4500 Brooktree Road | Suite 103 | Wexford, PA 15090 | P (724) 935-2611 | F (724) 935-2622
trinityconsultants.com

Tracking Number : 1Z865F5F0195040530

March 16, 2018

Mr. William F. Durham
Director
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street SE
Charleston, WV 25304

RE: Title V Renewal Application – Knauf Insulation
Inwood, WV Facility
Title V Permit Number R30-00300012-2013

Dear Mr. Durham:

On behalf of Knauf Insulation, Inc. (Knauf), Trinity Consultants (Trinity) is submitting the enclosed permit application for the renewal of the Title V Operating Permit for Knauf's wool fiberglass insulation facility in Inwood, WV. There are two hard copies and two CDs of the permit application attached.

The following outlines the components of this renewal application with respect to the "Title V Permit Application Checklist for Administrative Completeness" available on the Department's website and their location within the application.

- Two signed copies of the application (at least one must contain the original "*Certification*" page signed and dated in blue ink) **(ENCLOSED)**
- Correct number of copies of the application on separate CDs or diskettes, (i.e. at least one disc per copy) **(ENCLOSED)**
- Table of Contents (needs to be included but not for administrative completeness) (**See Attached Report Section 1.3)**
- Facility information (**See Attached Report Sections 1.1 and General Application Form – Section 4 of the report)**
- Description of process and products, including NAICS and SIC codes, and including alternative operating scenarios (**See Attached Report Sections 1.1 and General Application Form – Section 4 of the report)**
- Area map showing plant location (**See Appendix A)**
- Plot plan showing buildings and process areas (**See Appendix B)**
- Process flow diagram(s), showing all emission units, control equipment, emission points, and their relationships (**See Appendix C)**
- Identification of all applicable requirements with a description of the compliance status, the methods used for demonstrating compliance, and a Schedule of Compliance Form (ATTACHMENT F) for all requirements for which the source is not in compliance **(Not Applicable)**
- Listing of all active permits and consent orders (if applicable) (**See Attached Report Sections 1 and General Application Form – Section 4 of the report)**
- Facility-wide emissions summary **(See Appendix I, Table 1 and General Application Form – Section 4)**
- Identification of Insignificant Activities **(See General Application Form – Section 4 of the report)**

- ATTACHMENT D - Title V Equipment Table completed for all emission units at the facility except those designated as insignificant activities **(See Appendix D)**
- ATTACHMENT E - Emission Unit Form completed for each emission unit listed in the Title V Equipment Table (ATTACHMENT D) and a Schedule of Compliance Form (ATTACHMENT F – **not applicable**) for all requirements for which the emission unit is not in compliance **(See Appendix E)**
- ATTACHMENT G - Air Pollution Control Device Form completed for each control device listed in the Title V Equipment Table (ATTACHMENT D) **(See Appendix G)**
- ATTACHMENT H – Compliance Assurance Monitoring (CAM) Plan Form completed for each control device for which the "Is the device subject to CAM?" question is answered "Yes" on the Air Pollution Control Device Form (ATTACHMENT G) **Not Applicable**
- General Application Forms signed by a Responsible Official **See General Application Form (Section 4 of the Report)**
- Confidential Information submitted in accordance with 45CSR31 **None requested**

If you have any questions or comments about the information presented in this letter, please do not hesitate to call me at (724) 935-2611.

Sincerely,

TRINITY CONSULTANTS

Tom Muscenti
Manager of Consulting Services

cc: Mr. Chris Mahin (Shelbyville)

PROJECT REPORT

Knauf Insulation, Inc. > Inwood Facility

Title V Operating Permit Renewal Application

Permit No. R30-003000012-2013

TRINITY CONSULTANTS
4500 Brooktree Drive
Suite 103
Wexford, PA 15090
(724) 935-2611

March 2018

Trinity Consultants

EHS Solutions Delivered Uncommonly Well

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Knauf Insulation, Inc. (Knauf) operates a fiberglass roll and batt insulation manufacturing facility in Inwood, West Virginia (Inwood facility). The facility currently operates in accordance with West Virginia Department of Environmental Protection (WVDEP) Division of Air Quality Title V operating permit R30-00300012-2013, issued on September 20, 2013 and most recently modified on March 15, 2016.

The current Title V permit expires on September 20, 2018. Knauf is submitting this timely and complete Title V Operating Permit (TVOP) renewal application by the renewal submission deadline of March 20, 2018 (six months before the expiration of the current permit) in accordance with Series 30, Section 4.1.a.3 of the WVDEP Division of Air Quality (DAQ) Code of State Rules (C.S.R.) §45-30-4.1.a.3.

Presuming WVDEP finds this application administratively complete, Knauf may continue to operate the Inwood facility under the terms of the existing Title V permit until the renewed permit is issued, even if this issuance would occur after the current permit's expiration date.

1.1. FACILITY DESCRIPTION

Knauf's Inwood facility is a wool fiberglass manufacturing facility covered under Standard Industrial Classification (SIC) Code 3296 and North America Industry Classification (NAICS) Code 327993. The facility has the potential to operate 24 hours per day, 7 days per week. The facility consists of a raw materials receiving area and batch mixing point, electric melters, a series of natural gas fueled heaters, curing ovens, and storage tanks. The facility also consists of two production lines: Line 1 and Line 2.

The Inwood facility produces a bonded insulation type. The facility receives raw materials that are mixed into batch and the batch is then melted to form glass. The molten glass is separated into streams by use of a forehearth and fiber is spun into strands by the means of fiberizers. In bonded fiberglass production, the fibers are transferred to a fiber forming section where water, wax and ECOSE binder are added and are collected to form a binder coated fiber blanket, which is then cured in an oven. Upon exiting the curing oven the blanket is cooled via a "cooling table". The cooled blanket is then cut to size in rolls and batts of insulation per customer demand and packaged for shipment offsite.

Process flow diagrams are included in Appendix C.

1.2. FACILITY UPDATES

The Title V permit issued March 15, 2016, incorporated changes made to Line 1 authorized under R14-0015L. Since that update, Knauf has implemented changes that were authorized in R14-0015M, issued September 20, 2017. These changes include:

- Replacing the melter on Line 2 (ESS22) with a new gas oxygen fueled melting furnace;
- Upgrading the existing Line 2 forming and collection areas;
- Modifying the existing Line 2 curing oven and incorporating formulation changes in the bonded product; and
- Changes to ancillary equipment that supports the production line (e.g., raw material handling, generators, etc.).

In addition, Knauf has outlined minor changes to the ancillary equipment and tank inventory contained within the permit. These changes include:

- Specifying Tank M7, a filtered water hold tank, that was added as part of the Line 2 project (Permit R14-0015M);
- Correcting capacity of various tanks under the TANKS group (Group 001) and the name of Tank M4;
- Elimination of unit ES25K; and
- Clarifying the controls for emission units ES1L, ES1M, ES1N, ES15C, ES25C, ES25I and ES25L.

Knauf has begun operation of the equipment and changes authorized in this permit and has incorporated the changes into this Title V renewal application.

1.3. TITLE V APPLICATION ORGANIZATION

This West Virginia Title V permit renewal application is organized as follows:

- Section 2: Sample Emission Source Calculations;
- Section 3: Regulatory Discussion;
- Section 4: Title V Application Form;
- Attachment A: Area Map;
- Attachment B: Plot Plan;
- Attachment C: Process Flow Diagram;
- Attachment D: Equipment Table;
- Attachment E: Emission Unit Forms;
- Attachment F: Schedule of Compliance Forms *(Not applicable)*;
- Attachment G: Air Pollution Control Device Forms;
- Attachment H: Compliance Assurance Monitoring Forms *(Not applicable)*;
- Attachment I: Emissions Calculations; and
- Application Fee.

2. SAMPLE EMISSION SOURCE CALCULATIONS

This section contains a detailed description of the calculation methodology used to determine the emission rates for all affected sources at the Inwood facility. Detailed emission calculations are included in Appendix I of this application.

2.1. COMBUSTION SOURCES

For the combustion sources (e.g., heaters, emergency generators, fire pump) appropriate EPA-published emission factors were chosen and were then multiplied by the heat input capacity of each unit (MMBtu/hr) in order to determine the tpy and lb/hr emissions of CO, PM, PM_{10}, $PM_{2.5}$, NO_X, SO_2, VOC, and HAPs. For the new emergency engine (ESDG14), New Source Performance Standard limits and vendor data were used to calculate potential to emit.

2.2. FIBERGLASS PRODUCTION PROCESS

Calculations of pollutants are based on multiplying the process rate (tons material/hr) by the emission factor (lbs/ton material processed). These calculations are based on a maximum production capacity for each production line. Appropriate emission factors were taken from published data, stack test data, and permit limits. Note that the emission calculations include condensable particulate matter emissions based on stack test data and permit limits.

2.3. FUGITIVE SOURCES

Particulate matter emissions from raw materials handling were characterized by the USEPA in Section 11.13 Glass Fiber Manufacturing of AP-42 for unloading and conveying, storage bins, and mixing and weighing operations. Potential particulate matter emissions from these operations are controlled with bag filter dust collectors and vented to the in-plant environment. Emission factors were taken from Table 11.13-2 of the AP-42. Particulate matter emissions are controlled with bag filter dust collectors as well as process enclosures.

2.4. MISCELLANEOUS SOURCES

The cooling tower PM emission calculations are based on cooling water circulation flow rates and drift eliminator efficiency. Calculations assume that all particulates are less than 1 µm in diameter. Particulate matter originating from the paved road on site was estimated using the calculations and tables from AP-42 13.2.1.3. It was decided that the Municipal Solid Waste Landfill was the best approximation for the Inwood facility from Table 13.2-1.3.

Additional coating emissions (e.g., inkjet identification, lamination, etc.) are calculated using a mass balance and assuming all VOC are emitted to atmosphere. Storage tank emissions assume minimal as the material has a low vapor pressure and the tanks are located inside the manufacturing building.

2.5. GREENHOUSE GAS EMISSIONS

Greenhouse gases were calculated following 40 CFR 98 Subparts C and N. Subpart C covers GHGs from combustion sources which includes internal combustion engines and the facility's space and water heaters. Subpart C emissions are based on fuel usage rates and Subpart C provided emission factors. Subpart N covers the glass manufacturing industry as a whole. Raw materials used in glass manufacture have the potential to emit carbon dioxide as they are melted to make glass. Knauf obtained emission factors from their raw materials suppliers. These vendor specific emission factors, in combination with raw materials throughputs, provide the basis for the carbon dioxide emission calculations

This section documents the applicability determinations made for Federal and State air quality regulations. In this section, applicability or non-applicability of the following regulatory programs is addressed:

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

This review is presented to supplement and/or add clarification to the information provided in the Title V operating permit application forms, which fulfill the requirement to include citations and descriptions of applicable statutory and administrative code requirements.

In addition to providing a summary of applicable requirements, this section of the application also provides non-applicability determinations for certain regulations, allowing the WVDEP to confirm that identified regulations are not applicable to the Inwood facility. Note that explanations of non-applicability are limited to those regulations for which there may be some question of applicability specific to the operations at the station. Regulations that are categorically non-applicable are not discussed (e.g., NSPS Subpart J, Standards of Performance for Petroleum Refineries).

3.1. PSD AND NNSR SOURCE CLASSIFICATION

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration and new and modified sources of non-attainment pollutants under Non-Attainment New Source Review. PSD regulations apply when a new source is constructed in which emissions exceed major source thresholds, an existing minor source undergoes a modification in which emission increases exceed PSD major source thresholds, or an existing major source undergoes a modification in which emission increases exceed PSD significant emission rates. The Inwood facility is considered an existing major source with respect to PSD, and as such when undertaking modifications may be subject to NSR permit requirements. No new sources are being installed as part of this application and as such, PSD is not triggered.

NNSR regulations only apply in areas designated as non-attainment. The Inwood facility is located in Berkeley County, which is designated as attainment/unclassifiable for all criteria pollutants.[1] Therefore, NNSR regulations do not apply to the Inwood facility.

3.2. TITLE V OPERATING PERMIT PROGRAM

Title 40 of the Code of Federal Regulations Part 70 (40 CFR 70) establishes the federal Title V operating permit program. West Virginia has incorporated the provisions of this federal program in its Title V operating permit program in West Virginia Code of State Regulations (CSR) 45-30. The major source thresholds with respect to the West Virginia Title V operating permit program regulations are 10 tons per year (tpy) of a single HAP, 25 tpy of any

[1] U.S. EPA Greenbook, http://www.epa.gov/airquality/greenbook/anayo_wv.html, as of February 28, 2018.

combination of HAP, and 100 tpy of all other regulated pollutants. The potential emissions of the Inwood facility exceed major source thresholds for the Title V permit program. Therefore, the Inwood facility is a major source with respect to the Title V Program. The Inwood facility currently operates under Title V Permit No. R30-00300012-2013. This renewal application is being submitted to meet the requirements of the Title V program.

3.3. COMPLIANCE ASSURANCE MONITORING

Under 40 CFR 64, the Compliance Assurance Monitoring (CAM) regulations, facilities are required to prepare and submit monitoring plans for certain emissions units with the initial or renewal Title V operating permit application. CAM Plans are intended to provide an on-going and reasonable assurance of compliance with emission limits for sources that utilize active control devices. Knauf addressed CAM applicability in the previous Title V renewal application. Modifications to the facility have been authorized since the last Title V renewal. However, there have been no changes since the last renewal application which would trigger a CAM review as the potentially affected units have not changed, the stated exemptions from CAM have not changed (e.g., the continuous compliance determination exemption in 64.2(b)(1)(vi)), no control devices have been installed on previously uncontrolled units with pre-control emissions greater than the major source threshold.

