfuric acids.

**Conditions to Avoid**
Avoid high temperatures, open flames, sparks, static electricity, welding, smoking and other ignition sources.

**Hazardous Decomposition Products**
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

## 11. TOXICOLOGICAL INFORMATION

**Acute Toxicity:**
Acute Toxicity (Inhalation LC50)
Diesel Fuel (68476-34-6)
LC50 Inhalation Rat >6 mg/l/4h

Acute Toxicity (Dermal LD50)
Diesel Fuel (68476-34-6)
LD50 Dermal Rabbit >5000 mg/kg

Acute Toxicity (Oral LD50)
Diesel Fuel (68476-34-6)
LD50 Oral Rabbit >5000 mg/kg

Skin Corrosion/Irritation: Prolonged and repeated contact may cause skin irritation leading to dermatitis. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

Serious Eye Damage/Irritation: Causes serious eye irritation.

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Teratogenicity: Not available

Carcinogenicity: OSHA: NO, IARC: Group 3, NTP: NO, ACGIH: NOIC:A3, NIOSH: NO

IARC: Group 3 – Not classifiable as to their carcinogenicity to humans ACGIH: A3 – Confirmed animal carcinogen with unknown relevance to humans

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

IARC classifies whole diesel fuel exhaust particulates (byproduct of combustion of this material) carcinogenic to humans (Group 1) and NIOSH regards diesel fuel exhaust particulate as a potential occupational carcinogen.

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Specific Target Organ Toxicity (Single Exposure): Inhalation exposure may cause drowsiness or dizziness by inhalation exposure.

Aspiration Hazard: The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Potential Health Effects: Vapor irritating to skin, eyes, nose, and throat. Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

WARNING: The burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of

combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

## 12. ECOLOGICAL INFORMATION

**Toxicity:**
This material is expected to be toxic to aquatic organisms and may cause long-term adverse effects in the aquatic environment.

Data for Component: Diesel Fuel (68476-34-6)

Material is toxic to aquatic organisms based on an acute basis (LC50/EC50 >1 but ≤ 10 mg/L in the most sensitive species tested).

Material is a long-term aquatic hazard based on a chronic basis (LC50/EC50 >1 but ≤ 10 mg/L in the most sensitive species tested).

Persistence and Degradation: This material is not expected to be readily biodegradable.

Bioaccumulative Potential: Not available

Mobility in Soil: Not available

Other Adverse Effects: None known

Other Information: Avoid release to the environment.

## 13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options. May be considered a hazardous waste if disposed. Direct solid waste (landfill) or incineration at a solid waste facility is not permissible. Do not discharge to sanitary or storm sewer. Personnel handling waste containers should follow precautions provided in this document.

Shipping containers must be DOT authorized packages. Follow licensure and regulations for transport of hazardous material and hazardous waste as applicable.

## 14. TRANSPORT INFORMATION

**US DOT**

| | |
|---|---|
| UN Identification Number | NA 1993 |
| Proper Shipping Name | Diesel fuel |
| Hazard Class and Packing Group | 3, PGIII |
| Shipping Label | Flammable liquid |
| Placard / Bulk Package | Flammable liquid, 1993 |
| Emergency Response Guidebook Guide Number | 128 |

This product may be re-classified as a “Combustible Liquid” meeting the definition in 49 CFR 173.120 unless transported by vessel or aircraft.
Specific placard requirements must be met for shipments of this product as a Combustible Liquid by rail (See 49 CFR 172.332).
Non-bulk packages (<= 119 gal) of Combustible Liquids in package sizes less than the product reportable quantity are not regulated as hazardous materials if the material does not meet any other hazard class.

**IATA Information**

| | |
|---|---|
| UN Identification Number | UN 1202 |
| Proper Shipping Name | Diesel fuel |
| Hazard Class and Packing Group | 3, PGIII |
| ICAO Label | 3 |
| Packing Instructions Cargo | 310 |
| Max Quantity Per Package Cargo | 220L |
| Packing Instructions Passenger | 309Y |
| Max Quantity per Package Passenger | 60L |

**ICAO**

| | |
|---|---|
| UN Identification Number | UN 1202 |
| Shipping Name / Description | Diesel fuel |
| Hazard Class and Packing Group | 3, PG III |
| IMDG Label | 3 |

**IMDG**

| | |
|---|---|
| UN Identification Number | UN 1202 |
| Shipping Name / Description | Diesel fuel |
| Hazard Class and Packing Group | 3, PGIII |
| IMDG Label | 3 |
| EmS Number | F-E-S-E |
| Marine Pollutant | Yes |

## 15. REGULATORY INFORMATION

**U.S. Federal, State, and Local Regulatory Information**
Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

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

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

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

**Clean Water Act (Oil Spills)**
Any spill or release of this product to “navigable waters” (Essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

**CERCLA Section 103 and SARA Section 304 (Release to the Environment)**
The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts this material. This product does not contain any chemicals subject to the reporting requirements of CERCLA Section 103 or SARA 304.

**SARA Section 313- Supplier Notification**
This product does not contain any chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372.

**EPA Notification (Oil Spills)**
If the there is a discharge of more than 1,000-gallons of oil into or upon navigable waters of the United States, or if it is the second spill event of 42 gallons or more of oil into water within a twelve (12) month period, a written report must be submitted to the Regional Administrator of the EPA within sixty days of the event.

**Pennsylvania Right to Know Hazardous Substance list:**
The following product components are cited in the Pennsylvania Special Hazardous Substance List, and are present at levels which require reporting.

| Component | CAS | Amount |
|---|---|---|
| Diesel Fuel | 68476-34-6 | 100% |

**New Jersey Right to Know Hazardous Substance list:**
The following product components are cited in the New Jersey Right to Know Hazardous Substance List, and are present at levels which require reporting.

| Component | CAS | Amount |
|---|---|---|
| Diesel Fuel | 68476-34-6 | 100% |

**California Proposition 65 WARNING: This product contains chemicals known to the State of California to cause Cancer or Reproductive Toxicity.**

| Component | CAS | Amount |
|---|---|---|
| Naphthalene | 91-20-3 | <0.1% |

**U.S. Toxic Substances Control Act**
All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30.

**CEPA - Domestic Substances List (DSL)**
All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

**Canadian Regulatory Information (WHMIS)**
Class B3 – Combustible Liquid
Class D2A – Materials causing other toxic effects. (Very Toxic)

## 16. OTHER INFORMATION

| | |
|---|---|
| Version | 5 |
| Issue Date | June 26, 2019 |
| Prior Issue Date | May 20, 2016 |

**Description of Revisions**
Update viscosity information in Section 9. Update transportation information in Section 14 to clarify US DOT re-classification option as a Combustible Liquid.

**Abbreviations**

| | |
|---|---|
| ˚F | Degrees Fahrenheit (temperature) |
| < | Less than |
| = | Equal to |
| > | Greater than |
| AP | Approximately |
| C | Centigrade (temperature) |
| kg | Kilogram |
| L | Liter |
| mg | Milligrams |
| mL | Milliliter |
| $mm^2$ | Square millimeters |
| mmHg | Millimeters of mercury (pressure) |
| N/A | Not applicable |
| N/D | Not determined |
| ppm | Parts per million |
| sec | Second |
| ug | Micrograms |

**Acronyms**

| | |
|---|---|
| ACGIH | American Conference of Governmental Industrial Hygienists |
| AIHA | American Industrial Hygiene Association |
| AL | Action Level |
| ANSI | American National Standards Institute |
| API | American Petroleum Institute |
| CAS | Chemical Abstract Service |
| CERCLA | Comprehensive Emergency Response, Compensation, and Liability Act |
| DOT | U.S. Department of Transportation |
| EC50 | Ecological concentration 50% |
| EPA | U.S. Environmental Protection Agency |
| ERPG | Emergency Response Planning Guideline |
| GHS | Global Harmonized System |

| | |
|---|---|
| HMIS | Hazardous Materials Information System |
| IARC | International Agency for Research On Cancer |
| IATA | International Air Transport Association |
| IMDG | International Maritime Dangerous Goods |
| Koc | Soil Organic Carbon |
| LC50 | Lethal concentration 50% |
| LD50 | Lethal dose 50% |
| MSHA | Mine Safety and Health Administration |
| NFPA | National Fire Protection Association |
| NIOSH | National Institute of Occupational Safety and Health |
| NOIC | Notice of Intended Change |
| NTP | National Toxicology Program |
| OPA | Oil Pollution Act of 1990 |
| OSHA | U.S. Occupational Safety & Health Administration |
| PEL | Permissible Exposure Limit (OSHA) |
| RCRA | Resource Conservation and Recovery Act Reauthorization Act of 1986 Title III |
| REL | Recommended Exposure Limit (NIOSH) |
| RVP | Reid Vapor Pressure |
| SARA | Superfund Amendments and |
| SCBA | Self Contained Breathing Apparatus |
| SPCC | Spill Prevention, Control, and Countermeasures |
| STEL | Short Term Exposure Limit (generally 15 minutes) |
| TLV | Threshold Limit Value (ACGIH) |
| TSCA | Toxic Substances Control Act |
| TWA | Time Weighted Average (8 hr.) |
| UN | United Nations |
| UNECE | United Nations Economic Commission for Europe |
| WEEL | Workplace Environmental Exposure Level (AIHA) |
| WHMIS | Canadian Workplace Hazardous Materials Information System |

**Disclaimer of Expressed and Implied Warranties**

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

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

** End of Safety Data Sheet **

**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] |
|---|---|---|---|---|---|---|
| **BFB Boiler** | | | | | | |
| 121-H-2001<br>121-S-5001<br>121-S-9901 | 121-PKG-3001 | Wood Chip Fired Fluidized Bed Boiler<br>Makeup Sand Silo<br>Sodium Bicarbonate Storage Silo | | **121-H-2001**:<br>180 MMBtu/hr during startup<br>944 MMBtu/hr during normal operation;<br>**121-S-5001**:<br>50 tons/hr<br>1752 tons/yr;<br>**121-S-9901**:<br>100 lbs/hr<br>4380 tons/yr | New | H2001-1C - Pulse Jet Fabric Filter<br>H2001-2C - SCR<br>H2001-3C - CO Oxidation Catalyst<br>H2001-4C - Wet Flue Gas Desulfurization<br>H2001-5C - Dry Sorbent Injection |
| 121-H-2001<br>121-S-5001<br>121-S-9901 | 122-T-1001 | Wood Chip Fired Fluidized Bed Boiler<br>Makeup Sand Silo<br>Sodium Bicarbonate Storage Silo | | **121-H-2001**:<br>944 MMBtu/hr<br>**121-S-5001**:<br>50 tons/hr<br>1752 tons/yr;<br>**121-S-9901**:<br>100 lbs/hr<br>4380 tons/yr | New | H2001-1C - Pulse Jet Fabric Filter<br>H2001-2C - SCR<br>H2001-3C - CO Oxidation Catalyst<br>H2001-4C - Wet Flue Gas Desulfurization<br>H2001-5C - Dry Sorbent Injection |

| 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] |
|---|---|---|---|---|---|---|
| **Biomass Handling Process** | | | | | | |
| 121-LS-1001 | 121-PKG-1001 | Biomass Receiving Hopper 1001 | | 212.13 tons/hr<br>929,147 tons/yr | New | Baghouse 121-PKG-1001 |
| 121-LS-1002 | 121-PKG-1001 | Biomass Receiving Hopper 1002 | | 212.13 tons/hr<br>929,147 tons/yr | New | Baghouse 121-PKG-1001 |
| 121-CV-1001 | 121-CV-1001 | Conveyor #1 from Biomass Receiving Hopper 1001 to Storage Pile | | 106.07 tons/hr<br>929,147 tons/yr | New | Covered |
| 121-CV-1002 | 121-CV-1002 | Conveyor #2 from Biomass Receiving Hopper 1002 to Storage Pile | | 106.07 tons/hr<br>929,147 tons/yr | New | Covered |
| CHIP-1 | CHIP-1 | Biomass Storage Pile Loading Fugitives | | 106.07 tons/hr<br>929,147 tons/yr | New | NA |
| 121-S-1001 | 121-S-1001 | Biomass Feed Hopper | | 106.07 tons/hr<br>929,147 tons/yr | New | NA |
| 121-CV-1003 | 121-CV-1003 | Conveyor from Feed Hopper to 121-CV-2001 A/B | | 106.07 tons/hr<br>929,147 tons/yr | New | Covered |
| 121-CV-2001 A | 121-CV-2001 A | Screw Conveyor from Biomass Feed Hopper A to Biomass Fuel Metering Bin 121-S-2001 A | | 106.07 tons/hr<br>929,147 tons/yr | New | Covered |
| 121-CV-2001B | 121-CV-2001B | Screw Conveyor from Biomass Feed Hopper B to Biomass Fuel Metering Bin 121-S-2001 B | | 106.07 tons/hr<br>929,147 tons/yr | New | Covered |
| 121-S-2001 A | 121-S-2001 A | Biomass Fuel Metering Bin A | | 106.07 tons/hr<br>929,147 tons/yr | New | NA |
| 121-S-2001 B | 121-S-2001 B | Biomass Fuel Metering Bin B | | 106.07 tons/hr<br>929,147 tons/yr | New | NA |
| CHIP-2 | CHIP-2 | Wood Chips Storage Pile Wind Erosion | | - | New | NA |

| 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] |
|---|---|---|---|---|---|---|
| **Fly Ash / Economizer Ash Handling Process** | | | | | | |
| 121-CV-4001 A | 121-CV-4001 A | PJFF Ash Collection Drag Chain Conveyor A (From boiler hopper to surge bin A) | | 4.5 tons/hr | New | Covered |
| 121-CV-4001 B | 121-CV-4001 B | PJFF Ash Collection Drag Chain Conveyor B (from boiler to surge bin B) | | 4.5 tons/hr | New | Covered |
| 121-CV-4002 | 121-CV-4002 | PJFF Ash Transport Drag Chain Conveyor (From Surge Bins #1 and #2 to PJFF Ash Transfer Drag Chain Conveyor) | | 4.5 tons/hr | New | Covered |
| 121-CV-4003 | 121-CV-4003 | PJFF Ash Transfer Drag Chain Conveyor (to Ash Bucket Elevator) | | 4.5 tons/hr | New | Covered |
| 121-CV-4004 | 121-CV-4004 | Ash Bucket Elevator | | 4.5 tons/hr | New | Covered |
| 121-CV-4005 | 121-CV-4005 | Ash Distribution Drag Chain Conveyor (From Ash Bucket Elevator to Fly Ash Storage Silos) | | 4.5 tons/hr | New | Covered |
| 121-CV-4006 A | 121-CV-4006 A | Economizer Hopper Ash Drag Chain Conveyor A (From Economizer Hopper to Economizer Hopper Ash Surge Bin A) | | 3.3 tons/hr | New | Covered |
| 121-CV-4006 B | 121-CV-4006 B | Economizer Hopper Ash Drag Chain Conveyor B (From Economizer Hopper to Economizer Hopper Ash Surge Bin B) | | 3.3 tons/hr | New | Covered |
| 121-CV-4007 A | 121-CV-4007 A | Economizer Ash Transport Conveyor A (From Economizer Ash Surge Bin A to Fly Ash Silo A) | | 3.3 tons/hr | New | Covered |
| 121-CV-4007 B | 121-CV-4007 B | Economizer Ash Transport Conveyor B (From Economizer Ash Surge Bin B to Fly Ash Silo B) | | 3.3 tons/hr | New | Covered |
| 121-S-4001 A | 121-F-4001 A | Fly Ash Storage Silo A | | 7.8 tons/hr | New | Pulse Jet Filter 121-F-4001 A |
| 121-S-4001 B | 121-F-4001 B | Fly Ash Storage Silo B | | 7.8 tons/hr | New | Pulse Jet Filter 121-F-4001 B |
| 121-TL-0001 | 121-TL-0001 | Fly Ash Truck Loading | | 8.6 tons/hr | New | Wet fly ash, with a moisture content of at least 10% |

| 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] |
|---|---|---|---|---|---|---|
| **Bottom Ash and Sand Handling Process** | | | | | | |
| 121-CV-5001 A | 121-CV-5001 A | Metering Conveyor A (Bed Ash Screw A) | | 2250 lbs/hr | New | Covered |
| 121-CV-5001 B | 121-CV-5001 B | Metering Conveyor B (Bed Ash Screw B) | | 2250 lbs/hr | New | Covered |
| 121-CV-5002A | 121-CV-5002A | Vibrating Screener A (to separate bottom ash and sand) | | 2250 lbs/hr | New | Trough hood (Partial enclosure) |
| 121-CV-5002B | 121-CV-5002B | Vibrating Screener B (to separate bottom ash and sand) | | 2250 lbs/hr | New | Trough hood (Partial enclosure) |
| 121-S-1002 | 121-S-1002 | Sand Receiving Hopper | | 50 tons/hr<br>1752 tons/yr | New | NA |
| 121-CV-1004 | 121-CV-1004 | Inclined Sand Hopper Conveyor | | 50 tons/hr<br>1752 tons/yr | New | Covered |
| 121-S-5001 | 121-PKG-3001;<br>122-T-1001 | Makeup Sand Silo | | 50 tons/hr<br>1752 tons/yr | New | Vent piping to the BFB |
| 121-CV-5003 A | 121-CV-5003 A | Transfer Conveyor A (Recycled Sand) (From Vibrating Screener A to Sand Bucket Elevator A) | | 6000 lbs/24 hours | New | Cover assembly (partial enclosure) |
| 121-CV-5003 B | 121-CV-5003 B | Transfer Conveyor B (Recycled Sand) (From Vibrating Screener B to Sand Bucket Elevator B) | | 6000 lbs/24 hours | New | Cover assembly (partial enclosure) |
| 121-CV-5004 A | 121-CV-5004 A | Sand Bucket Elevator A (Recycled Sand + Fresh Sand) | | 650 | New | Covered |
| 121-CV-5004 B | 121-CV-5004 B | Sand Bucket Elevator B (Recycled Sand + Fresh Sand) | | 650 | New | Covered |

| 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] |
|---|---|---|---|---|---|---|
| **NaHCO3 Handling Process** | | | | | | |
| 121-S-9901 | 121-PKG-3001; 122-T-1001 | Sodium Bicarbonate Storage Silo | | 1400 scfm gas flow (intermittent, 86 hrs/yr) | New | Vent routed to PJFF |
| 121-S-9902 A | 121-F-9902 A | Sodium Bicarbonate Vent Hopper A | | 126 lbs/hr (549.40 tons/yr) | New | Pulse Jet Filter 121-F-9902 A |
| 121-S-9902 B | 121-F-9902 B | Sodium Bicarbonate Vent Hopper B | | 126 lbs/hr (549.40 tons/yr) | New | Pulse Jet Filter 121-F-9902 B |
| **Others Point Sources** | | | | | | |
| 129-CT-9301 | 129-CT-9301 | Cooling Tower | | 80,762 gpm | New | NA |
| PM-PlantRd | PM-PlantRd | Truck Road Fugitive Particulate Emissions | | Max 203 vehicles per day; On average 107 vehicles per day | New | NA |
| 122-TK-9902 | 122-TK-9901 | Amine Makeup Tank | | 8812 gal (max) | New | NA |
| 122-TK-9901 | 122-TK-9901 | Lean Amine Tank | | 375,986 gal (max) | New | NA |
| 129-P-9402 | 129-P-9402 | Fire Water Pump | | 600 HP | New | NA |
| 129-PKG-0001 | 129-PKG-0001 | NG Startup Generator | | 3000 HP | New | NA |
| VOC-Amine-LOAD | VOC-Amine-LOAD | Truck Loadout of Degraded Amine | | 6.3 Mgal/hr 84 Mgal/yr | New | NA |
| 127-PKG-0001 | 127-PKG-001 | Wastewater Treatment Plant | | 0.17 Mgal/yr 1,517.49 Mgal/yr | New | NA |
| **De Minimis Tanks** | | | | | | |
| 129-TK-9402 | 129-TK-9402 | Diesel Tank | | 1616 gal (max) | New | NA |
| 122-PKG-2001 | 122-PKG-2001 | Biodegraded Amine Tank | | 4,488 gal (max) | New | NA |

[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**

MGSCNP1 - BECCS Plant
Attachment J - Emission Points Data Summary Sheet

| Emission Point ID | Emission Point Type [1] | Emission Units Vented Through this Point | | Air Pollution Control Device | | Vent Time for Emission Unit (chemical processes only) | | Pollutant Chemical Name/CAS (See Emission Calculations for Speciate VOCs & HAPs) [3] | Maximum Uncontrolled Emissions [4] | | Maximum Controlled Emissions [5] | | Emission Form or Phase (At Exit Condition) | Est. Method Used [6] | Emission Concentration [7] | Inner Diameter | Exit Gas Temp. | Exit Gas Volumetric Flow [8] | Exit Gas Velocity | Ground Level (Height above Mean Sea Level) | Stack Height above Ground Level [9] | UTM Northing | UTM Easting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Emission Unit ID | Emission Unit Description | Control Device ID | Control Device Type | Short Term [2] | Max (hr/yr) | | lb/hr | tpy | lb/hr | tpy | | | (ppmv or mg/m$^3$) | (ft) | (°F) | (ACFM) | (fps) | | (ft) | (km) | (km) |
| 121-PKG-3001 | Upward Vertical Stack (for boiler startup and when CCU is offline) | 121-H-2001<br>121-S-5001<br>121-S-9901 | Wood Chip Fired Fluidized Bed Boiler | H2001-1C<br>H2001-2C<br>H2001-3C<br>H2001-4C<br>H2001-5C | H2001-1C - Baghouse<br>H2001-2C - SCR<br>H2001-3C - CO Oxidation Catalyst<br>H2001-4C - Wet Flue Gas Desulfurization<br>H2001-5C - Dry Sorbent Injection | C | C | $NO_X$ | 202 | 80.1 | 20.20 | 10.26 | Gas | EE | 13.55 ppmvd @ 5.23% O2 | 11.5 | 104 | 252874 | 40.58 | 680 | 199 | 4308.991 | 403.862 |
| | | | | | | | | CO | 102 | 40.45 | 10.20 | 5.17 | Gas | | 11.24 ppmvd@ 5.23% O2 | | | | | | | | |
| | | | | | | | | $SO_2$ | 31.30 | 12.38 | 11.58 | 4.82 | Gas | | 5.58 ppmvd @ 5.23% O2 | | | | | | | | |
| | | | | | | | | VOC | 4.73 | 1.82 | 1.89 | 0.74 | Gas | | 0.069 mg/dscf @ 5.23% O2 and 1 atm & 68 °F | | | | | | | | |
| | | | | | | | | PM | 808.08 | 320.51 | 15.54 | 6.16 | Solid/Gas | | 0.57 mg/dscf @ 5.23% O2 and 1 atm & 68 °F | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 808.08 | 320.51 | 15.54 | 6.16 | Solid/Gas | | 0.57 mg/dscf @ 5.23% O2 and 1 atm & 68 °F | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 808.08 | 320.51 | 15.54 | 6.16 | Solid/Gas | | 0.57 mg/dscf @ 5.23% O2 and 1 atm & 68 °F | | | | | | | | |
| | | | | | | | | Lead | 0.05 | 0.02 | 0.05 | 0.02 | Solid | | 0.002 mg/dscf @ 5.23% O2 and 1 atm & 68 °F | | | | | | | | |
| | | | | | | | | $NH_3$ | 2.01 | 0.77 | 2.01 | 0.77 | Gas | | 3.65 ppmvd @ 5.23% O2 | | | | | | | | |
| | | | | | | | | $H_2SO_4$ | 17.16 | 6.52 | 6.35 | 2.65 | Gas | | 2.00 ppmvd @ 5.23% O2 | | | | | | | | |
| | | | | | | | | HCl | 42.45 | 17.16 | 1.18 | 0.97 | Gas | | 1.00 ppmvd @ 5.23% O2 | | | | | | | | |
| | | | | | | | | Total HAPs | 47.49 | 18.66 | 3.37 | 1.46 | Gas | | 0.053 mg/dscf @ 5.23% O2 and 1 atm & 68 °F | | | | | | | | |
| 122-T-1001 | Upward Vertical Stack (when CCU is in operation) | 121-H-2001<br>121-S-5001<br>121-S-9901 | Wood Chip Fired Fluidized Bed Boiler | H2001-1C<br>H2001-2C<br>H2001-3C<br>H2001-4C<br>H2001-5C | H2001-1C - Baghouse<br>H2001-2C - SCR<br>H2001-3C - CO Oxidation Catalyst<br>H2001-4C - Wet Flue Gas Desulfurization<br>H2001-5C - Dry Sorbent Injection | C | C | $NO_X$ | 202 | 801.6 | 20.20 | 80.16 | Gas | EE | 15.96 ppmvd @ 5.55% O2 | 6 | 148 | 208000 | 122.61 | 680 | 145 | 4308.929 | 403.911 |
| | | | | | | | | CO | 102 | 404.8 | 10.20 | 40.48 | Gas | | 13.24 ppmvd@ 5.55% O2 | | | | | | | | |
| | | | | | | | | $SO_2$ | 31.30 | 124.22 | 11.58 | 45.96 | Gas | | 6.57 ppmvd @ 5.55% O2 | | | | | | | | |
| | | | | | | | | VOC | 11.08 | 43.975 | 4.43 | 17.59 | Gas | | 0.19 mg/dscf @ 5.55% O2 and 1 atm & 68 F | | | | | | | | |
| | | | | | | | | PM | 808.08 | 3207.36 | 15.54 | 61.68 | Solid/Gas | | 0.66 mg/dscf @ 5.55% O2 and 1 atm & 68 F | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 808.08 | 3207.36 | 15.54 | 61.68 | Solid/Gas | | 0.66 mg/dscf @ 5.55% O2 and 1 atm & 68 F | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 808.08 | 3207.36 | 15.54 | 61.68 | Solid/Gas | | 0.66 mg/dscf @ 5.55% O2 and 1 atm & 68 F | | | | | | | | |
| | | | | | | | | Lead | 0.05 | 0.18 | 0.05 | 0.18 | Solid | | 0.002 mg/dscf @ 5.55% O2 and 1 atm & 68 F | | | | | | | | |
| | | | | | | | | $NH_3$ | 5.09 | 20.21 | 5.09 | 20.21 | Gas | | 4.02 ppmvd @ 5.55% O2 | | | | | | | | |
| | | | | | | | | $H_2SO_4$ | 17.16 | 68.14 | 6.35 | 25.21 | Gas | | 2.35 ppmvd @ 5.55% O2 | | | | | | | | |
| | | | | | | | | HCl | 42.45 | 168.35 | 1.18 | 4.68 | Gas | | 1.17 ppmvd @ 5.55% O2 | | | | | | | | |
| | | | | | | | | Total HAPs | 49.55 | 196.94 | 5.43 | 21.53 | Gas | | 0.23 mg/dscf @ 5.55% O2 and 1 atm & 68 F | | | | | | | | |

| Emission Point ID | Emission Point Type [1] | Emission Units Vented Through this Point | | Air Pollution Control Device | | Vent Time for Emission Unit (chemical processes only) | | Pollutant Chemical Name/CAS (See Emission Calculations for Speciate VOCs & HAPs) [3] | Maximum Uncontrolled Emissions [4] | | Maximum Controlled Emissions [5] | | Emission Form or Phase (At Exit Condition) | Est. Method Used [6] | Emission Concentration [7] | Inner Diameter | Exit Gas Temp. | Exit Gas Volumetric Flow [8] | Exit Gas Velocity | Ground Level (Height above Mean Sea Level) | Stack Height above Ground Level [9] | UTM Northing | UTM Easting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Emission Unit ID | Emission Unit Description | Control Device ID | Control Device Type | Short Term [2] | Max (hr/yr) | | lb/hr | tpy | lb/hr | tpy | | | (ppmv or mg/m$^3$) | (ft) | (°F) | (ACFM) | (fps) | | (ft) | (km) | (km) |
| 121-PKG-1001 | Upward Vertical Stack | 121-LS-1001<br>121-LS-1002 | Receiving Hopper 1001;<br>Receiving Hopper 1002 | 121-PKG-1001 | Baghouse | C | C | $NO_X$ | - | - | - | - | - | - | - | 2 | Ambient | 12,566 | 66.66 | 680 | 15 | 4308.981 | 403.567 |
| | | | | | | | | CO | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | VOC | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | PM | 108.00 | 472.00 | 1.08 | 4.72 | Solid | EE | 0.65 mg/acf | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 108.00 | 472.00 | 1.08 | 4.72 | Solid | | 0.65 mg/acf | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 108.00 | 472.00 | 1.08 | 4.72 | Solid | | 0.65 mg/acf | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | | | | | | | | |
| 121-S-2001 A | Horizontal Stack | 121-S-2001 A | Biomass Fuel Metering Bin A | N/A | N/A | C | C | $NO_X$ | - | - | - | - | - | - | - | TBD | Ambient | TBD | TBD | 680 | TBD | 4039.046 | 403.781 |
| | | | | | | | | CO | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | VOC | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | PM | 0.06 | 0.19 | 0.06 | 0.19 | Solid | EE | 0.32 mg/cf | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 0.03 | 0.09 | 0.03 | 0.09 | Solid | | 0.16 mg/cf | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.004 | 0.01 | 0.004 | 0.01 | Solid | | 0.024 mg/cf | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | | | | | | | | |
| 121-S-2001 B | Horizontal Stack | 121-S-2001 B | Biomass Fuel Metering Bin B | N/A | N/A | C | C | $NO_X$ | - | - | - | - | - | - | - | TBD | Ambient | TBD | TBD | 680 | TBD | 4039.046 | 403.781 |
| | | | | | | | | CO | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | VOC | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | PM | 0.06 | 0.19 | 0.06 | 0.19 | Solid | EE | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 0.03 | 0.09 | 0.03 | 0.09 | Solid | | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.004 | 0.01 | 0.004 | 0.01 | Solid | | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | | | | | | | | |
| 121-F-4001 A | Upward Vertical Stack | 121-S-4001 A | Fly Ash Storage Silo 1 | 121-F-4001 A | Filter | C | C | $NO_X$ | - | - | - | - | - | - | - | 0.67 | Ambient | 1400 | 66.90 | 680 | 100 | 4309.058 | 403.812 |
| | | | | | | | | CO | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | VOC | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | PM | 2.00 | 6.00 | 0.02 | 0.06 | Solid | EE | 0.32 mg/cf | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 1.00 | 3.00 | 0.01 | 0.03 | Solid | | 0.16 mg/cf | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.10 | 0.45 | 0.001 | 0.0045 | Solid | | 0.024 mg/cf | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | | | | | | | | |
| 121-F-4001 B | Upward Vertical Stack | 121-S-4001 B | Fly Ash Storage Silo 2 | 121-F-4001 B | Filter | C | C | $NO_X$ | - | - | - | - | - | - | - | 0.67 | Ambient | 1400 | 66.90 | 680 | 100 | 4309.058 | 403.812 |
| | | | | | | | | CO | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | VOC | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | PM | 2.00 | 6.00 | 0.02 | 0.06 | Solid | EE | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 1.00 | 3.00 | 0.01 | 0.03 | Solid | | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.10 | 0.45 | 0.001 | 0.0045 | Solid | | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | | | | | | | | |
| 121-F-9902 A | Upward Vertical Stack | 121-S-9902 A | Sodium Bicarbonate Vent Hopper A | 121-F-9902 A | Filter | C | C | $NO_X$ | - | - | - | - | - | - | - | TBD | Ambient | TBD | TBD | 680 | TBD | 4309.03 | 430.814 |
| | | | | | | | | CO | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | VOC | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | PM | 0.002 | 0.009 | 1.95E-04 | 8.54E-04 | Solid | EE | 0.32 mg/cf | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 0.001 | 0.003 | 7.50E-05 | 3.29E-04 | Solid | | 0.16 mg/cf | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.001 | 0.003 | 7.50E-05 | 3.29E-04 | Solid | | 0.024 mg/cf | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | | | | | | | | |
| 121-F-9902 B | Upward Vertical Stack | 121-S-9902 B | Sodium Bicarbonate Vent Hopper B | 121-F-9902 B | Filter | C | C | $NO_X$ | - | - | - | - | - | - | - | TBD | Ambient | TBD | TBD | 680 | TBD | 4309.03 | 430.814 |
| | | | | | | | | CO | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | VOC | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | PM | 0.002 | 0.009 | 1.95E-04 | 8.54E-04 | Solid | EE | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 0.001 | 0.003 | 7.50E-05 | 3.29E-04 | Solid | | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.001 | 0.003 | 7.50E-05 | 3.29E-04 | Solid | | 0.01 gr/dscf | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | | | | | | | | |

| Emission Point ID | Emission Point Type [1] | Emission Units Vented Through this Point | | Air Pollution Control Device | | Vent Time for Emission Unit (chemical processes only) | | Pollutant Chemical Name/CAS (See Emission Calculations for Speciate VOCs & HAPs) [3] | Maximum Uncontrolled Emissions [4] | | Maximum Controlled Emissions [5] | | Emission Form or Phase (At Exit Condition) | Est. Method Used [6] | Emission Concentration [7] | Inner Diameter | Exit Gas Temp. | Exit Gas Volumetric Flow [8] | Exit Gas Velocity | Ground Level (Height above Mean Sea Level) | Stack Height above Ground Level [9] | UTM Northing | UTM Easting |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Emission Unit ID | Emission Unit Description | Control Device ID | Control Device Type | Short Term [2] | Max (hr/yr) | | lb/hr | tpy | lb/hr | tpy | | | (ppmv or mg/m$^3$) | (ft) | (°F) | (ACFM) | (fps) | | (ft) | (km) | (km) |
| 129-CT-9301 | Upward Vertical Stack | 129-CT-9301 | Cooling Tower | N/A | N/A | C | C | $NO_X$ | - | - | - | - | - | - | - | 33 [10] | 104 | 1239360 [10] | 24.15 | 680 | 51 | 4308.846 | 403.985 |
| | | | | | | | | CO | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | VOC | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | PM | 2.02 | 3.01 | 2.02 | 3.01 | Solid | EE | 0.0123 mg/acf | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 1.48 | 2.52 | 1.48 | 2.52 | Solid | EE | 0.009 mg/acf | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.67 | 1.26 | 0.67 | 1.26 | Solid | EE | 0.0041 mg/acf | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | - | - | | | | | | | | |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | | | | | | | | |
| 129-PKG-0001 | Upward Vertical Stack | 129-PKG-0001 | NG Startup Generator | N/A | N/A | 20 min/week for readiness check; 30 min/startup. | 100 | $NO_X$ | 6.61 | 0.33 | 6.61 | 0.33 | Gas | | NA | 2.5 | 846 | 19297 | 65.52 | 680 | 30 | 4309.011 | 403.752 |
| | | | | | | | | CO | 13.23 | 0.66 | 13.23 | 0.66 | Gas | | NA | | | | | | | | |
| | | | | | | | | $SO_2$ | 0.03 | < 0.01 | 0.03 | < 0.01 | Gas | | NA | | | | | | | | |
| | | | | | | | | VOC | 5.67 | 0.28 | 5.67 | 0.28 | Gas | | NA | | | | | | | | |
| | | | | | | | | PM | 0.20 | 0.01 | 0.20 | 0.01 | Solid/Gas | EE | NA | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 0.20 | 0.01 | 0.20 | 0.01 | Solid/Gas | | NA | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.20 | 0.01 | 0.20 | 0.01 | Solid/Gas | | NA | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | | NA | | | | | | | | |
| | | | | | | | | Total HAPs | 1.43 | 0.07 | 1.43 | 0.07 | Gas | | NA | | | | | | | | |
| 129-P-9402 | Upward Vertical Stack | 129-P-9402 | Fire Water Diesel Engine Pump | N/A | N/A | 20 min/week for readiness check | 100 | $NO_X$ | 3.95 | 0.2 | 3.95 | 0.2 | Gas | | NA | 1 | 909 | 3200 | 67.91 | 680 | 12 | 4308.863 | 404.067 |
| | | | | | | | | CO | 3.45 | 0.17 | 3.45 | 0.17 | Gas | | NA | | | | | | | | |
| | | | | | | | | $SO_2$ | 0.01 | < 0.01 | 0.01 | < 0.01 | Gas | | NA | | | | | | | | |
| | | | | | | | | VOC | 3.95 | 0.20 | 3.95 | 0.20 | Gas | | NA | | | | | | | | |
| | | | | | | | | PM | 0.20 | 0.01 | 0.20 | 0.01 | Solid/Gas | EE | NA | | | | | | | | |
| | | | | | | | | $PM_{10}$ | 0.20 | 0.01 | 0.20 | 0.01 | Solid/Gas | | NA | | | | | | | | |
| | | | | | | | | $PM_{2.5}$ | 0.20 | 0.01 | 0.20 | 0.01 | Solid/Gas | | NA | | | | | | | | |
| | | | | | | | | Lead | - | - | - | - | - | | NA | | | | | | | | |
| | | | | | | | | Total HAPs | 0.02 | < 0.01 | 0.02 | < 0.01 | Gas | | NA | | | | | | | | |
| 122-TK-9902 | Upward Vertical Stack | 122-TK-9902 | Amine Makeup Tank | N/A | N/A | C | C | $NO_X$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | CO | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | VOC | < 0.01 | < 0.01 | < 0.01 | < 0.01 | Gas | EE | NA | 0.125 | Ambient | 22.06 | 29.96 | 680 | 15 | 4308.917 | 403.951 |
| | | | | | | | | PM | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $PM_{10}$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $PM_{2.5}$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | Lead | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 122-TK-9901 | Upward Vertical Stack | 112-TK-9901 | Lean Amine Tank | N/A | N/A | C | C | $NO_X$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | CO | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | VOC | 0.01 | < 0.01 | 0.01 | < 0.01 | Gas | EE | NA | 0.25 | Ambient | 109.22 | 37.08 | 680 | 40 | 4308.939 | 403.928 |
| | | | | | | | | PM | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $PM_{10}$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $PM_{2.5}$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | Lead | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| VOC-Amine-Load | Upward Vertical Stack | VOC-Amine-Load | Truck Loadout of Degraded Amine | N/A | N/A | ~ 1 hour every 2 weeks | 27 | $NO_X$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | CO | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $SO_2$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | VOC | 0.01 | < 0.01 | 0.01 | < 0.01 | Gas | EE | NA | TBD | Ambient | TBD | TBD | 680 | 12 | 4308.919 | 403.979 |
| | | | | | | | | PM | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $PM_{10}$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | $PM_{2.5}$ | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | Lead | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | | | | | | Total HAPs | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

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).
The lb/hr in the table represents the maximum hourly emission rate under normal operating conditions; tpy in the table represents the maximum annual emissions, including emissions under normal operating conditions and emissions under startup, shutdown and maintenance conditions.

[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).

[8] Give at operating conditions. Include inerts.

[9] Release height of emissions above ground level.

[10] The cooling tower will have 6 cells. The diameter and volumetric exhaust flow rate are for each cell.

Note: Information labeled as "to be determined (TBD)" will be provided once specified equipment vendors have been selected.

**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?<br>☒ Yes ☐ No<br>☐ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET. |
| 2.) Will there be Storage Piles?<br>☐ Yes ☒ No The storage piles at the BECCS Plant will all be wood chip piles. As such, the information for the storage piles is presented in the R13-L (General) worksheet.<br>☐ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET. |
| 3.) Will there be Liquid Loading/Unloading Operations?<br>☒ Yes ☐ No<br>☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET. |
| 4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation?<br>☒ Yes ☐ No<br>☐ 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.)?<br>☒ Yes ☐ No<br>☐ 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?<br>☐ Yes ☒ No<br>☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET. |
| 7.) Will there be any other activities that generate fugitive emissions?<br>☒ Yes ☐ No<br>☐ 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<br>Paved Haul Roads | PM<br>PM10<br>PM2.5 | 10.74<br>2.15<br>0.53 | 9.50<br>1.90<br>0.47 | 10.74<br>2.15<br>0.53 | 9.50<br>1.90<br>0.47 | AP-42 Ch. 13.2.1 |
| Unpaved Haul Roads | | | | | | |
| Storage Pile Emissions | | | | | | |
| Loading/Unloading Operations | VOC | 0.01 | < 0.01 | 0.01 | < 0.01 | AP-42 Ch. 5.2 |
| Wastewater Treatment Evaporation & Operations | NH3<br>$H_2SO_4$<br>HCL | 0.51<br>0.64<br>0.12 | 0.51<br>0.64<br>0.12 | 0.51<br>0.64<br>0.12 | 0.51<br>0.64<br>0.12 | EE |
| Equipment Leaks | VOC<br>NH3 | Does not apply | 36.46<br>2.64 | Does not apply | 36.46<br>2.64 | EE |
| General Clean-up VOC Emissions | | | | | | |
| Other: [5]<br>Wood chips handling and storage, including emissions from loading of wood chips onto piles and wind erosion. | PM<br>PM10<br>PM2.5 | Does not apply | 1.71<br>0.81<br>0.12 | Does not apply | 1.71<br>0.81<br>0.12 | AP-42 Ch. 13.2.4 & 13.2.5 |

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts S0.06ervice (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).

[5] For fugitive emissions from sand/fly ash/$NaHCO_3$ handling, please refer to the emission calculations in Appendix B, Attachment N.

**Attachment L: Emission Unit Data Sheets (form for different types of emission units such as haul road, boiler (in direct heat exchanger), tanks, engines, general, etc.)**

**Attachment L**
**EMISSIONS UNIT DATA SHEET**
**GENERAL**

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

Identification Number (as assigned on *Equipment List Form*): 121-S-9901, 121-S-9902 A/B

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

Sodium bicarbonate ($NaHCO_3$) handling operations - emissions from loading $NaHCO_3$ into the controlled sodium bicarbonate storage silo (121-S-9901 which discharges to the boiler and is controlled by filter H2001-1C) and from transferring $NaHCO_3$ from the storage silo to the BFB boiler via the $NaHCO_3$ Vent Hoppers 121-S-9902 A/B and the Grinding Mills. The Grinding Mills are enclosed and will not generate any emissions.

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

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

$NaHCO_3$ will be received in bulk pneumatic tanker with a sealed pneumatic transfer mechanism, unloaded into storage silo (121-S-9901) which will discharge to the BFB boiler and be controlled by filter (H2001-1C). The $NaHCO_3$ will then flow through the $NaHCO_3$ Vent Hoppers 121-S-9902 A/B and the Grinding Mills to the boiler (121-H-2001) by gravity at a rate of 100 lb/hr.

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

$NaHCO_3$ will be received and stored in storage silo 121-S-9901 and delivered to the boiler at a rate of 100 lb/hr to control emissions of acid gases such as HCl, $SO_2$, and $SO_3$.

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

No reactions. Emissions from $NaHCO_3$ handling consists of particulate matter only.

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

6. Combustion Data (if applicable):

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

n/a

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

n/a

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

n/a @ °F and psia.

(d) Percent excess air: n/a

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

n/a

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

n/a

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

7. Projected operating schedule:

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

| 8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: | | | |
|---|---|---|---|
| @ | | °F and | psia |
| a. | $NO_X$ | lb/hr | grains/ACF |
| b. | $SO_2$ | lb/hr | grains/ACF |
| c. | CO | lb/hr | grains/ACF |
| d. | $PM_{10}$ | lb/hr | grains/ACF |
| e. | Hydrocarbons | lb/hr | grains/ACF |
| f. | VOCs | lb/hr | grains/ACF |
| g. | Pb | lb/hr | grains/ACF |
| h. | Specify other(s) | | |
| | See emission calculations in Attachment N. | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |

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

(2) Complete the Emission Points Data Sheet.

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

| MONITORING | RECORDKEEPING |
|---|---|
| Monitor the amount of $NaHCO_3$ delivered to site. | |
| REPORTING | TESTING |
| | |

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

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

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

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

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

TBD

**Attachment L**
**EMISSIONS UNIT DATA SHEET**
**GENERAL**

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

Identification Number (as assigned on *Equipment List Form*): 121-CV-5001 A/B, 121-CV-5002 A/B, 121-S-1002, 121-CV-1004, 121 -S-5001, 121-CV-5003 A/B, 121-CV-5004 A/B)

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

   Bottom ash and sand handling operations - emissions from transferring bed ash (sand and bottom ash), loading and transferring fresh sand, and recycling of sand to the BFB boiler. All the conveyors will be equipped with covers or hoods. The Sand Receiving Hopper (121-S-1002) is open to the atmosphere. The Makeup Sand Silo (121-S-5001) will vent to the boiler and the particulate emissions will be controlled by the boiler PJFF. Loading of bottom ash into open air containers is not expected to generate emissions due to the size of the bottom ash particles.

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

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

   106.07 tons/hr of biomass will be combusted in the BFB. 250 lb/hr of recovered sand and 400 lbs/hr of fresh sand will be used to help fluidize the biomass and acts as a heat transfer medium in the BFB.

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

   One ton of bottom ash will be generated every hour.

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

   No reactions. Emissions from sand and bottom ash handling consists of particulate matter only.

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

6. Combustion Data (if applicable):

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

n/a

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

n/a

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

n/a @ °F and psia.

(d) Percent excess air: n/a

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

n/a

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

n/a

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

7. Projected operating schedule:

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

| 8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: | | | |
|---|---|---|---|
| @ | | °F and | psia |
| a. | $NO_X$ | lb/hr | grains/ACF |
| b. | $SO_2$ | lb/hr | grains/ACF |
| c. | CO | lb/hr | grains/ACF |
| d. | $PM_{10}$ | lb/hr | grains/ACF |
| e. | Hydrocarbons | lb/hr | grains/ACF |
| f. | VOCs | lb/hr | grains/ACF |
| g. | Pb | lb/hr | grains/ACF |
| h. | Specify other(s) | | |
| | See emission calculations in Attachment N. | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |

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

(2) Complete the Emission Points Data Sheet.

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

| MONITORING | RECORDKEEPING |
|---|---|
| Monitor the amount of sand delivered to the site and the amount of bottom ash generated by the BFB boiler. | Keep records for two years of the amount of sand delivered to the site and the amount of bottom ash generated by the BFB boiler. |
| REPORTING | TESTING |
| | |

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

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

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

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

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

TBD

**Attachment L**
**EMISSIONS UNIT DATA SHEET**
**GENERAL**

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

Identification Number (as assigned on *Equipment List Form*): 121-PKG-1001, 121-LS-1001/1002, 121-CV-1001, 121-CV-1002, CHIP-1, CHIP-2, 121-S-1001, 121-CV-1003, 121-CV-2001 A/B, 121-S-2001 A/B

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

Wood chip handling operations - emissions from unloading wood chips to controlled receiving hoppers (121-LS-1001 and 121-LS-1002 controlled by 121-PKG-1001), loading clean wood chips onto conveyors (121-CV-1001 and 121-CV-1002), storage (CHIP-1 & CHIP-2). loading wood chips from storage pile to wood chip feed hopper (121-S-1001), then via covered conveyors (121-CV-1003, 121-CV-2001 A, 121-CV-2001 B) to wood chip measuring bins (121-S-2001 A and 121-S-2001 B).

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

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

Wood chips will be received in trucks, unloaded into receiving hoppers (121-LS-1001 and 121-LS-1002) which will be controlled by baghouse (121-PKG-1001). Then the wood chips will be conveyed by two covered conveyors (121-CV-1001 and 121-CV-1002) to the storage pile (CHIP-1). From the storage pile the wood chips will be loaded to the wood chip feed hopper (121-S-1001) using front end loaders at a rate of 106.07 tons/hr (929146.92 tons/yr). From the wood chip feed hopper (121-S-1001), the wood chips will be transferred by covered conveyor belt (121-CV-1003) and screw conveyors (121-CV-2001 A and 121-CV-2001 B) to two biomass fuel metering bins (121-S-2001 A and 121-S-2001 B). From the metering bins, the wood chips will be sent to the boiler 121-H-2001.

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

106.07 tons/hr of clean wood chips with an average moisture content of 45% will be received, stored, and transferred to the boiler for use as fuel.

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

No reactions. Emissions from biomass handling consists of particulate matter only.

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

6. Combustion Data (if applicable):

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

n/a

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

n/a

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

n/a @ °F and psia.

(d) Percent excess air: n/a

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

n/a

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

n/a

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

7. Projected operating schedule:

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

| 8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: | | | |
|---|---|---|---|
| @ | | °F and | psia |
| a. | $NO_X$ | lb/hr | grains/ACF |
| b. | $SO_2$ | lb/hr | grains/ACF |
| c. | CO | lb/hr | grains/ACF |
| d. | $PM_{10}$ | lb/hr | grains/ACF |
| e. | Hydrocarbons | lb/hr | grains/ACF |
| f. | VOCs | lb/hr | grains/ACF |
| g. | Pb | lb/hr | grains/ACF |
| h. | Specify other(s) | | |
| | See emission calculations in Attachment N. | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |

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

(2) Complete the Emission Points Data Sheet.

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

| MONITORING | RECORDKEEPING |
|---|---|
| Monitor the amount of biomass brought into the facility on a monthly basis.<br>Monitor the moisture content of biomass on a weekly basis. | Record the amount of biomass brought into facility and the moisture content of biomass. |
| REPORTING | TESTING |
| | |

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

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

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

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

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

TBD

**Attachment L**
**EMISSIONS UNIT DATA SHEET**
**GENERAL**

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

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

   Wastewater Treatment Plant (127-PKG-0001)

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

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

   Wastewater 0.173 Mgal/hr

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

   Wastewater 0.173 Mgal/hr

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

   The following compounds will be emitted from the wastewater treatment process due to evaporation
   NH3
   H2SO4
   HCL

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

6. Combustion Data (if applicable):

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

NA

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

NA

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

@ °F and psia.

(d) Percent excess air:

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

NA

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

NA

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

7. Projected operating schedule:

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

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

@ °F and psia

| | | | |
|---|---|---|---|
| a. | $NO_X$ | lb/hr | grains/ACF |
| b. | $SO_2$ | lb/hr | grains/ACF |
| c. | CO | lb/hr | grains/ACF |
| d. | $PM_{10}$ | lb/hr | grains/ACF |
| e. | Hydrocarbons | lb/hr | grains/ACF |
| f. | VOCs | lb/hr | grains/ACF |
| g. | Pb | lb/hr | grains/ACF |
| h. | Specify other(s) | | |
| | NH3 | 0.51 lb/hr | grains/ACF |
| | H2SO4 | 0.64 lb/hr | grains/ACF |
| | HCL | 0.12 lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |

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

(2) Complete the Emission Points Data Sheet.

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

| MONITORING | RECORDKEEPING |
|---|---|
| REPORTING | TESTING |

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

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

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

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

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

TBD

## ATTACHMENT L – INTERNAL COMBUSTION ENGINE DATA SHEET

Complete this data sheet for each internal combustion engine at the facility. Include manufacturer performance data sheet(s) or any other supporting document if applicable. Use extra pages if necessary. *Generator(s) and microturbine generator(s) shall also use this form.*

| | | | |
|---|---|---|---|
| Emission Unit ID#[1] | 129-PKG-0001 | 129-P-9402 | |
| Engine Manufacturer/Model | TBD | TBD | |
| Manufacturers Rated bhp/rpm | 3,000 | 600 | |
| Source Status[2] | NS | NS | |
| Date Installed/ Modified/Removed/Relocated[3] | 2025 | 2025 | |
| Engine Manufactured /Reconstruction Date[4] | 2025 | 2025 | |
| Check all applicable Federal Rules for the engine (include EPA Certificate of Conformity if applicable)[5] | ☒40CFR60 Subpart JJJJ<br>☒JJJJ Certified?<br>☐40CFR60 Subpart IIII<br>☐IIII Certified?<br>☐40CFR63 Subpart ZZZZ<br>☐ NESHAP ZZZZ/ NSPS JJJJ Window<br>☐ NESHAP ZZZZ Remote Sources | ☐40CFR60 Subpart JJJJ<br>☐JJJJ Certified?<br>☒40CFR60 Subpart IIII<br>☒IIII Certified?<br>☐40CFR63 Subpart ZZZZ<br>☐ NESHAP ZZZZ/ NSPS JJJJ Window<br>☐ NESHAP ZZZZ Remote Sources | ☐40CFR60 Subpart JJJJ<br>☐JJJJ Certified?<br>☐40CFR60 Subpart IIII<br>☐IIII Certified?<br>☐40CFR63 Subpart ZZZZ<br>☐ NESHAP ZZZZ/ NSPS JJJJ Window<br>☐ NESHAP ZZZZ Remote Sources |
| Engine Type[6] | 4SLB | | |
| APCD Type[7] | | | |
| Fuel Type[8] | PQ | D | |
| $H_2S$ (gr/100 scf) | 0.25 | | |
| Operating bhp/rpm | 3000 | 600 | |
| BSFC (BTU/bhp-hr) | 6589 | 8084.64 | |
| Hourly Fuel Throughput | 18,808 $ft^3$/hr<br>gal/hr | $ft^3$/hr<br>35.90 gal/hr | $ft^3$/hr<br>gal/hr |
| Annual Fuel Throughput (Must use 8,760 hrs/yr unless emergency generator) | 1.88 $MMft^3$/yr<br>gal/yr | $MMft^3$/yr<br>3590 gal/yr | $MMft^3$/yr<br>gal/yr |
| Fuel Usage or Hours of Operation Metered | Yes ☒ No ☐ | Yes ☒ No ☐ | Yes ☐ No ☐ |

| **Calculation Methodology[9]** | **Pollutant[10]** | **Hourly PTE (lb/hr)[11]** | **Annual PTE (tons/year)[11]** | **Hourly PTE (lb/hr)[11]** | **Annual PTE (tons/year)[11]** | **Hourly PTE (lb/hr)[11]** | **Annual PTE (tons/year)[11]** |
|---|---|---|---|---|---|---|---|
| OT | $NO_x$ | 6.61 | 0.33 | 3.95 | 0.20 | | |
| OT | CO | 13.23 | 0.66 | 3.45 | 0.17 | | |
| OT | VOC | 5.67 | 0.28 | 3.95 | 0.20 | | |
| OT | $SO_2$ | 0.03 | 0.002 | 0.01 | < 0.01 | | |
| OT | $PM_{10}$ | 0.20 | 0.01 | 0.20 | 0.01 | | |
| AP | Formaldehyde | 1.04 | 0.05 | 0.006 | 0.0003 | | |
| AP | Total HAPs | 1.43 | 0.07 | 0.02 | 0.001 | | |
| | GHG ($CO_2e$) | | | | | | |

1 Enter the appropriate Source Identification Number for each natural gas-fueled reciprocating internal combustion compressor/generator engine located at the compressor station. Multiple compressor engines should be designated CE-1, CE-2, CE-3 etc. Generator engines should be designated GE-1, GE-2, GE-3 etc. Microturbine generator engines should be designated MT-1, MT-2, MT-3 etc. If more than three (3) engines exist, please use additional sheets.

2 Enter the Source Status using the following codes:

| | | | |
|---|---|---|---|
| NS | Construction of New Source (installation) | ES | Existing Source |
| MS | Modification of Existing Source | RS | Relocated Source |
| REM | Removal of Source | | |

3 Enter the date (or anticipated date) of the engine's installation (construction of source), modification, relocation or removal.

4 Enter the date that the engine was manufactured, modified or reconstructed.

5 Is the engine a certified stationary spark ignition internal combustion engine according to 40CFR60 Subpart IIII/JJJJ? If so, the engine and control device must be operated and maintained in accordance with the manufacturer's emission-related written instructions. You must keep records of conducted maintenance to demonstrate compliance, but no performance testing is required. If the certified engine is not operated and maintained in accordance with the manufacturer's emission-related written instructions, the engine will be considered a non-certified engine and you must demonstrate compliance as appropriate.

**Provide a manufacturer's data sheet for all engines being permitted.**

6 Enter the Engine Type designation(s) using the following codes:

| | | | |
|---|---|---|---|
| 2SLB | Two Stroke Lean Burn | 4SRB | Four Stroke Rich Burn |
| 4SLB | Four Stroke Lean Burn | | |

7 Enter the Air Pollution Control Device (APCD) type designation(s) using the following codes:

| | | | |
|---|---|---|---|
| A/F | Air/Fuel Ratio | IR | Ignition Retard |
| HEIS | High Energy Ignition System | SIPC | Screw-in Precombustion Chambers |
| PSC | Prestratified Charge | LEC | Low Emission Combustion |
| NSCR | Rich Burn & Non-Selective Catalytic Reduction | OxCat | Oxidation Catalyst |
| SCR | Lean Burn & Selective Catalytic Reduction | | |

8 Enter the Fuel Type using the following codes:

| | | | | | |
|---|---|---|---|---|---|
| PQ | Pipeline Quality Natural Gas | RG | Raw Natural Gas /Production Gas | D | Diesel |

9 Enter the Potential Emissions Data Reference designation using the following codes. Attach all reference data used.

| | | | | |
|---|---|---|---|---|
| MD | Manufacturer's Data | AP | AP-42 | |
| GR | GRI-HAPCalc™ | OT | Other 40 CFR 60 JJJJ / IIII | (please list) |

10 Enter each engine's Potential to Emit (PTE) for the listed regulated pollutants in pounds per hour and tons per year. PTE shall be calculated at manufacturer's rated brake horsepower and may reflect reduction efficiencies of listed Air Pollution Control Devices. Emergency generator engines may use 500 hours of operation when calculating PTE. PTE data from this data sheet shall be incorporated in the *Emissions Summary Sheet.*

11 PTE for engines shall be calculated from manufacturer's data unless unavailable.

**Attachment L: FUGITIVE EMISSIONS FROM PAVED HAULROADS**

| | | |
|---|---|---|
| s = | Surface material silt content (%) | 2.4 |

| Roadway Segment | Description | Mean Vehicle Weight (tons) | Miles Per Trip | Maximum Trips Per Hour | Maximum Trips Per Year | Vehicle Mile Travelled Per Hour (VTM/hr) | Vehicle Mile Travelled Per Year (VTM/yr) | Control Device ID Number | Control Efficiency (%) |
|---|---|---|---|---|---|---|---|---|---|
| PAVED | Paved Plant Road (Hourly) | 32.1 | 0.63 | 20.3 | - | 12.79 | - | NA | NA |
| PAVED | Paved Plant Road (Annual) | 25.5 | 0.63 | - | 39,055 | - | 24604.65 | NA | NA |
| | | | | | | | | | |
| | | | | | | | | | |

SUMMARY OF PAVED HAULROAD EMISSIONS

| | PM | | | | PM-10 | | | |
|---|---|---|---|---|---|---|---|---|
| | Uncontrolled | | Controlled | | Uncontrolled | | Controlled | |
| Roadway Segment | lb/hr | TPY | lb/hr | TPY | lb/hr | TPY | lb/hr | TPY |
| PAVED | 10.74 | 9.50 | - | - | 2.15 | 1.90 | - | - |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Note: Extraneous information unrelated to regulatory requirements and air emissions has been excluded from the application form.

## LEAK SOURCE DATA SHEET

| Source Category | Pollutant | Number of Source Components[1] | Number of Components Monitored by Frequency[2] | Average Time to Repair (days)[3] | Estimated Annual Emission Rate (lb/yr)[4] |
|---|---|---|---|---|---|
| Pumps[5] | light liquid VOC[6,7] | | | | |
| | heavy liquid VOC[8] | 13 | 0 | | 1,090 (EPA) |
| | Non-VOC[9] | 4 | 0 | | NH3: 192 (EPA) |
| Valves[10] | Gas VOC | 6 | 0 | | 81 (EPA) |
| | Light Liquid VOC | | | | |
| | Heavy Liquid VOC | 497 | 0 | | 1,092 (EPA) |
| | Non-VOC | 61 | 0 | | NH3: 1,184 (EPA) |
| Safety Relief Valves[11] | Gas VOC | 43 | 0 | | 41,130 (EPA) |
| | Non VOC | 9 | 0 | | NH3: 2,004 (EPA) |
| Open-ended Lines[12] | VOC | | | | |
| | Non-VOC | | | | |
| Sampling Connections[13] | VOC | | | | |
| | Non-VOC | | | | |
| Compressors | VOC | | | | |
| | Non-VOC | | | | |
| Flanges | VOC | 1,693 | 0 | | 29,526 (EPA) |
| | Non-VOC | 216 | 0 | | NH3: 1,904 (EPA) |
| Other | VOC | | | | |
| | Non-VOC | | | | |

[1 - 13] See notes on the following page.

## Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% w/w VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.

2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:

   Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)

   If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category “valves, gas service:” 0/50/0/75/0/50 (bimonthly).

3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.

4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); O - other method, such as in-house emission factor (specify).

5. Do not include in the equipment count sealless pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)

6. Volatile organic compounds (VOC) means the term as defined in 40 CFR □51.100 (s).

7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a light liquid.

8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a heavy liquid.

9. LIST CO, $H_2S$, mineral acids, NO, $NO_2$, $SO_3$, etc. DO NOT LIST $CO_2$, $H_2$, $H_2O$, $N_2$, $O_2$, and Noble Gases.

10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.

11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.

12 Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.

13. Do not include closed-purge sampling connections.

**Attachment L**
**EMISSIONS UNIT DATA SHEET**
**BULK LIQUID TRANSFER OPERATIONS**

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

Identification Number (as assigned on *Equipment List Form*): VOC-Amine-Load

1. Loading Area Name: Degraded Amine Truck Loadout

2. Type of cargo vessels accommodated at this rack or transfer point (check as many as apply):

☐ Drums ☐ Marine Vessels ☐ Rail Tank Cars ☒ Tank Trucks

3. Loading Rack or Transfer Point Data:

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

4. Does ballasting of marine vessels occur at this loading area?

☐ Yes ☐ No ☒ Does not apply

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

Vessels are cleaned at a remote service location and/or used for dedicated service.

6. Are cargo vessels pressure tested for leaks at this or any other location?

☐ Yes ☐ No

If YES, describe:

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

| Maximum | Jan. - Mar. | Apr. - June | July - Sept. | Oct. - Dec. |
|---|---|---|---|---|
| hours/day | 1 | 1 | 1 | 1 |
| days/week | 1 | 1 | 1 | 1 |

| | | | | |
|---|---|---|---|---|
| weeks/quarter | 4 | 4 | 4 | 4 |

| 8. Bulk Liquid Data *(add pages as necessary):* | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pump ID No. | | | | | | | |
| Liquid Name | | degraded amine | | | | | |
| Max. daily throughput (1000 gal/day) | | 6.3 | | | | | |
| Max. annual throughput (1000 gal/yr) | | 84 | | | | | |
| Loading Method [1] | | SUB | | | | | |
| Max. Fill Rate (gal/min) | | 105 | | | | | |
| Average Fill Time (min/loading) | | 60 | | | | | |
| Max. Bulk Liquid Temperature ($^{o}$F) | | 65.3 | | | | | |
| True Vapor Pressure [2] | | 0.00268 | | | | | |
| Cargo Vessel Condition [3] | | U | | | | | |
| Control Equipment or Method [4] | | | | | | | |
| Minimum control efficiency (%) | | | | | | | |
| Maximum Emission Rate | Loading (lb/hr) | 0.015 | | | | | |
| | Annual (lb/yr) | 0.2 | | | | | |
| Estimation Method [5] | | EPA | | | | | |

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

[2] At maximum bulk liquid temperature

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

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

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

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

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

| MONITORING | RECORDKEEPING |
|---|---|
| None proposed | Track daily and yearly throughput |
| REPORTING | TESTING |
| None proposed | None proposed |

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

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

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

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

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

Manufacturer's operating ranges and maintenance procedures will be followed as recommended upon selection/design of the system.

# Attachment L
## Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Control Device ID No. (must match List Form): H2001-1C, H2001-2C, H2001-3C, H2001-4C, H2001-5C

**Equipment Information**

| | |
|---|---|
| 1. Manufacturer: Babcock & Wilcox | 2. Model No.<br>Serial No. |
| 3. Number of units: 1 | 4. Use Generate steam to produce power |
| 5. Rated Boiler Horsepower: 28,203,179.60 hp | 6. Boiler Serial No.: |
| 7. Date constructed: 2025 | 8. Date of last modification and explain: NA |
| 9. Maximum design heat input per unit:<br>944 $\times 10^6$ BTU/hr | 10. Peak heat input per unit:<br>944 $\times 10^6$ BTU/hr |
| 11. Steam produced at maximum design output:<br>572,000 LB/hr<br>1710.3 psig | 12. Projected Operating Schedule:<br>Hours/Day 24<br>Days/Week 7<br>Weeks/Year 52 |
| 13. Type of firing equipment to be used:<br>☐ Pulverized coal<br>☐ Spreader stoker<br>☐ Oil burners<br>☐ Natural Gas Burner<br>☒ Others, specify Biomass (Clean Wood Chips) | 14. Proposed type of burners and orientation:<br>☐ Vertical<br>☐ Front Wall<br>☐ Opposed<br>☐ Tangential<br>☐ Others, specify |
| 15. Type of draft: ☐ Forced ☐ Induced | 16. Percent of ash retained in furnace: % |
| 17. Will flyash be reinjected? ☐ Yes ☒ No | 18. Percent of carbon in flyash: % |

**Stack or Vent Data**

| | |
|---|---|
| 19. Inside diameter or dimensions: 11.5 ft. | 20. Gas exit temperature: 104 °F |
| 21. Height: 200 ft. | 22. Stack serves:<br>☒ This equipment only<br>☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent) |
| 23. Gas flow rate: 252,874 $ft^3$/min | |
| 24. Estimated percent of moisture: 4.43 wt. % | |

**Fuel Requirements**

| 25. | Type | Fuel Oil No. | Natural Gas | Gas (other, specify) | Coal, Type: | Other: |
|---|---|---|---|---|---|---|
| | **Quantity** (at Design Output) | gph@60°F | Startup: 171,265 $ft^3$/hr | $ft^3$/hr | TPH | Biomass: 106.07 ton/hr |
| | **Annually** | $\times 10^3$ gal | 1.71 $\times 10^6$ $ft^3$/hr | $\times 10^6$ $ft^3$/hr | tons | 929146.92 ton/yr |
| | **Sulfur** | Maximum: wt. % Average: wt. % | 0.59 gr/100 $ft^3$ | gr/100 $ft^3$ | Maximum: wt. % | 0.01 wt. % |
| | **Ash (%)** | | | | Maximum | 5.27 wt. % |
| | **BTU Content** | BTU/Gal. Lbs/Gal.@60°F | 1051 BTU/$ft^3$ | BTU/$ft^3$ | BTU/lb | 4,450 BTU/lb |
| | **Source** | | | | | |
| | **Supplier** | | | | | |
| | **Halogens** (Yes/No) | | | | | |
| | **List and Identify Metals** | | | | | |

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

27. Gas burner manufacture:

28. Oil burner manufacture:

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

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °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:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: Refer to Attachment N lb/hr

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

**Coal Characteristics**

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

**Emissions Stream**

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

| Pollutant | Pounds per Hour lb/hr | grain/ACF | @ °F | PSIA |
|---|---|---|---|---|
| CO | | | | |
| Hydrocarbons | | | | |
| $NO_x$ | | | | |
| Pb | | | | |
| $PM_{10}$ | | | | |
| $SO_2$ | | | | |
| VOCs | | | | |
| Other (specify) | | | | |
| | | | | |
| | | | | |
| | | | | |

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

| Pollutant | Pounds per Hour lb/hr | grain/ACF | @ °F | PSIA |
|---|---|---|---|---|
| CO | 10.20 | | | |
| Hydrocarbons | | | | |
| $NO_x$ | 20.20 | | | |
| Pb | 0.05 | | | |
| $PM_{10}$ | 15.54 | | | |
| $SO_2$ | 11.58 | | | |
| VOCs | 1.89 | | | |
| Other (specify) NH3 | 2.01 | | | |
| H2SO4 | 6.35 | | | |
| HCl | 1.18 | | | |
| Total HAPs | 5.40 | | | |

39. How will waste material from the process and control equipment be disposed of?
The waste material from the control equipment will be trucked off-site for disposal. The waste water from the process such as boiler blowdown, DCCPS blowdown, cooling tower blowdown, and reject from the raw water and demineralized water treatment system will be fed to a wastewater treatment unit. The fly ash and bottom ash produced by the bolier will be trucked off-site for disposal.