3.4. NEW SOURCE PERFORMANCE STANDARDS

New Source Performance Standards (NSPS), located in 40 CFR 60, require new, modified, or reconstructed sources to control emissions to the level achievable by the best demonstrated technology as specified in the applicable provisions. Moreover, any source subject to an NSPS is also subject to the general provisions of NSPS Subpart A, except where expressly noted. The following is a summary of applicability and non-applicability determinations for NSPS regulations of relevance to the Inwood facility.

3.4.1. NSPS Subparts K, Ka, and Kb

These subparts apply to storage tanks of certain sizes constructed, reconstructed, or modified during various time periods. Subpart K applies to storage tanks constructed, reconstructed, or modified prior to 1978, and Subpart Ka applies to those constructed, reconstructed, or modified prior to 1984. Both Subparts K and Ka apply to storage tanks with a capacity greater than 40,000 gallons. Subpart Kb applies to volatile organic liquid (VOL) storage tanks constructed, reconstructed, or modified after July 23, 1984 with a capacity equal to or greater than 75 m^3 (~19,813 gallons). All storage tanks at the Inwood facility have a capacity less than 75 m^3. Therefore, Subparts K, Ka, and Kb do not apply to the storage tanks at the Inwood facility.

3.4.2. NSPS Subpart CC – Glass Manufacturing Plants

This subpart applies to glass melting furnaces constructed after June 15, 1979. A glass melting furnace as defined in the rule is a unit comprising a refractory vessel in which raw materials are charged, melted at high temperature, refined, and conditioned to produce molten glass. The unit includes foundations, superstructure and retaining walls, raw material charger systems, heat exchangers, melter cooling system, exhaust system, refractory brick work, fuel supply and electrical boosting equipment, integral control systems and instrumentation, and appendages for conditioning and distributing molten glass to forming apparatuses. The Line 2 furnace does not utilize a refractory brick vessel. As such, it does not meet the definition of a glass melting furnace and is not subject to Subpart CC.

This subpart does not apply to furnaces that produce less than 4.55 Mg (5 tons) of glass per day and all-electric melters. An all-electric melter is a melting furnace in which all of the heat is provided by electric current, although some fossil fuel may be charged to the furnace as raw material only. The line 1 furnace at the Inwood facility qualifies as an all-electric melter and therefore Subpart CC does not apply.

3.4.3. NSPS Subpart IIII – Stationary Compression Ignition Internal Combustion Engines

This subpart applies to manufacturers, owners, and operators of stationary compression ignition internal combustion engines (ICE) that have been constructed, reconstructed, or modified after various dates, the earliest of which is July 11, 2005. Three diesel fired engines at the facility were in use on site prior to 2004 (ESDG12, ESDG13, and ESFW11). Therefore, NSPS Subpart IIII does not apply to these ICE at the Inwood facility. The newest emergency engine (ESDG14) is a new emergency engine subject to the requirements of NSPS IIII. These requirements have been incorporated into the latest R14 permit, R14-0015M.

3.4.4. NSPS Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines

This subpart applies to manufacturers, owners, and operators of stationary spark ignition ICE that have been constructed, reconstructed, or modified after various dates, the earliest of which is June 12, 2006. All of the engines at the Inwood facility, including emergency generators, are compression ignition ICE, and therefore the requirements of this subpart do not apply.

3.4.5. NSPS Subpart PPP – Wool Fiberglass Insulation Manufacturing Plants

This subpart applies to each rotary spin wool fiberglass insulation manufacturing line constructed, modified, or reconstructed after February 7, 1984. Subpart PPP applies to the Inwood facility. Subpart PPP sets a particulate matter standard of 11.0 lbs/ton glass pulled. Facilities comply with the mass emission rate via monitoring operations and using control devices. Subpart PPP prescribes recordkeeping and reporting activities associated with maintaining the elected control device. The production lines at the Inwood facility are currently in compliance with Subpart PPP, as incorporated into the current Title V permit.

3.4.6. Non-Applicability of All Other NSPS

NSPS are developed for particular industrial source categories. Other than NSPS developed for glass manufacturing plants (e.g., Subpart CC) and associated equipment (Subparts K-Kb), the applicability of a particular NSPS to the Inwood facility can be readily ascertained based on the industrial source category covered. All other NSPS are categorically not applicable to wool fiberglass insulation manufacturing facilities.

3.5. NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

Regulatory requirements for facilities subject to NESHAP standards, otherwise known as Maximum Available Control Technology (MACT) Standards for source categories, are contained in 40 CFR Part 63. 40 CFR Part 61 NESHAP standards are defined for specific pollutants while Part 63 NESHAPs are defined for source categories where allowable emission limits are established on the basis of a MACT determination for a particular major source. A major source of HAP is defined as having potential emissions in excess of 25 tpy for total HAP and/or potential emissions in excess of 10 tpy for any individual HAP. Part 63 NESHAPs apply to sources in specifically regulated industrial source categories (CAA Section 112(d)) or on a case-by-case basis (Section 112(g)) for facilities not regulated as a specific industrial source type.

The Inwood facility is an area source of HAP emissions since its potential emission of HAP are less than the 10/25 tpy major threshold. Besides 40 CFR 63 Subpart A (NESHAP Subpart A), which is similar to 40 CFR 60 Subpart A (NSPS Subpart A), the following NESHAP could potentially apply to the Inwood facility:

- 40 CFR Part 61 Subpart N –Inorganic Arsenic Emissions From Glass Manufacturing Plants
- 40 CFR Part 63 Subpart Q –Industrial Process Cooling Towers
- 40 CFR Part 63 Subpart NN – Wool Fiberglass Manufacturing at Area Sources
- 40 CFR Part 63 Subpart NNN –Hazardous Air Pollutants for Wool Fiberglass Manufacturing
- 40 CFR Part 63 Subpart HHHH –Hazardous Air Pollutants for Wet-Formed Fiberglass Mat Production

- 40 CFR Part 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines (RICE)
- 40 CFR Part 63 Subpart DDDDD – Major Source Industrial, Commercial, and Institutional Boilers and Process Heaters

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

3.5.1. 40 CFR 61 Subpart N –Inorganic Arsenic Emissions From Glass Manufacturing Plants

This NESHAP applies to glass melting furnaces that use commercial arsenic as a raw material. Since the Inwood facility does not use any arsenic as a raw material this subpart does not apply.

3.5.2. 40 CFR 63 Subpart Q –Industrial Process Cooling Towers

This NESHAP applies to industrial process cooling towers that remove heat from any chemical or industrial process as well as any combination of heating, ventilation, or cooling systems that uses chromium in the recirculating water as part of the system's water treatment. This requirement does not apply to the Inwood facility. If at any time Knauf become applicable to this requirement the proper notifications will be performed and records kept.

3.5.3. 40 CFR 63 Subpart NN – Wool Fiberglass Manufacturing at Area Sources

This NESHAP applies to each wool fiberglass manufacturing facility that is an area source. The requirements apply to each new and existing gas-fired melting furnace. The definition of glass melting furnace is similar to the definition in NSPS Subpart CC. Similarly, the Line 2 furnace does not meet the definition of a gas-fired melting furnace. As such, this subpart is not applicable to Line 2. Furthermore, as identified in the current permit, Subpart NN does not apply to Line 1 either.

3.5.4. 40 CFR 63 Subpart NNN – Wool Fiberglass Manufacturing

This NESHAP applies to equipment located at wool fiberglass manufacturing facilities, as defined as manufacturing wool fiberglass on a rotary spin manufacturing line or on a flame attenuation manufacturing line, located at major sources of HAP. Due to a formulation change, the Inwood facility is an area source of HAP and, therefore, is not subject to this Subpart.

3.5.5. 40 CFR 63 Subpart HHHH - Wet-Formed Fiberglass Mat Production

This NESHAP applies to drying and curing ovens at wet-formed fiberglass mat production facilities. Knauf 's Inwood facility is a wool-fiberglass production facility that produces insulation whereas the wet-formed fiberglass is a material used in the manufacture of asphalt roofing products (shingles and rolls). Therefore, Subpart HHHH does not apply to the Inwood facility.

3.5.6. 40 CFR 63 Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

This NESHAP applies to stationary reciprocating combustion engines (RICE) at major and minor sources. The engines are classified as compression-ignition emergency units. The emergency engines are rated at greater than 500 horsepower (hp), with the fire engine is rated at less than 500 hp. The engines must meet the definition of emergency in §63.6675, which includes references to §63.6640(f).

The RICE MACT requirements were incorporated into the existing Title V permit for units ESDG12, ESDG13, and ESFW11.

For the newest generator (ESDG14), 40 CFR §63.6590(c) states that a new or reconstructed stationary RICE located at an area HAP source must meet the requirements of NESHAP Subpart ZZZZ by meeting the requirements of NSPS

Subpart IIII. No further requirements apply for such engines under NESHAP Subpart ZZZZ. The Inwood facility is a minor (area) source of hazardous air pollutants and the emergency generator engine is considered a new stationary RICE. Therefore, the requirements contained in §63.6590(c) are applicable. Knauf will be in compliance with applicable requirements of 40 CFR 63 Subpart ZZZZ by meeting the applicable requirements of 40 CFR 60 Subpart IIII

3.5.7. 40 CFR 63 Subpart JJJJJJ – Industrial, Commercial, and Institutional Boilers at Area Sources

This standard applies to industrial, commercial, and institutional boilers of various sizes and fuel types at area sources of HAP emissions. Knauf's Inwood facility is considered an area source for HAP. However, all the units at the Inwood facility are natural gas fired. As such, the units are not subject to this rule.

3.6. WEST VIRGINIA SIP REGULATIONS

The Inwood facility is potentially subject to regulations contained in the West Virginia Code of State Regulations, Chapter 45 (Code of State Regulations). The Code of State Regulations fall under two main categories: those regulations that are generally applicable (e.g., permitting requirements), and those that have specific applicability (e.g., PM standards for manufacturing equipment).

3.6.1. 45 CSR 2: To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect Heat Exchangers

Compliance with this requirement shall be determined in keeping with 40 CFR Part 60, Appendix A, Method 9 or by using approved measurements from continuous opacity monitoring systems. Visible emissions are not expected since only natural gas is combusted in the applicable units, and emissions from sources that burn natural gas have low variability. Therefore, fuel recordkeeping will be adequate to demonstrate compliance. In addition, since the combustion units have maximum design heat inputs less than 10 MMBtu/hr, the units are exempted from the requirements of sections 4 through 6, 8 and 9 as specified in Section 11.

3.6.2. 45 CSR 4: To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

The Inwood facility is subject to this requirement. In accordance with the Title V permit, Knauf maintains appropriate records and takes appropriate response measures of all odor complaints.

3.6.3. 45 CSR 7: To Prevent and Control Particulate Matter Emissions from Manufacturing Processes

The Inwood facility is generally subject to these requirements, which include particulate matter and opacity limitations for manufacturing operations, based on process weight rate. Except where more stringent, these limits are incorporated into the current Title V permit.

3.6.4. 45 CSR 10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

This regulation is potentially applicable to the heaters at the Inwood facility as they produce heat or power by indirect heat transfer and are, by definition, "fuel burning units." However, the units are below the 10MMBtu/hr exemption per 45 CSR 10 Section 10.1. Additionally, the engines are not subject to this regulation as identified in the current Title V permit.

3.6.5. 45 CSR 17: To Prevent and Control Particulate Matter Air Pollution From Materials Handling, Preparation, Storage and Other Sources of Fugitive Particulate Matter

In accordance with the Title V permit, the Inwood facility will take appropriate response measures to control emissions of fugitive particulate matter.

3.6.6. 45 CSR 27: To Prevent and Control Emissions of Toxic Air Pollutants

The storage tanks at the Inwood facility are potentially subject to this regulation. Given the low level of emissions from these small storage tanks, no additional control measures are required. Furthermore, due to the conversion to ECOSE Technology binder, the Inwood facility is no longer a major source and will no longer use the phenol formaldehyde resin. As such, the requirements related to these provisions are no longer applicable.

3.6.7. 45 CSR 30: Requirements for Operating Permits

The Inwood facility is subject to the requirement for an operating permit. The station's Title V permit (R30-00300012-2013) was issued under this rule and this renewal application satisfies the application requirements of 45 CSR 30. Also under this rule, the Inwood facility is subject to operating under the requirements set forth in the issued Title V permit. This application is being submitted to fulfill the permit renewal requirements.

4. TITLE V APPLICATION FORMS

The WVDEP permit application forms contained in this application include all applicable Title V application forms including the required attachments.

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street SE

Charleston, WV 25304

Phone: (304) 926-0475

www.dep.wv.gov/daq

INITIAL/RENEWAL TITLE V PERMIT APPLICATION - GENERAL FORMS

Section 1: General Information

1. **Name of Applicant (As registered with the WV Secretary of State's Office):** Knauf Insulation Inc.	**2. Facility Name or Location:** 4812 Tabler Station Road Inwood, WV 25428
3. DAQ Plant ID No.: 0003 — 00012	**4. Federal Employer ID No. (FEIN):** 35-1417383

5. **Permit Application Type:**

☐ Initial Permit — When did operations commence? 07/20/1998

☒ Permit Renewal — What is the expiration date of the existing permit? 9/20/2018

☐ Update to Initial/Renewal Permit Application

6. Type of Business Entity:

☐ Corporation ☐ Governmental Agency ☒ LLC

☐ Partnership ☐ Limited Partnership

7. Is the Applicant the:

☐ Owner ☐ Operator ☒ Both

If the Applicant is not both the owner and operator, please provide the name and address of the other party.

_____

_____

_____

8. Number of onsite employees:

175

9. Governmental Code:

☒ Privately owned and operated; 0

☐ Federally owned and operated; 1

☐ State government owned and operated; 2

☐ County government owned and operated; 3

☐ Municipality government owned and operated; 4

☐ District government owned and operated; 5

10. 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.