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit. Yes

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.

CEMS will be installed to monitor NOx and CO2 per 40 CFR 60 Subpart Db and the acid rain program requirements. A bag-leak detection system will be used to monitor the performance of the fabric filter (baghouse) according to most current requirements in 40 CFR 60.48Da.

**TESTING PLAN:** Please describe any proposed emissions testing for this process equipment or air pollution control device.

The boiler will be tested within 60 days after achieving maximum output and no later than 180 days after commencing operation.

**RECORDKEEPING:** Please describe the proposed recordkeeping that will accompany the monitoring.

Follow the recordkeeping requirements in 40 CFR 60 Subpart Db and the acid rain program.

**REPORTING:** Please describe the proposed frequency of reporting of the recordkeeping.

Follow the reporting requirements in 40 CFR 60 Subpart Db and the acid rain program.

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

# Attachment L
# EMISSIONS UNIT DATA SHEET
# STORAGE TANKS

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

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

## I. GENERAL INFORMATION (required)

| | |
|---|---|
| 1. Bulk Storage Area Name | 2. Tank Name<br>Amine Makeup Tank |
| 3. Tank Equipment Identification No. (as assigned on *Equipment List Form*)<br>122-TK-9902 | 4. Emission Point Identification No. (as assigned on *Equipment List Form*)<br>122-TK-9902 |
| 5. Date of Commencement of Construction (for existing tanks) n/a | |
| 6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification | |
| 7. Description of Tank Modification (if applicable)<br>n/a | |
| 7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No | |
| 7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).<br>n/a | |
| 7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):<br>n/a | |

## II. TANK INFORMATION (required)

| | |
|---|---|
| 8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.<br>max 8812 gal | |
| 9A. Tank Internal Diameter (ft)<br>10 | 9B. Tank Internal Height (or Length) (ft)<br>15 |
| 10A. Maximum Liquid Height (ft)<br>12 | 10B. Average Liquid Height (ft)<br>6 |
| 11A. Maximum Vapor Space Height (ft)<br>14.10 | 11B. Average Vapor Space Height (ft)<br>9.10 |
| 12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.<br>7050 gal | |

| 13A. Maximum annual throughput (gal/yr) | 13B. Maximum daily throughput (gal/day) |
|---|---|
| 21,378 | 7049.7 |

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 3.03

15. Maximum tank fill rate (gal/min): 165

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

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

| 17A. Volume Expansion Capacity of System (gal) | 17B. Number of transfers into system per year |
|---|---|
| | |

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

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

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

| 20A. Shell Color White | 20B. Roof Color White | 20C. Year Last Painted |
|---|---|---|

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

22A. Is the tank heated? ☒ YES ☐ NO

22B. If YES, provide the operating temperature (°F): 50

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

23. Operating Pressure Range (psig): -0.03 to 0.03

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

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

24B. For cone roof, provide slope (ft/ft): 0.0625

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

25A. Year Internal Floaters Installed:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

| STUB DRAIN |
|---|
| 1-INCH DIAMETER: |

| OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY) |
|---|
| |

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

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

| | |
|---|---|
| 27. Provide the city and state on which the data in this section are based.<br>Huntington, WV | |
| 28. Daily Average Ambient Temperature (°F) | 55.75 |
| 29. Annual Average Maximum Temperature (°F) | 65.3 |
| 30. Annual Average Minimum Temperature (°F) | 46.2 |
| 31. Average Wind Speed (miles/hr) | 5.6 |
| 32. Annual Average Solar Insulation Factor (BTU/($ft^2$·day)) | 1250 |
| 33. Atmospheric Pressure (psia) | 14.26 |

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

| | | | |
|---|---|---|---|
| 34. Average daily temperature range of bulk liquid: 0 | | | |
| 34A. Minimum (°F) 50 | | 34B. Maximum (°F) 50 | |
| 35. Average operating pressure range of tank: 0.06 | | | |
| 35A. Minimum (psig) -0.03 | | 35B. Maximum (psig) 0.03 | |
| 36A. Minimum Liquid Surface Temperature (°F)<br>50 | | 36B. Corresponding Vapor Pressure (psia)<br>0.15 | |
| 37A. Average Liquid Surface Temperature (°F)<br>50 | | 37B. Corresponding Vapor Pressure (psia)<br>0.15 | |
| 38A. Maximum Liquid Surface Temperature (°F)<br>50 | | 38B. Corresponding Vapor Pressure (psia)<br>0.15 | |
| 39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary. | | | |
| 39A. Material Name or Composition | MEA/MDEA | | |
| 39B. CAS Number | 141-43-5/105-59-9 | | |
| 39C. Liquid Density (lb/gal) | 8.46 | | |
| 39D. Liquid Molecular Weight (lb/lb-mole) | 28.80 | | |
| 39E. Vapor Molecular Weight (lb/lb-mole) | 18.06 | | |

| | | | |
|---|---|---|---|
| Maximum Vapor Pressure<br>39F. True (psia)<br>39G. Reid (psia) | 0.15<br>n/a | | |
| Months Storage per Year<br>39H. From<br>39I. To | January to December | | |

**VI. EMISSIONS AND CONTROL DEVICE DATA** (required)

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

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

[1] Complete appropriate Air Pollution Control Device Sheet.

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

| Material Name & CAS No. | Breathing Loss (lb/hr) | Working Loss Amount | Working Loss Units | Annual Loss (lb/yr) | Estimation Method[1] |
|---|---|---|---|---|---|
| MEA/141-43-5 | < 0.01 | < 0.01 | lb/hr | 0.004 | EPA |
| MDEA/105-59-9 | < 0.01 | < 0.01 | lb/hr | 0.001 | EPA |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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

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

# Attachment L
# EMISSIONS UNIT DATA SHEET
# STORAGE TANKS

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

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

## I. GENERAL INFORMATION (required)

| | |
|---|---|
| 1. Bulk Storage Area Name | 2. Tank Name<br>Lean Amine Tank |
| 3. Tank Equipment Identification No. (as assigned on *Equipment List Form*)<br>122-TK-9901 | 4. Emission Point Identification No. (as assigned on *Equipment List Form*)<br>122-TK-9901 |
| 5. Date of Commencement of Construction (for existing tanks) n/a | |
| 6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification | |
| 7. Description of Tank Modification (if applicable)<br>n/a | |
| 7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No | |
| 7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).<br>n/a | |
| 7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):<br>n/a | |

## II. TANK INFORMATION (required)

| | |
|---|---|
| 8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.<br>max 375,986 gal | |
| 9A. Tank Internal Diameter (ft)<br>40 | 9B. Tank Internal Height (or Length) (ft)<br>40 |
| 10A. Maximum Liquid Height (ft)<br>32 | 10B. Average Liquid Height (ft)<br>16 |
| 11A. Maximum Vapor Space Height (ft)<br>38.42 | 11B. Average Vapor Space Height (ft)<br>24.42 |
| 12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.<br>300,789 gal | |

| 13A. Maximum annual throughput (gal/yr) | 13B. Maximum daily throughput (gal/day) |
|---|---|
| 322,166 | 300,788.6 |

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume): 1.07

15. Maximum tank fill rate (gal/min): 816.9

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

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

| 17A. Volume Expansion Capacity of System (gal) | 17B. Number of transfers into system per year |
|---|---|
| | |

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

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

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

| 20A. Shell Color White | 20B. Roof Color White | 20C. Year Last Painted |
|---|---|---|

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

22A. Is the tank heated? ☒ YES ☐ NO

22B. If YES, provide the operating temperature (°F): 50

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

23. Operating Pressure Range (psig): -0.03 to 0.03

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

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

24B. For cone roof, provide slope (ft/ft): 0.0625

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

25A. Year Internal Floaters Installed:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

| STUB DRAIN |
|---|
| 1-INCH DIAMETER: |

| OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY) |
|---|
| |

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

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

| | |
|---|---|
| 27. Provide the city and state on which the data in this section are based.<br>Huntington, WV | |
| 28. Daily Average Ambient Temperature (°F) | 55.75 |
| 29. Annual Average Maximum Temperature (°F) | 65.3 |
| 30. Annual Average Minimum Temperature (°F) | 46.2 |
| 31. Average Wind Speed (miles/hr) | 5.6 |
| 32. Annual Average Solar Insulation Factor (BTU/($ft^2$·day)) | 1250 |
| 33. Atmospheric Pressure (psia) | 14.26 |

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

| | | | |
|---|---|---|---|
| 34. Average daily temperature range of bulk liquid: 0 | | | |
| 34A. Minimum (°F) 50 | | 34B. Maximum (°F) 50 | |
| 35. Average operating pressure range of tank: 0.06 | | | |
| 35A. Minimum (psig) -0.03 | | 35B. Maximum (psig) 0.03 | |
| 36A. Minimum Liquid Surface Temperature (°F)<br>50 | | 36B. Corresponding Vapor Pressure (psia)<br>0.15 | |
| 37A. Average Liquid Surface Temperature (°F)<br>50 | | 37B. Corresponding Vapor Pressure (psia)<br>0.15 | |
| 38A. Maximum Liquid Surface Temperature (°F)<br>50 | | 38B. Corresponding Vapor Pressure (psia)<br>0.15 | |
| 39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary. | | | |
| 39A. Material Name or Composition | MEA/MDEA | | |
| 39B. CAS Number | 141-43-5/105-59-9 | | |
| 39C. Liquid Density (lb/gal) | 8.46 | | |
| 39D. Liquid Molecular Weight (lb/lb-mole) | 28.80 | | |
| 39E. Vapor Molecular Weight (lb/lb-mole) | 18.06 | | |

| | | | |
|---|---|---|---|
| Maximum Vapor Pressure<br>39F. True (psia)<br>39G. Reid (psia) | 0.15<br>n/a | | |
| Months Storage per Year<br>39H. From<br>39I. To | January to December | | |

**VI. EMISSIONS AND CONTROL DEVICE DATA** (required)

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

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

[1] Complete appropriate Air Pollution Control Device Sheet.

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

| Material Name & CAS No. | Breathing Loss (lb/hr) | Working Loss Amount | Working Loss Units | Annual Loss (lb/yr) | Estimation Method[1] |
|---|---|---|---|---|---|
| MEA/141-43-5 | < 0.01 | 0.01 | lb/hr | 0.05 | EPA |
| MDEA/105-59-9 | < 0.01 | < 0.01 | lb/hr | 0.01 | EPA |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

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

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

**Attachment L**
**EMISSIONS UNIT DATA SHEET**
**GENERAL**

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

Identification Number (as assigned on *Equipment List Form*): 121-CV-4001 A/B, 121-CV-4002, 121-CV-4003, 121-CV-4004, 121-CV-4005, 121-CV-4006 A/B, 121-CV-4007 A/B, 121-S-4001 A/B, 121-TL-0001

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

Fly ash handling operations - emissions from loading fly ash onto conveyors (121-CV-4001 A/B through 121-CV-4007 A/B) and into fly ash storage silos (121-S-4001 A/B) as well as from loading fly ash from the storage silos into trucks through telescoping chutes extending into the trucks (121-TL-0001).

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

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

4.5 tons of fly ash and 3.3 tons of economizer ash will be produced every hour. Due to the addition of water, 8.6 tons of wet ash need to be transported by truck to off-site for disposal.

The amount of fly ash / economizer ash handled by each conveyor is shown in Table N-6 in Attachment N.

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

4.5 tons/hr of fly ash and 3.3 tons of economizer ash will be generated, stored, and conveyed to the fly ash storage silos. 8.6 tons/hr of wet ash will be trucked offsite for disposal.

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

No reactions. Emissions from fly ash handling and truck loading consists of particulate matter only.

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

6. Combustion Data (if applicable):

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

n/a

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

n/a

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

n/a @ °F and psia.

(d) Percent excess air: n/a

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

n/a

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

n/a

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

7. Projected operating schedule:

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

| 8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: | | | |
|---|---|---|---|
| @ | | °F and | psia |
| a. | $NO_X$ | lb/hr | grains/ACF |
| b. | $SO_2$ | lb/hr | grains/ACF |
| c. | CO | lb/hr | grains/ACF |
| d. | $PM_{10}$ | lb/hr | grains/ACF |
| e. | Hydrocarbons | lb/hr | grains/ACF |
| f. | VOCs | lb/hr | grains/ACF |
| g. | Pb | lb/hr | grains/ACF |
| h. | Specify other(s) | | |
| | See emission calculations in Attachment N. | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |
| | | lb/hr | grains/ACF |

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

(2) Complete the Emission Points Data Sheet.

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

| MONITORING | RECORDKEEPING |
|---|---|
| Monitor the amount of ash generated and trucked offsite for disposal. | |
| REPORTING | TESTING |
| | |

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

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

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

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

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

TBD

**Attachment M: Air Pollution Control Device Sheets (Baghouse, SCR, CO Oxidation Catalyst, Injection of Caustic to Control $SO_X$, Dry Sorbent Injection System, etc)**

# Attachment M
# Air Pollution Control Device Sheet
(BAGHOUSE)

Control Device ID No. (must match Emission Units Table): 121-F-4001 A and 121-F-4001 B

**Equipment Information and Filter Characteristics**

1. Manufacturer: TBD
   Model No. TBD

2. Total number of compartments: TBD

3. Number of compartment online for normal operation: TBD

4. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

5. Baghouse Configuration: (check one)
   ☐ Open Pressure ☐ Closed Pressure ☐ Closed Suction
   ☐ Electrostatically Enhanced Fabric
   ☐ Other, Specify

6. Filter Fabric Bag Material:
   ☐ Nomex nylon ☐ Wool
   ☐ Polyester ☐ Polypropylene
   ☐ Acrylics ☐ Ceramics
   ☐ Fiber Glass
   ☐ Cotton Weight oz./sq.yd
   ☐ Teflon Thickness in
   ☐ Others, specify

7. Bag Dimension:
   Diameter in.
   Length ft.

8. Total cloth area: $ft^2$

9. Number of bags:

10. Operating air to cloth ratio: ft/min

11. Baghouse Operation: ☒ Continuous ☐ Automatic ☐ Intermittent

12. Method used to clean bags:
   ☐ Mechanical Shaker ☐ Sonic Cleaning ☐ Reverse Air Jet
   ☐ Pneumatic Shaker ☐ Reverse Air Flow ☐ Other:
   ☐ Bag Collapse ☒ Pulse Jet
   ☐ Manual Cleaning ☐ Reverse Jet

13. Cleaning initiated by:
   ☒ Timer ☐ Frequency if timer actuated
   ☐ Expected pressure drop range in. of water ☐ Other

14. Operation Hours: Max. per day: 24
    Max. per yr: 8760

15. Collection efficiency: Rating: %
    Guaranteed minimum: 99 %

**Gas Stream Characteristics**

16. Gas flow rate into the collector: ACFM at °F and PSIA
    ACFM: Design: PSIA Maximum: PSIA Average Expected: PSIA

17. Water Vapor Content of Effluent Stream: lb. Water/lb. Dry Air

18. Gas Stream Temperature: °F

19. Fan Requirements: hp
    OR $ft^3$/min

20. Stabilized static pressure loss across baghouse. Pressure Drop: High in. $H_2O$
    Low in. $H_2O$

21. Particulate Loading: Inlet: grain/scf Outlet: grain/scf

22. Type of Pollutant(s) to be collected (if particulate give specific type):

PM, $PM_{10}$, $PM_{2.5}$

23. Is there any $SO_3$ in the emission stream? ☐ No ☒ Yes $SO_3$ content: 2 ppmv

24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:

| | IN | | OUT | |
|---|---|---|---|---|
| **Pollutant** | **lb/hr** | **grains/acf** | **lb/hr** | **grains/acf** |
| Filterable PM | | | 0.02 | |
| Filterable $PM_{10}$ | | | 0.01 | |

25. Complete the table:

| | **Particle Size Distribution at Inlet to Collector** | **Fraction Efficiency of Collector** |
|---|---|---|
| **Particulate Size Range (microns)** | **Weight % for Size Range** | **Weight % for Size Range** |
| 0 – 2 | | |
| 2 – 4 | | |
| 4 – 6 | | |
| 6 – 8 | | |
| 8 – 10 | | |
| 10 – 12 | | |
| 12 – 16 | | |
| 16 – 20 | | |
| 20 – 30 | | |
| 30 – 40 | | |
| 40 – 50 | | |
| 50 – 60 | | |
| 60 – 70 | | |
| 70 – 80 | | |
| 80 – 90 | | |
| 90 – 100 | | |
| >100 | | |

26. How is filter monitored for indications of deterioration (e.g., broken bags)?
- ☐ Continuous Opacity
- ☒ Pressure Drop
- ☐ Alarms-Audible to Process Operator
- ☐ Visual opacity readings, Frequency:
- ☐ Other, specify:

27. Describe any recording device and frequency of log entries:
TBD

28. Describe any filter seeding being performed:
TBD

29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
TBD

30. Describe the collection material disposal system:
Each fly ash storage silo will be equipped with a pulse jet filter to minimize PM emissions from the storage silo. When the filter is cleaned with pulse air, the captured particles will fall into the silo. The fly ash in the storage silo will be mixed with utility water in pug mills and then trucked off site. The fly ash will have a minimum moisture content of 10 wt% when loaded into trucks.

31. Have you included ***Baghouse Control Device*** in the Emissions Points Data Summary Sheet? Yes

32. **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:<br>Pressure drop | RECORDKEEPING:<br>Pressure drop |
| REPORTING:<br>Pressure drop | TESTING: |

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

33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

    99% for filterable PM as measured by EPA Method 5B.

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

    TBD

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

# Attachment M
# Air Pollution Control Device Sheet
(BAGHOUSE)

Control Device ID No. (must match Emission Units Table): 121-F-9902 A and 121-F-9902 B

**Equipment Information and Filter Characteristics**

1. Manufacturer: TBD
   Model No. TBD

2. Total number of compartments: TBD

3. Number of compartment online for normal operation: TBD

4. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

5. Baghouse Configuration: (check one)
   ☐ Open Pressure ☐ Closed Pressure ☐ Closed Suction
   ☐ Electrostatically Enhanced Fabric
   ☐ Other, Specify

6. Filter Fabric Bag Material:
   ☐ Nomex nylon ☐ Wool
   ☐ Polyester ☐ Polypropylene
   ☐ Acrylics ☐ Ceramics
   ☐ Fiber Glass
   ☐ Cotton Weight oz./sq.yd
   ☐ Teflon Thickness in
   ☐ Others, specify

7. Bag Dimension:
   Diameter in.
   Length ft.

8. Total cloth area: $ft^2$

9. Number of bags:

10. Operating air to cloth ratio: ft/min

11. Baghouse Operation: ☒ Continuous ☐ Automatic ☐ Intermittent

12. Method used to clean bags:
   ☐ Mechanical Shaker ☐ Sonic Cleaning ☐ Reverse Air Jet
   ☐ Pneumatic Shaker ☐ Reverse Air Flow ☐ Other:
   ☐ Bag Collapse ☒ Pulse Jet
   ☐ Manual Cleaning ☐ Reverse Jet

13. Cleaning initiated by:
   ☒ Timer ☐ Frequency if timer actuated
   ☐ Expected pressure drop range in. of water ☐ Other

14. Operation Hours: Max. per day: 24
    Max. per yr: 8760

15. Collection efficiency: Rating: %
    Guaranteed minimum: 90 %

**Gas Stream Characteristics**

16. Gas flow rate into the collector: ACFM at °F and PSIA
    ACFM: Design: PSIA Maximum: PSIA Average Expected: PSIA

17. Water Vapor Content of Effluent Stream: lb. Water/lb. Dry Air

18. Gas Stream Temperature: °F

19. Fan Requirements: hp
    OR $ft^3$/min

20. Stabilized static pressure loss across baghouse. Pressure Drop: High in. $H_2O$
    Low in. $H_2O$

21. Particulate Loading: Inlet: grain/scf Outlet: grain/scf

22. Type of Pollutant(s) to be collected (if particulate give specific type):

PM, $PM_{10}$, $PM_{2.5}$

23. Is there any $SO_3$ in the emission stream? ☐ No ☒ Yes $SO_3$ content: 2 ppmv

24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:

| | IN | | OUT | |
|---|---|---|---|---|
| **Pollutant** | **lb/hr** | **grains/acf** | **lb/hr** | **grains/acf** |
| Filterable PM | | | 0.0002 | |
| Filterable $PM_{10}/PM_{2.5}$ | | | 0.0001 | |

25. Complete the table:

| | Particle Size Distribution at Inlet to Collector | Fraction Efficiency of Collector |
|---|---|---|
| **Particulate Size Range (microns)** | **Weight % for Size Range** | **Weight % for Size Range** |
| 0 – 2 | | |
| 2 – 4 | | |
| 4 – 6 | | |
| 6 – 8 | | |
| 8 – 10 | | |
| 10 – 12 | | |
| 12 – 16 | | |
| 16 – 20 | | |
| 20 – 30 | | |
| 30 – 40 | | |
| 40 – 50 | | |
| 50 – 60 | | |
| 60 – 70 | | |
| 70 – 80 | | |
| 80 – 90 | | |
| 90 – 100 | | |
| >100 | | |

26. How is filter monitored for indications of deterioration (e.g., broken bags)?
- ☐ Continuous Opacity
- ☒ Pressure Drop
- ☐ Alarms-Audible to Process Operator
- ☐ Visual opacity readings, Frequency:
- ☐ Other, specify:

27. Describe any recording device and frequency of log entries:
TBD

28. Describe any filter seeding being performed:
TBD

29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
TBD

30. Describe the collection material disposal system:
Each $NaHCO_3$ Vent Hopper will be equipped with a pulse jet filter to minimize PM emissions from the hopper. The filter will be located on top of the hopper. When the filter is cleaned with pulse air, the captured particles will fall into the hopper.

31. Have you included ***Baghouse Control Device*** in the Emissions Points Data Summary Sheet? Yes

32. **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:<br>Pressure drop | RECORDKEEPING:<br>Pressure drop |
| REPORTING:<br>Pressure drop | TESTING: |

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

33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

    90% for filterable PM as measured by EPA Method 5B.

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

    TBD

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

# Attachment M
# Air Pollution Control Device Sheet
(BAGHOUSE)

Control Device ID No. (must match Emission Units Table): 121-PKG-1001

**Equipment Information and Filter Characteristics**

1. Manufacturer: TBD
   Model No. TBD

2. Total number of compartments: TBD

3. Number of compartment online for normal operation: TBD

4. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

5. Baghouse Configuration: (check one)
   ☐ Open Pressure ☐ Closed Pressure ☐ Closed Suction
   ☐ Electrostatically Enhanced Fabric
   ☐ Other, Specify

6. Filter Fabric Bag Material:
   ☐ Nomex nylon ☐ Wool
   ☐ Polyester ☐ Polypropylene
   ☐ Acrylics ☐ Ceramics
   ☐ Fiber Glass
   ☐ Cotton Weight oz./sq.yd
   ☐ Teflon Thickness in
   ☐ Others, specify

7. Bag Dimension:
   Diameter in.
   Length ft.

8. Total cloth area: $ft^2$

9. Number of bags:

10. Operating air to cloth ratio: ft/min

11. Baghouse Operation: ☒ Continuous ☐ Automatic ☐ Intermittent

12. Method used to clean bags:
   ☐ Mechanical Shaker ☐ Sonic Cleaning ☐ Reverse Air Jet
   ☐ Pneumatic Shaker ☐ Reverse Air Flow ☐ Other:
   ☐ Bag Collapse ☒ Pulse Jet
   ☐ Manual Cleaning ☐ Reverse Jet

13. Cleaning initiated by:
   ☐ Timer ☐ Frequency if timer actuated
   ☐ Expected pressure drop range in. of water ☐ Other

14. Operation Hours: Max. per day: 24
    Max. per yr: 8760

15. Collection efficiency: Rating: %
    Guaranteed minimum: 99.9 %

**Gas Stream Characteristics**

16. Gas flow rate into the collector: ACFM at °F and PSIA
    ACFM: Design: PSIA Maximum: PSIA Average Expected: PSIA

17. Water Vapor Content of Effluent Stream: lb. Water/lb. Dry Air

18. Gas Stream Temperature: °F

19. Fan Requirements: hp
    OR
    $ft^3$/min

20. Stabilized static pressure loss across baghouse. Pressure Drop: High in. $H_2O$
    Low in. $H_2O$

21. Particulate Loading: Inlet: grain/scf Outlet: 0.01 grain/scf

22. Type of Pollutant(s) to be collected (if particulate give specific type):

PM, $PM_{10}$, $PM_{2.5}$

23. Is there any $SO_3$ in the emission stream? ☐ No ☐ Yes $SO_3$ content: ppmv

24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:

| | IN | | OUT | |
|---|---|---|---|---|
| **Pollutant** | **lb/hr** | **grains/acf** | **lb/hr** | **grains/acf** |
| Filterable PM | | | 1.08 | |
| Filterable $PM_{10}/PM_{2.5}$ | | | 1.08 | |

25. Complete the table:

| | **Particle Size Distribution at Inlet to Collector** | **Fraction Efficiency of Collector** |
|---|---|---|
| **Particulate Size Range (microns)** | **Weight % for Size Range** | **Weight % for Size Range** |
| 0 – 2 | | |
| 2 – 4 | | |
| 4 – 6 | | |
| 6 – 8 | | |
| 8 – 10 | | |
| 10 – 12 | | |
| 12 – 16 | | |
| 16 – 20 | | |
| 20 – 30 | | |
| 30 – 40 | | |
| 40 – 50 | | |
| 50 – 60 | | |
| 60 – 70 | | |
| 70 – 80 | | |
| 80 – 90 | | |
| 90 – 100 | | |
| >100 | | |

26. How is filter monitored for indications of deterioration (e.g., broken bags)?
- ☐ Continuous Opacity
- ☒ Pressure Drop
- ☐ Alarms-Audible to Process Operator
- ☐ Visual opacity readings, Frequency:
- ☐ Other, specify:

27. Describe any recording device and frequency of log entries:
TBD

28. Describe any filter seeding being performed:
TBD

29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
TBD

30. Describe the collection material disposal system:
TBD

31. Have you included ***Baghouse Control Device*** in the Emissions Points Data Summary Sheet? Yes

32. **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:<br>Pressure drop | RECORDKEEPING:<br>Pressure drop |
| REPORTING:<br>Pressure drop | TESTING:<br>Stack testing (initial and subsequent testing as required) |

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

33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

99.9% for PM with a diameter < 2.5 microns.

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

TBD

35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
TBD.
The final design has not been completed. Operating ranges and maintenance procedures will be determined during the final design. The operating and maintenance procedures provided by the vendor will be followed.

# Attachment M
# Air Pollution Control Device Sheet
(BAGHOUSE)

Control Device ID No. (must match Emission Units Table): H2001-1C

**Equipment Information and Filter Characteristics**

1. Manufacturer: TBD
   Model No. TBD

2. Total number of compartments: TBD

3. Number of compartment online for normal operation: TBD

4. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

5. Baghouse Configuration: (check one)
   ☐ Open Pressure ☐ Closed Pressure ☒ Closed Suction
   ☐ Electrostatically Enhanced Fabric
   ☐ Other, Specify

6. Filter Fabric Bag Material:
   ☐ Nomex nylon ☐ Wool
   ☐ Polyester ☐ Polypropylene
   ☐ Acrylics ☐ Ceramics
   ☐ Fiber Glass
   ☐ Cotton Weight oz./sq.yd
   ☐ Teflon Thickness in
   ☐ Others, specify

7. Bag Dimension:
   Diameter in.
   Length ft.

8. Total cloth area: $ft^2$

9. Number of bags:

10. Operating air to cloth ratio: ft/min

11. Baghouse Operation: ☒ Continuous ☐ Automatic ☐ Intermittent

12. Method used to clean bags:
   ☐ Mechanical Shaker ☐ Sonic Cleaning ☐ Reverse Air Jet
   ☐ Pneumatic Shaker ☐ Reverse Air Flow ☐ Other:
   ☐ Bag Collapse ☒ Pulse Jet
   ☐ Manual Cleaning ☐ Reverse Jet

13. Cleaning initiated by:
   ☒ Timer ☐ Frequency if timer actuated
   ☐ Expected pressure drop range in. of water ☐ Other

14. Operation Hours: Max. per day: 24
    Max. per yr: 8760

15. Collection efficiency: Rating: %
    Guaranteed minimum: 99.9 %

**Gas Stream Characteristics**

16. Gas flow rate into the collector: ACFM at °F and PSIA
    ACFM: Design: PSIA Maximum: PSIA Average Expected: PSIA

17. Water Vapor Content of Effluent Stream: lb. Water/lb. Dry Air

18. Gas Stream Temperature: °F

19. Fan Requirements: hp
    OR
    $ft^3$/min

20. Stabilized static pressure loss across baghouse. Pressure Drop: High in. $H_2O$
    Low in. $H_2O$

21. Particulate Loading: Inlet: grain/scf Outlet: 0.0042 grain/scf

22. Type of Pollutant(s) to be collected (if particulate give specific type):

PM, $PM_{10}$, $PM_{2.5}$

23. Is there any $SO_3$ in the emission stream? ☐ No ☒ Yes $SO_3$ content: 2 ppmv

24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:

| | IN | | OUT | |
|---|---|---|---|---|
| **Pollutant** | **lb/hr** | **grains/acf** | **lb/hr** | **grains/acf** |
| Filterable $PM/PM_{10}/PM_{2.5}$ | | | 7.99 | |
| | | | | |

25. Complete the table:

| | **Particle Size Distribution at Inlet to Collector** | **Fraction Efficiency of Collector** |
|---|---|---|
| **Particulate Size Range (microns)** | **Weight % for Size Range** | **Weight % for Size Range** |
| 0 – 2 | | |
| 2 – 4 | | |
| 4 – 6 | | |
| 6 – 8 | | |
| 8 – 10 | | |
| 10 – 12 | | |
| 12 – 16 | | |
| 16 – 20 | | |
| 20 – 30 | | |
| 30 – 40 | | |
| 40 – 50 | | |
| 50 – 60 | | |
| 60 – 70 | | |
| 70 – 80 | | |
| 80 – 90 | | |
| 90 – 100 | | |
| >100 | | |

26. How is filter monitored for indications of deterioration (e.g., broken bags)?
- ☐ Continuous Opacity
- ☒ Pressure Drop
- ☐ Alarms-Audible to Process Operator
- ☐ Visual opacity readings, Frequency:
- ☐ Other, specify:

27. Describe any recording device and frequency of log entries:
TBD

28. Describe any filter seeding being performed:
Pre-coating of the filter bags is required before initial startup or whenever the bags are replaced.

29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
TBD

30. Describe the collection material disposal system:
Pulse jet cleaning discharges the captured fly ash into fly ash hoppers. Then the fly ash will be transferred to two ash storage silos (121-S-4001 A/B) via two PJFF Ash Collection Drag Chain Conveyors (121-CV-4001 A/B), two PJFF Ash Collection Surge Bins (121-S-4002 A/B), a PJFF Ash Transport Drag Chain Conveyor (121-CV-4003), an Ash Bucket Elevator (121-CV-4004), and an Ash Distribution Drag Chain Conveyor (121-CV-4005). Each fly ash storage silo will be equipped with a pulse jet filter to minimize PM from the storage silo. When a sufficient volume has been collected, the fly ash will be mixed with utility water in pug mills and then trucked off site. The fly ash will have a minimum moisture content of 10 wt% when loaded into trucks. The chute used to dispense fly ash into the truck will be designed to minimize PM emissions.

31. Have you included ***Baghouse Control Device*** in the Emissions Points Data Summary Sheet? Yes

32. **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:<br>Pressure drop | RECORDKEEPING:<br>Pressure drop |
| REPORTING:<br>Pressure drop | TESTING:<br>Stack testing (initial and subsequent testing as required) |

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

33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

    99.9% for filterable PM as measured by EPA Method 5B.

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

    TBD

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

# Attachment M
# Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): H2001-2C, H2001-3C, H2001-4C, H2001-5C

**Equipment Information**

| | |
|---|---|
| 1. Manufacturer: TBD<br>Model No. TBD | 2. Control Device Name: SCR, OxyCat, Wet FGD, DSI<br>Type: TBD |
| 3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency. | |
| 4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device. | |
| 5. Provide a scale diagram of the control device showing internal construction. | |
| 6. Submit a schematic and diagram with dimensions and flow rates. | |
| 7. Guaranteed minimum collection efficiency for each pollutant collected: 92% for SCR, 90% for OxyCat, 63% for Wet FGD, 97.2% for DSI | |
| 8. Attached efficiency curve and/or other efficiency information. | |
| 9. Design inlet volume: SCFM | 10. Capacity: |
| 11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any. | |
| 12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment. | |
| 13. Description of method of handling the collected material(s) for reuse of disposal. | |

**Gas Stream Characteristics**

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

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

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

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

| Pollutant | IN Pollutant | | Emission Capture Efficiency % | OUT Pollutant | | Control Efficiency % |
|---|---|---|---|---|---|---|
| | lb/hr | grains/acf | | lb/hr | grains/acf | |
| A NOx | | | 100 | 20.20 | | 92% |
| B CO | | | 100 | 10.20 | | 90% |
| C VOC | | | 100 | 1.89 | | 60% |
| D SO2 | | | 100 | 11.58 | | 63% |
| E HCl | | | 100 | 1.18 | | 97.2% |

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

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

**Particulate Distribution**

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

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

28. Describe the collection material disposal system:

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

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

| | |
|---|---|
| MONITORING: see the EUDS for the BFB | RECORDKEEPING: see the EUDS for the BFB |
| REPORTING: see the EUDS for the BFB | TESTING: see the EUDS for the BFB |

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

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

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

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
The final design has not been completed. Operating ranges and maintenance procedures will be determined during the final design. The operating and maintenance procedures provided by the vendor will be followed.

**Attachment N: Supporting Emission Calculations**

# MGS CNP 1, LLC Biomass Fired Power Plant Initial Minor NSR Application Emission Calculations Summary

| Emission ID | $NO_x$ | | CO | | PM | | $PM_{10}$ | | $PM_{2.5}$ | | PM- Filterable | | $PM_{10}$ - Filterable | | $PM_{2.5}$ - Filterable | | VOC | | $SO_2$ | | $NH_3$ | | $H_2SO_4$ | | Pb | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr | lb/hr | Tons/Yr |
| **121-H-2001** | 20.20 | 90.42 | 10.20 | 45.65 | 15.54 | 67.83 | 15.54 | 67.83 | 15.54 | 67.83 | 7.99 | 34.87 | 7.99 | 34.87 | 7.99 | 34.87 | 4.43 | 18.33 | 11.58 | 50.78 | 5.09 | 20.98 | 6.35 | 27.86 | 0.05 | 0.20 |
| **129-P-9402** | 3.95 | 0.20 | 3.45 | 0.17 | 0.20 | <0.01 | 0.20 | <0.01 | 0.20 | <0.01 | 0.20 | <0.01 | 0.20 | <0.01 | 0.20 | <0.01 | 3.95 | 0.20 | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- |
| **129-PKG-0001** | 6.61 | 0.33 | 13.23 | 0.66 | 0.20 | <0.01 | 0.20 | <0.01 | 0.20 | <0.01 | 0.20 | <0.01 | 0.20 | <0.01 | 0.20 | <0.01 | 5.67 | 0.28 | 0.03 | <0.01 | -- | -- | -- | -- | -- | -- |
| **127-PKG-0001** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.51 | 2.10 | 0.64 | 2.79 | -- | -- |
| **121-LS-1001 / 121-LS-1002** | -- | -- | -- | -- | 1.08 | 4.72 | 1.08 | 4.72 | 1.08 | 4.72 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-1001** | -- | -- | -- | -- | 0.06 | 0.19 | 0.03 | 0.09 | <0.01 | 0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-1002** | -- | -- | -- | -- | 0.06 | | 0.03 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **CHIP-1** | -- | -- | -- | -- | 0.11 | 0.37 | 0.05 | 0.18 | <0.01 | 0.03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-S-1001** | -- | -- | -- | -- | 0.11 | 0.37 | 0.05 | 0.18 | <0.01 | 0.03 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-1003** | -- | -- | -- | -- | 0.06 | 0.19 | 0.03 | 0.09 | <0.01 | 0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-2001 A** | -- | -- | -- | -- | 0.06 | 0.19 | 0.03 | 0.09 | <0.01 | 0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-2001 B** | -- | -- | -- | -- | 0.06 | | 0.03 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-S-2001 A** | -- | -- | -- | -- | 0.06 | 0.19 | 0.03 | 0.09 | <0.01 | 0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-S-2001 B** | -- | -- | -- | -- | 0.06 | | 0.03 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **CHIP-2** | -- | -- | -- | -- | -- | 0.21 | -- | 0.11 | -- | 0.02 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4001 A** | -- | -- | -- | -- | 0.54 | 1.79 | 0.25 | 0.85 | 0.04 | 0.13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4001 B** | -- | -- | -- | -- | 0.54 | | 0.25 | | 0.04 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4002** | -- | -- | -- | -- | 0.54 | 1.79 | 0.25 | 0.85 | 0.04 | 0.13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4003** | -- | -- | -- | -- | 0.54 | 1.79 | 0.25 | 0.85 | 0.04 | 0.13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4004** | -- | -- | -- | -- | 0.54 | 1.79 | 0.25 | 0.85 | 0.04 | 0.13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4005** | -- | -- | -- | -- | 0.54 | 1.79 | 0.25 | 0.85 | 0.04 | 0.13 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4006 A** | -- | -- | -- | -- | 0.39 | 1.31 | 0.19 | 0.62 | 0.03 | 0.09 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4006 B** | -- | -- | -- | -- | 0.39 | | 0.19 | | 0.03 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4007 A** | -- | -- | -- | -- | 0.39 | 1.31 | 0.19 | 0.62 | 0.03 | 0.09 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-4007 B** | -- | -- | -- | -- | 0.39 | | 0.19 | | 0.03 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-S-4001 A** | -- | -- | -- | -- | 0.02 | 0.06 | <0.01 | 0.03 | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-S-4001 B** | -- | -- | -- | -- | 0.02 | | <0.01 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-TL-0001** | -- | -- | -- | -- | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-5001 A** | -- | -- | -- | -- | <0.01 | 0.02 | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-5001 B** | -- | -- | -- | -- | <0.01 | | <0.01 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-5002A** | -- | -- | -- | -- | <0.01 | 0.02 | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-5002B** | -- | -- | -- | -- | <0.01 | | <0.01 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-S-1002** | -- | -- | -- | -- | 0.35 | <0.01 | 0.17 | <0.01 | 0.17 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-1004** | -- | -- | -- | -- | 0.17 | <0.01 | 0.08 | <0.01 | 0.08 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-5003 A** | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-5003 B** | -- | -- | -- | -- | <0.01 | | <0.01 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-5004 A** | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-CV-5004 B** | -- | -- | -- | -- | <0.01 | | <0.01 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-S-9902 A** | -- | -- | -- | -- | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-S-9902 B** | -- | -- | -- | -- | <0.01 | | <0.01 | | <0.01 | | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **121-X-9901 A / 121-X-9901 B** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **129-CT-9301** | -- | -- | -- | -- | 2.02 | 3.01 | 1.48 | 2.52 | 0.67 | 1.26 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **PM-PlantRd** | -- | -- | -- | -- | 10.74 | 9.50 | 2.15 | 1.90 | 0.53 | 0.47 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **129-TK-9402** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| **122-TK-9902** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | <0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- |
| **122-TK-9901** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- |
| **BECCS-FUG** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 8.32 | 36.46 | -- | -- | 0.60 | 2.64 | -- | -- | -- | -- |
| **VOC - Amine -LOAD** | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.01 | <0.01 | -- | -- | -- | -- | -- | -- | -- | -- |
| **Totals:** | **30.76** | **90.95** | **26.88** | **46.48** | **35.76** | **98.51** | **23.48** | **83.35** | **18.86** | **75.28** | **8.38** | **34.89** | **8.38** | **34.89** | **8.38** | **34.89** | **22.40** | **55.27** | **11.62** | **50.78** | **6.20** | **25.72** | **6.99** | **30.65** | **0.05** | **0.20** |

| MGS CNP 1, LLC Biomass Fired Power Plant Initial Minor NSR Application Emission Calculations HAPs Summary | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Emission ID** | **Total HAPs** | | **Acetaldehyde** | | **Acrolein** | | **Benzene** | | **Formaldehyde** | | **HCl** | | **Styrene** | | **Toluene** | |
| | **lb/hr** | **Tons/Yr** | **lb/hr** | **Tons/Yr** | **lb/hr** | **Tons/Yr** | **lb/hr** | **Tons/Yr** | **lb/hr** | **Tons/Yr** | **lb/hr** | **Tons/Yr** | **lb/hr** | **Tons/Yr** | **lb/hr** | **Tons/Yr** |
| **121-H-2001** | 5.43 | 23.36 | -- | 8.14 | -- | 1.95 | -- | 2.05 | -- | 2.56 | 1.18 | 5.65 | -- | 0.93 | -- | 0.45 |
| **129-P-9402** | 0.02 | <0.01 | -- | <0.01 | -- | <0.01 | -- | <0.01 | -- | <0.01 | -- | -- | -- | -- | -- | <0.01 |
| **129-PKG-0001** | 1.43 | 0.07 | -- | <0.01 | -- | <0.01 | -- | <0.01 | -- | 0.05 | -- | -- | -- | <0.01 | -- | <0.01 |
| **127-PKG-0001** | 0.12 | 0.57 | -- | -- | -- | -- | -- | -- | -- | -- | 0.12 | 0.57 | -- | -- | -- | -- |
| **Totals:** | **6.99** | **24.00** | **<0.01** | **8.15** | **<0.01** | **1.96** | **<0.01** | **2.05** | **<0.01** | **2.61** | **1.30** | **6.22** | **<0.01** | **0.93** | **<0.01** | **0.45** |

**MGS CNP 1, LLC**
**Biomass Fired Power Plant**
**Initial Minor NSR Application**
**Emission Calculations**

| Date: | NSR Air Permit Initian Application | Permit No.: |
|---|---|---|
| Area Name: | Biomass Energy Power Plant | |

**AIR CONTAMINANT DATA**

| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
|---|---|---|---|---|---|
| Emission Unit (A) | Emission Point (B) | Name (C) | | (lbs/hr) (A) | (tons/yr) (B) |
| 121-H-2001 | 121-PKG-3001<br>122-T-1001 | Wood Chip Fired Fluidized Bed Boiler | NOx | 20.20 | 90.42 |
| | | | CO | 10.20 | 45.65 |
| | | | PM- Filterable | 7.99 | 34.87 |
| | | | PM10 - Filterable | 7.99 | 34.87 |
| | | | PM2.5 - Filterable | 7.99 | 34.87 |
| | | | PM | 15.54 | 67.83 |
| | | | PM10 | 15.54 | 67.83 |
| | | | PM2.5 | 15.54 | 67.83 |
| | | | VOC | 4.43 | 18.33 |
| | | | SO2 | 11.58 | 50.78 |
| | | | NH3 | 5.09 | 20.98 |
| | | | H2SO4 | 6.35 | 27.86 |
| | | | Pb | 0.05 | 0.20 |
| | | | HCl | 1.18 | 5.65 |
| | | | Total HAPs | 5.43 | 23.36 |
| 121-H-2001 | 121-PKG-3001 | Wood Chip Fired Fluidized Bed Boiler Startup + Normal Operation without CCU | NOx | - | 10.26 |
| | | | CO | - | 5.17 |
| | | | PM - Filterable | - | 3.16 |
| | | | PM10 - Filterable | - | 3.16 |
| | | | PM2.5 - Filterable | - | 3.16 |
| | | | PM | - | 6.16 |
| | | | PM10 | - | 6.16 |
| | | | PM2.5 | - | 6.16 |
| | | | VOC | - | 0.74 |
| | | | SO2 | - | 4.82 |
| | | | NH3 | - | 0.77 |
| | | | H2SO4 | - | 2.65 |
| | | | Pb | - | 0.02 |
| | | | HCl | - | 0.97 |
| | | | Total HAPs | - | 1.83 |
| 121-H-2001 | 122-T-1001 | Wood Chip Fired Fluidized Bed Boiler Normal Operation (with CCU) | NOx | - | 80.16 |
| | | | CO | - | 40.48 |
| | | | PM | - | 61.68 |
| | | | PM10 | - | 61.68 |
| | | | PM2.5 | - | 61.68 |
| | | | PM- Filterable | - | 31.71 |
| | | | PM10 - Filterable | - | 31.71 |
| | | | PM2.5 - Filterable | - | 31.71 |
| | | | VOC | - | 17.59 |
| | | | SO2 | - | 45.96 |
| | | | NH3 | - | 20.21 |
| | | | H2SO4 | - | 25.21 |
| | | | Pb | - | 0.18 |
| | | | HCl | - | 4.68 |
| | | | Total HAPs | - | 21.53 |
| 121-LS-1001 / 121-LS-1002 | 121-PKG-1001 | Biomass Unloading Baghouse | PM | 1.08 | 4.72 |
| | | | PM10 | 1.08 | 4.72 |
| | | | PM2.5 | 1.08 | 4.72 |
| 121-CV-1001 | 121-CV-1001 | Conveyor #1 from Biomass Receiving Hopper 1001 to Storage Pile | PM | 0.06 | - |
| | | | PM10 | 0.03 | - |
| | | | PM2.5 | 0.00 | - |

**MGS CNP 1, LLC**
**Biomass Fired Power Plant**
**Initial Minor NSR Application**
**Emission Calculations**

| | | |
|---|---|---|
| Date: | NSR Air Permit Initian Application | Permit No.: |
| Area Name: | Biomass Energy Power Plant | |

**AIR CONTAMINANT DATA**

| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
|---|---|---|---|---|---|
| Emission Unit (A) | Emission Point (B) | Name (C) | | (lbs/hr) (A) | (tons/yr) (B) |
| 121-CV-1002 | 121-CV-1002 | Conveyor #2 from Biomass Receiving Hopper 1002 to Storage Pile | PM | 0.06 | - |
| | | | PM10 | 0.03 | - |
| | | | PM2.5 | 0.00 | - |
| 121-CV-1001 / 121-CV-1002 | 121-CV-1001 / 121-CV-1002 | Conveyors from Biomass Receiving Hoppers to Storage Pile | PM | - | 0.19 |
| | | | PM10 | - | 0.09 |
| | | | PM2.5 | - | 0.01 |
| CHIP-1 | Biomass Storage Pile Loading Fugitives | Biomass Storage Pile Loading Fugitives | PM | 0.11 | 0.37 |
| | | | PM10 | 0.05 | 0.18 |
| | | | PM2.5 | 0.01 | 0.03 |
| 121-S-1001 | 121-S-1001 | Biomass Feed Hopper | PM | 0.11 | 0.37 |
| | | | PM10 | 0.05 | 0.18 |
| | | | PM2.5 | 0.01 | 0.03 |
| 121-CV-1003 | 121-CV-1003 | Conveyor from Feed Hopper to 121-CV-2001 A/B | PM | 0.06 | 0.19 |
| | | | PM10 | 0.03 | 0.09 |
| | | | PM2.5 | 0.00 | 0.01 |
| 121-CV-2001 A | 121-CV-2001 A | Screw Conveyor from 121-CV-1003 to Biomass Fuel Metering Bin 121-S-2001 A | PM | 0.06 | - |
| | | | PM10 | 0.03 | - |
| | | | PM2.5 | 0.00 | - |
| 121-CV-2001 B | 121-CV-2001 B | Screw Conveyor from 121-CV-1003 to Biomass Fuel Metering Bin 121-S-2001 B | PM | 0.06 | - |
| | | | PM10 | 0.03 | - |
| | | | PM2.5 | 0.00 | - |
| 121-CV-2001 A / 121-CV-2001 B | 121-CV-2001 A / 121-CV-2001 B | Conveyors from 121-CV-1003 to Biomass Fuel Metering Bins 121-CV-2001 A/B | PM | - | 0.19 |
| | | | PM10 | - | 0.09 |
| | | | PM2.5 | - | 0.01 |
| 121-S-2001 A | 121-S-2001 A | Biomass Fuel Metering Bin A | PM | 0.06 | - |
| | | | PM10 | 0.03 | - |
| | | | PM2.5 | 0.004 | - |
| 121-S-2001 B | 121-S-2001 B | Biomass Fuel Metering Bin B | PM | 0.06 | - |
| | | | PM10 | 0.03 | - |
| | | | PM2.5 | 0.00 | - |
| 121-S-2001 A / 121-S-2001 B | 121-S-2001 A / 121-S-2001 B | Biomass Fuel Measuring Bin A / Biomass Fuel Measuring Bin B | PM | - | 0.19 |
| | | | PM10 | - | 0.09 |
| | | | PM2.5 | - | 0.01 |
| CHIP-2 | CHIP-2 | Wood Chips Storage Pile Wind Erosion | PM | -- | 0.21 |
| | | | PM10 | -- | 0.11 |
| | | | PM2.5 | -- | 0.02 |
| 121-CV-4001 A | 121-CV-4001 A | PJFF Ash Collection Drag Chain Conveyor A (From boiler hopper to surge bin A) | PM | 0.54 | - |
| | | | PM10 | 0.25 | - |
| | | | PM2.5 | 0.04 | - |
| 121-CV-4001 B | 121-CV-4001 B | PJFF Ash Collection Drag Chain Conveyor B (from boiler hopper to surge bin B) | PM | 0.54 | - |
| | | | PM10 | 0.25 | - |
| | | | PM2.5 | 0.04 | - |
| 121-CV-4001 A / 121-CV-4001 B | 121-CV-4001 A / 121-CV-4001 B | PJFF Ash Collecting Drag Chain Conveyors (from boiler hopper to surge bins) | PM | - | 1.79 |
| | | | PM10 | - | 0.85 |
| | | | PM2.5 | - | 0.13 |
| 121-CV-4002 | 121-CV-4002 | PJFF Ash Transport Drag Chain Conveyor (From Surge Bins #1 and #2 to PJFF Ash Transfer Drag Chain Conveyor) | PM | 0.54 | 1.79 |
| | | | PM10 | 0.25 | 0.85 |
| | | | PM2.5 | 0.04 | 0.13 |
| 121-CV-4003 | 121-CV-4003 | PJFF Ash Transfer Drag Chain Conveyor (to Ash Bucket Elevator) | PM | 0.54 | 1.79 |
| | | | PM10 | 0.25 | 0.85 |
| | | | PM2.5 | 0.04 | 0.13 |
| 121-CV-4004 | 121-CV-4004 | Ash Bucket Elevator | PM | 0.54 | 1.79 |
| | | | PM10 | 0.25 | 0.85 |
| | | | PM2.5 | 0.04 | 0.13 |

**MGS CNP 1, LLC**
**Biomass Fired Power Plant**
**Initial Minor NSR Application**
**Emission Calculations**

| Date: | NSR Air Permit Initian Application | Permit No.: |
|---|---|---|
| Area Name: | Biomass Energy Power Plant | |

**AIR CONTAMINANT DATA**

| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
|---|---|---|---|---|---|
| Emission Unit (A) | Emission Point (B) | Name (C) | | (lbs/hr) (A) | (tons/yr) (B) |
| 121-CV-1004 | 121-CV-1004 | Inclined Sand Hopper Conveyor | PM | 0.17 | 0.003 |
| | | | PM10 | 0.08 | 0.001 |
| | | | PM2.5 | 0.08 | 0.001 |
| 121-CV-5003 A | 121-CV-5003 A | Transfer Conveyor A (Recycled Sand) (From Vibrating Screener A to Sand Bucket Elevator A) | PM | 0.0004 | - |
| | | | PM10 | 0.0002 | - |
| | | | PM2.5 | 0.0002 | - |
| 121-CV-5003 B | 121-CV-5003 B | Transfer Conveyor B (Recycled Sand) (From Vibrating Screener B to Sand Bucket Elevator B) | PM | 0.0004 | - |
| | | | PM10 | 0.0002 | - |
| | | | PM2.5 | 0.0002 | - |
| 121-CV-5003 A / 121-CV-5003 B | 121-CV-5003 A / 121-CV-5003 B | Transfer Conveyors (Recycled Sand) | PM | - | 0.0019 |
| | | | PM10 | - | 0.0009 |
| | | | PM2.5 | - | 0.0009 |
| 121-CV-5004 A | 121-CV-5004 A | Sand Bucket Elevator A (Recycled Sand + Fresh Sand) | PM | 0.0011 | - |
| | | | PM10 | 0.0005 | - |
| | | | PM2.5 | 0.0005 | - |
| 121-CV-5004 B | 121-CV-5004 B | Sand Bucket Elevator B (Recycled Sand + Fresh Sand) | PM | 0.0011 | - |
| | | | PM10 | 0.0005 | - |
| | | | PM2.5 | 0.0005 | - |
| 121-CV-5004 A / 121-CV-5004 B | 121-CV-5004 A / 121-CV-5004 B | Sand Bucket Elevators | PM | - | 0.0049 |
| | | | PM10 | - | 0.0023 |
| | | | PM2.5 | - | 0.0023 |
| 121-S-9902 A | 121-F-9902 A | Sodium Bicarbonate Vent Hopper A | PM | 1.95E-04 | - |
| | | | PM10 | 7.50E-05 | - |
| | | | PM2.5 | 7.50E-05 | - |
| 121-S-9902 B | 121-F-9902 B | Sodium Bicarbonate Vent Hopper B | PM | 1.95E-04 | - |
| | | | PM10 | 7.50E-05 | - |
| | | | PM2.5 | 7.50E-05 | - |
| 121-S-9902 A; 121-S-9902 B | 121-F-9902A; 121-F-9902 B | Sodium Bicarbonate Vent Hoppers | PM | - | 8.54E-04 |
| | | | PM10 | - | 3.29E-04 |
| | | | PM2.5 | - | 3.29E-04 |
| 129-CT-9301 | 129-CT-9301 | Cooling Tower | PM | 2.02 | 3.01 |
| | | | PM10 | 1.48 | 2.52 |
| | | | PM2.5 | 0.67 | 1.26 |
| PM-PlantRd | PM-PlantRd | Truck Road Fugitive Particulate Emissions | PM | 10.74 | 9.50 |
| | | | PM10 | 2.15 | 1.90 |
| | | | PM2.5 | 0.53 | 0.47 |
| 129-TK-9402 | 129-TK-9402 | Diesel Tank | VOC | 0.07 | 0.0003 |
| 122-TK-9902 | 122-TK-9902 | Amine Makeup Tank | VOC | 0.0014 | 0.000002 |
| 122-TK-9901 | 122-TK-9901 | Lean Amine Tank | VOC | 0.0100 | 0.00003 |

**MGS CNP 1, LLC**
**Biomass Fired Power Plant**
**Initial Minor NSR Application**
**Emission Calculations**

| | | |
|---|---|---|
| Date: | NSR Air Permit Initian Application | Permit No.: |
| Area Name: | Biomass Energy Power Plant | |

**AIR CONTAMINANT DATA**

| 1. Emission Point | | | 2. Component or Air Contaminant Name | 3. Air Contaminant Emission Rate | |
|---|---|---|---|---|---|
| Emission Unit (A) | Emission Point (B) | Name (C) | | (lbs/hr) (A) | (tons/yr) (B) |
| 129-P-9402 | 129-P-9402 | Fire Water Pump | NOx | 3.95 | 0.20 |
| | | | CO | 3.45 | 0.17 |
| | | | PM | 0.20 | 0.01 |
| | | | PM10 | 0.20 | 0.01 |
| | | | PM2.5 | 0.20 | 0.01 |
| | | | VOC | 3.95 | 0.20 |
| | | | SO2 | 0.01 | 0.00 |
| | | | Total HAPs | 0.02 | 0.00 |
| 129-PKG-0001 | 129-PKG-0001 | NG Startup Generator | NOx | 6.61 | 0.331 |
| | | | CO | 13.23 | 0.661 |
| | | | PM | 0.20 | 0.010 |
| | | | PM10 | 0.20 | 0.010 |
| | | | PM2.5 | 0.20 | 0.010 |
| | | | VOC | 5.67 | 0.284 |
| | | | SO2 | 0.03 | 0.002 |
| | | | Total HAPs | 1.43 | 0.07 |
| BECCS-FUG | BECCS-FUG | BECCS Plant Equipment Leaks | VOC | 8.32 | 36.46 |
| | | | NH3 | 0.60 | 2.64 |
| VOC - Amine -LOAD | VOC - Amine -LOAD | Truck Loadout of Degraded Amine | VOC | 0.015 | 0.0001 |
| 127-PKG-0000 | 127-PKG-0000 | Wastewater Treatment Plant | NH3 | 0.51 | 2.098 |
| | | | H2SO4 | 0.64 | 2.786 |
| | | | HCl2 | 0.12 | 0.565 |

**List of Tables in Attachment N - Emission Calculations**

Table N-1 Bubbling Fluidized Bed Boiler
MGS CNP 1, LLC

| **Source Name:** | Wood Chip Fired Fluidized Bed Boiler | **EPN:** | 121-PKG-3001; 122-T-1001 | |
|---|---|---|---|---|
| **Proposed MAERT Limits** | | **Date:** | 2/5/2025 | |
| **FIN** | **EPN** | **Air Contaminant** | **lbs/hr [1]** | **tpy** |
| 121-H-2001 | 121-PKG-3001<br>122-T-1001 | NOx | 20.20 | 90.42 |
| | | CO | 10.20 | 45.65 |
| | | PM- Filterable | 7.99 | 34.87 |
| | | PM10 - Filterable | 7.99 | 34.87 |
| | | PM2.5 - Filterable | 7.99 | 34.87 |
| | | PM | 15.54 | 67.83 |
| | | PM10 | 15.54 | 67.83 |
| | | PM2.5 | 15.54 | 67.83 |
| | | VOC | 4.43 | 18.33 |
| | | SO2 | 11.58 | 50.78 |
| | | NH3 | 5.09 | 20.98 |
| | | H2SO4 | 6.35 | 27.86 |
| | | Pb | 0.05 | 0.20 |
| | | HCl | 1.18 | 5.65 |
| | | HAPs | 5.43 | 23.36 |

[1] hourly emission rate is the emission rate under normal operating conditions.

**Process Description:**

Emissions from the boiler result from combustion of clean wood products. Emissions from the boiler are controlled by the following equipment:

-Pulse Jet Fabric Filter to control PM/PM10/PM2.5

-Selective Catalytic Reduction unit fed with aqueous ammonia to control NOx

-CO Oxidation Catalyst to control CO

-Injection of Caustic to Control SOx (Wet Flue Gas Desulfurization)

-Dry Sorbent injection system injects Sodium Bicarbonate (NaHCO3) into the flue gas to control HCl and H2SO4

**Bases and Factors:**

Factors are based on Vendor's Guarantee. The emission calculations are based on emission factors provided by the boiler supplier.

The carbon capture unit will capture 95% of the CO2 in the boiler flue gas. It is assumed that the carbon capture unit will not reduce the $NO_X$, CO and VOC emissions from boiler combustion.

into the atmosphere along with the CO2-depleted gas stream. These emissions are added to those from boiler combustion to arrive at total emissions of these compounds.

Emissions of these compounds are estimated based on the best information currently available.

Since the flue gas temperature after the CCCU is close to the ambient air temperature, it is assumed that no condensable particulate matter will be formed in the flue gas after the CCU.

Pounds per Hour Emissions:

Max Emissions (lb/hr) = Emission Factor (lb/MMBtu) x Boiler Max Heat Input (MMBtu/hr)

Tons per Year Emissions:

Max Emissions (tpy) = [Max Emissions (lbs/hr) x Annual Operating Hours (hr/yr)] / 2,000 (lbs/ton)

**Emission Calculations**

| | | | |
|---|---|---|---|
| Ideal Gas Law Constant R: | 0.73024 | $atm.ft^3.lbmol^{-1}.°R^{-1}$ | |
| Volume of 1 lbmol gas @ 1.04 atm and 104 °F | 396.04 | ft3/lbmol | |
| Volume of 1 lbmol gas @ 1 atm and 32 °F: | 359.04 | ft3/lbmol | |
| 1 hour: | 60.00 | min | |
| Gas Temperature | 104.00 | °F | |
| Gas Pressure | 16.00 | inwg | |
| Gas Pressure | 1.04 | atm, absolute | 1 atm = 406.78 in H2O |
| Total Mass Flow | 1,036,759 | lb/hr | |
| CO2 | 210,734 | lb/hr | |
| H2O | 45,945 | lb/hr | |
| O2 | 54,236 | lb/hr | |
| Water Vapor Volumetric Flow before CCU | 16829.40 | acfm | |
| Dry Flue Gas Volumetric Flow before CCU | 213,814.19 | acfm, dry | |
| Wet Flue Gas Volumetric Flow before CCU | 230,643.59 | acfm, wet | |
| Wet Flue Gas Volumetric Flow before CCU | 220,995.00 | scfm, wet | |
| CO2 Removal Efficiency | 95% | | |
| Wet Flue Gas Flow after CCU | 835,337.00 | lb/hr | |
| MW of the Wet Flue Gas after CCU | 27.38 | lb/lbmol | |
| Wet Flue Gas Volumetric Flow after CCU | 310,179.62 | Nm3/hr | |

**Data:**

| | | |
|---|---|---|
| Boiler Maximum Heat Input: | 944 | MMBtu/hr |
| Annual Operating Hours: | 8760 | hours/year |
| Startup Hours per Year: | 55 | hours/yr |
| Startup Hours + CCU Out of Service | 823 | hours/yr |
| Maximum Heat Input from NG during Startup: | 180 | MMBtu/hr |
| Average Heat Input from NG during Startup: | 131.1 | MMBtu/hr |
| Duration of NG Combustion during each Startup: | 10 | hours |
| Average Heat Input from NG + Biomass during Startup: | 414.3 | MMBtu/hr |

Table N-1 Bubbling Fluidized Bed Boiler
MGS CNP 1, LLC

**Emissions from Boiler Combustion**

| Pollutant | Normal Operation Emission Factor | Normal Operation Emission Factor | Note | Normal Operation (Hourly Maximum) | Normal Operation (Annual) | Startup Emission Factor | Note | Startup Annual Total | Annual Total |
|---|---|---|---|---|---|---|---|---|---|
| | ppmvd | lb/MMBtu | | lb/hr | tpy | lb/MMBtu | | tpy | tpy |
| NOx | 13.55 | 0.021 | SCR<br>Vendor's guarantee | 20.20 | 87.92 | - | Vendor's Guarantee | 2.50 | 90.42 |
| CO | 11.24 | 0.011 | CO Catalyst<br>Vendor's guarantee | 10.20 | 44.40 | - | Vendor's Guarantee | 1.25 | 45.65 |
| PM - Filterable only (with CCU) | - | 0.0085 | Pulse Jet Fabric Filter<br>Vendor's guarantee | 7.99 | 31.71 | - | See note 7 | - | 34.87 |
| PM - Filterable only (startup + without CCU) | - | 0.0085 | Pulse Jet Fabric Filter<br>Vendor's guarantee | 7.99 | 3.07 | 0.0085 | Vendor's Guarantee | 0.10 | |
| PM - Total [1] (with CCU) | - | 0.0165 | See Note 1 | 15.54 | 61.68 | - | Vendor's Guarantee for filterable PM + adjusted AP-42 emission factor for condensable PM | | 67.83 |
| PM - Total [1] (startup + without CCU) | - | 0.0165 | See Note 1 | 15.54 | 5.97 | 0.0165 | | 0.19 | |
| PM10 - Filterable only (with CCU) | - | 0.0085 | Vendor's guarantee | 7.99 | 31.71 | - | See note 7 | - | 34.87 |
| PM10 - Filterable only (startup + without CCU) | - | 0.0085 | Vendor's guarantee | 7.99 | 3.07 | 0.0085 | Vendor's Guarantee | 0.10 | |
| PM10 - Total [1] (with CCU) | - | 0.0165 | See Note 1 | 15.54 | 61.68 | - | Vendor's Guarantee for filterable PM + adjusted AP-42 emission factor for condensable PM | | 67.83 |
| PM10 - Total [1] (startup + without CCU) | - | 0.0165 | See Note 1 | 15.54 | 5.97 | 0.0165 | | 0.19 | |
| PM2.5 - Filterable only (with CCU) | - | 0.0085 | Vendor's guarantee | 7.99 | 31.71 | - | See note 7 | - | 34.87 |
| PM2.5 - Filterable only (startup + without CCU) | - | 0.0085 | Vendor's guarantee | 7.99 | 3.07 | 0.0085 | Vendor's Guarantee | 0.10 | |
| PM2.5 - Total [1] (with CCU) | - | 0.0165 | See Note 1 | 15.54 | 61.68 | - | Vendor's Guarantee for filterable PM + adjusted AP-42 emission factor for condensable PM | | 67.83 |
| PM2.5 - Total [1] (startup + without CCU) | - | 0.0165 | See Note 1 | 15.54 | 5.97 | 0.0165 | | 0.19 | |
| VOC (from boiler combustion) [5] | - | 0.002 | Vendor's guarantee | 1.89 | 8.22 | | Vendor's Guarantee | 0.02 | 8.24 |
| Amines (except boiler VOC) [2] | - | | | 2.54 | 10.10 | | | | 10.10 |
| VOC Total | - | | | | | | | | 18.33 |
| SO2 | 5.58 | 0.012 | Wet Desulfurization<br>Vendor's guarantee | 11.58 | 50.40 | 0.0332 | See note 6 | 0.38 | 50.78 |
| NH3 | 3.65 | 0.0021 | Vendor's guarantee | 2.01 | 8.76 | - | | | 8.76 |
| H2SO4 | 2.00 | 0.0067 | | 6.35 | 27.66 | 0.02 | | 0.21 | 27.86 |
| Pb | - | 0.000048 | AP-42 | 0.05 | 0.20 | 4.80E-05 | Table 1.4-2 in AP-42 | 1.25E-03 | 0.20 |
| HCl | 1.00 | 0.00125 | Dry In-Duct Sorbent Injection | 1.18 | 5.14 | 0.045 | | 0.51 | 5.65 |
| Hg | | 3.50E-06 | Table 1.4-4 AP-42 | 3.30E-03 | 0.01 | 2.60E-04 | Table 1.4-4 in AP-42 | 2.96E-03 | 0.02 |
| Organic HAPs [3] | | | | 1.91 | 8.32 | | | 0.02 | 8.34 |
| Metallic HAPs [4] | | 2.91E-04 | See Note 4 | 0.27 | 1.20 | 0.0003 | | 0.003 | 1.20 |

1. Total particulate matter (PM) = filterable PM + condensable PM. Emission factor of 0.0085 lb/MMBtu for filterable PM, PM10, and PM2.5 is based on vendor's guarantee; Emission factor of 0.008 lb/MMBtu is based on a aggregation of test data collected from operating units. The flue gas from the proposed boiler will pass through the amine absorber and the wash water column. These steps will reduce the temperature of the flue gas to approximately 110 °F before it is discharged to the atmosphere. Therefore, the data entries for stokers using a wet scrubber as PM control and with complete test data records were used to derive the average emissions factor of condensable PM. The data are attached as supporting material at the end of the boiler emissions calculation.