11. Mailing Address		
Street or P.O. Box: 4812 Tabler Station Road		
City: Inwood	**State:** WV	**Zip:** 25428-
Telephone Number: (304) 267-6085	**Fax Number:** (304) 267-6885	

12. Facility Location		
Street: 4812 Tabler Station Road	**City:** Inwood	**County:** Berkeley
UTM Easting: 756.55 km	**UTM Northing:** 4365.50 km	**Zone:** ☒ 17 or ☐ 18
Directions: From Martinsburg, take I-81 southwest to Tabler Station Road, Exit 8 (County Route 32). Site is located on the southeast corner of the I-81 and County Route 32 intersection.		
Portable Source? ☐ Yes ☒ No		
Is facility located within a nonattainment area? ☐ Yes ☒ No		**If yes, for what air pollutants?**
Is facility located within 50 miles of another state? ☒ Yes ☐ No		**If yes, name the affected state(s).** Virginia Maryland
Is facility located within 100 km of a Class I Area[1]? ☒ Yes ☐ No **If no, do emissions impact a Class I Area[1]?** ☐ Yes ☐ No		**If yes, name the area(s).** Shenandoah National Park

[1] *Class I areas include Dolly Sods and Otter Creek Wilderness Areas in West Virginia, and Shenandoah National Park and James River Face Wilderness Area in Virginia.*

13. Contact Information		
Responsible Official: Iain James		**Title:** VP Manufacturing
Street or P.O. Box: One Knauf Drive		
City: Shelbyville	**State:** IN	**Zip:** 46176-
Telephone Number: 317-421-8758	**Fax Number:** ( ) -	
E-mail address: Iain.james@knaufinsulation.com		
Environmental Contact: Chris Mahin		**Title:** Regional HSE Manager
Street or P.O. Box: One Knauf Drive		
City: Shelbyville	**State:** IN	**Zip:** 46176-
Telephone Number: 317-421-8561	**Fax Number:** ( ) -	
E-mail address: chris.mahin@knaufinsulation.com		
Application Preparer: Tom Muscenti		**Title:** Principal Consultant
Company: Trinity Consultants		
Street or P.O. Box: 4500 Brooktree Rd Suite 103		
City: Wexford	**State:** PA	**Zip: 15090-**
Telephone Number: (724) 935-2611	**Fax Number:** ( ) -	
E-mail address: tmuscenti@trinityconsultants.com		

14. Facility Description

List all processes, products, NAICS and SIC codes for normal operation, in order of priority. Also list any process, products, NAICS and SIC codes associated with any alternative operating scenarios if different from those listed for normal operation.

Process	Products	NAICS	SIC
Wool fiberglass manufacturing	Rolls and batts of fiberglass insulation	327993	3296

Provide a general description of operations.

Raw Materials are mixed into batch and the batch is then melted to form glass. The molten glass is separated into streams by use of a Forehearth and fiber is spun into strands by the means of fiberizers. The fibers are collected to form a blanket then cured in a three-zone oven. Upon exiting the curing oven the blanket is cooled via "cooling table". The cooled blanket is then cut to size in rolls and batts of insulation per customer demand.

15. Provide an **Area Map** showing plant location as **ATTACHMENT A**.

16. Provide a **Plot Plan(s)**, e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is located as **ATTACHMENT B**. For instructions, refer to "Plot Plan - Guidelines."

17. Provide a detailed **Process Flow Diagram(s)** showing each process or emissions unit as **ATTACHMENT C**. Process Flow Diagrams should show all emission units, control equipment, emission points, and their relationships.

Section 2: Applicable Requirements

18. Applicable Requirements Summary	
Instructions: Mark all applicable requirements.	
☒ SIP	☐ FIP
☐ Minor source NSR (45CSR13)	☒ PSD (45CSR14)
☐ NESHAP (45CSR34)	☐ Nonattainment NSR (45CSR19)
☒ Section 111 NSPS	☒ Section 112(d) MACT standards
☐ Section 112(g) Case-by-case MACT	☐ 112(r) RMP
☐ Section 112(i) Early reduction of HAP	☐ Consumer/commercial prod. reqts., section 183(e)
☐ Section 129 Standards/Reqts.	☐ Stratospheric ozone (Title VI)
☐ Tank vessel reqt., section 183(f)	☐ Emissions cap 45CSR§30-2.6.1
☐ NAAQS, increments or visibility (temp. sources)	☐ 45CSR27 State enforceable only rule
☐ 45CSR4 State enforceable only rule	☐ Acid Rain (Title IV, 45CSR33)
☐ Emissions Trading and Banking (45CSR28)	☐ **C**ompliance **A**ssurance **M**onitoring (40CFR64)
☐ CAIR NO_x Annual Trading Program (45CSR39)	☐ CAIR NO_x Ozone Season Trading Program (45CSR40)
☐ CAIR SO_2 Trading Program (45CSR41)	

19. Non Applicability Determinations
List all requirements which the source has determined not applicable and for which a permit shield is requested. The listing shall also include the rule citation and the reason why the shield applies. 40 CFR 60 Subpart CC – See section 3.4.2 40 CFR 63 Subpart NN – See section 3.5.3
☒ Permit Shield

20. Facility-Wide Applicable Requirements

List all facility-wide applicable requirements. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*).

<u>Permit R14-0015M:</u>

3.1.1 Open burning. The open burning of refuse by any person, firm, corporation, association or public agency is prohibited except as noted in 45 CSR §6-3.1.

3.1.2. Open burning exemptions. The exemptions listed in 45CSR§6-3.1 are subject to the following stipulation: Upon notification by the Secretary, no person shall cause, suffer, allow or permit any form of open burning during existing or predicated periods of atmospheric stagnation. Notification shall be made by such means as the Secretary may deem necessary and feasible.

3.1.3. Asbestos. The permittee is responsible for thoroughly inspecting the facility, or part of the facility, prior to commencement of demolition or renovation for the presence of asbestos and complying with 40 C.F.R. § 61.145, 40 CFR §61.148, and 40CFR§61.150. The permittee, owner or operator must notify the Secretary at least ten (10) working days prior to the commencement of any asbestos removal on the forms prescribed by the Secretary if the permittee is subject to the notification requirements of 40CFR§61.145(b)(3)(i). The USEPA, the Division of Waste Management and the Bureau for Public Health-Environmental Health require a copy of this notice to be sent to them.

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

3.1.5. Permanent shutdown. A source which has not operated at least 500 hours in one 12-month period within the previous five (5) year time period may be considered permanently shutdown, unless such source can provide to the Secretary, with reasonable specificity, information to the contrary. All permits may be modified or revoked and/or reapplication or application for new permits may be required for any source determined to be permanently shutdown.

3.1.6. Standby plan for reducing emissions. When requested by the Secretary, the permittee shall prepare standby plans for reducing the emission of air pollutants in accordance with the objectives set forth in Tables I, II and III of 45 CSR 11.

☐ Permit Shield

For all facility-wide applicable requirements listed above, provide monitoring/testing / recordkeeping / reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number and/or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

<u>Permit R14-0015H:</u>

3.3.1. Stack Testing. As per provisions set forth in this permit or as otherwise required by the Secretary, in accordance with the West Virginia code, underlying regulations, permits and orders, the permittee shall conduct test(s) to determine compliance with the emission limitations set forth in this permit and/or established or set forth in underlying documents. The Secretary, or his duly authorized representative, may at his option witness or conduct such test(s). Should the Secretary exercise his option to conduct such test(s), the operator shall provide all necessary sampling connection and sampling ports to be located in such manner as the Secretary may require, power for test equipment and the required safety equipment, such as scaffolding, railing and ladders, to comply with generally accepted good safety practices. Such tests shall be conducted in accordance with the methods and

procedures set forth in this permit or as otherwise approved or specified by the Secretary in accordance with the following:

a. The Secretary may on a source specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with 40 CFR Parts 60, 61, and 63 in accordance with the Secretary's delegated authority and any established equivalency determinate methods which are applicable. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be reviewed in accordance with 45CSR§13-4 or 45CSR§13-5.4 as applicable.

b. The Secretary may on a source-specific basis approve or specify additional testing or alternative testing to the test methods specified in the permit for demonstrating compliance with applicable requirements which do not involve federal delegation. In specifying or approving such alternative testing to the test methods, the Secretary, to the extent possible, shall utilize the same equivalency criteria as would be used in approving such changes under Section 3.3.1.A of this permit. If a testing method is specified or approved which effectively replaces a test method specified in the permit, the permit may be revised in accordance with 45CSR§13-4 or 45CSR§13-5.4 as applicable.

c. All periodic test to determine mass emissions limits from or air pollutant concentration in discharge stacks and such other tests as specified in this permit shall be conducted in accordance with an approved test protocol. Unless previously approved, such protocols shall be submitted to the Secretary in writing at least thirty (30) days prior to any testing and shall contain the information set forth by the Secretary. In addition, the permittee shall notify the Secretary at least fifteen (15) days prior to any testing so the Secretary man have the opportunity to observe such tests. This notification shall include the actual date and time during which the test will be conducted and, if appropriate, verification that the tests will fully conform to a referenced protocol previously approved by the Secretary.

3.4.1. Retention of records. The permittee shall maintain records of all information (including monitoring data, support information, reports and notifications) required by this permit recorded in a form suitable and readily available for expeditious inspection and review. Support information includes all calibration and maintenance records and all original strip-chart recordings for continuous monitoring or instrumentation. The files shall be maintained for at least five (5) years following the date of each occurrence, measurement, maintenance, corrective action, report, or records. At a minimum, the most recent two (2) years of data shall be maintained on site, the remaining three (3) years of data may be maintained off site, but must remain accessible within a reasonable time. Where appropriate, the permittee may maintain records electronically (on a computer, on computer floppy disks, CDs, DVDs, or magnetic tape disks), on microfilm, or on microfiche.

3.4.2. Odors. For the purposes of 45CSR4, the permittee shall maintain a record of all odor complaints received, any investigation performed in response to such a compliant, and any responsive action(s) taken.

3.5.1. Responsible official. Any application form, report, or compliance certification required by this permit to be submitted to the DAQ and/or USEPA shall contain a certification by the responsible official that states that, based on formation and belief formed after reasonable inquiry, the statements and information in the document are true, accurate and complete.

3.5.2. Confidential information. A permittee may request confidential treatment of the submission of reporting required by this permit pursuant to the limitations and procedures of W.Va. Code§22-5-10 and 45CSR31.

3.5.3. Correspondence. All notices, requests, demands, submissions and other communications required or permitted to be made to the Sectary of DEP and/or USEPA shall be made in writing and shall be deemed to have been duly given when delivered by and/or mailed first class with postage prepaid to the address(es) set forth below or to such other person or address as the Secretary of the Department of Environmental Protection may designate.
3.5.4.1 In accordance with 45 CSR30-Operating Permit Program, the permittee shall submit a Certified Emissions Statement (CES) and pay fees on an annual basis in accordance the submittal requirements of the Division of Air Quality. A receipt of the appropriate fee shall be maintained on the premises for with the receipt has been issued, and shall be made immediately available for inspection by the Secretary and his/her duly authorized representative.

3.5.5. Emission Inventory. At such times(s) as the Secretary may designate, the permittee herein shall prepare and submit an emission inventory for the previous year, addressing the emission from the facility and/or process(es) authorized herein, in accordance with the emission inventory submittal requirements of the Division of Air Quality. After initial submittal, the Secretary may, based upon the type and quantity of the pollutants emitted, establish a frequency other than on an annual basis.

Are you in compliance with all facility-wide applicable requirements? ☒ Yes ☐ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

21. Active Permits/Consent Orders

Permit or Consent Order Number	Date of Issuance MM/DD/YYYY	List any Permit Determinations that Affect the Permit *(if any)*
R30-00300012-2013 (MM01)	3/15/2016	
R14-0015M	09/20/2017	
	/ /	

22. Inactive Permits/Obsolete Permit Conditions

Permit Number	Date of Issuance	Permit Condition Number
	/ /	

Section 3: Facility-Wide Emissions

23. Facility-Wide Emissions Summary [Tons per Year]	
Criteria Pollutants	Potential Emissions
Carbon Monoxide (CO)	172.4
Nitrogen Oxides (NO_X)	200.1
Lead (Pb)	<0.001
Particulate Matter ($PM_{2.5}$)[1]	207.6
Particulate Matter (PM_{10})[1]	209.2
Total Particulate Matter (TSP)	187.2
Sulfur Dioxide (SO_2)	25.8
Volatile Organic Compounds (VOC)	112.2
Hazardous Air Pollutants[2]	Potential Emissions
Total HAP	1.0
n-Hexane	1.0
Regulated Pollutants other than Criteria and HAP	Potential Emissions
Ammonia	229.57
Carbon Dioxide Equivalents (CO_2e)	69,405.7

[1]$PM_{2.5}$ and PM_{10} are components of TSP.
[2]For HAPs that are also considered PM or VOCs, emissions should be included in both the HAPs section and the Criteria Pollutants section.