2. Amine emissions from the CCU absorber stack are quantified based on engineering judgement and similar projects.

3. It is assumed that the amount of organic HAPs is the same as the amount of VOCs from fuel combustion. This assumption is supported by Table 1.6-3 in AP-42.

4. The emission factor for total metallic HAPs is based on Table 1.6-4 in AP-42. However, the emission factor for Manganese in AP-42 is adjusted after auditing AP-42 for outlier data. There is one FBC entry in the supporting database with an Manganese emission factor of 1.14E-05. The data used for this project is 10 times that value.

5. The vendor guaranteed VOC emission factor is 0.005 lb/MMBtu in the flue gas before the SCR/CO catalyst. Due to the presence of the CO catalyst, a VOC removal efficiency of 60% is applied to reduce the VOC emissions.

6. The emission factor for startup is the higher of the two emission factors of biomass combustion and natural gas combustion.

For natural gas combustion during startup, the SO2 emissions are calculated as follows,
(131.1 MMBtu/hr * 1000000 Btu/MMBtu * 55 hrs for startup/yr)/(1051 Btu/Scf)/(379.48 Scf/lbmol) * (10 ppmv S/Scf) / 1000000 * 64 lb/lbmol = 11.57 lb/yr = 0.01 tpy

7. The amount of filterable PM/PM10/PM2.5 includes the particulates from the fresh sand storage silo and the sodium bicarbonate storage silo.

**Emissions from CCU**

| Pollutant | Normal Operation | Normal Operation (Hourly Maximum) | Normal Operation (Annual) |
|---|---|---|---|
| | mg/Nm3 | lb/hr | tpy |
| Solvent Amines | 0.70 | 0.48 | 1.90 |
| Ammonia | 4.50 | 3.08 | 12.21 |
| Nitrosamines [1] | 0.01 | 0.01 | 0.03 |
| Nitramines | 0.01 | 0.01 | 0.03 |
| Acetaldehyde [1] | 2.85 | 1.95 | 7.73 |
| Formaldehyde [1] | 0.15 | 0.10 | 0.41 |

1. HAPs

Table N-1 Bubbling Fluidized Bed Boiler
MGS CNP 1, LLC

**HAP Emissions from Boiler Combustion**

Reference: Table 1.6-3 of AP-42

| Organic Compound | Average Emission Factor (lb/MMBtu) | CAS | HAP | HAP EF (lb/MMBtu) | Project HAP EF (lb/MMBtu) [3] | Emissions (tpy) [4] | Notes |
|---|---|---|---|---|---|---|---|
| Acenaphthene | 9.10E-07 | 83-32-9 | Yes | 9.10E-07 | 1.08E-07 | 4.45E-04 | |
| Acenaphthylene | 5.00E-06 | 208-96-8 | Yes | 5.00E-06 | 5.91E-07 | 2.44E-03 | |
| Acetaldehyde | 8.30E-04 | 75-07-0 | Yes | 8.30E-04 | 9.81E-05 | 4.06E-01 | |
| Acetone | 1.90E-04 | 67-64-1 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | Neither a VOC nor a HAP |
| Acetophenone | 3.20E-09 | 98-86-2 | Yes | 3.20E-09 | 3.78E-10 | 1.56E-06 | |
| Acrolein | 4.00E-03 | 107-02-8 | Yes | 4.00E-03 | 4.73E-04 | 1.95E+00 | |
| Anthracene | 3.00E-06 | 120-12-7 | Yes | 3.00E-06 | 3.55E-07 | 1.47E-03 | |
| Benzaldehyde | <8.5E-07 | 100-52-7 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Benzene | 4.20E-03 | 71-43-2 | Yes | 4.20E-03 | 4.96E-04 | 2.05E+00 | |
| Benzo(a)anthracene | 6.50E-08 | 56-55-3 | Yes | 6.50E-08 | 7.68E-09 | 3.18E-05 | |
| Benzo(a)pyrene | 2.60E-06 | 50-32-8 | Yes | 2.60E-06 | 3.07E-07 | 1.27E-03 | |
| Benzo(b)fluoranthene | 1.00E-07 | 205-99-2 | Yes | 1.00E-07 | 1.18E-08 | 4.89E-05 | |
| Benzo(e)pyrene | 2.60E-09 | 192-97-2 | Yes | 2.60E-09 | 3.07E-10 | 1.27E-06 | |
| Benzo(g,h,i)perylene | 9.30E-08 | 191-24-2 | Yes | 9.30E-08 | 1.10E-08 | 4.55E-05 | |
| Benzo(j,k)fluoranthene | 1.60E-07 | 205-82-3 | Yes | 1.60E-07 | 1.89E-08 | 7.82E-05 | |
| Benzo(k)fluoranthene | 3.60E-08 | 207-08-9 | Yes | 3.60E-08 | 4.26E-09 | 1.76E-05 | |
| Benzoic acid | 4.70E-08 | 65-85-0 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| bis(2-Ethylhexyl)phthalate | 4.70E-08 | 117-81-7 | Yes | 4.70E-08 | 5.56E-09 | 2.30E-05 | |
| Bromomethane | 1.50E-05 | 74-83-9 | Yes | 1.50E-05 | 1.77E-06 | 7.33E-03 | |
| 2-Butanone (MEK) | 5.40E-06 | 78-93-3 | Yes | 5.40E-06 | 6.38E-07 | 2.64E-03 | |
| Carbazole | 1.80E-06 | 86-74-8 | Yes | 1.80E-06 | 2.13E-07 | 8.80E-04 | |
| Carbon tetrachloride | 4.50E-05 | 56-23-5 | Yes | 4.50E-05 | 5.32E-06 | 2.20E-02 | |
| Chlorine | 7.90E-04 | 7782-50-5 | Yes | 7.90E-04 | | | |
| Chlorobenzene | 3.30E-05 | 108-90-7 | Yes | 3.30E-05 | 3.90E-06 | 1.61E-02 | |
| Chloroform | 2.80E-05 | 67-66-3 | Yes | 2.80E-05 | 3.31E-06 | 1.37E-02 | |
| Chloromethane | 2.30E-05 | 74-87-3 | Yes | 2.30E-05 | 2.72E-06 | 1.12E-02 | |
| 2-Chloronaphthalene | 2.40E-09 | 91-58-7 | Yes | 2.40E-09 | 2.84E-10 | 1.17E-06 | |
| 2-Chlorophenol | 2.40E-08 | 95-57-8 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Chrysene | 3.80E-08 | 218-01-9 | Yes | 3.80E-08 | 4.49E-09 | 1.86E-05 | |
| Crotonaldehyde | 9.90E-06 | 4170-30-3/123-73-9/15798-64-8 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Decachlorobiphenyl | 2.70E-10 | 2051-24-3 | Yes | 2.70E-10 | 3.19E-11 | 1.32E-07 | |
| Dibenzo(a,h)anthracene | 9.10E-09 | 53-70-3 | Yes | 9.10E-09 | 1.08E-09 | 4.45E-06 | |
| 1,2-Dibromoethene | 5.50E-05 | 540-49-8/590-12-5 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Dichlorobiphenyl | 7.40E-10 | 34883-43-7 | Yes | 7.40E-10 | 8.75E-11 | 3.62E-07 | |
| 1,2-Dichloroethane | 2.90E-05 | 107-06-2 | Yes | 2.90E-05 | 3.43E-06 | 1.42E-02 | |
| Dichloromethane | 2.90E-04 | 75-09-2 | Yes | 2.90E-04 | 3.43E-05 | 1.42E-01 | |
| 1,2-Dichloropropane | 3.30E-05 | 78-87-5 | Yes | 3.30E-05 | 3.90E-06 | 1.61E-02 | |
| 2,4-Dinitrophenol | 1.70E-07 | 51-28-5 | Yes | 1.70E-07 | 2.01E-08 | 8.31E-05 | |
| Ethylbenzene | 3.10E-05 | 100-41-4 | Yes | 3.10E-05 | 3.66E-06 | 1.52E-02 | |
| Fluoranthene | 1.60E-06 | 206-44-0 | Yes | 1.60E-06 | 1.89E-07 | 7.82E-04 | |
| Fluorene | 3.40E-06 | 86-73-7 | Yes | 3.40E-06 | 4.02E-07 | 1.66E-03 | |
| Formaldehyde | 4.40E-03 | 50-00-0 | Yes | 4.40E-03 | 5.20E-04 | 2.15E+00 | |
| Heptachlorobiphenyl | 6.60E-11 | 28655-71-2 | Yes | 6.60E-11 | 7.80E-12 | 3.23E-08 | |
| Hexachlorobiphenyl | 5.50E-10 | Multiple | Yes | 5.50E-10 | 6.50E-11 | 2.69E-07 | |
| Hexanal | 7.00E-06 | 66-25-1 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Heptachlorodibenzo-p-dioxins | 2.00E-09 | Multiple | Yes | 2.00E-09 | 2.36E-10 | 9.77E-07 | |
| Heptachlorodibenzo-p-furans | 2.40E-10 | Multiple | Yes | 2.40E-10 | 2.84E-11 | 1.17E-07 | |
| Hexachlorodibenzo-p-dioxins | 1.60E-06 | Multiple | Yes | 1.60E-06 | 1.89E-07 | 7.82E-04 | |
| Hexachlorodibenzo-p-furans | 2.80E-10 | Multiple | Yes | 2.80E-10 | 3.31E-11 | 1.37E-07 | |
| Hydrogen chloride | 1.90E-02 | 7647-01-0 | Yes | 1.90E-02 | | | |
| Indeno(1,2,3,c,d)pyrene | 8.70E-08 | 193-39-5 | Yes | 8.70E-08 | 1.03E-08 | 4.25E-05 | |
| Isobutyraldehyde | 1.20E-05 | 78-84-2 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Methane | 2.10E-02 | 74-82-8 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 2-Methylnaphthalene | 1.60E-07 | 91-57-6 | Yes | 1.60E-07 | 1.89E-08 | 7.82E-05 | |
| Monochlorobiphenyl | 2.20E-10 | 27323-18-8 | Yes | 2.20E-10 | 2.60E-11 | 1.08E-07 | |
| Naphthalene | 9.70E-05 | 91-20-3 | Yes | 9.70E-05 | 1.15E-05 | 4.74E-02 | |
| 2-Nitrophenol | 2.40E-07 | 88-75-5 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 4-Nitrophenol | 1.10E-07 | 100-02-7 | Yes | 1.10E-07 | 1.30E-08 | 5.38E-05 | |
| Octachlorodibenzo-p-dioxins | 6.60E-08 | 3268-87-9 | Yes | 6.60E-08 | 7.80E-09 | 3.23E-05 | |
| Octachlorodibenzo-p-furans | 8.80E-11 | | Yes | 8.80E-11 | 1.04E-11 | 4.30E-08 | |
| Pentachlorodibenzo-p-dioxins | 1.50E-09 | | Yes | 1.50E-09 | 1.77E-10 | 7.33E-07 | |
| Pentachlorodibenzo-p-furans | 4.20E-10 | | Yes | 4.20E-10 | 4.96E-11 | 2.05E-07 | |
| Pentachlorobiphenyl | 1.20E-09 | | Yes | 1.20E-09 | 1.42E-10 | 5.86E-07 | |
| Pentachlorophenol | 5.10E-08 | 87-86-5 | Yes | 5.10E-08 | 6.03E-09 | 2.49E-05 | |
| Perylene | 5.20E-10 | 198-55-0 | Yes | 5.20E-10 | 6.15E-11 | 2.54E-07 | |
| Phenanthrene | 7.00E-06 | 85-01-8 | Yes | 7.00E-06 | 8.27E-07 | 3.42E-03 | |
| Phenol | 5.10E-05 | 108-95-2 | Yes | 5.10E-05 | 6.03E-06 | 2.49E-02 | |
| Propanal (propionaldehyde) | 3.20E-05 | 123-38-6 | Yes | 3.20E-05 | 3.78E-06 | 1.56E-02 | |
| Pyrene | 3.70E-06 | 129-00-0 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Styrene | 1.90E-03 | 100-42-5 | Yes | 1.90E-03 | 2.25E-04 | 9.29E-01 | |

Table N-1 Bubbling Fluidized Bed Boiler
MGS CNP 1, LLC

| Organic Compound | Average Emission Factor (lb/MMBtu) | CAS | HAP | HAP EF (lb/MMBtu) | Project HAP EF (lb/MMBtu) [3] | Emissions (tpy) [4] | Notes |
|---|---|---|---|---|---|---|---|
| 2,3,7,8-Tetrachlorodibenzo-p-dioxins | 8.60E-12 | 1746-01-6 | Yes | 8.60E-12 | 1.02E-12 | 4.20E-09 | |
| Tetrachlorodibenzo-p-dioxins | 4.70E-10 | | Yes | 4.70E-10 | 5.56E-11 | 2.30E-07 | |
| 2,3,7,8-Tetrachlorodibenzo-p-furans | 9.00E-11 | | Yes | 9.00E-11 | 1.06E-11 | 4.40E-08 | |
| Tetrachlorodibenzo-p-furans | 7.50E-10 | | Yes | 7.50E-10 | 8.86E-11 | 3.67E-07 | |
| Tetrachlorobiphenyl | 2.50E-09 | 35693-99-3 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Tetrachloroethene | 3.80E-05 | 127-18-4 | Yes | 3.80E-05 | 4.49E-06 | 1.86E-02 | Not a VOC |
| o-Tolualdehyde | 7.20E-06 | 529-20-4 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| p-Tolualdehyde | 1.10E-05 | 104-87-0 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| Toluene | 9.20E-04 | 108-88-3 | Yes | 9.20E-04 | 1.09E-04 | 4.50E-01 | |
| Trichlorobiphenyl | 2.60E-09 | 7012-37-5 | Yes | 2.60E-09 | 3.07E-10 | 1.27E-06 | |
| 1,1,1-Trichloroethane | 3.10E-05 | 71-55-6 | Yes | 3.10E-05 | 3.66E-06 | 1.52E-02 | Not a VOC |
| Trichloroethene | 3.00E-05 | 79-01-6 | Yes | 3.00E-05 | 3.55E-06 | 1.47E-02 | |
| Trichlorofluoromethane | 4.10E-05 | 75-69-4 | No | 0.00E+00 | 0.00E+00 | 0.00E+00 | |
| 2,4,6-Trichlorophenol | <2.2E-08 | 88-06-2 | Yes | <2.2E-08 | 2.60E-09 | 1.08E-05 | |
| Vinyl Chloride | 1.80E-05 | 85-01-4 | Yes | 1.80E-05 | 2.13E-06 | 8.80E-03 | |
| o-Xylene | 2.50E-05 | 95-47-6 | Yes | 2.50E-05 | 2.95E-06 | 1.22E-02 | |
| Total organic compounds (TOC) [1] | 0.039 | | | | | | |
| Volatile organic compounds (VOC) [2] | 0.017 | | | | | | |
| Nitrous Oxide (N2O) | 0.013 | 10024-97-2 | No | 0.00E+00 | 0.00E+00 | | |
| Carbon Dioxide (CO2) | 195 | 124-38-9 | No | 0.00E+00 | 0.00E+00 | | |
| **VOC Total** | 1.69E-02 | | | | | | |
| **HAPs Total (Organic + Inorganic)** | | | | **0.036923** | | | |
| **Organic HAPs** | | | | **1.71E-02** | **2.03E-03** | 8.37 | |

1. Per note *ai* in AP-42 Section 1.6, factor for TOC is the sum of all factors in table except nitrous oxide and carbon dioxide.
2. Per note *aj* in AP-42 Section 1.6, factor for VOC is the sum of all factors in table except hydrogen chloride, chlorine, formaldehyde, tetrachloroethene, 1,1,1,-trichloroethane, dichloromethane, acetone, nitrous oxide, methane, and carbon dioxide.
3. Project HAP EFs are proportionally adjusted to match the project VOC EFs.
4. The annual emissions are conservatively estimated using the maximum heat input capacity of the boiler and 8760 hours per year.

Table N-1 Bubbling Fluidized Bed Boiler
MGS CNP 1, LLC

| Organic Compound | Average Emission Factor (lb/MMBtu) | CAS | HAP | HAP EF (lb/MMBtu) | Project HAP EF (lb/MMBtu) [3] | Emissions (tpy) [4] | Notes |
|---|---|---|---|---|---|---|---|
| Reference: | Table 1.6-4 of AP-42 | | | | | | |

| Trace Element | Average Emission Factor (lb/MMBtu) | HAP | HAP EF (lb/MMBtu) |
|---|---|---|---|
| Antimony | 7.90E-06 | Yes | 0.0000079 |
| Arsenic | 2.20E-05 | Yes | 0.000022 |
| Barium | 1.70E-04 | No | 0 |
| Beryllium | 1.10E-06 | Yes | 0.0000011 |
| Cadmium | 4.10E-06 | Yes | 0.0000041 |
| Chromium, total | 2.10E-05 | Yes | 0.000021 |
| Chromium, hexavalent | 3.50E-06 | Yes | 0.0000035 |
| Cobalt | 6.50E-06 | Yes | 0.0000065 |
| Copper | 4.90E-05 | No | 0 |
| Iron | 9.90E-04 | No | 0 |
| Lead | 4.80E-05 | Yes | 0.000048 |
| Manganese [1] | 1.14E-04 | Yes | **0.000114** |
| Mercury | 3.50E-06 | Yes | 0.0000035 |
| Molybdenum | 2.10E-06 | No | 0 |
| Nickel | 3.30E-05 | Yes | 0.000033 |
| Phosphorus | 2.70E-05 | Yes | 0.000027 |
| Potassium | 3.90E-02 | No | 0 |
| Selenium | 2.80E-06 | Yes | 0.0000028 |
| Silver | 1.70E-03 | No | 0 |
| Sodium | 3.60E-04 | No | 0 |
| Strontium | 1.00E-05 | No | 0 |
| Tin | 2.30E-05 | No | 0 |
| Titanium | 2.00E-05 | No | 0 |
| Vanadium | 9.80E-07 | No | 0 |
| Yttrium | 3.00E-07 | No | 0 |
| Zinc | 4.20E-04 | No | 0 |
| **Hazardous Trace Elements Total** | | | **0.0002909** |

1. For Manganese, the emission factors is an adjusted emission factor after auditing AP-42 for outlier data. There is one FBC entry in the supporting database with an Manganese emission factor of 1.14E-05. The data used for this project is 10 times that value.

| TEST ID | POLLUTANT | AVG RUN EF (LB_MMBtu) | Run 1 _ Temp | Run 2 _ Temp | Run 3 _ Temp | FIRING CONFIG | CON DEV DESC_2 |
|---|---|---|---|---|---|---|---|
| AP21.01 | Particulate matter, condensible | 1.18E-02 | 350 | 355 | 368 | Stoker | ESP |
| AP33.01 | Particulate matter, condensible | 1.00E-02 | 352 | 345 | 352 | Stoker | ESP |
| AP34.03 | Particulate matter, condensible | 1.57E-03 | 137 | 138 | 138 | Stoker | Wet Scrubber |
| AP35.03 | Particulate matter, condensible | 1.10E-01 | 273 | 274 | 276 | Not Reported | Mechanical Collector |
| AP36.03 | Particulate matter, condensible | 1.55E-02 | 493 | 512 | 550 | Dutch Oven | Mechanical Collector |
| AP37.02 | Particulate matter, condensible | 2.46E-02 | 154 | 152 | 158 | Stoker | Wet Scrubber |
| AP37.04 | Particulate matter, condensible | 2.01E-03 | 155 | 0 | 0 | Stoker | Wet Scrubber |
| AP38.05 | Particulate matter, condensible | 1.20E-02 | 371 | 363 | 359 | Stoker | ESP |
| AP39.03 | Particulate matter, condensible | 2.68E-02 | 365 | 368 | 373 | Stoker | Mechanical Collector |
| AP40.03 | Particulate matter, condensible | 1.73E-02 | 330 | 340 | 329 | FBC | ESP |
| AP41.02 | Particulate matter, condensible | 1.36E-02 | 162 | 154 | 144 | Dutch Oven | Mechanical Collector |
| AP43.03 | Particulate matter, condensible | 8.65E-02 | 161 | 160 | 172 | Dutch Oven | Wet Scrubber |
| E915.001 | Particulate matter, condensible | 6.04E-03 | 345 | 348 | 350 | Stoker | Not Reported |
| E917.001 | Particulate matter, condensible | 2.80E-03 | 403 | 408 | 411 | Stoker | Not Reported |
| E967.001 | Particulate matter, condensible | 1.36E-02 | 399 | 393 | 370 | Stoker | No Equipment |
| ODEQ0042.01 | Particulate matter, condensible | 7.10E-03 | 332.9 | 341.2 | 346.7 | Dutch Oven | Mechanical Collector |
| ODEQ0047.01 | Particulate matter, condensible | 1.28E-02 | 139 | 137 | 0 | Stoker | Wet Scrubber |
| ODEQ0047.02 | Particulate matter, condensible | 8.55E-03 | 138 | 137 | 0 | Stoker | Wet Scrubber |
| ODEQ0047.03 | Particulate matter, condensible | 8.68E-03 | 137 | 135 | 0 | Stoker | Wet Scrubber |
| ODEQ0048.01 | Particulate matter, condensible | 8.28E-03 | 129 | 122 | 0 | Stoker | Wet Scrubber |
| ODEQ0048.02 | Particulate matter, condensible | 3.92E-03 | 123 | 122 | 0 | Stoker | Wet Scrubber |
| ODEQ0048.03 | Particulate matter, condensible | 6.76E-03 | 132 | 127 | 0 | Stoker | Wet Scrubber |
| ODEQ0049.01 | Particulate matter, condensible | 2.40E-03 | 131.1 | 138.4 | 0 | Stoker | Wet Scrubber |
| ODEQ0049.02 | Particulate matter, condensible | 5.71E-03 | 141.3 | 140.4 | 0 | Stoker | Wet Scrubber |
| ODEQ0049.03 | Particulate matter, condensible | 4.48E-03 | 130 | 130 | 0 | Stoker | Wet Scrubber |
| ODEQ0051.01 | Particulate matter, condensible | 9.50E-03 | 231.9 | 230.3 | 232.4 | Stoker | Fabric Filter |
| ODEQ0052.01 | Particulate matter, condensible | 3.57E-02 | 276 | 289 | 296 | Dutch Oven | No Equipment |
| ODEQ0052.02 | Particulate matter, condensible | 8.96E-03 | 333 | 338 | 328 | Dutch Oven | No Equipment |
| ODEQ0053.01 | Particulate matter, condensible | 9.79E-03 | 408.9 | 409.6 | 421.8 | Dutch Oven | Mechanical Collector |
| ODEQ0054.01 | Particulate matter, condensible | 1.50E-02 | 588.5 | 596.9 | 599.5 | Dutch Oven | Mechanical Collector |
| ODEQ0055.01 | Particulate matter, condensible | 7.59E-03 | 588 | 587.6 | 583.5 | Dutch Oven | Mechanical Collector |
| ODEQ0055.02 | Particulate matter, condensible | 1.33E-02 | 604.6 | 603.3 | 601.8 | Dutch Oven | Mechanical Collector |
| ODEQ0057.01 | Particulate matter, condensible | 3.50E-03 | 418 | 415 | 415 | Stoker | Not Reported |
| WDNR0006.01 | Particulate matter, condensible | 1.55E-03 | 357 | 360 | 364 | Not Reported | No Equipment |
| WDNR0007.01 | Particulate matter, condensible | 7.99E-02 | 299 | 297 | 298 | Stoker | No Equipment |
| WDNR0008.001 | Particulate matter, condensible | 4.00E-02 | 329 | 320 | 320 | Not Reported | No Equipment |
| WDNR0024.01 | Particulate matter, condensible | 5.04E-03 | 335 | 335 | 345 | Stoker | Mechanical Collector |
| WDNR0038.01 | Particulate matter, condensible | 1.90E-02 | 297 | 312 | 197 | Stoker | No Equipment |
| WDNR0041.01 | Particulate matter, condensible | 3.28E-02 | 366.9 | 360.9 | 389.5 | Not Reported | Not Reported |

| TEST ID | POLLUTANT | AVG RUN EF (LB_MMBtu) | Run 1 _ Temp | Run 2 _ Temp | Run 3 _ Temp | FIRING CONFIG | CON DEV DESC_2 |
|---|---|---|---|---|---|---|---|
| WDNR0045.01 | Particulate matter, condensible | 6.10E-03 | 387 | 384 | 388 | Stoker | Electrolyzed Gravel Bed |
| WDNR0046.001 | Particulate matter, condensible | 2.40E-02 | 250 | 259 | 254 | Not Reported | Fabric Filter |
| WDNR0048.001 | Particulate matter, condensible | 7.25E-03 | 139.1 | 145.5 | 152.4 | Not Reported | Not Reported |
| WDNR0048.002 | Particulate matter, condensible | 2.84E-02 | 215 | 209 | 215 | Not Reported | Not Reported |
| WDNR0049.001 | Particulate matter, condensible | 2.38E-02 | 340 | 342 | 356 | Not Reported | Mechanical Collector |
| WDNR0052.01 | Particulate matter, condensible | 7.10E-03 | 365 | 362 | 359 | Stoker | Fabric Filter |
| WDNR0056.001 | Particulate matter, condensible | 9.61E-03 | 289 | 300 | 313 | Not Reported | Mechanical Collector |
| WDNR0063.01 | Particulate matter, condensible | 8.35E-03 | 458 | 454 | 477 | Not Reported | Mechanical Collector |
| WDNR0063.02 | Particulate matter, condensible | 5.16E-03 | 498 | 475 | 471 | Not Reported | Mechanical Collector |
| WDNR0064.01 | Particulate matter, condensible | 5.20E-03 | 466 | 461 | 453 | Not Reported | Mechanical Collector |
| WDNR0085.01 | Particulate matter, condensible | 1.77E-02 | 255 | 255 | 261 | Stoker | No Equipment |
| WDNR0085.02 | Particulate matter, condensible | 5.83E-03 | 290 | 285 | 299 | Stoker | No Equipment |
| WDNR0086.01 | Particulate matter, condensible | 7.71E-02 | 312 | 314 | 317 | Stoker | No Equipment |
| WDNR0095.01 | Particulate matter, condensible | 1.95E-02 | 342 | 347 | 349 | FBC | Mechanical Collector |
| WDNR0104.01 | Particulate matter, condensible | 3.89E-02 | 255 | 251 | 255 | FBC | Mechanical Collector |

Table N-2 Wood Chips Receiving Hoppers
MGS CNP 1, LLC

| Source Name: | Biomass Unloading Baghouse | EPN: | 121-PKG-1001 | |
|---|---|---|---|---|
| Proposed MAERT Limits | | Date: | 12/6/2024 | |
| FIN | EPN | Air Contaminant | lbs/hr | TPY |
| 121-LS-1001<br>121-LS-1002 | 121-PKG-1001 | PM | 1.08 | 4.72 |
| | | PM10 | 1.08 | 4.72 |
| | | PM2.5 | 1.08 | 4.72 |

Process Description:

Wood fuel is delivered to the site by trucks. Trucks unload wood fuel into two receiving hoppers (121-LS-1001 and 121-LS-1002). Dust control is provided by a slight negative pressure in the dumping area. The extracted dust laden air will be directed through a bag house (121-PKG-1001) before discharge to atmosphere.
The bag house will reduce the particulate matter emissions to reach a PM loading of 0.01 grains/cf.

To represent worst case emissions, maximum hourly emissions for 121-LS-1001 and 121-LS-1002 are both based on the total amount of wood fuel to be delivered to the site, rather than splitting the emissions in half. This scenario is conservative, as if one of the truck unloaders fails, fuel can be delivered via the other unloader and all the wood chips would be delivered to one hopper. The annual emissions of 121-LS-1001 and 121-LS-1002 are permitted under a cap quantified based on the maximum amount of wood chips delivered each year.

Bases and Factors:
Particulate Matter (PM) emissions from truck unloading are estimated using the following design information:

Baghouse volumetric exhaust flow rate: 12566 ft3/min

The bag house will reduce the particulate matter emissions to a PM loading of 0.01 grains/cf.

Hourly emission rates are determined as follows:

Hourly Emissions (lb/hr) = exhaust flow (ft3/min) x 60 min/hr x PM loading in exhaust (0.01 grains/cf)
Annual emission rates are determined as follows:
Annual Emissions (tpy) = [hourly emissions (lb/hr) * annnual operating hours (hr)] / 2,000 (lb/ton)

Table N-2 Wood Chips Receiving Hoppers
MGS CNP 1, LLC

Data:

| | Fuel Delivered Per Year | Exhaust Flow | PM Loading in Exhaust | Controlled Max Hourly Emissions | Annual Operating Hours | Controlled Annual Emissions |
|---|---|---|---|---|---|---|
| Pollutant | tons/yr | ft3/min | gr/cf | lb/hr | hr/year | tpy |
| PM | 929146.92 | 12566 | 0.01 | 1.08 | 8760 | 4.72 |
| PM10 | 929146.92 | 12566 | 0.01 | 1.08 | 8760 | 4.72 |
| PM2.5 | 929146.92 | 12566 | 0.01 | 1.08 | 8760 | 4.72 |

Emission Factors for Biomass Handling Process:
Emissions are based on AP-42 emission factors for Aggregate Handling and Storage Piles (AP-42 V5, Section 13.2.4.3, November 2006)

Average Wind Speed is obtained from US EPA AP-42 Table 7.1-7 for Huntington, West Virginia (closest data collection point)

Data:

| Source Parameters | | | | |
|---|---|---|---|---|
| Pollutant | Particle Size (µm) | # of Drops in Transfer Process | Average Moisture % (M) [1] | k(2) |
| PM/TSP | < 30 | 1 | 4.8 | 0.74 |
| $PM_{10}$ | < 10 | 1 | 4.8 | 0.35 |
| $PM_{2.5}$ | < 2.5 | 1 | 4.8 | 0.053 |

[1] 0.25% -4.8% maintains the quality rating level A of the equation. The moisture content of the wood chips is 45%. 4.8% is used in the calculations to get conservative results.

| | | | |
|---|---|---|---|
| Hours of Operation | 8,760 | hours/year (24 hours/day X 7 days/week X 52 weeks/year) | |
| Annual Average Wind Speed of Area (U)= | 5.6 | mph | annual average and highest monthly average wind speed for Huntington, WV taken from US EPA AP-42 Table 7.1-7. |
| Highest Monthly Average Wind Speed of Area (U)= | 6.9 | mph | |

Calculations:
AP-42 (section 13.2.4.3) lb/ton of material

$$Emission\ factor\ (lb/ton) = k * (0.0032) * \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

Where: k = particle size multiplier from AP-42 Section 13.2.4.3
M = material moisture content (%)
U = mean wind speed

| TSP/PM hourly emission factor: | | | TSP/PM annual emission factor: | | |
|---|---|---|---|---|---|
| = (0.74) x (0.0032) x [(6.9/5)^1.3/(4.8/2)^1.4] | | | = (0.74) x (0.0032) x [(5.6/5)^1.3/(4.8/2)^1.4] | | |
| = | *0.0011* | lbs/ton | = | *0.0008* | lbs/ton |

| $PM_{10}$ hourly emission factor: | | | $PM_{10}$ annual emission factor: | | |
|---|---|---|---|---|---|
| = (0.35) x (0.0032) x [(6.9/5)^1.3/(4.8/2)^1.4] | | | = (0.35) x (0.0032) x [(5.6/5)^1.3/(4.8/2)^1.4] | | |
| = | *0.0005* | lbs/ton | = | *0.0004* | lbs/ton |

| $PM_{2.5}$ hourly average emission factor: | | | $PM_{2.5}$ annual average emission factor: | | |
|---|---|---|---|---|---|
| = (0.053) x (0.0032) x [(6.9/5)^1.3/(4.8/2)^1.4] | | | = (0.053) x (0.0032) x [(5.6/5)^1.3/(4.8/2)^1.4] | | |
| = | *0.0001* | lbs/ton | = | *0.0001* | lbs/ton |

| Emission Unit | Emission Point | Description |
|---|---|---|
| 121-CV-1001 | 121-CV-1001 | Conveyor #1 from Biomass Receiving Hopper 1001 to Storage Pile |
| 121-CV-1002 | 121-CV-1002 | Conveyor #2 from Biomass Receiving Hopper 1002 to Storage Pile |
| CHIP-1 | CHIP-1 | Biomass Storage Pile Loading Fugitives |
| 121-S-1001 | 121-S-1001 | Biomass Feed Hopper |
| 121-CV-1003 | 121-CV-1003 | Conveyor from Feed Hopper to 121-CV-2001 A/B |
| 121-CV-2001 A | 121-CV-2001 A | Screw Conveyor from 121-CV-1003 to Biomass Fuel Metering Bin 121-S-2001 A |
| 121-CV-2001 B | 121-CV-2001 B | Screw Conveyor from 121-CV-1003 to Biomass Fuel Metering Bin 121-S-2001 B |
| 121-S-2001 A | 121-S-2001 A | Biomass Fuel Metering Bin A |
| 121-S-2001 B | 121-S-2001 B | Biomass Fuel Metering Bin B |

Process Description:

From the receiving hoppers, biomass is conveyed via covered conveyors (121-CV-1001 and 121-CV-1002) to an uncovered chip pile (CHIP-1).

The biomass is loaded from the chip pile into a biomass feed hopper (121-S-1001) using front end loaders.

The biomass is conveyed from the biomass feed hopper (121-S-1001) to the fuel metering bins (121-S-2001 A/B) through a covered transfer conveyor (121-CV-1003) and two covered screw conveyors (121-CV-2001 A/B).

the receiving hopper to the BFB (except there will be just one biomass feed hopper and one conveyor from the feed hopper to the screw conveyors). For each transfer process, there will be 6 drop points from the receiving hoppers to the BFB.

To represent worst case emissions, the maximum hourly emissions for each drop point are based on the total amount of wood fuel to be delivered to the site, rather than splitting the emissions in half. The annual emissions for both drop points at each step are permitted under a cap.

Bases and Factors:

Emission factors are based on AP-42 emission factors for Aggregate Handling and Storage Piles (AP-42 V5, Section 13.2.4.3, November 2006). Please refer to Table N-3 for emission factor calculations.

Hourly emission rates are determined as follows:
Hourly Emissions (lb/hr) = annual emissions (tpy) / annual operating hours (hr) x 2,000 lb/ton

Annual emission rates are determined as follows:
Annual Emissions (tpy) = [wood conveyed (tpy) * emission factor (lb emissions per ton of wood conveyed per drop point) * number of drop points] / 2,000 (lb/ton)

Total Emissions:

| Pollutant | Wood Chips Conveyed at Each Transfer Step TPY | Emission Factor lb PM/ ton of wood/ drop point | Number of Drop Points | Annual Emissions TPY | Annual Operating Hours | Hourly Emission lb/hr |
|---|---|---|---|---|---|---|
| PM | 929,147 | 0.0011 | 6 | 2.95 | 8,760 | 0.67 |
| PM10 | 929,147 | 0.0005 | 6 | 1.39 | 8,760 | 0.32 |
| PM2.5 | 929,147 | 0.0001 | 6 | 0.21 | 8,760 | 0.05 |

Note: Because the amount of biomass transferred are not split in half, the hourly emissions calculated above represent the maximum hourly emission rate at each of the 8 drop points in the two transfer processes. The annual emissions calculated above represent the cap for the two drop points at each transfer step.

Emissions at each individual piece of equipment:

| Source | Transfer Rate | | Emission Factor (lb/ton) | | | | | | Emissions | | | | | | Protection from Wind | Efficiency [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Hourly | | | Annual | | | Short-term Emissions (lb/hr) | | | Annual Emissions (tpy) | | | | |
| | (tons/hr) | (tons/yr) | PM | PM10 | PM2.5 | PM | PM10 | PM2.5 | PM | PM10 | PM2.5 | PM | PM10 | PM2.5 | | |
| 121-CV-1001 | 106.07 | 929146.92 | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.056 | 0.027 | 0.004 | 0.187 | 0.088 | 0.013 | Yes | 50% |
| 121-CV-1002 | 106.07 | | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.056 | 0.027 | 0.004 | | | | Yes | 50% |
| CHIP-1 | 106.07 | 929146.92 | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.112 | 0.053 | 0.008 | 0.374 | 0.177 | 0.027 | No | 0% |
| 121-S-1001 | 106.07 | 929146.92 | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.112 | 0.053 | 0.008 | 0.374 | 0.177 | 0.027 | No | 0% |
| 121-CV-1003 | 106.07 | 929146.92 | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.056 | 0.027 | 0.004 | 0.187 | 0.088 | 0.013 | Yes | 50% |
| 121-CV-2001 A | 106.07 | 929146.92 | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.056 | 0.027 | 0.004 | 0.187 | 0.088 | 0.013 | Yes | 50% |
| 121-CV-2001 B | 106.07 | | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.056 | 0.027 | 0.004 | | | | Yes | 50% |
| 121-S-2001 A [2] | 106.07 | 929146.92 | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.056 | 0.027 | 0.004 | 0.187 | 0.088 | 0.013 | Yes | 50% |
| 121-S-2001 B [2] | 106.07 | | 0.0011 | 0.0005 | 0.0001 | 0.0008 | 0.0004 | 0.0001 | 0.056 | 0.027 | 0.004 | | | | Yes | 50% |
| | | | | | | | | TOTAL | - | - | - | 1.50 | 0.71 | 0.11 | | |

[1] Design is still in progress. Because there will be covers on the conveyors to reduce wind speed, an emission control efficiency of 50% is used in the calculations.

[2] Both biomass metering bins adopt gooseneck opening.

PM PM10 PM2.5 PM PM10 PM2.5

Table N-5 Storage Pile Wind Erosion
MGS CNP 1, LLC

| Source Name: | Wood Chips Storage Pile Wind Erosion | EPN: | CHIP-2 | |
|---|---|---|---|---|
| Proposed MAERT Limits | | Date: | 12/6/2024 | |
| FIN | EPN | Air Contaminant | lbs/hr | TPY |
| CHIP-2 | CHIP-2 | PM | -- | 0.21 |
| | | PM10 | -- | 0.11 |
| | | PM2.5 | -- | 0.02 |

Process Description:

Wood chips are stored outside in one storage pile.

Bases and Factors:

Emissions from wood chip storage wind erosion are estimated using the AP-42, Section 13.2.5, Industrial Wind Erosion, November 2006 - Equation (2).

Monthly fastest mile is obtained for Mason County, West Virginia (closest data collection point).
Measusred wind gust speed plus additional 10 mph to account for yearly fluctuations.
Storage piles will be sprayed with water as necessary to control particulate emissions.

Data:

Calculations:

AP-42 (section 13.2.5, Industrial Wind Erosion, November 2006 - Equation (2)) lb/ton of material

$$\text{Emission factor} = k \sum_{i=1}^{N} P_i \qquad (2)$$

Where:

EF = emission factor ($g/m^2/yr$)

k = particle size multiplier from AP-42 Section 13.2.5

N = number of disturbances per year

$P_i$ = erosion potential corresponding to the observed (or probable) fastest mile of wind for the ith period between disturbances, $g/m^2$

$P = 58 (u^* - u_t^*)^2 + 25 (u^* - u_t^*)$ (equation 3)

$p = 0$ for $u^* < u_t^*$

$u^*$ = friction velocity = 0.053 X the fastest mile (m/s) (equation 4)

$u_t^*$ = threshold friction velocity (m/s) = 1.02 m/s for overburden from AP-42 Table 13.2.5-2

The fastest mile is defined as the fastest observed mile of wind from Huntington, WV for the years 1980 - 2010.

Input

| Aerodynamic Particle Size Multipliers for Equation 2 | | |
|---|---|---|
| Pollutant | Particle Size (µm) | k |
| PM/TSP | < 30 | 1.0 |
| $PM_{10}$ | < 10 | 0.5 |
| $PM_{2.5}$ | < 2.5 | 0.075 |

Threshold friction velocity ($u_t^*$) 1.02 m/s

Frequency of disturbance 35040 per year

Average frequency of wind events resulting in wind erosion 125 per month

Erosion Potential Emission Factors

| Month | Fastest Mile | | $u^*$ | $(u^* - u_t^*)$ | $(u^* - u_t^*)^2$ | $P_{PM}$ | $P_{PM10}$ | $P_{PM2.5}$ |
|---|---|---|---|---|---|---|---|---|
| | (mph) | (m/s) | (m/s) | | | ($g/m^2$) | ($g/m^2$) | ($g/m^2$) |
| Jan | 40 | 17.88 | 0.95 | -0.07 | 0.01 | 0 | 0 | 0 |
| Feb | 53 | 23.69 | 1.26 | 0.24 | 0.06 | 9.12 | 4.56 | 0.68 |
| Mar | 48 | 21.46 | 1.14 | 0.12 | 0.01 | 3.73 | 1.86 | 0.28 |
| Apr | 49 | 21.90 | 1.16 | 0.14 | 0.02 | 4.68 | 2.34 | 0.35 |
| May | 38 | 16.99 | 0.90 | -0.12 | 0.01 | 0.00 | 0.00 | 0.00 |
| Jun | 46 | 20.56 | 1.09 | 0.07 | 0.00 | 2.03 | 1.02 | 0.15 |
| Jul | 43 | 19.22 | 1.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Aug | 33 | 14.75 | 0.78 | -0.24 | 0.06 | 0.00 | 0.00 | 0.00 |
| Sep | 35 | 15.65 | 0.83 | -0.19 | 0.04 | 0.00 | 0.00 | 0.00 |
| Oct | 33 | 14.75 | 0.78 | -0.24 | 0.06 | 0.00 | 0.00 | 0.00 |
| Nov | 42 | 18.78 | 1.00 | -0.02 | 0.00 | 0.00 | 0.00 | 0.00 |
| Dec | 46 | 20.56 | 1.09 | 0.07 | 0.00 | 2.03 | 1.02 | 0.15 |
| | | | | | Maximum Erosion Potential | 9.12 | 4.56 | 0.68 |
| | | | | | Annualized Erosion Factor ($g/m^2$-yr) | 91.90 | 45.97 | 6.85 |

Wind Erosion Emissions

| Emission Source | Total Area | Disturbed Area | | Control Efficiency | PM | PM10 | PM2.5 |
|---|---|---|---|---|---|---|---|
| | ($m^2$) | (%) | ($m^2$) | (%) | (tpy) | (tpy) | (tpy) |
| Chip Storage | 21,000 | 10 | 2100 | 0 | 0.21 | 0.11 | 0.02 |

Table N-6 Fly Ash Handling Process
MGS CNP 1, LLC

| Emission Unit | Emission Point | Description | Hourly Rate (tons/hr) | Annual Rate (tons/yr) | Control | Note |
|---|---|---|---|---|---|---|
| 121-CV-4001 A | 121-CV-4001 A | PJFF Ash Collection Drag Chain Conveyor A (From boiler hopper to surge bin A) | 4.5 | 39420 | Covered | |
| 121-CV-4001 B | 121-CV-4001 B | PJFF Ash Collection Drag Chain Conveyor B (from boiler hopper to surge bin B) | 4.5 | | Covered | |
| 121-S-4002 A | 121-S-4002 A | PJFF Ash Collection Surge Bin A | 4.5 | 39420 | NA | Hoppers are not open to the atmosphere. According to information provided by the boiler supplier, Babcock & Wilcox (B&W), the hopper does not produce any emissions. |
| 121-S-4002 B | 121-S-4002 B | PJFF Ash Collection Suge Bin B | 4.5 | | NA | |
| 121-CV-4002 | 121-CV-4002 | PJFF Ash Transport Drag Chain Conveyor (From Surge Bins #1 and #2 to PJFF Ash Transfer Drag Chain Conveyor) | 4.5 | 39420 | Covered | |
| 121-CV-4003 | 121-CV-4003 | PJFF Ash Transfer Drag Chain Conveyor (to Ash Bucket Elevator) | 4.5 | 39420 | Covered | |
| 121-CV-4004 | 121-CV-4004 | Ash Bucket Elevator | 4.5 | 39420 | Covered | |
| 121-CV-4005 | 121-CV-4005 | Ash Distrubution Drag Chain Conveyor (From Ash Bucket Elevator to Fly Ash Storage Silos) | 4.5 | 39420 | Covered | |
| 121-CV-4006 A | 121-CV-4006 A | Economizer Hopper Ash Drag Chain Conveyor A (From Economizer Hopper to Economizer Hopper Ash Surge Bin A) | 3.3 | 28908 | Covered | |
| 121-CV-4006 B | 121-CV-4006 B | Economizer Hopper Ash Drag Chain Conveyor B (From Economizer Hopper to Economizer Hopper Ash Surge Bin B) | 3.3 | | Covered | |
| 121-S-4003 A | 121-S-4002 A | Economizer Hopper Ash Surge Bin A | 3.3 | 28908 | NA | Hoppers are not open to the atmosphere. According to information provided by the boiler supplier, B&W, the hoppers will not produce any emissions. |
| 121-S-4003 B | 121-S-4002 B | Economizer Hopper Ash Surge Bin B | 3.3 | | NA | |

Table N-6 Fly Ash Handling Process
MGS CNP 1, LLC

| Emission Unit | Emission Point | Description | Hourly Rate (tons/hr) | Annual Rate (tons/yr) | Control | Note |
|---|---|---|---|---|---|---|
| 121-CV-4007 A | 121-CV-4007 A | Economizer Ash Transport Conveyor A (From Economizer Ash Surge Bin A to Fly Ash Silo A) | 3.3 | 28908 | Covered | |
| 121-CV-4007 B | 121-CV-4007 B | Economizer Ash Transport Conveyor B (From Economizer Ash Surge Bin B to Fly Ash Silo B) | 3.3 | | Covered | |
| 121-S-4001 A | 121-S-4001 A | Fly Ash Storage Silo A | 7.8 | 68328 | Pulse Jet Filter 121-F-4001 A | |
| 121-S-4001 B | 121-S-4001 B | Fly Ash Storage Silo B | 7.8 | | Pulse Jet Filter 121-F-4001 B | |
| 121-MX-4001 A | 121-MX-4001 A | Pugmill A | 7.8 | 68328 | NA | There will be no emissions per B&W. |
| 121-MX-4001 B | 121-MX-4001 B | Pugmill B | 7.8 | | NA | |
| 121-TL-0001 | 121-TL-0001 | Fly Ash Truck Loading | 8.6 | 75336 | Wet fly ash, with a moisture content of at least 10% | |

Table N-6 Fly Ash Handling Process
MGS CNP 1, LLC

Fugitive emissions can be expected from conveying and transferring of fly ash due to wind and conveyor vibration.

| Source | No. of Transfer | Transfer Rate | | Emission Factors (lb/ton) | | | | | | Emissions | | | | | | Protection from Wind | Efficiency [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hourly | | | Annual | | | Short-term Emissions (lb/hr) | | | Annual Emissions (tpy) | | | | |
| | | (tons/hr) | (tons/yr) | PM | PM10 | PM2.5 | PM | PM10 | PM2.5 | PM | PM10 | PM2.5 | PM | PM10 | PM2.5 | | |
| 121-CV-4001 A | 1 | 4.5 | 39420 | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.537 | 0.254 | 0.038 | 1.793 | 0.848 | 0.128 | Yes | 50% |
| 121-CV-4001 B | 1 | 4.5 | | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.537 | 0.254 | 0.038 | | | | Yes | 50% |
| 121-CV-4002 | 1 | 4.5 | 39420 | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.537 | 0.254 | 0.038 | 1.793 | 0.848 | 0.128 | Yes | 50% |
| 121-CV-4003 | 1 | 4.5 | 39420 | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.537 | 0.254 | 0.038 | 1.793 | 0.848 | 0.128 | Yes | 50% |
| 121-CV-4004 | 1 | 4.5 | 39420 | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.537 | 0.254 | 0.038 | 1.793 | 0.848 | 0.128 | Yes | 50% |
| 121-CV-4005 | 1 | 4.5 | 39420 | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.537 | 0.254 | 0.038 | 1.793 | 0.848 | 0.128 | Yes | 50% |
| 121-CV-4006 A | 1 | 3.3 | 28908 | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.394 | 0.186 | 0.028 | 1.315 | 0.622 | 0.094 | Yes | 50% |
| 121-CV-4006 B | 1 | 3.3 | | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.394 | 0.186 | 0.028 | | | | Yes | 50% |
| 121-CV-4007 A | 1 | 3.3 | 28908 | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.394 | 0.186 | 0.028 | 1.315 | 0.622 | 0.094 | Yes | 50% |
| 121-CV-4007 B | 1 | 3.3 | | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | 0.394 | 0.186 | 0.028 | | | | Yes | 50% |
| 121-S-4001 A | 1 | 7.8 | 68328 | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | Refer to emission calculations for fly ash storage silos | | | | | | | |
| 121-S-4001 B | 1 | 7.8 | | 0.2386 | 0.1129 | 0.0171 | 0.1819 | 0.0860 | 0.0130 | | | | | | | | |
| 121-TL-0001 | 1 | 8.6 | 75336 | - | - | - | - | - | - | Refer to emission calculations for fly ash truck loading | | | | | | | |
| | | | | | | TOTAL | | | | 4.796 | 2.268 | 0.343 | 11.592 | 5.483 | 0.830 | | |

[1] Design is still in progress. Because there will be covers on the conveyors to reduce wind speed, an emission control efficiency of 50% is used in the calculations.

Emission Factors for Dry Fly Ash Handling Process:
Emissions are based on AP-42 emission factors for Aggregate Handling and Storage Piles (AP-42 V5, Section 13.2.4.3, Equation (1), November 2006)

Average Wind Speed is obtained from US EPA AP-42 Table 7.1-7 for Huntington, West Virginia (closest data collection point)

Data:

| Source Parameters | | | | |
|---|---|---|---|---|
| Pollutant | Particle Size (µm) | # of Drops in Transfer Process | Average Moisture % (M) [1] | k(2) |
| PM/TSP | < 30 | 1 | 0.10 | 0.74 |
| $PM_{10}$ | < 10 | 1 | 0.10 | 0.35 |
| $PM_{2.5}$ | < 2.5 | 1 | 0.10 | 0.053 |

[1] 0.25% -4.8% maintains the quality rating level A of the equation. The moisture content of the dry fly ash is conservatively assumed to be 0.1%.

| | | | |
|---|---|---|---|
| Hours of Operation | 8,760 | hours/year (24 hours/day X 7 days/week X 52 weeks/year) | |
| Annual Average Wind Speed of Area (U)= | 5.6 | mph | annual average and highest monthly average wind speeds for Huntington, WV taken from US EPA AP-42 Table 7.1-7. |
| Highest Monthly Average Wind Speed of Area (U)= | 6.9 | mph | |

Calculations:

AP-42 (section 13.2.4.3) lb/ton of material

$$Emission\ factor\ (lb/ton) = k * (0.0032) * \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

Where: k = particle size multiplier from AP-42 Section 13.2.4.3
M = material moisture content (%)
U = mean wind speed

| TSP/PM hourly emission factor: | | |
|---|---|---|
| = (0.74) x (0.0032) x [(6.9/5)^1.3/(0.1/2)^1.4] | | |
| = | *0.2386* | lbs/ton |

| TSP/PM annual average emission factor: | | |
|---|---|---|
| = (0.74) x (0.0032) x [(5.6/5)^1.3/(0.1/2)^1.4] | | |
| = | *0.1819* | lbs/ton |

| $PM_{10\ hourly}$ emission factor: | | |
|---|---|---|
| = (0.35) x (0.0032) x [(6.9/5)^1.3/(0.1/2)^1.4] | | |
| = | *0.1129* | lbs/ton |

| $PM_{10\ annual}$ average emission factor: | | |
|---|---|---|
| = (0.35) x (0.0032) x [(5.6/5)^1.3/(0.1/2)^1.4] | | |
| = | *0.0860* | lbs/ton |

| $PM_{2.5\ hourly}$ emission factor: | | |
|---|---|---|
| = (0.053) x (0.0032) x [(6.9/5)^1.3/(0.1/2)^1.4] | | |
| = | *0.0171* | lbs/ton |

| $PM_{2.5\ annual}$ average emission factor: | | |
|---|---|---|
| = (0.053) x (0.0032) x [(5.6/5)^1.3/(0.1/2)^1.4] | | |
| = | *0.0130* | lbs/ton |

Table N-6 Fly Ash Handling Process
MGS CNP 1, LLC

| Source Name: | Fly Ash Storage Silos A & B | EPN: | 121-F-4001 A / 121-F-4001 B | |
|---|---|---|---|---|
| Proposed MAERT Limits | | Date: | 12/6/2024 | |
| FIN | EPN | Air Contaminant | lbs/hr | TPY |
| 121-S-4001 A<br>121-S-4001 B | 121-F-4001 A / 121-F-4001 B | PM | 0.02 | 0.06 |
| | | PM10 | 0.01 | 0.03 |
| | | PM2.5 | 0.00 | 0.00 |

Process Description:

Generated fly ash will be transferred to two ash storage silos via an enclosed conveyor. When a sufficient volume has been collected, the fly ash will be mixed with utility water before removed from site for disposal by trucks.

The emissions from the fly ash silos were conservatively estimated using emission factors for Aggregate Handling and Storage Piles (AP-42 V5, Section 13.2.4.3, Equation (1), November 2006).

The two fly ash silos will be used alternately. Therefore, the annual emissions from the two silos will be permitted under a cap.

Bases and Factors:

The emission factors used to estimate the uncontrolled PM, PM10 and PM2.5 emissions were presented in Table N-6 Fly Ash Handling (2). A filter will be installed on each silo and run continuously, reducing particulate emissions by 99%.

Data:

Filter control efficiency: 99%

| Pollutant | Emission Factor (lb/ton) | | Feed Rate per Hour | Feed Rate per Year | Uncontrolled | | Controlled | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Hourly Emissions | Annual Emissions | Hourly Emissions | Annual Emissions |
| | Hourly | Annual | Tons/hr | Tons/yr | lb/hr | TPY | lb/hr | TPY |
| PM | 0.2386 | 0.1819 | 7.8 | 68328.00 | 1.86 | 6.21 | 0.02 | 0.06 |
| PM10 | 0.1129 | 0.0860 | 7.8 | 68328.00 | 0.88 | 2.94 | 0.01 | 0.03 |
| PM2.5 | 0.0171 | 0.0130 | 7.8 | 68328.00 | 0.13 | 0.45 | 0.00 | 0.0045 |

Table N-6 Fly Ash Handling Process
MGS CNP 1, LLC

| Source Name: | Fly Ash Truck Loading | EPN: | 121-TL-0001 | |
|---|---|---|---|---|
| Proposed MAERT Limits | | Date: | 12/6/2024 | |
| FIN | EPN | Air Contaminant | lbs/hr | TPY |
| 121-TL-0001 | 121-TL-0001 | PM | 0.00 | 0.01 |
| | | PM10 | 0.00 | 0.01 |
| | | PM2.5 | 0.00 | 0.00 |

Process Description:

Generated fly ash will be transferred to the ash storage silos via a conveying system. When a sufficient volume has been collected, the fly ash will be mixed with utility water before removed from site for disposal by trucks. The fly ash will have a minimum moisture content of 10% when loaded into trucks.
The particulate matter emissions will be controlled by keeping high moisture content of the fly ash.

Fly Ash Loading into Trucks

Data:

| Pollutant | Emission Factor | Ash Produced per Hour | Ash Produced per Year | Hourly Emissions | Annual Emissions |
|---|---|---|---|---|---|
| | lb/Ton | Tons/hr | Tons/yr | lb/hr | TPY |
| PM | 0.0004 | 8.6 | 75336 | 0.0033 | 0.01 |
| PM10 | 0.0002 | 8.6 | 75336 | 0.0015 | 0.01 |
| PM2.5 | 0.0000 | 8.6 | 75336 | 0.0002 | 0.001 |

Emission Factors for Dry Fly Ash Handling Process:
Emissions are based on AP-42 emission factors for Aggregate Handling and Storage Piles (AP-42 V5, Section 13.2.4.3, Equation (1), November 2006)

Average Wind Speed is obtained from US EPA AP-42 Table 7.1-7 for Huntington, West Virginia (closest data collection point)

Data:

| Source Parameters | | | | |
|---|---|---|---|---|
| Pollutant | Particle Size (µm) | # of Drops in Transfer Process | Average Moisture % (M) [1] | k(2) |
| PM/TSP | < 30 | 1 | 10 | 0.74 |
| $PM_{10}$ | < 10 | 1 | 10 | 0.35 |
| $PM_{2.5}$ | < 2.5 | 1 | 10 | 0.053 |

[1] 0.25% -4.8% maintains the quality rating level A of the equation. The minimum moisture content of the wet fly ash is 10%.

| | | | |
|---|---|---|---|
| Hours of Operation | 8,760 | hours/year (24 hours/day X 7 days/week X 52 weeks/year) | |
| Annual Average Wind Speed of Area (U)= | 5.6 | mph | annual average and highest monthly average wind speeds for Huntington, WV taken from US EPA AP-42 Table 7.1-7. |
| Highest Monthly Average Wind Speed of Area (U)= | 6.9 | mph | |

Calculations:

AP-42 (section 13.2.4.3) lb/ton of material

$$Emission\ factor\ (lb/ton) = k * (0.0032) * \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

Where: k = particle size multiplier from AP-42 Section 13.2.4.3
M = material moisture content (%)
U = mean wind speed

| TSP/PM average emission factor: | | |
|---|---|---|
| = (0.74) x (0.0032) x [(6.9/5)^1.3/(10/2)^1.4] | | |
| = | *0.0004* | lbs/ton |

| $PM_{10}$ average emission factor: | | |
|---|---|---|
| = (0.35) x (0.0032) x [(6.9/5)^1.3/(10/2)^1.4] | | |
| = | *0.0002* | lbs/ton |

| $PM_{2.5}$ average emission factor: | | |
|---|---|---|
| = (0.053) x (0.0032) x [(6.9/5)^1.3/(10/2)^1.4] | | |
| = | *0.00003* | lbs/ton |

Table N-7 Sand Handling Process
MGS CNP 1, LLC

Bottom Ash and Sand Handling Process

| | | | Hourly Rate | Annual Rate | | |
|---|---|---|---|---|---|---|
| Emission Unit ID | Emission Point ID | Description | lb/hr | tpy | Control | Note |
| 121-CV-5001 A | 121-CV-5001 A | Metering Conveyor A (Bed Ash Screw A) | 2250 | 9855 | Covered | |
| 121-CV-5001 B | 121-CV-5001 B | Metering Conveyor B (Bed Ash Screw B) | 2250 | | Covered | |
| 121-CV-5002A | 121-CV-5002A | Vibrating Screener A (to separate bottom ash and sand) | 2250 | 9855 | Trough hood (Partial enclosure) | |
| 121-CV-5002B | 121-CV-5002B | Vibrating Screener B (to separate bottom ash and sand) | 2250 | | Trough hood (Partial enclosure) | |
| 121-S-6001 A | 121-S-6001 A | Bottom Ash Storage Bin A | 2000 | 8760 | NA | No emissions are expected due to the size of the material. |
| 121-S-6001 B | 121-S-6001 B | Bottom Ash Storage Bin B | 2000 | | NA | |
| 121-S-1002 | 121-S-1002 | Sand Receiving Hopper | 100000 | 1752 | NA | |
| 121-CV-1004 | 121-CV-1004 | Inclined Sand Hopper Conveyor | 100000 | 1752 | Covered | |
| 121-S-5001 | 121-S-5001 | Makeup Sand Silo | 100000 | 1752 | Vent piping to the BFB | |
| NA | NA | Chute (From Makeup Sand Silo to Sand Bucket Elevator) | 400 | 1752 | Full enclosure (Pipe) | |
| 121-CV-5003 A | 121-CV-5003 A | Transfer Conveyor A (Recycled Sand) (From Vibrating Screener A to Sand Bucket Elevator A) | 250 | 1095 | Cover assembly (partial enclosure) | |
| 121-CV-5003 B | 121-CV-5003 B | Transfer Conveyor B (Recycled Sand) (From Vibrating Screener B to Sand Bucket Elevator B) | 250 | | Cover assembly (partial enclosure) | |
| 121-CV-5004 A | 121-CV-5004 A | Sand Bucket Elevator A (Recycled Sand + Fresh Sand) | 650 | 2847 | Covered | 250 lbs/hr of reclaimed sand + 400 lbs/hr of makeup sand |
| 121-CV-5004 B | 121-CV-5004 B | Sand Bucket Elevator B (Recycled Sand + Fresh Sand) | 650 | | Covered | 251 lbs/hr of reclaimed sand + 400 lbs/hr of makeup sand |
| NA | NA | Recycle Sand Chute A (From Sand Bucket Elevator A Discharge to Boiler) | 6000 lbs/24 hours | | Full enclosure (Pipe) | No emissions |
| NA | NA | Recycle Sand Chute B (From Sand Bucket Elevator B Discharge to Boiler) | 6000 lbs/24 hours | | Full enclosure (Pipe) | No emissions |

Fugitive emissions can be expected from conveying and transferring of sand due to wind and conveyor vibration.

Basis:
Particulate emissions from the sand handling process are conservatively estimated using uncontrolled emission factors in AP-42 Table 11.12-2 for aggregate transfer.

| Source | No. of Transfer Points | Transfer Rate | | Emission Factor (lb/ton) | | | Emissions | | | | | | Protection from Wind | Efficiency [1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Short-term Emissions (lb/hr) | | | Annual Emissions (tpy) | | | | |
| | | (tons/hr) | (tons/yr) | PM | PM10 | PM2.5 | PM | PM10 | PM2.5 | PM | PM10 | PM2.5 | | |
| 121-CV-5001 A | 1 | 1.125 | 9855 | 0.0069 | 0.0033 | 0.0033 | 0.004 | 0.002 | 0.002 | 0.017 | 0.008 | 0.008 | Yes | 50% |
| 121-CV-5001 B | 1 | 1.125 | | 0.0069 | 0.0033 | 0.0033 | 0.004 | 0.002 | 0.002 | | | | Yes | 50% |
| 121-CV-5002A | 1 | 1.125 | 9855 | 0.0069 | 0.0033 | 0.0033 | 0.004 | 0.002 | 0.002 | 0.017 | 0.008 | 0.008 | Yes | 50% |
| 121-CV-5002B | 1 | 1.125 | | 0.0069 | 0.0033 | 0.0033 | 0.004 | 0.002 | 0.002 | | | | Yes | 50% |
| 121-S-1002 | 1 | 50 | 1752 | 0.0069 | 0.0033 | 0.0033 | 0.345 | 0.165 | 0.165 | 0.006 | 0.003 | 0.003 | No | 0% |
| 121-CV-1004 | 1 | 50 | 1752 | 0.0069 | 0.0033 | 0.0033 | 0.173 | 0.083 | 0.083 | 0.003 | 0.001 | 0.001 | Yes | 50% |
| 121-CV-5003 A | 1 | 0.125 | 1095 | 0.0069 | 0.0033 | 0.0033 | 0.000 | 0.000 | 0.000 | 0.002 | 0.001 | 0.001 | Yes | 50% |
| 121-CV-5003 B | 1 | 0.125 | | 0.0069 | 0.0033 | 0.0033 | 0.000 | 0.000 | 0.000 | | | | Yes | 50% |
| 121-CV-5004 A | 1 | 0.325 | 2847 | 0.0069 | 0.0033 | 0.0033 | 0.001 | 0.001 | 0.001 | 0.005 | 0.002 | 0.002 | Yes | 50% |
| 121-CV-5004 B | 1 | 0.325 | | 0.0069 | 0.0033 | 0.0033 | 0.001 | 0.001 | 0.001 | | | | Yes | 50% |
| | | | | | | TOTAL | 0.536 | 0.256 | 0.256 | 0.050 | 0.024 | 0.024 | | |

[1] Design is still in progress. Because there will be covers on the conveyors to reduce wind speed, an emission control efficiency of 50% is used in the calculations.