Section 4: Insignificant Activities

24. Insignificant Activities (Check all that apply)		
☒	1.	Air compressors and pneumatically operated equipment, including hand tools.
☐	2.	Air contaminant detectors or recorders, combustion controllers or shutoffs.
☒	3.	Any consumer product used in the same manner as in normal consumer use, provided the use results in a duration and frequency of exposure which are not greater than those experienced by consumer, and which may include, but not be limited to, personal use items; janitorial cleaning supplies, office supplies and supplies to maintain copying equipment.
☒	4.	Bathroom/toilet vent emissions.
☒	5.	Batteries and battery charging stations, except at battery manufacturing plants.
☒	6.	Bench-scale laboratory equipment used for physical or chemical analysis, but not lab fume hoods or vents. Many lab fume hoods or vents might qualify for treatment as insignificant (depending on the applicable SIP) or be grouped together for purposes of description.
☐	7.	Blacksmith forges.
☒	8.	Boiler water treatment operations, not including cooling towers.
☒	9.	Brazing, soldering or welding equipment used as an auxiliary to the principal equipment at the source.
☐	10.	CO_2 lasers, used only on metals and other materials which do not emit HAP in the process.
☐	11.	Combustion emissions from propulsion of mobile sources, except for vessel emissions from Outer Continental Shelf sources.
☒	12.	Combustion units designed and used exclusively for comfort heating that use liquid petroleum gas or natural gas as fuel.
☒	13.	Comfort air conditioning or ventilation systems not used to remove air contaminants generated by or released from specific units of equipment.
☒	14.	Demineralized water tanks and demineralizer vents.
☐	15.	Drop hammers or hydraulic presses for forging or metalworking.
☒	16.	Electric or steam-heated drying ovens and autoclaves, but not the emissions from the articles or substances being processed in the ovens or autoclaves or the boilers delivering the steam.
☐	17.	Emergency (backup) electrical generators at residential locations.
☐	18.	Emergency road flares.
☒	19.	Emission units which do not have any applicable requirements and which emit criteria pollutants (CO, NO_x, SO_2, VOC and PM) into the atmosphere at a rate of less than 1 pound per hour and less than 10,000 pounds per year aggregate total for each criteria pollutant from all emission units. Please specify all emission units for which this exemption applies along with the quantity of criteria pollutants emitted on an hourly and annual basis: Diesel storage tank 500 gallons Diesel Storage tank 300 gallons Gasoline storage tank 250 gallons Kerosene Storage tank 500 gallons

24. Insignificant Activities (Check all that apply)		
☐	20.	Emission units which do not have any applicable requirements and which emit hazardous air pollutants into the atmosphere at a rate of less than 0.1 pounds per hour and less than 1,000 pounds per year aggregate total for all HAPs from all emission sources. This limitation cannot be used for any source which emits dioxin/furans nor for toxic air pollutants as per 45CSR27. Please specify all emission units for which this exemption applies along with the quantity of hazardous air pollutants emitted on an hourly and annual basis: _____ _____ _____ _____ _____
☐	21.	Environmental chambers not using hazardous air pollutant (HAP) gases.
☐	22.	Equipment on the premises of industrial and manufacturing operations used solely for the purpose of preparing food for human consumption.
☐	23.	Equipment used exclusively to slaughter animals, but not including other equipment at slaughterhouses, such as rendering cookers, boilers, heating plants, incinerators, and electrical power generating equipment.
☒	24.	Equipment used for quality control/assurance or inspection purposes, including sampling equipment used to withdraw materials for analysis.
☒	25.	Equipment used for surface coating, painting, dipping or spray operations, except those that will emit VOC or HAP.
☒	26.	Fire suppression systems.
☐	27.	Firefighting equipment and the equipment used to train firefighters.
☐	28.	Flares used solely to indicate danger to the public.
☒	29.	Fugitive emission related to movement of passenger vehicle provided the emissions are not counted for applicability purposes and any required fugitive dust control plan or its equivalent is submitted.
☒	30.	Hand-held applicator equipment for hot melt adhesives with no VOC in the adhesive formulation.
☒	31.	Hand-held equipment for buffing, polishing, cutting, drilling, sawing, grinding, turning or machining wood, metal or plastic.
☐	32.	Humidity chambers.
☐	33.	Hydraulic and hydrostatic testing equipment.
☒	34.	Indoor or outdoor kerosene heaters.
☒	35.	Internal combustion engines used for landscaping purposes.
☐	36.	Laser trimmers using dust collection to prevent fugitive emissions.
☐	37.	Laundry activities, except for dry-cleaning and steam boilers.
☒	38.	Natural gas pressure regulator vents, excluding venting at oil and gas production facilities.
☐	39.	Oxygen scavenging (de-aeration) of water.
☐	40.	Ozone generators.

24. Insignificant Activities (Check all that apply)		
☒	41.	Plant maintenance and upkeep activities (e.g., grounds-keeping, general repairs, cleaning, painting, welding, plumbing, re-tarring roofs, installing insulation, and paving parking lots) provided these activities are not conducted as part of a manufacturing process, are not related to the source's primary business activity, and not otherwise triggering a permit modification. (Cleaning and painting activities qualify if they are not subject to VOC or HAP control requirements. Asphalt batch plant owners/operators must still get a permit if otherwise requested.)
☒	42.	Portable electrical generators that can be moved by hand from one location to another. "Moved by Hand" means that it can be moved without the assistance of any motorized or non-motorized vehicle, conveyance, or device.
☒	43.	Process water filtration systems and demineralizers.
☒	44.	Repair or maintenance shop activities not related to the source's primary business activity, not including emissions from surface coating or de-greasing (solvent metal cleaning) activities, and not otherwise triggering a permit modification.
☒	45.	Repairs or maintenance where no structural repairs are made and where no new air pollutant emitting facilities are installed or modified.
☐	46.	Routing calibration and maintenance of laboratory equipment or other analytical instruments.
☐	47.	Salt baths using nonvolatile salts that do not result in emissions of any regulated air pollutants. Shock chambers.
☐	48.	Shock chambers.
☐	49.	Solar simulators.
☒	50.	Space heaters operating by direct heat transfer.
☐	51.	Steam cleaning operations.
☐	52.	Steam leaks.
☐	53.	Steam sterilizers.
☐	54.	Steam vents and safety relief valves.
☒	55.	Storage tanks, reservoirs, and pumping and handling equipment of any size containing soaps, vegetable oil, grease, animal fat, and nonvolatile aqueous salt solutions, provided appropriate lids and covers are utilized.
☒	56.	Storage tanks, vessels, and containers holding or storing liquid substances that will not emit any VOC or HAP. Exemptions for storage tanks containing petroleum liquids or other volatile organic liquids should be based on size limits such as storage tank capacity and vapor pressure of liquids stored and are not appropriate for this list.
☐	57.	Such other sources or activities as the Director may determine.
☐	58.	Tobacco smoking rooms and areas.
☒	59.	Vents from continuous emissions monitors and other analyzers.

Section 5: Emission Units, Control Devices, and Emission Points

25. Equipment Table

Fill out the **Title V Equipment Table** and provide it as **ATTACHMENT D**.

26. Emission Units

For each emission unit listed in the **Title V Equipment Table**, fill out and provide an **Emission Unit Form** as **ATTACHMENT E**.

For each emission unit not in compliance with an applicable requirement, fill out a **Schedule of Compliance Form** as **ATTACHMENT F**.

27. Control Devices

For each control device listed in the **Title V Equipment Table**, fill out and provide an **Air Pollution Control Device Form** as **ATTACHMENT G**.

For any control device that is required on an emission unit in order to meet a standard or limitation for which the potential pre-control device emissions of an applicable regulated air pollutant is greater than or equal to the Title V Major Source Threshold Level, refer to the **Compliance Assurance Monitoring (CAM) Form(s)** for CAM applicability. Fill out and provide these forms, if applicable, for each Pollutant Specific Emission Unit (PSEU) as **ATTACHMENT H**.

Section 6: Certification of Information

28. Certification of Truth, Accuracy and Completeness and Certification of Compliance

*Note: This Certification must be signed by a responsible official. The **original**, signed in **blue ink**, must be submitted with the application. Applications without an **original** signed certification will be considered as incomplete.*

a. Certification of Truth, Accuracy and Completeness

I certify that I am a responsible official (as defined at 45CSR§30-2.38) and am accordingly authorized to make this submission on behalf of the owners or operators of the source described in this document and its attachments. I certify under penalty of law that I have personally examined and am familiar with the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine and/or imprisonment.

b. 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.

Responsible official (type or print)

Name: Iain James	Title: VP Manufacturing

Responsible official's signature:

Signature: _____ Signature Date: 3/14/2018

(Must be signed and dated in blue ink)

Note: Please check all applicable attachments included with this permit application:

☒	ATTACHMENT A: Area Map
☒	ATTACHMENT B: Plot Plan(s)
☒	ATTACHMENT C: Process Flow Diagram(s)
☒	ATTACHMENT D: Equipment Table
☒	ATTACHMENT E: Emission Unit Form(s)
☐	ATTACHMENT F: Schedule of Compliance Form(s) **N/A**
☒	ATTACHMENT G: Air Pollution Control Device Form(s)
☐	ATTACHMENT H: Compliance Assurance Monitoring (CAM) Form(s) **N/A**

All of the required forms and additional information can be found and downloaded from, the DEP website at www.dep.wv.gov/daq, requested by phone (304) 926-0475, and/or obtained through the mail.

ATTACHMENT A

Area Map

Figure 1 – Aerial Image of Knauf Inwood Facility

Facility Coordinates:

Latitude: 39°24’09.30’’ N
Longitude: 78°01’22.39’’ W

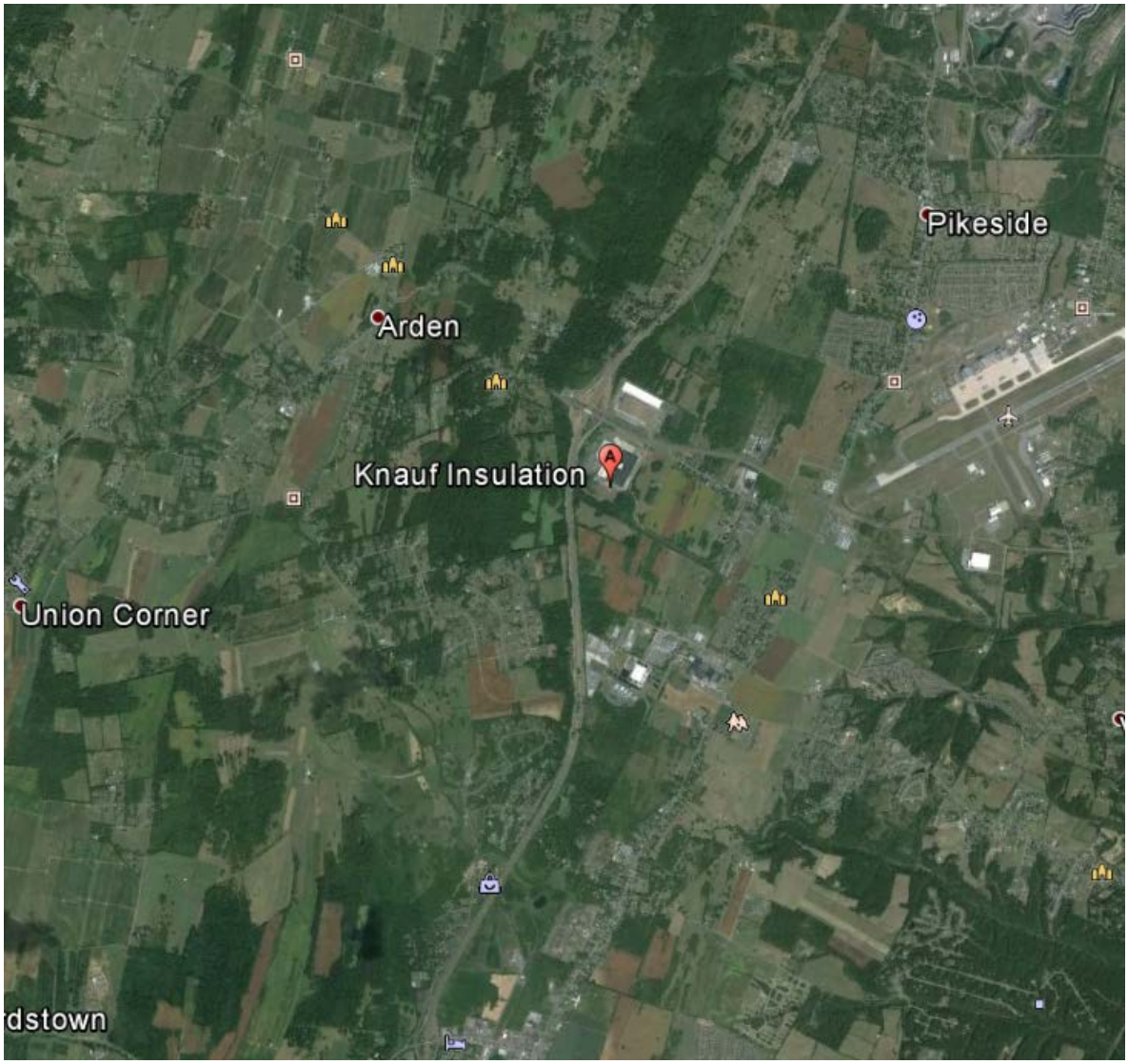
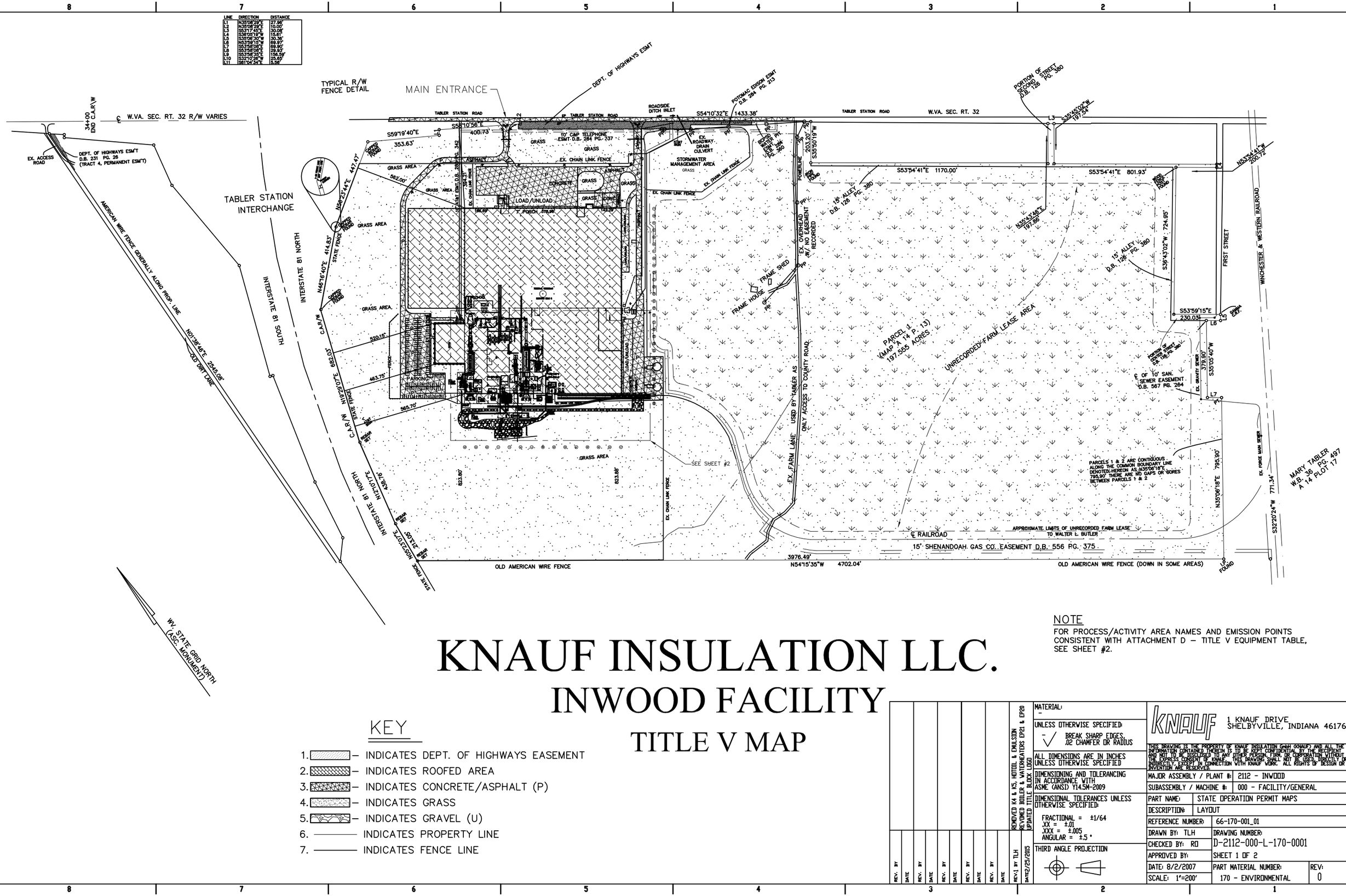