Table N-8 Sodium Bicarbonate Handling Process
MGS CNP 1, LLC

| | | | Hourly Rate | Annual Rate | | |
|---|---|---|---|---|---|---|
| Emission Unit | Emission Point | Description | lb/hr | tpy | Control | Note |
| 121-S-9901 | 121-PKG-3001; 122-T-1001 | Sodium Bicarbonate Storage Silo | 13000 | 438 | Vent routed to boiler and controlled by the boiler PJFF | Batch operation; NaHCO3 will be pneumatically transferred to the silo. |
| 121-S-9902 A | 121-F-9902 A | Sodium Bicarbonate Vent Hopper A | 100 | 438 | Pulse Jet Filter 121-F-9902 A | |
| 121-S-9902 B | 121-F-9902 B | Sodium Bicarbonate Vent Hopper B | 100 | | Pulse Jet Filter 121-F-9902 B | |

Table N-8 Sodium Bicarbonate Handling Process
MGS CNP 1, LLC

| Source Name: | Sodium Bicarbonate Vent Hoppers | EPN: | 121-F-9902 A; 121-F-9902 B | |
|---|---|---|---|---|
| Proposed MAERT Limits | | Date: | 12/6/2024 | |
| FIN | EPN | Air Contaminant | lbs/hr | TPY |
| 121-F-9902 A; 121-F-9902 B | 121-F-9902A; 121-F-9902 B | PM | 1.95E-04 | 8.54E-04 |
| | | PM10 | 7.50E-05 | 3.29E-04 |
| | | PM2.5 | 7.50E-05 | 3.29E-04 |

Process Description:

From the NaHCO3 Silo, NaHCO3 will be gravity fed to the vent hoppers.
The emissions from the vent hoppers are estimated using emission factors from Table 11.19.2-2 in Section 11.19.2 of AP-42.

Bases and Factors:

0.039 lb/ton and 0.015 lb/ton are used to estimate the uncontrolled PM and PM10/PM2.5 emissions. Each vent hopper will be equipped with one filter and will reduce particulate emissions by 90%.

To represent worst case emissions, the maximum hourly emissions for each vent hopper are based on the total amount of NaHCO3 to flow through the vent hoppers, rather than splitting the emissions in half. The annual emissions for both vent hoppers are permitted under a cap.

Data:

Filter control efficiency: 90%

| Pollutant | Emission Factor | Feed Rate per Hour | Feed Rate per Year | Uncontrolled | | Controlled | |
|---|---|---|---|---|---|---|---|
| | | | | Hourly Emissions | Annual Emissions | Hourly Emissions | Annual Emissions |
| | lb/ton | Tons/hr | Tons/yr | lb/hr | TPY | lb/hr | TPY |
| PM | 0.039 | 0.05 | 438.00 | 0.00195 | 0.0085 | 0.0002 | 0.0009 |
| PM10 | 0.015 | 0.05 | 438.00 | 0.00075 | 0.0033 | 0.0001 | 0.0003 |
| PM2.5 | 0.015 | 0.05 | 438.00 | 0.00075 | 0.0033 | 0.0001 | 0.0003 |

***Cooling Tower***

***One open recirculating, induced draft and counterflow cooling tower will be installed to support the facility's operation. The cooling tower will have 6 cells.***

| | | Cooling Tower | Notes |
|---|---|---|---|
| | **Emission Unit ID** | 129-CT-9301 | |
| | EPN | 129-CT-9301 | |
| Input | Recirculation Rate (gpm) | 80,762 | Rated capacity, Design Info |
| | Drift (%)[2] | 0.001 | Design Info |
| | Maximum TDS (ppm) | 5000 | |
| | Annual Average TDS (ppm) | 1700 | |
| | Annual operating hours | 8760 | |
| Calculated Emissions | Avg. PM (lb/hr) | 0.69 | |
| | Max. PM (lb/hr) | 2.02 | |
| | PM (tpy) | 3.01 | |
| | Avg. PM10 (lb/hr) | 0.57 | |
| | Max. PM10 (lb/hr) | 1.48 | |
| | PM10 (tpy) | 2.52 | |
| | Avg. PM2.5 (lb/hr) | 0.29 | |
| | Max. PM2.5 (lb/hr) | 0.67 | |
| | PM2.5 (tpy) | 1.26 | |

Cooling Tower Water Info:

| | | | |
|---|---|---|---|
| concentration ratio: | 5 | | Design Info |
| TDS (average) make up water: | 340 | ppmw | Design Info |
| TDS (maximum) make up water: | 1,000 | ppmw | |
| Maximum TDS: | 5,000 | ppmw | |
| Annual Average TDS: | 1700 | ppmw | |

| | | |
|---|---|---|
| Recirculation Rate: | 18,386 | m3/hr |
| Water density: | 8.34 | lb/gal |
| | 997 | kg/m3 |
| 1 lb = | 453.59 | grams |
| 1 hr = | 60 | min |
| 1 kg = | 1000 | grams |

Equation: PM = Recirculation Rate, gpm * Drift% * 8.34 lb/gal * 60 min/hr * TDS ppm/1000000 Reference (1)

**Particle Size Calculation (Hourly Max.)[3]**

| **Cooling Tower Droplet Size** | | | **Particle Size** | | |
|---|---|---|---|---|---|
| **Droplet (Dd, microns)** | **Mean (Dd, microns)** | **Distribution (% Mass Smaller Than)** | **(Dp, microns)** | **PM 10 %Mass** | **PM2.5 %Mass** |
| < 15 | 7.5 | 20.00 | 0.983 | | 33.23 |
| 15 - 35 | 25 | 40.00 | 3.277 | | |
| 35 - 65 | 50 | 60.00 | 6.554 | 73.14 | |
| 65 - 115 | 90 | 80.00 | 11.797 | | |
| 115 - 170 | 142.5 | 90.00 | 18.679 | | |
| 170 - 230 | 200 | 95.00 | 26.216 | | |
| 230 - 275 | 252.5 | 99.00 | 33.098 | | |
| 275 - 525 | 400 | 99.80 | 52.432 | | |
| > 525 | 525 | 100.00 | 68.817 | | |

| Particle Size Calculation (Annual Emis.)[3] | | | | | |
|---|---|---|---|---|---|
| **Cooling Tower Droplet Size** | | | **Particle Size** | | |
| **Droplet (Dd, microns)** | **Mean (Dd, microns)** | **Distribution (% Mass Smaller Than)** | **(Dp, microns)** | **PM 10 %Mass** | **PM2.5 %Mass** |
| < 15 | 7.5 | 20.00 | 0.686 | | |
| 15 - 35 | 25 | 40.00 | 2.287 | | 41.86 |
| 35 - 65 | 50 | 60.00 | 4.574 | | |
| 65 - 115 | 90 | 80.00 | 8.234 | 83.68 | |
| 115 - 170 | 142.5 | 90.00 | 13.037 | | |
| 170 - 230 | 200 | 95.00 | 18.298 | | |
| 230 - 275 | 252.5 | 99.00 | 23.101 | | |
| 275 - 525 | 400 | 99.80 | 36.595 | | |
| > 525 | 525 | 100.00 | 48.031 | | |

Dp = Dd * [(pd/pp) * (TDS) / 1,000,000)] ^ 1/3

where: Density of Water (pd)= 1
Density of TDS (pp) = 2.22
TDS is assumed to be sodium chloride.

**Equations and Example Calculations:**

Max. PM Hourly Emissions (lb/hr) = Cooling Water Circulation Rate (gpm) * Drift (%) * 60 * 8.34 * Max. TDS in Circulating Water (ppm)/1000000

$$= \frac{80{,}762\ \text{gal}}{\text{min}} \times \frac{0.0010\%}{} \times \frac{60\ \text{min}}{\text{hr}} \times \frac{8.34\ \text{lb}}{\text{gal}} \times \frac{5000\ \text{parts}}{1000000\ \text{parts}} = \frac{2.02\ \text{lb}}{\text{hr}}$$

PM Annual Emissions (tpy) = Average PM Emissions (lb/hr) * Maximum Hours of Operation * Conversion (1 ton/2000 lb)

$$= \frac{0.69\ \text{lb}}{\text{hr}} \times \frac{8760\ \text{hrs}}{\text{yr}} \times \frac{1\ \text{ton}}{2000\ \text{lbs}} = \frac{3.01\ \text{tons}}{\text{yr}}$$

Max. PM10 Hourly Emissions (lb/hr) = Max. PM Hourly Emissions (lb/hr) * Mass of drift with PM10 (%)

$$= \frac{2.02\ \text{lb}}{\text{hr}} \times \frac{73.14\%}{} = \frac{1.48\ \text{lbs}}{\text{hr}}$$

PM10 Annual Emissions (tpy) = Average PM10 Hourly Emissions (lb/hr) *Maximum Hours of Operation (hr/yr) * (1 ton/2000 lb)

$$= \frac{0.57\ \text{lb}}{\text{hr}} \times \frac{8760\ \text{hrs}}{\text{yr}} \times \frac{1\ \text{ton}}{2000\ \text{lbs}} = \frac{2.52\ \text{tons}}{\text{yr}}$$

Max. PM2.5 Hourly Emissions (lb/hr) = Max. PM Hourly Emissions (lb/hr) * Mass of drift with PM2.5 (%)

$$= \frac{2.02\ \text{lb}}{\text{hr}} \times \frac{33.23\%}{} = \frac{0.67\ \text{lbs}}{\text{hr}}$$

PM2.5Annual Emissions (tpy) = Average PM2.5 Hourly Emissions (lb/hr) *Maximum Hours of Operation (hr/yr) * (1 ton/2000 lb)

$$= \frac{0.29\ \text{lb}}{\text{hr}} \times \frac{8760\ \text{hrs}}{\text{yr}} \times \frac{1\ \text{ton}}{2000\ \text{lbs}} = \frac{1.26\ \text{tons}}{\text{yr}}$$

**References**

1. AP-42 Chapter 13.4 Cooling Towers.
2. 0.001% Drift is based on design.
3. Calculation Methodology is based on "Calculating Realistic PM10 Emissions from Cooling Towers", Joel Reisman and Gordon Frisbie, Greystone Environmental Consultants, Sacramento, CA.

Table N-10a Fugitive Road - Annual
MGS CNP 1, LLC

Annual Emission Rate

| Unit EPN | Vehicles Per Day | Hours of Vehicle Traffic (hrs/day) | Road Length (miles) | Vehicle Mile Travelled Hourly (VMT/hr) |
|---|---|---|---|---|
| PM-PlantRd | 107 | 24 | 0.63 | 2.81 |

| Constituents | Emission Factor | | Average Hourly Emissions (lb/hr) | Annual Emissions (ton/yr) |
|---|---|---|---|---|
| | Factor | Units | | |
| **Criteria Pollutants** | | | | |
| PM | 0.7725 | lb/VMT | 2.17 | 9.50 |
| PM 2.5 | 0.0379 | lb/VMT | 0.11 | 0.47 |
| PM 10 | 0.1545 | lb/VMT | 0.43 | 1.90 |

**Assumptions:**

All roads paved

Maximum annual emission rate assumes 107 vehicle/24 hr day.

Mix of vehicles

| | |
|---|---|
| 4.90% | 25.5 ton |
| 5.88% | 30 ton |
| 94.12% | 31.5 ton |
| Average weight | 32.7 ton |

Maximum inside plant speed (posted speed limit) 20 mph.

Number of days with rainfall greater than 0.01 inch is 140 days.

Table N-10a Fugitive Road - Annual
MGS CNP 1, LLC

**Constants:**

| | | |
|---|---|---|
| k for PM | 0.011 | lb/VMT, Particle size multiplier for particle size range. |
| k for PM2.5 | 0.00054 | lb/VMT, Particle size multiplier for particle size range. |
| k for PM10 | 0.0022 | lb/VMT, Particle size multiplier for particle size range. |
| sL | 2.4 | $g/m^2$, Road surface silt loading |
| W | 32.7 | ton, Average weight of the vehicles travelling the road. |
| P | 140 | days, Number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period based on Figure 13.2.1-2 in AP-42. |
| N | 365 | days, Number of days in the averaging period. |
| | 8760 | hrs, Annual operation |

**Equations and Example Calculations:**

(1) PM Emission Factor (lb/VMT) = $EF = [k * (sL)^{0.91} * (W)^{1.02}](1-P/4N)$

= 0.011 lb/VMT * $(2.4\ g/m^2)^{0.91}$ *$(32.7\ ton)^{1.02}$ * (1-140/(4*365))

0.7725 lb/VMT

(2) PM Average Hourly Emission (lb/hr) = (VMT Hourly) * (EF for PM)

(2.79 VMT/hr) * (0.7725 lb/VMT)

2.17 lb/hr

(3) PM Annual Emission (ton/yr) = (PM Hourly Emission * Annual Operation) / 2000 lb/ton

(2.17 lb/hr * 8760 yrs) / 2000 lb/ton

9.50 ton/yr

**References:**

(1) AP-42, 13.2.1 Paved Roads
(2) Particle size multiplier, k, from Table 13.2.1-1
(3) Road surface silt loading constant, sL, estimated based on low traffic travel in Table 13.2.1-2 with application of identified controls:
•Paving of all in-plant haul roads
•Post and limit the maximum travelling speed to 20 mph

Table N-10b Fugitive Road - Hourly
MGS CNP 1, LLC

Max Hourly Rate

| Unit EPN | Vehicles Per Day | Hours of Vehicle Traffic (hrs/day) | Road Length (miles) | Vehicle Mile Travelled Hourly (VMT/hr) |
|---|---|---|---|---|
| PM-PlantRd | 203 | 10 | 0.63 | 12.79 |

| Constituents | Emission Factor | | Max Hourly Emissions (lb/hr) |
|---|---|---|---|
| | Factor | Units | |
| **Criteria Pollutants** | | | |
| PM | 0.8395 | lb/VMT | 10.74 |
| PM 2.5 | 0.0412 | lb/VMT | 0.527 |
| PM 10 | 0.1679 | lb/VMT | 2.15 |

**Assumptions:**

All roads paved

Maximum hourly emission rate assumes 198 vehicle/10 hr day.

Mix of vehicles

| | |
|---|---|
| 2.53% | 25.5 ton |
| 3.03% | 30 ton |
| 96.97% | 31.5 ton |
| Average weight | 32.1 ton |

Maximum inside plant speed (posted speed limit) 20 mph.

Number of hours with rainfall greater than 0.01 inch is 0 days.

Table N-10b Fugitive Road - Hourly

MGS CNP 1, LLC

**Constants:**

| | | |
|---|---|---|
| k for PM | 0.011 | lb/VMT, Particle size multiplier for particle size range. |
| k for PM2.5 | 0.00054 | lb/VMT, Particle size multiplier for particle size range. |
| k for PM10 | 0.0022 | lb/VMT, Particle size multiplier for particle size range. |
| sL | 2.4 | $g/m^2$, Road surface silt loading |
| W | 32.1 | ton, Average weight of the vehicles travelling the road. |
| P | 0 | days, Number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period. |
| N | 1 | days, Number of days in the averaging period. |

**Equations and Example Calculations:**

(1) PM Emission Factor (lb/VMT) = $EF = k * (sL)^{0.91} * (W)^{1.02}$

= 0.011 lb/VMT * $(2.4\ g/m^2)^{0.91}$ *$(32.1\ ton)^{1.02}$ * (1-0/4*1)

0.8395 lb/VMT

(2) PM Hourly Emission (lb/hr) = (VMT Hourly) * (EF for PM)

(12.79 VMT/hr) * (0.8395 lb/VMT)

10.74 lb/hr

**References:**

(1) AP-42, 13.2.1 Paved Roads

(2) Particle size multiplier, k, from Table 13.2.1-1

(3) Road surface silt loading constant, sL, estimated based on low traffic travel in Table 13.2.1-2 with application of identified controls:

•Paving of all in-plant haul roads

•Post and limit the maximum travelling speed to 20 mph

Table N-11 Fixed Roof Tanks Emissions
MGS CNP 1, LLC

Fixed roof tank emissions:
Breathing and working losses from fixed roof tanks were estimated using equations and methodology from AP-42 Chapter 7.
Emissions are based on the anticipated annual throughput for each tank along with the material composition to be stored.

| Equipment ID | Description | Tank Type | Throughput | Maximum Filling Rate | Working Volume | | Shell Height/Length | Max. Liquid Height | Diameter | Heated/Insulated | | Control |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | (bbl/yr) | (bbl/hr) | (bbl) | (gal) | (ft) | (ft) | (ft) | (Y/N) | °F | |
| 128-V-9001 | Ammonia Storage Tank | Vertical | 11,140.00 | 154.70 | 196 | 8,225 | 17.5 | 14 | 10 | N | NA | to atmosphere |
| 122-TK-9901 | Lean Amine Tank | Vertical | 7,670.63 | 1,167.00 | 7,162 | 300,789 | 40 | 32 | 40 | Y | 50 | to atmosphere |
| TOTAL | 2 | | | | | | | | | | | |

Table N-11 Fixed Roof Tanks Emissions - Amine Tanks
MGS CNP 1, LLC

| Company Name | | | | MGS CNP 1, LLC | |
|---|---|---|---|---|---|
| Site Name | | | | BECCS Plant | |
| Emission Unit ID | | | | 122-TK-9902 | 122-TK-9901 |
| Description | | | | Amine Makeup Tank | Lean Amine Tank |

INPUT DATA

Tank Data

| | | | | | |
|---|---|---|---|---|---|
| Tank Type (Vertical or Horizontal) | | | | Vertical Fixed Roof | Vertical Fixed Roof |
| Diameter, D | D | ft | | 10.00 | 40 |
| Height, H (or length for horizontal tanks) | $H_S$ | ft | | 15.00 | 40 |
| Roof Type | | | | Cone | Cone |
| Cone Roof Slope (cone roof only), $S_R$ | $S_R$ | dimensionless, default 0.0625 | | 0.0625 | 0.0625 |
| Shell Paint Color | | | | White | White |
| Shell Paint Condition | | | | Good | Good |
| Roof Paint Color | | | | White | White |
| Roof Paint Condition | | | | Good | Good |
| Breather Vent Pressure Setting, $P_{BP}$ | $P_{BP}$ | psig (default is 0.03) | | 0.03 | 0.03 |
| Breather Vent Vacuum Setting, $P_{BV}$ | $P_{BV}$ | psig (default is - 0.03) | | -0.03 | -0.03 |
| Pressure of Vapor Space at Normal Conditions, $P_I$ | $P_I$ | psig (default is 0) | | 0 | 0 |
| Maximum Liquid Height, $H_{LX}$ | $H_{LX}$ | ft | | 12.00 | 32.00 |
| Minimum Liquid Height, $H_{LN}$ | $H_{LN}$ | ft | | 1 | 2 |
| Average Liquid Height, $H_{LA}$ | $H_{LA}$ | ft | $H_{LX}/2$ | 6.00 | 16.00 |
| Maximum Hourly Throughput, $Q_{MAX}$ | $Q_{MAX}$ | bbl/hr | | 167.85 | 1167.00 |
| Annual Throughput, $Q_{ANN}$ | $Q_{ANN}$ | bbl/yr | | 509.00 | 7670.63 |
| Control Type | | | | NA | NA |
| Control Efficiency | | | | NA | NA |
| Tank insulated? | | | | Yes | Yes |
| | $T_{LA}$, $T_B$, $T_{LX}$, $T_{LN}$ | °R | | 509.67 | 509.67 |
| Tank Maximum Liquid Volume, $V_{LX}$ | $V_{LX}$ | Gal | | 6462.71 | 282008.96 |

Meteorological Data

| | | | | | |
|---|---|---|---|---|---|
| Daily Min. Ambient Temp, $T_{AN}$ | $T_{AN}$ | °F | | 46.2 | 46.2 |
| Daily Max. Ambient Temp, $T_{AX}$ | $T_{AX}$ | °F | | 65.3 | 65.3 |
| Daily Total Solar Insolation, I | I | Btu/($ft^2$-day) | | 1250 | 1250 |
| Atmospheric Pressure, $P_A$ | $P_A$ | psia (default is 14.7) | | 14.26 | 14.26 |

Table N-11 Fixed Roof Tanks Emissions - Amine Tanks
MGS CNP 1, LLC

Material Data

| | | | | | |
|---|---|---|---|---|---|
| Working Loss Product Factor, $K_P$ | $K_P$ | dimensionless (0.75 for crude oils, 1.0 for all other organic | | 1 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| Total Losses, $L_T$ (Eq. 1-1) | $L_T$ | tpy | $L_T = L_S + L_W$ | 0.001 | 0.010 |
| Total Losses, $L_T$ (Eq. 1-1) | $L_T$ | lb/yr | $L_T = L_S + L_W$ | 1.35 | 20.34 |
| Standing Storage Losses, $L_S$ (Eq. 1-4) | Ls | lb/yr | $L_S = 365V_VW_VK_EK_S$ | 0.00 | 0.00 |
| Tank Vapor Space Volume, $V_V$ (Eq. 1-3) | $V_V$ | $ft^3$ | $V_V = ((\pi/4)D_E^2)H_{VO}$ | 715.04 | 30682.89 |
| Vapor Space Outage, $H_{VO}$ (Eq. 1-16) | $H_{VO}$ | ft | $H_{VO} = H_S - H_L + H_{RO}$ (vertical tanks) | 9.10 | 24.42 |
| Cone Roof Outage, $H_{RO}$ (Eq. 1-17) | $H_{RO}$ | ft | $H_{RO} = H_R/3$ (cone roof) | 0.10 | 0.42 |
| Cone Tank Roof Height, $H_R$ (Eq. 1-18) | $H_R$ | ft | $H_R = S_RR_S$ (cone roof) | 0.31 | 1.25 |
| Vapor Space Expansion Factor, $K_E$ (Eq. 1-5) | $K_E$ | dimensionless | $K_E = \Delta T_V/T_{LA} + (\Delta P_V - \Delta P_B)/(P_A - P_{VA})$ | 0.00 | 0.00 |
| Vapor Space Expansion Factor, $K_E$ (Eq. 1-12) | $K_E$ | dimensionless | $K_E = 0.0018\Delta T_V$ | 0.00 | 0.00 |
| Average Daily Vapor Temperature Range, $\Delta T_V$ (Eq. 1-6) | $\Delta T_V$ | °R | $\Delta T_V = (1-0.8/(2.2*(Hs/D)+1.9))\Delta T_A + (0.042\alpha_R I+0.026(Hs/D)\alpha_S I)/(2.2(Hs/D)+1.9)$ | 0.00 | 0.00 |
| Average Daily Vapor Temperature Range, $\Delta T_V$ (Eq. 1-7) | $\Delta T_V$ | °R | $\Delta T_V = 0.7\Delta T_A + 0.02\alpha I$ | 0.00 | 0.00 |
| Paint Solar Absorptance, α (Table 7.1-6) | | dimensionless | | 0.17 | 0.17 |
| Average Daily Ambient Temperature Range, $\Delta T_A$ (Eq. 1-11) | $\Delta T_A$ | °R | $\Delta T_A = T_{AX} - T_{AN}$ | 19.10 | 19.10 |
| Average daily liquid Surface Temperature, $T_{LA}$ (Eq. 1-27) | $T_{LA}$ | °R | $T_{LA} = (0.5-0.8/(4.4(Hs/D)+3.8))T_{AA} + (0.5 + 0.8/(4.4(Hs/D)+3.8))T_B + (0.021\alpha_R I + 0.013 (Hs/D)\alpha_S I)/(4.4(Hs/D)+3.8))$ | 509.67 | 509.67 |
| | | °F | | 50.00 | 50.00 |
| | | °C | | 10.00 | 10.00 |
| | | K | | 283.15 | 283.15 |
| Average daily Liquid Surface Temperature, $T_{LA}$ (Eq. 1-28) | $T_{LA}$ | °R | $T_{LA} = 0.4T_{AA} + 0.6T_B+0.005\alpha I$ | 509.67 | 509.67 |
| | | °F | | 50.00 | 50.00 |
| | | °C | | 10.00 | 10.00 |
| | | K | | 283.15 | 283.15 |
| Liquid Bulk Temperature, $T_B$ (Eq. 1-31) | $T_B$ | °R | $T_B = T_{AA} + 0.003\alpha I$ | 509.67 | 509.67 |
| | | °F | | 50.00 | 50.00 |
| Average Daily Ambient Temperature, $T_{AA}$ (Eq. 1-30) | $T_{AA}$ | °R | $T_{AA} = (T_{AX} + T_{AN})/2$ | 515.42 | 515.42 |
| Average Daily Minimum Liquid Surface Temperature, $T_{LN}$ (Fig 7.1-17) | $T_{LN}$ | °R | $T_{LN} = T_{LA} - 0.25\Delta T_V$ | 509.67 | 509.67 |
| | | °F | | 50.00 | 50.00 |
| | | °C | | 10.00 | 10.00 |
| | | K | | 283.15 | 283.15 |
| Average Daily Maximum Liquid Surface Temperature, $T_{LX}$ (Fig. 7.1-17) | $T_{LX}$ | °R | $T_{LX} = T_{LA} + 0.25\Delta T_V$ | 509.67 | 509.67 |
| | | °F | | 50.00 | 50.00 |
| | | °C | | 10.00 | 10.00 |
| | | K | | 283.15 | 283.15 |
| Daily Vapor Pressure Range, $\Delta P_V$ (Eq. 1-9) | $\Delta P_V$ | psia | $\Delta P_V = P_{VX} - P_{VN}$ | 0.000 | 0.000 |
| Is the fixed roof tank of bolted or riveted construction? | | | | No | No |

Table N-11 Fixed Roof Tanks Emissions - Amine Tanks
MGS CNP 1, LLC

| | | | | | |
|---|---|---|---|---|---|
| Breather Vent Pressure Setting Range, $\Delta P_B$ (Eq. 1-10) | $\Delta P_B$ | psig | $\Delta P_B = P_{BP} - P_{BV}$ | 0.06 | 0.06 |
| Vented Vapor Saturation Factor, $K_S$ (Eq. 1-21) | $K_S$ | dimensionless | $K_S = 1/(1 + 0.053 P_{VA} H_{VO})$ | 0.93 | 0.84 |
| Vapor Pressure at the Average Daily Liquid Surface Temp., $P_{VA}$ (Eq. 1-24) | $P_{VA}$ | psia | | 0.1451 | 0.1451 |
| Stock Vapor Density, $W_V$ (Eq. 1-22) | $W_V$ | lb/ft$^3$ | $W_V = (M_V P_{VA})/(RTv)$ | 4.73E-04 | 4.73E-04 |
| Vapor Molecular Weight, $M_V$ (Eq. 1-23) | $M_V$ | lb/lb-mol | | 18.06 | 18.06 |
| Average Vapor Temperature, $T_V$ (Eq. 1-32) | $T_V$ | °R | $T_V = ((2.2(Hs/D)+1.1)T_{AA} + 0.8T_B+0.021\alpha_R I + 0.013(Hs/D)\alpha_s I)/(2.2(Hs/D)+1.9)$ | 516.19 | 516.06 |
| Average Vapor Temperature, $T_V$ (Eq. 1-33) | $T_V$ | °R | $T_V = 0.7T_{AA} + 0.3T_B + 0.009\alpha I$ | 509.67 | 509.67 |
| Working Loss, $L_W$ (Eq. 1-29) | $L_W$ | lb/yr | $L_W = V_Q K_N K_P W_V K_B$ | 1.35 | 20.34 |
| Number of Turnovers per Year, N (Eq. 1-30) | N | dimensionless | $N = 5.614Q/V_{LX}$ | 3.31 | 1.14 |
| Working Loss Turnover (saturation) factor, $K_N$ | $K_N$ | dimensionless | | 1.00 | 1.00 |
| Working Loss Product Factor, $K_P$ | $K_P$ | dimensionless | | 1 | 1 |
| Tank Maximum Liquid Volume, $V_{LX}$ (Eq. 1-31) | $V_{LX}$ | ft$^3$ | $V_{LX} = (\pi/4)D^2(H_{LX}-H_{LN})_)$ | 863.94 | 37699.11 |
| Vent Setting Correction Factor Test (Eq. 1-40) | | | $K_N(P_{BP} + P_A)/(P_I + P_A) > 1.0$ | 1.002 | 1.002 |
| Vent Setting Correction Factor, $K_B$ (Eq. 1-41) | $K_B$ | dimensionless | | 0.998 | 0.998 |
| Vent Setting Correction Factor, $K_B$ | $K_B$ | dimensionless | $K_B = (((P_I + P_A)/K_N) - P_{VA})/(P_{BP} + P_A - P_{VA})$ | 0.998 | 0.998 |

MAXIMUM HOURLY EMISSIONS (TCEQ GUIDANCE DOCUMENT "ESTIMATING SHORT TERM EMISSION RATES FROM FIXED ROOF TANKS", 02/20)

| | | | | | |
|---|---|---|---|---|---|
| Maximum Short-Term Emission Rate, $L_{MAX}$ (Eq. 1) | $L_{MAX}$ | lb/hr | $L_{MAX} = (M_V \times P_{VA} \times FR_M)/(R \times T)$ | 0.45 | 3.14 |
| Vapor Molecular Weight of the Compound, $M_V$ | | lb/lbmol | | 18.06 | 18.06 |
| Maximum Filling Rate, $FR_M$ | | gal/hr | | 7049.73 | 49014.00 |
| Ideal Gas Constant, R | R | [(psia × gal)/(lbmol × ° R)] | | 80.27 | 80.27 |
| Worst Case Liquid Surface Temperature, T | $T_{LX}$ + 10 | °R | input or 95 as max. ambient | 509.67 | 509.67 |
| Vapor Pressure of the Tank Contents at $T_{MAX}$ | $P_{VA}$ | psia | | 0.15 | 0.15 |

Speciated Emissions (122-TK-9901)

| | | | | | 122-TK-9901 | |
|---|---|---|---|---|---|---|
| | | | | | Uncontrolled Emissions | |
| | Vapor Phase @ $T_{LA}$ | Vapor Phase @ $T_{LX}$ | Vapor Phase @ $T_{LN}$ | Vapor Phase @ $T_{max}$ | | |
| Components | wt% | wt% | wt% | wt% | (lb/hr) | (tpy) |
| MEA | 0.27 | 0.27 | 0.27 | 0.27 | 1.20E-03 | 1.79E-06 |
| MDEA | 0.05 | 0.05 | 0.05 | 0.05 | 2.40E-04 | 3.59E-07 |
| Water | 99.68 | 99.68 | 99.68 | 99.68 | 0.4502 | 0.0007 |

Speciated Emissions (122-TK-2001)

| | | | | | 122-TK-2201 | |
|---|---|---|---|---|---|---|
| | | | | | Uncontrolled Emissions | |
| | Vapor Phase @ $T_{LA}$ | Vapor Phase @ $T_{LX}$ | Vapor Phase @ $T_{LN}$ | Vapor Phase @ $T_{max}$ | | |
| Components | wt% | wt% | wt% | wt% | (lb/hr) | (tpy) |
| MEA | 0.27 | 0.27 | 0.27 | 0.27 | 8.33E-03 | 2.70E-05 |
| MDEA | 0.05 | 0.05 | 0.05 | 0.05 | 1.67E-03 | 5.41E-06 |
| Water | 99.68 | 99.68 | 99.68 | 99.68 | 3.1299 | 0.0101 |

Table N-11 Fixed Roof Tanks Emissions - Vapor Pressure Amine
MGS CNP 1, LLC

Vapor Pressure Calculations for Tanks 122-TK-9901 and 122-TK-9902

| | | | | a | b | c | $P_{VAi}$ | $P_{VXi}$ | $P_{VNi}$ | $P_{max}$ | Vapor Phase @ $T_{LA}$ | Vapor Phase @ $T_{LX}$ | Vapor Phase @ $T_{LN}$ | Vapor Phase @ $T_{max}$ | Vapor Phase @ $T_{LA}$ | Vapor Phase @ $T_{LX}$ | Vapor Phase @ $T_{LN}$ | Vapor Phase @ $T_{max}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Components | MW | Wt.% | mol% | dimensionless | (°K) | (°K) | psia | psia | psia | psia | mol% | mol% | mol% | mol% | wt% | wt% | wt% | wt% |
| MEA [1] | 61.08 | 23.00 | 10.85 | 4.29252 | 1408.87 | -116.093 | 0.0010484 | 0.0010484 | 0.0010484 | 0.0010484 | 0.0785 | 0.0785 | 0.0785 | 0.0785 | 0.2653 | 0.2653 | 0.2653 | 0.2653 |
| MDEA [2] | 119.163 | 25.00 | 6.04 | | | | 0.0001934 | 0.0001934 | 0.0001934 | 0.0001934 | 0.008 | 0.008 | 0.008 | 0.008 | 0.05 | 0.05 | 0.05 | 0.05 |
| Water [3] | 18.02 | 52.00 | 83.11 | 4.6543 | 1435.264 | -64.848 | 0.17 | 0.17 | 0.17 | 0.17 | 99.913 | 99.913 | 99.913 | 99.913 | 99.68 | 99.68 | 99.68 | 99.68 |
| | | | | | | | 0.14 | 0.14 | 0.14 | 0.14 | | | | | | | | |
| | MW of Liquid Product | | | | | | Vapor Pressures | | | | MW of Vapor | | | | | | | |
| | MW | 28.80 | | | | TOTAL | 0.15 | 0.15 | 0.15 | 0.15 | 18.06 | 18.06 | 18.06 | 18.06 | | | | |

[1] Pressure equation for MEA is $P_{VA}$ in bar and T in °K. P = 10^(A-B/(C+T)). (https://webbook.nist.gov/cgi/cbook.cgi?ID=C141435&Mask=4&Type=ANTOINE&Plot=on).
$P_{VA}$ in bar is converted to psia by multiplying 14.50377. Temperature range [338.6 to 444.1] K.

[2] MDEA has a vapor pressure less than 0.01 mm Hg at 20 °C. The amine tank is kept at 10 °C. 0.01 mmHg was used in the calculation to obtain conservative results.

[3] Pressure equation for water is $P_{VA}$ in bar and T in °K. P = 10^(A-B/(C+T)). (https://webbook.nist.gov/cgi/cbook.cgi?ID=C7732185&Mask=4&Type=ANTOINE&Plot=on).
$P_{VA}$ in bar is converted to psia by multiplying 14.50377. Temperature range [255.9 - 373] K.