Figure 2 – Extended Aerial Image of Knauf Inwood Facility

ATTACHMENT B

Plot Plan

LINE	DIRECTION	DISTANCE
L1	N39°09'29"E	127.98'
L2	N39°08'29"E	10.00'
L3	S53°17'49"E	10.08'
L4	S34°05'10"W	15.81'
L5	S35°06'30"W	30.36'
L6	N53°59'15"W	69.97'
L7	S55°35'08"E	69.90'
L8	S53°39'08"E	29.83'
L9	S53°38'35"E	156.59'
L10	S32°10'26"W	23.05'
L11	S81°04'34"E	9.56'



NOTE

FOR PROCESS/ACTIVITY AREA NAMES AND EMISSION POINTS CONSISTENT WITH ATTACHMENT D – TITLE V EQUIPMENT TABLE, SEE SHEET #2.

KNAUF INSULATION LLC.

INWOOD FACILITY

TITLE V MAP

KEY

1. – INDICATES DEPT. OF HIGHWAYS EASEMENT
2. – INDICATES ROOFED AREA
3. – INDICATES CONCRETE/ASPHALT (P)
4. – INDICATES GRASS
5. – INDICATES GRAVEL (U)
6. ——— INDICATES PROPERTY LINE
7. ——— INDICATES FENCE LINE

REV.	BY	DATE	DESCRIPTION
1	TLH	2/25/2015	REMOVED K4 & K5, HOTOIL & EMULSION BOILER & WATERHEATERS EP21 & EP20 UPDATED TITLE BLOCK LOGO

MATERIAL:
-

UNLESS OTHERWISE SPECIFIED:
BREAK SHARP EDGES, .02 CHAMFER OR RADIUS

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED

DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME (ANSI) Y14.5M-2009

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL = ±1/64
.XX = ±.01
.XXX = ±.005
ANGULAR = ±.5°

THIRD ANGLE PROJECTION

KNAUF
1 KNAUF DRIVE
SHELBYVILLE, INDIANA 46176

MAJOR ASSEMBLY / PLANT #:	2112 - INWOOD
SUBASSEMBLY / MACHINE #:	000 - FACILITY/GENERAL
PART NAME:	STATE OPERATION PERMIT MAPS
DESCRIPTION:	LAYOUT
REFERENCE NUMBER:	66-170-001_01
DRAWN BY: TLH	DRAWING NUMBER: D-2112-000-L-170-0001
CHECKED BY: RD	
APPROVED BY:	SHEET 1 OF 2
DATE: 8/2/2007	PART MATERIAL NUMBER: 170 - ENVIRONMENTAL
SCALE: 1"=200'	REV: 0

KNAUF INSULATION LLC.

INWOOD FACILITY

TITLE V MAP

756557mE, 4365508mN

ELEVATION 586.5 ft

GROUP	AREA	ID. NO.	NAME	EMISSION POINTS
001	A		RAW MATERIAL HANDLING	FP11
002	B		MELTING & REFINING LINE 1	EP12
	B1	ES12C	MELTER	
	B2	ES12E	FOREHEARTH	
003	C		MELTING & REFINING LINE 2	EP22
	C1	ES22C	MELTER	
	C2	ES22E	FOREHEARTH	
004	D		FORMING & COLLECTION LINE 1	EP13
	D1	ES13A	FIBERIZERS	
005	E		FORMING & COLLECTION LINE 2	EP23
	E1	ES23A	FIBERIZERS	
006	F		CURING & COOLING LINE 1	EP14
	F1	ES14A	OVEN	
	F2	ES14B	COOLING TABLE	
007	G		CURING & COOLING LINE 2	EP24
	G1	ES24A	OVEN	
	G2	ES24B	COOLING TABLE	
008	H		FACING, SIZING & PACKAGING LINE 1	FP15
	J		FACING, SIZING & PACKAGING LINE 2	FP15
009	K		SUPPORT FACILITIES (MAINTENANCE)	
	K1	ESDG12	EMERGENCY GENERATOR (LINE 1)	EP16
	K2	ESDG13	EMERGENCY GENERATOR (LINE 2)	EP17
	K3	ESFW11	2 EMERGENCY FIRE WATER TANKS	EP18
	K6	ESSH15	8.525 MMBTU/HR MAKEUP AIR HANDLING UNIT	EP19
	K7	ESSH16	7.875 MMBTU/HR MAKEUP AIR HANDLING UNIT	EP22

AREA	STORAGE TANKS
T1	BINDER ROOM
T2	GENERATOR DIESEL
T3	WAX
T4	AMMONIUM HYDROXIDE
T5	ECOSE STORAGE
T6	DIESEL FUEL
T7	GASOLINE STORAGE
T8	KEROSENE

NEW COURT YARD

OFFICE

#1 PRODUCTION LINE (WEST)

#2 PRODUCTION LINE (EAST)

TUMBLER

SCRUBBER CD25A

SCRUBBER CD24B

RTO CD24A

EP 23 EL. 120 FT. E 756.003 N 4365.304

EP14 EL. 120 FT. E 755.923 N 4365.399

RTO CD14A

CD23A

CD23B

CD23C

SCRUBBER

CD13B

CD13A

EP13 EL. 120 FT. E 755.920 N 4365.364

BAG HOUSE CD12B

CD12Bb

EP12 EL. 60 FT. E 755.906 N 4365.365

EP22 EL. 60 FT. E 755.994 N 4365.314

CD22B

CD22Bb

BAG HOUSE

EP 24 EL. 120 FT. E 756.023 N 4365.373

CONTAINMENT AREA

EX. CHAIN LINK FENCE

CONCRETE

ASPHALT

CHEMICAL LOAD / UNLOAD

EMERGENCY GENERATORS

AMMONIUM HYDROXIDE

WV STATE GRID NORTH (ASSC. MONUMENT)

REMOVED K4 & K5, HOTOIL & EMULSION
REVISED BOILER & WATERHEATERS EP21 & EP20
UPDATED TITLE BLOCK LOGO

REV. BY
DATE
REV. BY
DATE
REV. BY
DATE
REV. BY
DATE
REV. BY
DATE
REV. BY
DATE
REV. BY
DATE
REV.1 BY TLH
DATE2/25/2015

MATERIAL:
-

UNLESS OTHERWISE SPECIFIED:
BREAK SHARP EDGES, .02 CHAMFER OR RADIUS

ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED

DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ASME (ANSI) Y14.5M-2009

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED:
FRACTIONAL = ±1/64
.XX = ±.01
.XXX = ±.005
ANGULAR = ±.5 °

THIRD ANGLE PROJECTION

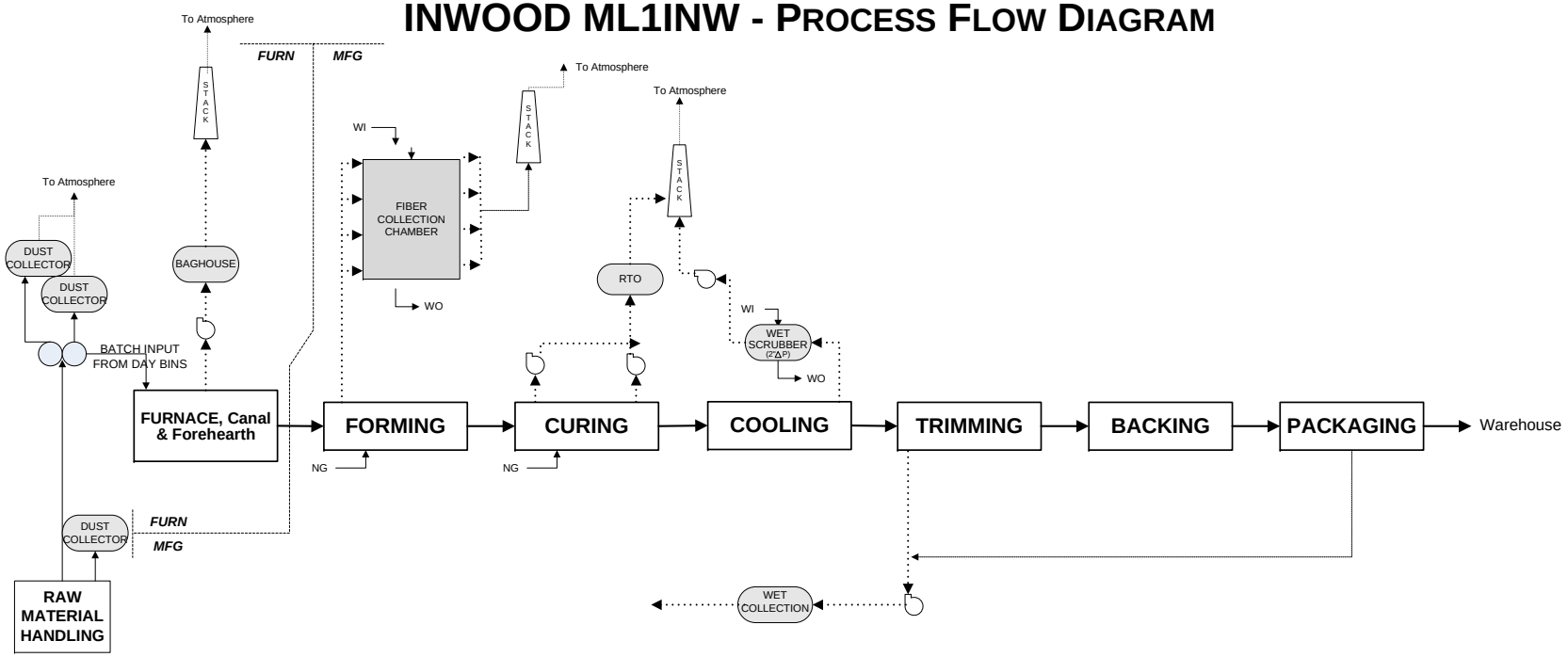
KNAUF 1 KNAUF DRIVE SHELBYVILLE, INDIANA 46176

MAJOR ASSEMBLY / PLANT #:	2112 - INWOOD
SUBASSEMBLY / MACHINE #:	000 - FACILITY/GENERAL
PART NAME:	STATE OPERATION PERMIT MAPS
DESCRIPTION:	LAYOUT
REFERENCE NUMBER:	66-170-001_02
DRAWN BY: TLH	DRAWING NUMBER: D-2112-000-L-170-0002
CHECKED BY: RD	
APPROVED BY:	SHEET 2 OF 2
DATE: 8/2/2007	PART MATERIAL NUMBER: 170 - ENVIRONMENTAL
SCALE: 1"=40'	REV: 0

ATTACHMENT C

Process Flow Diagram

INWOOD ML1INW - PROCESS FLOW DIAGRAM



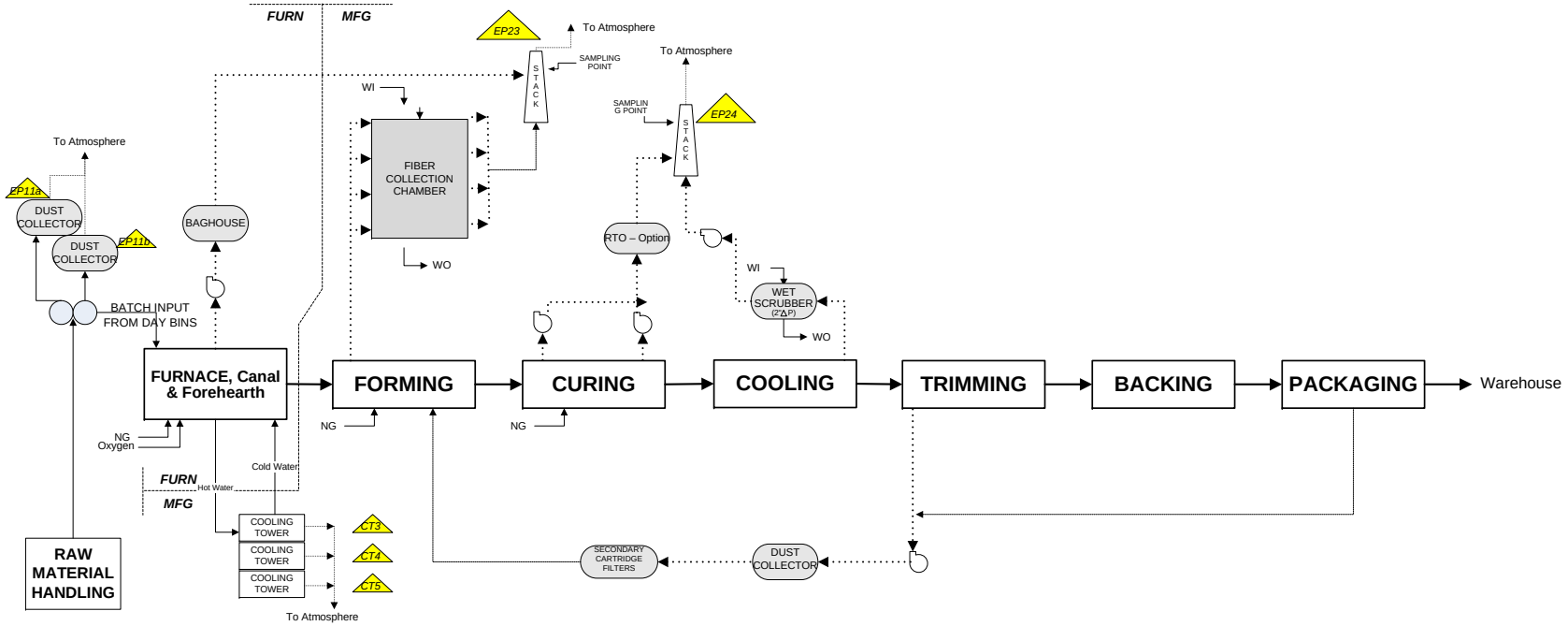
LEGEND

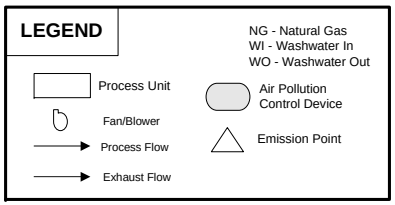
NG - Natural Gas
WI - Washwater In
WO - Washwater Out

- Process Unit
- Air Pollution Control Device
- Fan/Blower
- Emission Point
- Process Flow
- Exhaust Flow

MINIMUM WET SCRUBBER WATER FLOW - 150 GPM

INWOOD ML2INW - PROCESS FLOW DIAGRAM





MINIMUM WET SCRUBBER WATER FLOW - 150 GPM

ATTACHMENT D

Equipment Table

ATTACHMENT D - Emission Units Table

(includes all emission units at the facility except those designated as insignificant activities in Section 4, Item 24 of the General Forms)

Emission Unit ID[1]	Emission Point ID[1]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Control Device[1]
RAW MATERIAL HANDLING OPERATIONS (Group 001)					
ES1A	FP23	Raw Material Storage Bin for Sand	07/25/1998	178.35 tons	CD1A
ES1B	FP23	Raw Material Storage Bin for Borax	07/25/1998	137.45 tons	CD1B
ES1C	FP23	Raw Material Storage Bin for Borax	07/25/1998	137.45 tons	CD1B
ES1D	FP23	Raw Material Storage Bin for Soda Ash	07/25/1998	137.45 tons	CD1D
ES1E	FP23	Raw Material Storage Bin for Soda Ash	07/25/1998	137.45 tons	CD1D
ES1F	FP23	Raw Material Storage Bin for Aplite	07/25/1998	137.45 tons	CD1F
ES1G	FP23	Raw Material Storage Bin for Lime	07/25/1998	109.50 tons	CD1G
ES1H	FP23	Raw Material Storage Bin for Cullet	07/25/1998	108.50 tons	CD1I
ES1I	FP23	Raw Material Storage Bin for Cullet	07/25/1998	108.50 tons	CD1I
ES1J	FP23	Raw Material Storage Bin for Cullet	07/25/1998	137.45 tons	CD1F
ES1K	FP23	Raw Material Storage Bin for Baghouse Dust	07/25/1998	75.00 tons	CD1K
ES1L	FP23	Raw Material Storage Bin for Cullet	2017	137.45 tons	CD1L
ES1M	FP23	Raw Material Storage Bin for Cullet	2017	137.45 tons	CD1M
ES1N	FP23	Raw Material Storage Bin for Cullet	2017	137.45 tons	CD1N
ES12A	FP11	Batch Mixers' Receiving Bin For 1st & 2nd Lines	07/25/1998	8,000 lbs	CD12A
ES22A	FP11	Batch Mixer Receiving Bin for 2nd Line	2004	8,000 lbs	CD22A
ES12B	FP11	Mixed Batch Storage Backup Day Bin for 1st Line (5" Line)	07/25/1998	21.72 tons	CD12D
ES22B	FP11	Mixed Batch Storage Day Bin for 2nd Line (1 Hour)	2004	6.675 tons	CD22C
ES22Bb	FP11	Mixed Batch Storage Backup Day Bin for 2nd Line (8 Hour)	2004	42.2 tons	CD22C
ES12D	FP11	Mixed Batch Storage Day Bin for 1st Line	07/25/1998	39.0 tons	CD12C
ES12Db	FP11	Mixed Batch Storage Day Bin for 1st Line	07/25/1998	1.31 tons	CD12Cb
ES11a	EP11a	Line 2 Day Bin	2017		CD11a
ES11b	EP11b	Line 2 Day Bin	2017		CD11b

TANKS (Group 001)					
T3	FP11	ECOSE Storage Tank	07/25/1998	5,131 gallons	NA
T4	FP11	ECOSE Storage Tank	07/25/1998	5,131 gallons	NA
T5	FP11	ECOSE Storage Tank	07/25/1998	5,131 gallons	NA
T6	FP11	ECOSE Storage Tank	07/25/1998	5,131 gallons	NA
T7A	FP11	Wax Storage Tank	07/25/1998	5,000 gallons	NA
T7B	FP11	Wax Storage Tank	07/25/1998	5,000 gallons	NA
T8	FP11	Ammonia (aqueous) Storage Tank	07/25/1998	6,000 gallons	NA
M1	FP11	Catalyst Mix Tank	2015	1,200 gallons	NA
M2	FP11	Catalyst Hold Tank	2015	1,500 gallons	NA
M3	FP11	Spare Holding Tank	07/25/1998	1,700 gallons	NA
M4	FP11	Binder Holding Tank	2015	1,750 gallons	NA
M5	FP11	Binder Mix Tank	2015	750 gallons	NA
M6	FP11	Binder Holding Tanks	2015	1,600 gallons	NA
M7	FP11	Filtered Water Hold Tank	2017	2,600 gallons	NA
MELTING & REFINING LINE 1 Group(002) [9,000 lbs/hr or 39,420 TPY Production Rate]					
ES12C	EP12	Melter Hood for 1st Line Custom Built by Guardian Fiberglass	07/25/1998	4.5 TPH	CD12B and CD12Bb
ES12E	EP12 and EP13	Forehearth for 1st Line Natural Gas Fired Brick Holding Process Heater Tank Max Heat Input Rate: 5.5 MMBtu/hr	07/25/1998	9,000 lbs/hr of Molten Glass	CD13A and CD13B
MELTING & REFINING LINE 2 Group(003) [13,333 lbs/hr]					
ES22	EP23	ML2INW KING melter Gas (natural gas-NG) oxygen fuel furnace includes electric/gas fired canal and electric forehearth	2017	6.67 tons of glass pulled (TGP)/hr	CD22B
FORMING AND COLLECTING 1 Group (004)					
ES13A	EP13	Glass Fiber Forming Units Natural Gas Fired	07/25/1998	9,000 lbs/hr	CD13A, CD13B, CD13C
FORMING AND COLLECTING 2 Group (005)					
ES22E	EP23	ML2INW forming includes forming unit (fiberizers) and collection plenum Total design heat input of 20 MMbtu/hr of NG	2017	6.67 TGP/hr	CD23A, CD23B, CD23C, CD23D
CURING AND COOLING LINE 1 Group (006)					
ES14A	EP14	3 Zone Curing Oven for 1st Line Manufacturer: B&M Steel of New Castle Indiana Natural Gas Fired Max Heat Input Rate: 18.0 MMBtu/hr	0ES7/25/1998	9,000 lbs/hr	CD14A
ES14B	EP14	Cooling Table for 1st Line	07/25/1998	9,000 lbs/hr	CD14A

CURING AND COOLING LINE 2 Group (007)					
ES24A	EP24	5 Zone Curing Oven for 2nd Line	2017	6.67 TGP/hr	CD24A
ES24B	EP24	Cooling Table for 2nd Line	2017	6.67 TGP/hr	CD24B
FACING SIZING & PACKAGING for 1st Line Group (008)					
ES15A	FP15	Hot Roll – Facing Application	07/25/1998	50-400^{O}F @ 180 GPM	None
ES15Aa	FP15	Infrared Radiation – Facing Application	2004	50-400^{O}F @ 200 amps	CD15A
ES15B	FP15	Slitter Saw	07/25/1998	NA	CD15A
ES15C	FP15	Edge Trimmer and Dicers (or Cubes)	07/25/1998	NA	CD13A, CD13B, CD13C
ES15D	FP15	Choppers	07/25/1998	NA	CD15A
ES15E	FP15	Roll Up	07/25/1998	NA	CD15A
ES15F	FP15	Batt Folder	07/25/1998	NA	CD15A
ES15G	FP15	Batt Packers	07/25/1998	NA	CD15A
ES15H	FP15	Dicers or Cubers	07/25/1998	NA	CD15C and CD15D
ES15I	FP15	Blowing Wool Bagger	07/25/1998	NA	CD15C and CD15D
ES15J	FP15	Ring Wrapper	07/25/1998	NA	CD15A
FACING SIZING & PACKAGING for 2nd Line Group (008)					
ES25A	FP15	Infrared Radiation – Facing Application	2004	N/A	None
ES25B	FP15	Slitter Saw	2017	NA	CD25A
ES25C	FP15	Edge Trimmer and Dicers (or Cubes)	2004	NA	CD23A, CD23B, CD23C, CD23D
ES25D	FP15	Choppers	2017	NA	CD25A
ES25F	FP15	Batt Folder	2017	NA	CD25A
ES25G	FP15	Batt Packers	2017	NA	CD25C/D
ES25H	FP15	Dicers or Cubers	2004	NA	CD25C/D
ES25I	FP15	Blowing Wool Bagger	2004	NA	CD15A
ES25J	FP15	Dicers	2004	NA	CD25C/D
ES25L	FP15	Blowing Wool Bagger	2004	NA	CD15A
SUPPORT FACILITIES Group (009)					
ESDG12	EP16	Emergency Generator - Caterpillar 3406 Diesel Fired Internal Combustion Engine	07/25/1998	587 bhp	None

ESDG13	EP17	Emergency Generator - Caterpillar 3456 Diesel Fired Internal Combustion Engine	2004	610 bhp	None
ESFW11	EP18	Emergency Fire Water Pump - Cummins NT-855-F1 Diesel Fired Internal Combustion Engine	07/25/1998	255 hp	None
ESDG14	NewGEN	Emergency Generator - Caterpillar C18 Diesel Fired Internal Combustion Engine	2017	900 bhp	None
ESSH15	EP19	Air Handling Unit: Rapid Engineering, Model: 4089 fired by natural gas	07/25/1998	8.525 MMBtu/hr	None
ESSH16	EP22	Air Handling Unit; Rapid Engineering, Model: 4089 fired by natural gas	2004	7.875 MMBtu/hr	None
CT1	CT1	Cooling Tower	1998		None
CT2	CT2	Cooling Tower	1998		None
CT3	CT3	Cooling Tower	2017		Drift Eliminator
CT4	CT4	Cooling Tower	2017		Drift Eliminator
CT5	CT5	Cooling Tower	2017		Drift Eliminator

[1]For 45CSR13 permitted sources, the numbering system used for the emission points, control devices, and emission units should be consistent with the numbering system used in the 45CSR13 permit. For grandfathered sources, the numbering system should be consistent with registrations or emissions inventory previously submitted to DAQ. For emission points, control devices, and emissions units which have not been previously labeled, use the following 45CSR13 numbering system: 1S, 2S, 3S,... or other appropriate description for emission units; 1C, 2C, 3C,... or other appropriate designation for control devices; 1E, 2E, 3E, ... or other appropriate designation for emission points.

ATTACHMENT E

Emission Unit Forms

ATTACHMENT E - Emission Unit Form

Emission Unit Description Raw Material Handling Operations (Group 001)

Emission unit ID numbers:	**Emission unit names:**	**List any control devices associated with these emission units:**
ES1A, ES1B, ES1C, ES1D, ES1E, ES1F, ES1G, ES1H, ES1I, ES1J, ES1K, ES1L, ES1M, ES1N, ES12A, ES12B, ES12D, ES12Db, ES22A, ES22B, ES22Bb, ES12Db, ES11a, ES11b	Raw Material Storage Silos for Sand, Borax, Soda Ash, Aplite, Cullet, Soda Lime Cullet (Purchased), Lime & Baghouse Dust and Raw Material Storage Silos for Mixed Batch	CD1A, CD1B, CD1D, CD1F, CD1I , CD1G, CD1K, CD12A, CD12C, CD12Cb, CD12D, CD22A, CD22C, CD11a, CD11b

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Sand, Borax, Soda Ash, Aplite, Cullet and Lime is pneumatically conveyed from the delivery trucks or railroad cars to storage bins, where they are kept until needed in the process. Baghouse dust and Cullet are recycled from the process and pneumatically conveyed into a silo for reuse. The mixed raw ingredients (batch) are then conveyed to storage bins until needed in the process.