**There will be one diesel-fired fire water pump, with rating @ 600 hp.**
Sulfur content of fuel used in engines will be 15 ppm sulfur or less.
Annual non-emergency operating hours will be limited to 100 hr/yr.
Engines will be new (model year 2024 or later).

**FIN:** **129-P-9402** **EPN:** **129-P-9402**

| | | |
|---|---|---|
| **Fuel Type:** | **Diesel** | |
| **Year** | 2024 | |
| **Total Engines:** | 1 | |
| **Fuel Consumption per Engine:** | 35.90 | gal/hr |
| **Diesel Density** [1] | 7.001 | lb/gal |
| **Fuel Consumption per Engine:** | 251.34 | lbs/hr |
| **Diesel Fuel Heat Content (HHV):** [1] | 19,300 | Btu/lb |
| **Heat Input (HHV) per Engine:** | 4.85 | MMBtu/hr |
| **Engine Horsepower Output:** | 600 | hp |
| **Engine Output:** | 447 | kW |
| **Annual Operation:** | 100 | hr/yr |
| **Engine Load:** | 100% | |
| **Displacement per Cylinder** | < 30 L per cylinder | |
| **Brake Specific Fuel Consumptions:** [2] | 8084.64 | Btu/hp-hr |

Notes:
[1] 19,300 Btu/lb is the average heating value of diesel and 7.001 lb/gal is the density of diesel as provided by vendor.
[2] Brake specific fuel consumption per hour = (Heat Input (HHV)) / (Engine Horsepower Output (hp)).

**Water Pump Diesel Engine Emission Rates**

| **Pollutant** | **Emission Factor** [1,2,3] | | **Emissions Rates (Per Engine)** | | |
|---|---|---|---|---|---|
| | | | **Max. Hourly** | **Annual Average**[4] | **Annual** |
| | | | **lb/hr** | **lb/hr** | **tpy** |
| **NOX** [1] | 4.0 | g/kw-hr | 3.95 | 0.05 | 0.20 |
| **CO** [1] | 3.5 | g/kw-hr | 3.45 | 0.04 | 0.17 |
| **PM10** [1,3] | 0.2 | g/kw-hr | 0.20 | 0.002 | 0.01 |
| **PM2.5** [1,3] | 0.2 | g/kw-hr | 0.20 | 0.0023 | 0.01 |
| **VOC** [1] | 4.0 | g/kw-hr | 3.95 | 0.05 | 0.20 |
| **SO2** [2] | 1.26E-05 | lb/hp-hr | 0.01 | 0.00 | 0.000 |

Notes:
1. NOX, CO, PM, and VOC emission factors are from 40 CFR 60.4205(c) for engines with rated power greater than or equal to 600 hp (450 kW) but less than or equal to 750 hp (560 kW). NSPS Subpart IIII specifies to use emission factors from Table 4 to 40 CFR Subpart IIII.
2. Emission factors for SO2 based on 15 ppmw ULSD.
3. All PM is assumed to be less than 1.0 µm in diameter. Therefore, the PM emission factor is used to estimate emissions of PM10 and PM2.5.
4. Annual average hourly emission rates are (annual emissions in tpy)*2000 lb/ton*1 year/8760 hours.

Example Calculation:

$$\text{Hourly } NO_X = \frac{4.0\ \text{g}}{\text{kW-hr}} \times 447.43\ \text{kW} \times \frac{1\ \text{lb}}{453.59\ \text{g}} = \frac{3.95\ \text{lb}}{\text{hr}}$$

$$\text{Annual } NO_X = \frac{3.95\ \text{lb}}{\text{hr}} \times \frac{100\ \text{hrs}}{\text{yr}} \times \frac{1\ \text{ton}}{2000\ \text{lbs}} = \frac{0.20\ \text{ton}}{\text{yr}}$$

**HAP Emissions from Engines**

**HAP Emission Estimation**

***Max Input =*** 4.85 MMBtu/hr each engine
***Annual Hours @ Max Rating =*** 100.0 hrs/yr
***Hourly Emissions =*** (Max Heat Input - MMBtu/hr) x (1 SCF/1,020 Btu) x (EF - lb/MMSCF)
***Annual Emissions =*** (Max Heat Input - MMBtu/hr) x (1 SCF/1,020 Btu) x (EF - lb/MMSCF) x (Annual Operating Hours) / (2,000 lb/Ton)

| Pollutant | EF [1] (lb/MMBtu) | Source | §112 HAP? [2] | Max. Hourly Emission [3] (lb/hr) | Annual Emission (lb/yr) [4] | Annual Emissions (tpy) [5] |
|---|---|---|---|---|---|---|
| Benzene | 9.33E-04 | AP42; Table 3.3-2; 10/96. | YES | 4.53E-03 | 4.53E-01 | 2.26E-04 |
| Toluene | 4.09E-04 | AP42; Table 3.3-2; 10/96. | YES | 1.98E-03 | 1.98E-01 | 9.92E-05 |
| Xylenes | 2.85E-04 | AP42; Table 3.3-2; 10/96. | YES | 1.38E-03 | 1.38E-01 | 6.91E-05 |
| Propylene | 2.58E-03 | AP42; Table 3.3-2; 10/96. | NO | 1.25E-02 | 1.25E+00 | 6.26E-04 |
| 1,3-Butadiene | <3.91E-05 | AP42; Table 3.3-2; 10/96. | YES | 1.90E-04 | 1.90E-02 | 9.48E-06 |
| Formaldehyde | 1.18E-03 | AP42; Table 3.3-2; 10/96. | YES | 5.72E-03 | 5.72E-01 | 2.86E-04 |
| Acetaldehyde | 7.67E-04 | AP42; Table 3.3-2; 10/96. | YES | 3.72E-03 | 3.72E-01 | 1.86E-04 |
| Acrolein | <9.25E-05 | AP42; Table 3.3-2; 10/96. | YES | 4.49E-04 | 4.49E-02 | 2.24E-05 |
| Total PAH | <1.68E-04 | AP42; Table 3.3-2; 10/96. | YES | 8.15E-04 | 8.15E-02 | 4.07E-05 |
| Naphthalene | 8.48E-05 | AP42; Table 3.3-2; 10/96. | YES | 4.11E-04 | 4.11E-02 | 2.06E-05 |
| Acenaphthylene | <5.06E-06 | AP42; Table 3.3-2; 10/96. | YES | 2.45E-05 | 2.45E-03 | 1.23E-06 |
| Acenaphthene | <1.42E-06 | AP42; Table 3.3-2; 10/96. | YES | 6.89E-06 | 6.89E-04 | 3.44E-07 |
| Fluorene | 2.92E-05 | AP42; Table 3.3-2; 10/96. | YES | 1.42E-04 | 1.42E-02 | 7.08E-06 |
| Phenanthrene | 2.94E-05 | AP42; Table 3.3-2; 10/96. | YES | 1.43E-04 | 1.43E-02 | 7.13E-06 |
| Anthracene | 1.87E-06 | AP42; Table 3.3-2; 10/96. | YES | 9.07E-06 | 9.07E-04 | 4.54E-07 |
| Fluoranthene | 7.61E-06 | AP42; Table 3.3-2; 10/96. | YES | 3.69E-05 | 3.69E-03 | 1.85E-06 |
| Pyrene | 4.78E-06 | AP42; Table 3.3-2; 10/96. | YES | 2.32E-05 | 2.32E-03 | 1.16E-06 |
| Benzo(a)anthracene | 1.68E-06 | AP42; Table 3.3-2; 10/96. | YES | 8.15E-06 | 8.15E-04 | 4.07E-07 |
| Chrysene | 3.53E-07 | AP42; Table 3.3-2; 10/96. | YES | 1.71E-06 | 1.71E-04 | 8.56E-08 |
| Benzo(b)fluoranthene | <9.91E-08 | AP42; Table 3.3-2; 10/96. | YES | 4.81E-07 | 4.81E-05 | 2.40E-08 |
| Benzo(k)fluoranthene | <1.55E-07 | AP42; Table 3.3-2; 10/96. | YES | 7.52E-07 | 7.52E-05 | 3.76E-08 |
| Benzo(a)pyrene | <1.88E-07 | AP42; Table 3.3-2; 10/96. | YES | 9.12E-07 | 9.12E-05 | 4.56E-08 |
| Indeno(1,2,3-cd)pyrene | <3.75E-07 | AP42; Table 3.3-2; 10/96. | YES | 1.82E-06 | 1.82E-04 | 9.10E-08 |
| Dibenzo(a,h)anthracene | <5.83E-07 | AP42; Table 3.3-2; 10/96. | YES | 2.83E-06 | 2.83E-04 | 1.41E-07 |
| Benzo(g,h,l)perylene | <4.89E-07 | AP42; Table 3.3-2; 10/96. | YES | 2.37E-06 | 2.37E-04 | 1.19E-07 |
| **Total §112 HAP =** | 3.87E-03 | | | 1.88E-02 | 1.88E+00 | 9.39E-04 |

[1] Emission factors obtained from US EPA AP-42 Section 3.3 Gasoline and Diesel Engines (10/96), Table 3.3-2.

[2] Listed US EPA Hazardous Air Pollutants.

[3] Max. Hourly Emissions = Emission Factor (lb/MMBtu) *Max Heat Input Capacity per Engine (MMBtu/hr)

[4] Maximum Annual Emission Rate (lb/yr) = Hourly Emissions (lb/hr) * Annual Operating Hours (hr/yr)

[4] Maximum Annual Emission Rate (lb/yr) = Hourly Emissions (lb/hr) * Annual Operating Hours (hr/yr)

[5] Maximum Potential Annual Emission Rate (tpy) = Hourly Emissions (lb/hr) * Annual Hours (hr/yr) ( (1 ton/2000 lb).

Table N-13 NG Startup Generator
MGS CNP 1, LLC

**There will be one NG-fired startup generator, with power rating @ 2237 kW**
Sulfur content of fuel used in engine will be 10 ppmv sulfur or less.
Annual operating hours will be limited to 100 hr/yr.
Engines will be new (model year 2024 or later).

**FIN:** **129-PKG-0001** **EPN:** **129-PKG-0001**
Engine Type 4-stroke, lean burn engine

| **Fuel Type:** | **Natural Gas** | |
|---|---|---|
| **Year** | 2024 | |
| **Total Engines:** | 1 | |
| **Fuel Consumption:** | 18808 | Scf/hr |
| **NG HHV** | 1051.00 | Btu/Scf |
| **Heat Input (HHV):** | 19.77 | MMBtu/hr |
| **Engine Horsepower Output:** | 3000 | hp |
| **Engine Output:** | 2237 | kW |
| **Annual Operation:** | 100 | hr/yr |
| **Engine Load:** | 100% | |
| **Brake Specific Fuel Consumptions:** [1] | 8836.00 | Btu/kW-hr |

1 hp = 2544 Btu/hr
1 kW = 1.341 hp

| | | |
|---|---|---|
| Standard Temperature: | 60 °F | 15.56 °C |
| Standard Pressure: | 1 atm | |
| Standard Volume: | 379.48 ft3/lbmol | |

Notes:
[1] Vendor supplied data - 8836 Btu/kW-hr

**Generator Gas Engine Emission Rates**

| **Pollutant** | **Emission Factor** [1,2,3,4] | | **Emissions Rates** | | |
|---|---|---|---|---|---|
| | | | **Max. Hourly** | **Annual Average**[5] | **Annual** |
| | | | **Max lb/hr** | **annual avg lb/hr** | **tpy** |
| **NOX** [1] | 1.0 | g/hp-hr | 6.61 | 0.08 | 0.33 |
| **CO** [1] | 2.0 | g/hp-hr | 13.23 | 0.15 | 0.66 |
| **PM** [2,4] | 0.0099871 | lb/MMBtu | 0.20 | 0.0023 | 0.01 |
| **PM10** [2,4] | 0.0099871 | lb/MMBtu | 0.20 | 0.0023 | 0.01 |
| **PM2.5** [2,4] | 0.0099871 | lb/MMBtu | 0.20 | 0.0023 | 0.01 |
| **$VOC_{JJJJ}$** [1] | 0.7 | g/hp-hr | 4.63 | 0.05 | 0.23 |
| **VOC** [6] | - | - | 5.67 | 0.06 | 0.28 |
| **SO2** [3] | 1.06E-05 | lb/hp-hr | 0.03 | 0.00 | 0.002 |

Table N-13 NG Startup Generator
MGS CNP 1, LLC

Notes:
1. NOX, CO, and $VOC_{JJJJ}$ emission factors are Table 1 to 40 CFR 60 Subpart JJJJ for engines with rated power greater than or equal to 500 hp and manufactured after 7/1/2010.
40 CFR 60.4233(e) specifies to use emission factors from Table 1 to 40 CFR 60 Subpart JJJJ.
2. PM/PM10/PM2.5 emission factors come from Table 3.2-2 in AP-42.
3. Emission factors for SO2 based on 10 ppmv sulfur in NG.
4. All PM is assumed to be less than 1.0 µm in diameter. Therefore, the PM emission factor is used to estimate emissions of PM10 and PM2.5.
5. Annual average hourly emission rates are (annual emissions in tpy)*2000 lb/ton*1 year/8760 hours.
6. As indicated in 4*0 CFR 60 Subpart JJJJ, Table 1, Note d,* , $VOC_{JJJJ}$ does not include formaldehyde. Total VOC = $VOC_{JJJJ}$ + Formaldehyde. Formaldehyde is quantified using emission factor in Section 3.2 of AP-42.

Example Calculation:

$$\text{Hourly } NO_X = \frac{1.00\text{ g}}{\text{hp-hr}} \times 3000.00\text{ hp} \times \frac{1\text{ lb}}{453.59\text{ g}} = \frac{6.61\text{ lb}}{\text{hr}}$$

$$\text{Annual } NO_X = \frac{6.61\text{ lb}}{\text{hr}} \times \frac{100\text{ hrs}}{\text{yr}} \times \frac{1\text{ ton}}{2000\text{ lbs}} = \frac{0.33\text{ ton}}{\text{yr}}$$

**HAP Emissions from NG Engine**

**HAP Emission Estimation**

***Max Input =*** 19.77 MMBtu/hr each engine
***Annual Hours @ Max Rating =*** 100.0 hrs/yr
***Hourly Emissions =*** (Max Heat Input - MMBtu/hr) x (EF - lb/MMBtu)
***Annual Emissions =*** (Max Heat Input - MMBtu/hr) x (EF - lb/MMBtu) x (Annual Operating Hours) / (2,000 lb/Ton)

**4-Stroke, Lean Burn Engine (37 HAPs)**

| Pollutant | HAPs [2] | Emission Factor [1] | Emission Factor Rating | HAPs Emission Factor | Max Hourly Emission [3] | Annual Emission | Annual Emissions |
|---|---|---|---|---|---|---|---|
| | | lb/MMBtu(fuel input) | | lb/MMBtu(fuel input) | (lb/hr) | (lb/yr) [4] | (tpy) [5] |
| 1,1,2,2-Tetrachloroethanek | Yes | 0.00004 | E | 0.00004 | 7.91E-04 | 7.91E-02 | 3.95E-05 |
| 1,1,2-Trichloroethanek | Yes | 0.0000318 | E | 0.0000318 | 6.29E-04 | 6.29E-02 | 3.14E-05 |
| 1,1-Dichloroethane | No | 0.0000236 | E | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,3-Trimethylbenzene | No | 2.30E-05 | D | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2,4-Trimethylbenzene | No | 1.43E-05 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2-Dichloroethane | No | 0.0000236 | E | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,2-Dichloropropane | No | 0.0000269 | E | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,3,5-Trimethylbenzene | No | 3.38E-05 | D | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 1,3-Butadienek | Yes | 2.67E-04 | D | 2.67E-04 | 5.28E-03 | 5.28E-01 | 2.64E-04 |
| 1,3-Dichloropropenek | Yes | 0.0000264 | E | 0.0000264 | 5.22E-04 | 5.22E-02 | 2.61E-05 |
| 2-Methylnaphthalenek | Yes | 3.32E-05 | C | 3.32E-05 | 6.56E-04 | 6.56E-02 | 3.28E-05 |
| 2,2,4-Trimethylpentanek | Yes | 2.50E-04 | C | 2.50E-04 | 4.94E-03 | 4.94E-01 | 2.47E-04 |
| Acenaphthenek | Yes | 1.25E-06 | C | 1.25E-06 | 2.47E-05 | 2.47E-03 | 1.24E-06 |
| Acenaphthylenek | Yes | 5.53E-06 | C | 5.53E-06 | 1.09E-04 | 1.09E-02 | 5.47E-06 |
| Acetaldehydek,l | Yes | 8.36E-03 | A | 8.36E-03 | 1.65E-01 | 1.65E+01 | 8.26E-03 |
| Acroleink,l | Yes | 5.14E-03 | A | 5.14E-03 | 1.02E-01 | 1.02E+01 | 5.08E-03 |
| Benzenek | Yes | 4.40E-04 | A | 4.40E-04 | 8.70E-03 | 8.70E-01 | 4.35E-04 |
| Benzo(b)fluoranthenek | Yes | 1.66E-07 | D | 1.66E-07 | 3.28E-06 | 3.28E-04 | 1.64E-07 |
| Benzo(e)pyrenek | Yes | 4.15E-07 | D | 4.15E-07 | 8.20E-06 | 8.20E-04 | 4.10E-07 |
| Benzo(g,h,i)perylenek | Yes | 4.14E-07 | D | 4.14E-07 | 8.18E-06 | 8.18E-04 | 4.09E-07 |

Table N-13 NG Startup Generator
MGS CNP 1, LLC

| Pollutant | HAPs [2] | Emission Factor [1] | Emission Factor Rating | HAPs Emission Factor | Max Hourly Emission [3] | Annual Emission | Annual Emissions |
|---|---|---|---|---|---|---|---|
| | | lb/MMBtu(fuel input) | | lb/MMBtu(fuel input) | (lb/hr) | (lb/yr) [4] | (tpy) [5] |
| Biphenylk | Yes | 2.12E-04 | D | 2.12E-04 | 4.19E-03 | 4.19E-01 | 2.10E-04 |
| Butane | No | 5.41E-04 | D | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Butyr/Isobutyraldehyde | No | 1.01E-04 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Carbon Tetrachloridek | Yes | 0.0000367 | E | 0.0000367 | 7.25E-04 | 7.25E-02 | 3.63E-05 |
| Chlorobenzenek | Yes | 0.0000304 | E | 0.0000304 | 6.01E-04 | 6.01E-02 | 3.00E-05 |
| Chloroethane | No | 1.87E-06 | D | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Chloroformk | Yes | 0.0000285 | E | 0.0000285 | 5.63E-04 | 5.63E-02 | 2.82E-05 |
| Chrysenek | Yes | 6.93E-07 | C | 6.93E-07 | 1.37E-05 | 1.37E-03 | 6.85E-07 |
| Cyclopentane | No | 2.27E-04 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ethane | No | 1.05E-01 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ethylbenzenek | Yes | 3.97E-05 | B | 3.97E-05 | 7.85E-04 | 7.85E-02 | 3.92E-05 |
| Ethylene Dibromidek | Yes | 0.0000443 | E | 0.0000443 | 8.76E-04 | 8.76E-02 | 4.38E-05 |
| Fluoranthenek | Yes | 1.11E-06 | C | 1.11E-06 | 2.19E-05 | 2.19E-03 | 1.10E-06 |
| Fluorenek | Yes | 5.67E-06 | C | 5.67E-06 | 1.12E-04 | 1.12E-02 | 5.60E-06 |
| Formaldehydek,l | Yes | 5.28E-02 | A | 5.28E-02 | 1.04E+00 | 1.04E+02 | 5.22E-02 |
| Methanolk | Yes | 2.50E-03 | B | 2.50E-03 | 4.94E-02 | 4.94E+00 | 2.47E-03 |
| Methylcyclohexane | No | 1.23E-03 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Methylene Chloridek | Yes | 2.00E-05 | C | 2.00E-05 | 3.95E-04 | 3.95E-02 | 1.98E-05 |
| n-Hexanek | Yes | 1.11E-03 | C | 1.11E-03 | 2.19E-02 | 2.19E+00 | 1.10E-03 |
| n-Nonane | No | 1.10E-04 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| n-Octane | No | 3.51E-04 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| n-Pentane | No | 2.60E-03 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalenek | Yes | 7.44E-05 | C | 7.44E-05 | 1.47E-03 | 1.47E-01 | 7.35E-05 |
| PAHk | Yes | 2.69E-05 | D | 2.69E-05 | 5.32E-04 | 5.32E-02 | 2.66E-05 |
| Phenanthrenek | Yes | 1.04E-05 | D | 1.04E-05 | 2.06E-04 | 2.06E-02 | 1.03E-05 |
| Phenolk | Yes | 2.40E-05 | D | 2.40E-05 | 4.74E-04 | 4.74E-02 | 2.37E-05 |
| Propane | No | 4.19E-02 | C | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Pyrenek | Yes | 1.36E-06 | C | 1.36E-06 | 2.69E-05 | 2.69E-03 | 1.34E-06 |
| Styrenek | Yes | 0.0000236 | E | 0.0000236 | 4.67E-04 | 4.67E-02 | 2.33E-05 |
| Tetrachloroethanek | Yes | 2.48E-06 | D | 2.48E-06 | 4.90E-05 | 4.90E-03 | 2.45E-06 |
| Toluenek | Yes | 4.08E-04 | B | 4.08E-04 | 8.07E-03 | 8.07E-01 | 4.03E-04 |
| Vinyl Chloridek | Yes | 1.49E-05 | C | 1.49E-05 | 2.95E-04 | 2.95E-02 | 1.47E-05 |
| Xylenek | Yes | 1.84E-04 | B | 1.84E-04 | 3.64E-03 | 3.64E-01 | 1.82E-04 |
| | | | Total HAPs | 0.0002617 | 1.43 | 142.71 | 0.07 |

[1] Emission factors obtained from US EPA AP-42 Section 3.4 Large Stationary Diesel and All Stationary Dual-fuel Engines (10/96), Tables 3.4-3 and 3.4-4.

[2] Listed US EPA Hazardous Air Pollutants.

[3] Max. Hourly Emissions = Emission Factor (lb/MMBtu) *Max Heat Input Capacity per Engine (MMBtu/hr)

[4] Maximum Annual Emission Rate (lb/yr) = Hourly Emissions (lb/hr) * Annual Operating Hours (hr/yr)

[5] Maximum Potential Annual Emission Rate (tpy) = Hourly Emissions (lb/hr) * Annual Hours (hr/yr) ( (1 ton/2000 lb).

| | |
|---|---|
| Company: | MGS CNP 1, LLC |
| Emission Point ID: | BECCS-FUG<br>BECCS Plant Equipment Leaks |
| HOURS OF OPERATION: | 8,760 |

*Emission Summary*

| Pollutant | Hourly Emission Rate lb/hr | Annual Emission Rate tpy |
|---|---|---|
| VOC | 8.32 | 36.46 |
| $NH_3$ | 0.60 | 2.64 |

*Emission Calculation*

| Component | Product (Service) | Component Count[1] | TOC Emission Factor[2] kg/comp-hr | Stream Composition, wt% | | Hourly Emissions, lb/hr | |
|---|---|---|---|---|---|---|---|
| | | | | VOC | $NH_3$ | VOC | $NH_3$ |
| Valves | Rich Amine (Heavy Liquid) | 58 | 0.00023 | 44% | 0.0001% | 0.01 | 2.93E-08 |
| Pump Seals | | 2 | 0.00862 | | | 0.02 | 3.79E-08 |
| Compressor Seals | | 0 | - | | | - | - |
| Pressure Relief Valves (Gas Service) | | 5 | 0.104 | | | 0.50 | 1.14E-06 |
| Flanges | | 200 | 0.00183 | | | 0.36 | 8.05E-07 |
| Open-ended Lines [3] | | 15 | 0 | | | 0.00 | 0.00E+00 |
| Valves | Lean Amine (Heavy Liquid) | 410 | 0.00023 | 47% | - | 0.10 | - |
| Pump Seals | | 10 | 0.00862 | | | 0.09 | - |
| Compressor Seals | | 0 | - | | | - | - |
| Pressure Relief Valves (Gas Service) | | 37 | 0.104 | | | 3.96 | - |
| Flanges | | 1362 | 0.00183 | | | 2.57 | - |
| Open-ended Lines [3] | | 104 | 0 | | | 0.00 | - |
| Valves | Natural Gas (Gas) | 6 | 0.00597 | 12% | - | 0.01 | - |
| Pump Seals | | 0 | - | | | - | - |
| Compressor Seals | | 0 | 0.228 | | | 0.00 | - |
| Pressure Relief Valves | | 0 | 0.104 | | | 0.00 | - |
| Flanges | | 22 | 0.00183 | | | 0.01 | - |
| Open-ended Lines [3] | | 1 | 0 | | | 0.00 | - |

Table N-14 Equipment Leaks
MGS CNP 1, LLC

| Component | Product (Service) | Component Count[1] | TOC Emission Factor[2] kg/comp-hr | Stream Composition, wt% | | Hourly Emissions, lb/hr | |
|---|---|---|---|---|---|---|---|
| | | | | VOC | $NH_3$ | VOC | $NH_3$ |
| Valves | Diesel (Heavy Liquid) | 29 | 0.00023 | 100% | - | 0.01 | - |
| Pump Seals | | 1 | 0.00862 | | | 0.02 | - |
| Compressor Seals | | 0 | - | | | - | - |
| Pressure Relief Valves (Gas Service) | | 1 | 0.104 | | | 0.23 | - |
| Flanges | | 109 | 0.00183 | | | 0.44 | - |
| Open-ended Lines [3] | | 6 | 0 | | | 0.00 | - |
| Valves | Aqueous Ammonia (Light Liquid) | 61 | 0.00403 | - | 25% | - | 1.35E-01 |
| Pump Seals | | 2 | 0.0199 | | | - | 2.19E-02 |
| Compressor Seals | | 0 | - | | | - | - |
| Pressure Relief Valves (Gas Service) | | 4 | 0.104 | | | - | 2.29E-01 |
| Flanges | | 216 | 0.00183 | | | - | 2.17E-01 |
| Open-ended Lines [3] | | 14 | 0 | | | - | 0.00E+00 |
| Total Hourly Emissions, lb/hr | | | | | | 8.32 | 0.60 |

[1] *Component Count is estimated based on similar projects.*

[2] *TOC emission factor is obtained from protocol for equipment leak emission estimates, EPA-453/R-95-017, November 1995, Table 2-1. SOCMI Average Emission Factors*

[3] *Open-ended Lines will be equipped with a cap, blind flange, plug, or a second valve; therefore a 100% control credit is taken.*

[4] *Sampling connections will be closed-purge connections; therefore a 100% control credit is taken.*

**Truck Loadout of Degraded Amine**

**Overview:**

Degraded amine removed from the reclaiming system will be loaded offsite by trucks. Maximum permit calculations are based on 2000 barrels per year. For hourly maximum, the loading rate is 105 GPM (150 barrels per hour). MEA is used to represent the amine.

**Emissions Methodology:**

AP-42, Section 5.2 : Transport and Marketing of Petroleum Liquids

Formula for calculating loading losses:

$$L_L = 12.46 \frac{S * P * M}{T}$$ AP-42, Section 5.2 6/08, Equation 1

where:

$L_L$ = Loading loss, pounds per 1000 gallons (lb/$10^3$ gal) of liquid loaded
S = A saturation factor (based on type and service of loaded vessel)
P = True vapor pressure of liquid loaded, pounds per square inch absolute
M = molecular weight of vapors, pounds per pound-mole (lb/lb-mole)
T = temperature of bulk liquid loaded, °R 524.97 °R

**Physical and Chemical Properties:**

| Emission Unit ID | True Vapor Pressure [1] (psia) | MW of Vapors [1] (lb / lb-mole) | Loading Loss (lb / $10^3$ gal) | Notes |
|---|---|---|---|---|
| VOC - Amine -LOAD | 0.0027 | 61.08 | 0.002 | Submerged Loading: dedicated normal service, Uncontrolled |

**Throughput and Emissions:**

| Emission Unit ID | Max Hourly Mgal/hr | Annual Mgal/yr | Max Hourly Vapor Released (lb / hr) | Maximum Annual Vapor Released (lb/yr) | Notes |
|---|---|---|---|---|---|
| VOC - Amine -LOAD | 6.3 | 84 | 0.015 | 0.20 | Submerged Loading: dedicated normal service, Uncontrolled |

**Degraded Amine loading vapors - Uncontrolled**

| Emissions | Average lb / hr | Maximum lb / hr | Maximum tons /yr |
|---|---|---|---|
| VOC - Amine -LOAD | 0.000022 | 0.015 | 0.00010 |

Table N-15 Degraded Amine Truck Loadout
MGS CNP 1, LLC

**Calculation of MEA vapor pressure**

| | | | | a | b | c |
|---|---|---|---|---|---|---|
| Components | MW | Wt.% | mol% | dimensionless | (°K) | (°K) |
| MEA [1] | 61.08 | 100.00 | 100.00 | 4.29252 | 1408.87 | -116.093 |

| | | |
|---|---|---|
| $P_{VA}$ | 0.0026844 | psia |

[1] Pressure equation for MEA is $P_{VA}$ in bar and T in °K. P = 10^(A-B/(C+T)). (https://webbook.nist.gov/cgi/cbook.cgi?ID=C141435&Mask=4&Type=ANTOINE&Plot=on). $P_{VA}$ in bar is converted to psia by multiplying 14.50377. Temperature range [338.6 to 444.1] K.

Table N-16 Wastewater Treatment Plant
MGS CNP 1, LLC

| **Source Name:** | Wastewater Treatment Plant | **EPN:** | 127-PKG-0001 | |
|---|---|---|---|---|
| **Proposed Limits** | | **Date:** | 2/18/2025 | |
| **FIN** | **EPN** | **Air Contaminant[3]** | **lbs/hr [1]** | **tpy** |
| 127-PKG-0001 | 127-PKG-0001 | NH3 | 0.51 | 2.10 |
| | | H2SO4 | 0.64 | 2.79 |
| | | HCl[2] | 0.12 | 0.57 |

[1] Hourly emission rate is the emission rate under normal operating conditions.

[2] Hazardous Air Pollutant

[3] VOC and HAPs were excluded from this calculation

**Process Description:**
The wastewater treatment plant will receive water from the direct contact cooler/polishing scrubber system. The scrubbing liquid will have direct contact with the flue gas exhaust from the boiler. The scrubber solution will adsorb ammonia, sulfuric acid and hydrochloric acid that could be present in the flue gas. The scrubbing solution will be sent to the Wastewater Treatment Plant for further processing before it is discharged to the outfall. It is conservatively assumed that 10% of the ammonia, sulfuric acid and hydrochloric acid in the flue gas could be emitted from the Wastewater Treatment plant. The wastewater treatment plant will also receive water from the demineralized water system, raw water treatment, flush pond water, cooling tower water and boiler blowdown water. These streams are not expected to contribute emissions from the wastewater treatment plant.

## Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans

- Record the amount of biomass brought into the facility on a monthly basis
- Record moisture content of biomass on a weekly basis
- Record the mass rate of biomass used by the BFB
- Pressure drop across each baghouse on at least a daily basis
- Record natural gas usage and combustion duration during boiler startup
- Comply with the monitoring/recordkeeping/reporting/testing requirements of state regulations, 40 CFR 60 Subpart Db, and 40 CFR Parts 72 – 78 applicable to the BFB
- Record annual operating hours for the NG Startup Generator and the Fire Water Diesel Engine Pump
- Record fuel sulfur content for the fire water pump per 40 CFR 60.4207

Section 4 of the application narrative provides an analysis of the applicability of state and federal regulations applicable to the facility and a summary of compliance requirements. MGSCNP1 will work with the Division of Air Quality to identify and address required Monitoring, Recordkeeping, Reporting, and Testing Plans. Requirements identified in the permit will be implemented.

**Attachment P: Public Notice**

**(Affidavit of Publication to be provided)**

**AIR QUALITY PERMIT NOTICE**
**Notice of Application**

Notice is given that MGS CNP 1, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Construction Permit for a Biomass Energy and Carbon Capture Sequestration Plant located off of WV Route 62, near Point Pleasant, in Mason County, West Virginia. The facility will be utilized primarily in the production of carbon dioxide removal (CDR) credits with future power/steam generation. The latitude and longitude coordinates are: 38.92450, -82.10822.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be: Nitrogen Oxides, 90.95 tons per year (TPY); Carbon Monoxide, 46.48 TPY; Volatile Organic Compounds, 55.27 TPY; Sulfur Dioxide, 55.27 TPY; Particulate Matter-10, 83.35 TPY; Total Hazardous Air Pollutants, 24.00 TPY.

Startup of operation is planned to begin on or about the 15th day of November, 2028. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice. Written comments will also be received via email at DEPAirQualityPermitting@WV.gov.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 41281, during normal business hours.
Dated this the 6th day of February 2025.

By: MGS CNP 1, LLC
Jack Calhoun
Vice President
109 Post Oak Lane, Suite 140
Houston, TX 77024

**Attachment Q: Business Confidential Claims (Not Applicable)**

## Attachment R: Authority Forms (Not Applicable)

Authority Forms are only required when someone other than the responsible official signs the application.

**Attachment S: Title V Permit Revision Information (Not Applicable)**