Manufacturer:	**Model numbers:**	**Serial numbers:**
Whirl Air Flow	Various	Various
Construction date:	**Installation date:**	**Modification date(s):**
1997	07/25/1998	2017

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): varies – see Attachment D

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	112,493 tons	The facility operates 24 hours a day 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ___Yes _**X**_ No	**If yes, is it?** ___ Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating: NA	**Type and Btu/hr rating of burners:** NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
NA

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
NA			

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	NA	NA
Nitrogen Oxides (NO_X)	NA	NA

Lead (Pb)	NA	NA
Particulate Matter ($PM_{2.5}$)	0.13	0.55
Particulate Matter (PM_{10})	0.13	0.55
Total Particulate Matter (TSP)	0.27	1.10
Sulfur Dioxide (SO_2)	NA	NA
Volatile Organic Compounds (VOC)	NA	NA
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Carbon Dioxide Equivalent (CO_2e)	1,146	5,021

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

The above emission factor was obtained from AP-42 Table11.13-2 for Glass Fiber Manufacturing and computed with the maximum production capacity listed above.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

R14-0015M, Condition 5.1.1 The storage devices shall be equipped and operated with the corresponding control devices. Day bins ES11a and ES11b shall be equipped with control devices with removal efficiency of 99.9% or greater.

R14-0015M, Condition 5.1.2. Emissions of PM_{10} and $PM_{2.5}$ from EP11a and EP11b shall not exceed 0.016 tpy from each point. Throughput is limited to 184 tons per day and 64,240 tons per rolling 12-month total.

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

R14-0015M, Condition 5.2.3. Daily and rolling12-month total received in bins Es11a and ES11b.

R14-0015M, Condition 5.2.4. At least once per month, take visual observations of CD11a and CD11b.

Are you in compliance with all applicable requirements for this emission unit? _**X**_Yes _**_**_No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ES12C, ES12E (Group 002)	Melter Hood and Forehearth Line 1	CD12B, CD12Bb, CD13A & CD13B

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
A 9,000 lb/hr, electrically fired, water-cooled, brick lined melting unit that is used to melt batch. The molten glass flows from the Melters to Forehearths, natural gas fired, brick holding tanks. The Forehearth for Line 1 has natural gas burners. The Forehearth splits the molten glass flow and presents a consistent glass flow (pull rates) to each fiberizer. Forehearth emissions are combined with forming / collection system emissions and passed through a set of water sprays with drop-out boxes before being discharged into the air.

Manufacturer:	**Model number:** NA	**Serial number:** NA
Construction date: 1998	**Installation date:** 07/25/1998	**Modification date(s):** NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons):
4.50 tons of glass pulled (TGP) per hour

Maximum Hourly Throughput: 4.50 TGP/hr	**Maximum Annual Throughput:** 39,420 TpY	**Maximum Operating Schedule:** 24 hours per day, 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? __x_Yes ___ No ES12E- Forehearth	**If yes, is it?** _**X** Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating: 5.5 MM Btu/Hr	**Type and Btu/hr rating of burners:** Pre Mix Tunnel Burner 5.5 MM Btu/Hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Max. 8,200 CFH & 71,750 CF/Yr

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	NA	NA	1020-1050

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	3.3	14.4
Nitrogen Oxides (NO_X)	0.1	0.6
Lead (Pb)	0	0

Particulate Matter ($PM_{2.5}$)	0.3	1.4
Particulate Matter (PM_{10})	0.3	1.4
Total Particulate Matter (TSP)	0.3	1.4
Sulfur Dioxide (SO_2)	<0.01	<0.01
Volatile Organic Compounds (VOC)	1.0	4.3
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.01	0.04
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
CO_2e	644	2,820.9

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).
The emission factors and TPY listed above for CO NO_x, VOC and PM are from Permit R14-0015 emission limits. The remaining emission factors were obtained from stack tests.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Applicable condition and summary provided below.

<u>R14-0015M:</u>

4.1.1. The permittee shall operate a resinated (bonded) fiberglass insulation line identified as 1st line with associated emission EP12 (melter stack), EP13 (collection stack), and EP14 (incinerator stack). This line shall be operated and maintained in accordance with the following operational and emission limitations:

a. The production line shall not use a phenol formaldehyde binder in manufacturing resinated product
b. Production of fiberglass insulation from this line shall not exceed 9,000 pounds of glass pulled per hour or 39,420 TPY. Compliance with this limit shall be based on a 12-month rolling total;
c. Emissions from the line shall not exceed the following limits with respect to the corresponding emission point and pollutant;

Emission Point	CO lb/TGP	NO_x lb/TGP	PM lb/TGP	PM_{10} lb/TGP	VOC* lb/TGP	NH_3 lb/TGP
EP12	0.73	0.03	0.07	0.07		
EP13	3.60	3.61	3.49	3.49	2.54	4.64
EP14						

*VOC emissions shall not include methane and ethane

d. Exhaust from the electric melter shall be vented into a closed vent system that routes this stream directly to either one of identified baghouses (CD12B or CD12Bb) at all times when the line is operating.

4.1.3 The following condition applies to both production lines.

a. A bag leak detection system (BLDS) shall be installed and operated on the fabric filter baghouses identified as CD12B, CD12Bb, CD22B. Each BLDS shall be installed, maintained, and operated in accordance with U.S. EPA guidance document, "Fabric Filter Bag Leak Detection Guidance" (EPA-454/R-98-015, September 1997);

b. A device that continuously measures and records pressure drop across the scrubber shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).
c. A device that continuously measures and records the scrubbing liquid flow to each wet scrubber shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).

e. All monitoring devices in b and c shall be recalibrated quarterly.

4.1.4 The permitted shall, to the extent practicable, install maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary. **[45CSR§13-5.11.]**

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Applicable condition and summary provided below.

R14-0015M:
Condition 4.2.1 – Monitor and record hourly production data on a daily basis.
Condition 4.2.2 – Maintain records of monitoring data from stipulated control devices.
Condition 4.2.3 – Monitoring and record product LOI at least one every eight hours.

Condition 4.3.1 – General testing requirements
Condition 4.3.2 – Initial performance testing within 180 days of startup of Line 1 (no longer applicable)
Condition 4.4.5 – Record date and time of any BLDS alarm.
Condition 4.5.1 – Submit semiannual reports of exceedance of operating parameters

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ES13A (Group 004)	Fiberizers and Collection	CD13A, CD13B, CD13C

Provide a description of the emission unit (type, method of operation, design parameters, etc.):

Fiber forming units (or fiberizers) are positioned below orifices in the Forehearth to receive the molten glass stream, and "spun" into glass fibers with a total material throughput capacity of 9,000 pounds per hour. For bonded products, cooling water, wax and binder is applied to the fiber just below the fiberizers. Conditioned fiber from the fiberizers is pulled down into the collection area.

Manufacturer:	**Model number:** NA	**Serial number:** NA
Construction date: NA	**Installation date:** 07/25/1998	**Modification date(s):** 2015

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 9,000 lbs/hr

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
9,000 lbs/hr	39,420 Tons per Year	24 hours a day, 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? _x_ Yes __ No	**If yes, is it?** ___ Indirect Fired _x_Direct Fired
Maximum design heat input and/or maximum horsepower rating: 13 MM BTU/Hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas Max. Nat. Gas Usage Per Hour: ~13,000 CFH
Max. Nat. Gas Usage Per Year: ~111 MM CF

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	NA	NA	1020-1050

Emissions Data

Criteria Pollutants *Combined ES13A and ES14A/ES14B emissions	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)*	16.2	71.0
Nitrogen Oxides (NO_X)*	16.2	71.2
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)*	15.7	68.8

Particulate Matter (PM_{10})*	15.7	68.8
Total Particulate Matter (TSP)*	15.7	68.8
Sulfur Dioxide (SO_2)*	<0.01	0.02
Volatile Organic Compounds (VOC)*	11.4	50.1
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.02	0.1
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Ammonia	20.9	91.5
Carbon Dioxide Equivalent (CO_2e)	1,522	6,668

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

The emission factors and TPY listed above for CO, NO_x, PM, VOC, and Ammonia are from Permit R14-0015 emission limits. Remaining emissions calculated based on stack testing. CO_2e was calculated following 40 CFR 98 Subparts C and N as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Applicable condition and summary provided below.

<u>R14-0015M:</u>

4.1.1. The permittee shall operate a resinated (bonded) fiberglass insulation line identified as 1st line with associated emission EP12 (melter stack), EP13 (collection stack), and EP14 (incinerator stack). This line shall be operated and maintained in accordance with the following operational and emission limitations:

a. The production line shall not use a phenol formaldehyde binder in manufacturing resinated product
b. Production of fiberglass insulation from this line shall not exceed 9,000 pounds of glass pulled per hour or 39,420 TPY. Compliance with this limit shall be based on a 12-month rolling total;
c. Emissions from the line shall not exceed the following limits with respect to the corresponding emission point and pollutant;

Emission Point	CO lb/TGP	NO_x lb/TGP	PM lb/TGP	PM_{10} lb/TGP	VOC* lb/TGP	NH_3 lb/TGP
EP12	0.73	0.03	0.07	0.07		
EP13	3.60	3.61	3.49	3.49	2.54	4.64
EP14						

*VOC emissions shall not include methane and ethane

d. Exhaust from the forehearth and fiberizers shall be vented into a closed vent system that routes this stream directly to either one of identified wet scrubbers (CD13A or CD13B) at all times when the line is operating.

4.1.3 The following condition applies to both production lines.

b. A device that continuously measures and records pressure drop across the scrubber shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).

c. A device that continuously measures and records the scrubbing liquid flow to each wet scrubber shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).

e. All monitoring devices in b and c shall be recalibrated quarterly.

4.1.4 The permitted shall, to the extent practicable, install maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary. **[45CSR§13-5.11.]**

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Applicable condition and summary provided below.

R14-0015M:
Condition 4.2.1 – Monitor and record hourly production data on a daily basis.
Condition 4.2.2 – Maintain records of monitoring data from stipulated control devices.
Condition 4.2.3 – Monitoring and record product LOI at least one every eight hours.

Condition 4.3.1 – General testing requirements
Condition 4.3.2 – Initial performance testing within 180 days of startup of Line 1 (no longer applicable)
Condition 4.3.3 – Testing every 5 years for CO and NO_X for the collection stack
Condition 4.3.4 – Testing every 5 years or within 180 days of LOI 1% greater than previous test for PM for the collection stack

Condition 4.5.1 – Submit semiannual reports of exceedance of operating parameters

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ES14A, ES14B (Group 006)	3 Zone Curing Oven and Cooling Table	CD14A

Provide a description of the emission unit (type, method of operation, design parameters, etc.):

The collected fibers, coated with binder, are conveyed to a three (3) zone natural gas-fired, recirculating heated air oven. While the fiberglass blanket is in the oven it is sized to thickness and the binder is cured by means of the recirculating heated air. A cooling section is provided downstream of the curing oven, where ambient plant air is drawn through the cured fiberglass blanket. The maximum rated heat input of the curing oven is 18.0 mmBtu/hr.

Manufacturer:	**Model number:** NA	**Serial number:** NA
Construction date: 1998	**Installation date:** 07/25/1998	**Modification date(s):** NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 9,000 lbs/hr

Maximum Hourly Throughput: 9,000 lbs/hr	**Maximum Annual Throughput:** 39,420 Tons per Year	**Maximum Operating Schedule:** The facility operates 24 hours a day, 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? _x_ Yes __ No CD14A- Curing Oven	**If yes, is it?** ___ Indirect Fired __x_Direct Fired
Maximum design heat input and/or maximum horsepower rating: 18.0 MM Btu/Hr	**Type and Btu/hr rating of burners:** Nozzle Mix Burner 18.0 mmBtu/hr nat'l gas-fired

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
Max./Hr.: 18,000 CFH Nat. Gas
Max/Yr : 160 MM CF

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	NA	NA	1020-1050

Emissions Data

Criteria Pollutants *Combined ES13A and ES14A/ES14B emissions	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	16.2	71.0
Nitrogen Oxides (NO_X)	16.2	71.2

Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	15.7	68.8
Particulate Matter (PM_{10})	15.7	68.8
Total Particulate Matter (TSP)	15.7	68.8
Sulfur Dioxide (SO_2)	<0.01	0.02
Volatile Organic Compounds (VOC)	11.4	50.1
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.03	0.1
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Ammonia*	20.9	91.5
Carbon Dioxide Equivalent (CO_2e)	2,108	9,232

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

The emission factors and TPY listed above for CO NO_x, PM, VOC, and Ammonia are from Permit R14-0015. Remaining emissions are based on stack test data. CO_2e was calculated according to 40 CFR 98 Subparts C and N as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Applicable condition and summary provided below.

<u>R14-0015M:</u>

4.1.1. The permittee shall operate a resinated (bonded) fiberglass insulation line identified as 1st line with associated emission EP12 (melter stack), EP13 (collection stack), and EP14 (incinerator stack). This line shall be operated and maintained in accordance with the following operational and emission limitations:

a. The production line shall not use a phenol formaldehyde binder in manufacturing resinated product
b. Production of fiberglass insulation from this line shall not exceed 9,000 pounds of glass pulled per hour or 39,420 TPY. Compliance with this limit shall be based on a 12-month rolling total;
c. Emissions from the line shall not exceed the following limits with respect to the corresponding emission point and pollutant;

Emission Point	CO lb/TGP	NO_x lb/TGP	PM lb/TGP	PM_{10} lb/TGP	VOC* lb/TGP	NH_3 lb/TGP
EP12	0.73	0.03	0.07	0.07		
EP13	3.60	3.61	3.49	3.49	2.54	4.64
EP14						

*VOC emissions shall not include methane and ethane

f. Exhaust from the curing oven shall be vented into a closed vent system that routes this stream directly to CD14A at all times when the line is operating.
    i. The temperature shall not be below 1500F or the average temperature during the last performance test.
    ii. The oxidizer shall not consume more the 5,000 cubic feet per hour or 43.8 MMscf per year.

4.1.3 The following condition applies to both production lines.

d. A device that continuously measures and records the temperature of the combustion chamber for each thermal oxidizer shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).

4.1.4 The permitted shall, to the extent practicable, install maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary. **[45CSR§13-5.11.]**

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Applicable condition and summary provided below.

R14-0015M:
Condition 4.2.1 – Monitor and record hourly production data on a daily basis.
Condition 4.2.2 – Maintain records of monitoring data from stipulated control devices.
Condition 4.2.3 – Monitoring and record product LOI at least one every eight hours.

Condition 4.3.1 – General testing requirements
Condition 4.3.2 – Initial performance testing within 180 days of startup of Line 1 (no longer applicable)
Condition 4.3.3 – Testing every 5 years for CO and NO_X for the incinerator stack
Condition 4.3.4 – Testing every 5 years or within 180 days of LOI 1% greater than previous test for PM for the incinerator stack

Are you in compliance with all applicable requirements for this emission unit? _x__Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ES22 Group 003	ML2INW KING melter	CD22B

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Gas-oxygen fired melter rated at 160 tons per day. The molten glass flows from the melter to the forehearth which is a natural gas fired and brick lined holding tank. The Forehearth conditions the molten glass flow and presents a consistent glass flow (pull rates) to each fiber forming unit.

Manufacturer:	**Model number:** NA	**Serial number:** NA
Construction date: 2017	**Installation date:** 2017	**Modification date(s):** NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 6.67 TGP/hr

Maximum Hourly Throughput: 6.67 tgp/hr	**Maximum Annual Throughput:** 58,400 TpY	**Maximum Operating Schedule:** 24 hours a day, 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? __x Yes ___ No	**If yes, is it?** __ Indirect Fired __ x _Direct Fired
Maximum design heat input and/or maximum horsepower rating: 26.2 MM Btu/Hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Max. Nat. Gas Usage Per Hour: ~26,000 CFH
Max. Nat. Gas Usage Per Year: ~235 MM CF

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas (and oxygen)	NA	NA	1020-1050

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	3.5	15.2
Nitrogen Oxides (NO_X)	20.0	87.6
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	1.7	7.3
Particulate Matter (PM_{10})	1.7	7.3

Total Particulate Matter (TSP)	1.7	7.3
Sulfur Dioxide (SO_2)	5.2	22.8
Volatile Organic Compounds (VOC)	1.3	5.8
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.05	0.2
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Carbon Dioxide (CO_2e)	3,068	13,438

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).
The emission factors and TPY listed above for CO, SO_2, VOC, NO_x, PM and NH_3 are from Permit R14-0015. CO_2e was calculated based on 40 CFR 98 Subparts C and N as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Applicable condition and summary provided below.

<u>R14-0015M:</u>

4.1.1. The permittee shall operate a fiberglass insulation line identified as 2nd line with associated emission EP23 (melter/collection stack) and EP24 (curing and cooling stack). This line shall be operated and maintained in accordance with the following operational and emission limitations:

a. The production line shall not use a phenol formaldehyde binder in manufacturing resinated product
b. Production of fiberglass insulation from this line shall not exceed 13,333 pounds of glass pulled per hour or 58,400 TPY. Compliance with this limit shall be based on a 12-month rolling total;
c. Emissions from the line shall not exceed the following limits with respect to the corresponding emission point and pollutant;

Emission Unit	Emission Point	CO lb/TGP	NO_x lb/TGP	SO_2 lb/TGP	PM_{10} lb/TGP	PM_{10} lb/TGP	$PM_{2.5}$ lb/TGP	VOC* lb/TGP	NH_3 lb/TGP
ES22	EP22	0.52	3.00	0.78	0.25	0.25	0.25	0.20	
Total	EP23	1.64	3.21	0.81	2.92	3.58	3.58	1.21	4.29
ES22E, ES24A, ES24B	EP23/EP24	2.34	0.80	0.05	3.45	4.31	4.31	0.87	4.73
Total	EP24	1.22	0.59	0.03	0.88	1.10	1.10	0.39	0.44

*VOC emissions shall not include methane and ethane

d. Visible emissions from EP23 and EP24 shall not exceed 20%
e. Exhaust from the melter, which includes canal and foreheart shall be vented into a closed vent system that routes this stream directly to baghouse CD22B at all times when the line is operating except during startup operations.
f. Operate wet scrubbing device within specified pressure drop and liquid flow rate
h. Establish and maintain minimum oxygen to combustion air ratio.
i. Tune up burners at least once per year
n. Continuous pull rate monitor shall be installed, calibrated, and maintained

4.1.3 The following condition applies to both production lines.

a. A bag leak detection system (BLDS) shall be installed and operated on the fabric filter baghouses identified as CD12B, CD12Bb, CD22B. Each BLDS shall be installed, maintained, and operated in accordance with U.S. EPA guidance document, "Fabric Filter Bag Leak Detection Guidance" (EPA-454/R-98-015, September 1997);

4.1.4 The permitted shall, to the extent practicable, install maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary. **[45CSR§13-5.11.]**

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Applicable condition and summary provided below.

R14-0015M:
Condition 4.2.1 – Monitor and record hourly production data on a daily basis. Record startup and shutdown times for the furnace and any period of control device bypass.
Condition 4.2.2 – Maintain records of monitoring data from stipulated control devices.
Condition 4.2.4 – Monitor and record ratio of oxygen enrichment to combustion air.
Condition 4.2.6 – Should testing for SO_2 be 90% of more of limit, monitor and record amount of raw materials or feedstock that contains sulfur compounds consumed each month.

Condition 4.3.1 – General testing requirements
Condition 4.3.5 – Initial performance testing within 180 days of startup of Line 2
Condition 4.3.2 – Initial performance testing within 180 days of startup of Line 1 (no longer applicable)
Condition 4.3.2 – Initial performance testing within 180 days of startup of Line 1 (no longer applicable)
Condition 4.4.5 – Record date and time of any BLDS alarm.
Condition 4.4.6 – Record tune-ups.
Condition 4.5.1 – Submit semiannual reports of exceedance of operating parameters

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ES22E Group 005	Fiberizers and Collection Plenum for 2nd Line	CD23A, CD23B, CD23C, CD23D

Provide a description of the emission unit (type, method of operation, design parameters, etc.):

Fiber forming units (or fiberizers) are positioned below orifices in the bottom of the Forehearth to receive the molten glass stream, and "spin" it into glass fibers. Conditioned fiber from the fiberizers is pulled down onto the collection area.

Manufacturer:	**Model number:** NA	**Serial number:** NA
Construction date: 2004	**Installation date:** 2004	**Modification date(s):** 2017

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 13,333 lbs/hr

Maximum Hourly Throughput: 13,333 lbs/hr	**Maximum Annual Throughput:** 58,400 Tons per Year	**Maximum Operating Schedule:** The facility operates 24 hours a day, 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? __x_Yes __ No	**If yes, is it?** ___ Indirect Fired __x_Direct Fired
Maximum design heat input and/or maximum horsepower rating: 20 mmBtu/hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Max. Nat. Gas Usage Per Hour: ~20,000 CFH
Max. Nat. Gas Usage Per Year: ~170 MM CF

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	NA	NA	1020-1050

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	7.5	32.7
Nitrogen Oxides (NO_X)	1.4	6.1
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	21.4	93.7

Particulate Matter (PM_{10})	21.4	93.7
Total Particulate Matter (TSP)	17.1	75.0
Sulfur Dioxide (SO_2)	0.2	0.9
Volatile Organic Compounds (VOC)	3.2	14.0
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.04	0.2
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Ammonia	28.6	125.3
Carbon Dioxide Equivalent (CO_2e)	2,342	10,258

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

The emission factors and TPY listed above for CO, SO_2, VOC, NO_x, PM and NH_3 are from Permit R14-0015. CO_2e was calculated based on 40 CFR 98 Subparts C and N as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Applicable condition and summary provided below.

<u>R14-0015M:</u>

4.1.1. The permittee shall operate a fiberglass insulation line identified as 2nd line with associated emission EP23 (melter/collection stack) and EP24 (curing and cooling stack). This line shall be operated and maintained in accordance with the following operational and emission limitations:

a. The production line shall not use a phenol formaldehyde binder in manufacturing resinated product
b. Production of fiberglass insulation from this line shall not exceed 13,333 pounds of glass pulled per hour or 58,400 TPY. Compliance with this limit shall be based on a 12-month rolling total;
c. Emissions from the line shall not exceed the following limits with respect to the corresponding emission point and pollutant;

Emission Unit	Emission Point	CO lb/TGP	NO_x lb/TGP	SO_2 lb/TGP	PM_{10} lb/TGP	PM_{10} lb/TGP	$PM_{2.5}$ lb/TGP	VOC* lb/TGP	NH_3 lb/TGP
ES22	EP22	0.52	3.00	0.78	0.25	0.25	0.25	0.20	
Total	EP23	1.64	3.21	0.81	2.92	3.58	3.58	1.21	4.29
ES22E, ES24A, ES24B	EP23/EP24	2.34	0.80	0.05	3.45	4.31	4.31	0.87	4.73
Total	EP24	1.22	0.59	0.03	0.88	1.10	1.10	0.39	0.44

*VOC emissions shall not include methane and ethane

d. Visible emissions from EP23 and EP24 shall not exceed 20%
f. Operate wet scrubbing device within specified pressure drop and liquid flow rate

j. Install and continuously operate combustion controls which minimize peak flame temperature.
k. Exhaust from forming setion shall be vented into a closed vent system to one of four venture scrubbers.

4.1.3 The following condition applies to both production lines.

b. A device that continuously measures and records pressure drop across the scrubber shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).

c. A device that continuously measures and records the scrubbing liquid flow to each wet scrubber shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).

e. All monitoring devices in b and c shall be recalibrated quarterly.

4.1.4 The permitted shall, to the extent practicable, install maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary. **[45CSR§13-5.11.]**

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Applicable condition and summary provided below.

R14-0015M:
Condition 4.2.1 – Monitor and record hourly production data on a daily basis.
Condition 4.2.2 – Maintain records of monitoring data from stipulated control devices.
Condition 4.2.3 – Monitoring and record product LOI at least one every eight hours.
Condition 4.2.5 – Develop and implement means to verify combustion controls used to minimize flame temperature in the glass forming units. Monitor at least four time per day.

Condition 4.3.1 – General testing requirements
Condition 4.3.5 – Initial performance testing within 180 days of startup of Line 2
Condition 4.3.3 – Testing every 5 years for CO and NO_X for the collection stack
Condition 4.3.4 – Testing every 5 years or within 180 days of LOI 1% greater than previous test for PM for the collection stack
Condition 4.5.1 – Submit semiannual reports of exceedance of operating parameters

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ES24A, ES24B (Group 007)	5 Zone Curing Oven and Cooling Table	CD24A, CD24B

Provide a description of the emission unit (type, method of operation, design parameters, etc.):

The collected fibers, coated with binder, are conveyed to a natural gas-fired heated air oven. While the fiberglass blanket is in the oven it is sized to thickness and the binder is cured by means of the recirculating heated air. A cooling section is provided downstream of the curing oven, where ambient plant air is drawn through the cured fiberglass blanket.

Manufacturer:	**Model number:** NA	**Serial number:** NA
Construction date: 2004	**Installation date:** 2004	**Modification date(s):** 2017

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 13,333 lbs/hr

Maximum Hourly Throughput: 13,333 lbs/hr	**Maximum Annual Throughput:** 58,400 Tons per Year	**Maximum Operating Schedule:** The facility operates 24 hours a day, 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? _x_ Yes __ No	**If yes, is it?** ___ Indirect Fired _x__Direct Fired
Maximum design heat input and/or maximum horsepower rating: 25.2 MM Btu/Hr	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas
Max./Hr.: ~25,000 CFH
Max/Yr : ~220 MM CF

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	NA	NA	1020-1050

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	8.1	35.6
Nitrogen Oxides (NO_X)	3.9	17.2
Lead (Pb)	0	0

Particulate Matter ($PM_{2.5}$)	7.3	32.1
Particulate Matter (PM_{10})	7.3	32.1
Total Particulate Matter (TSP)	5.9	25.7
Sulfur Dioxide (SO_2)	0.2	0.9
Volatile Organic Compounds (VOC)	2.6	11.4
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.05	0.2
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Ammonia	2.9	12.9
Carbon Dioxide (CO_2e)	2,951	12,925

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

The emission factors and TPY listed above for CO, SO_2, VOC, NO_x, PM and NH_3 are from Permit R14-0015. CO_2e was calculated based on 40 CFR 98 Subparts C and N as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Applicable condition and summary provided below.

<u>R14-0015M:</u>

4.1.1. The permittee shall operate a fiberglass insulation line identified as 2nd line with associated emission EP23 (melter/collection stack) and EP24 (curing and cooling stack). This line shall be operated and maintained in accordance with the following operational and emission limitations:

a. The production line shall not use a phenol formaldehyde binder in manufacturing resinated product
b. Production of fiberglass insulation from this line shall not exceed 13,333 pounds of glass pulled per hour or 58,400 TPY. Compliance with this limit shall be based on a 12-month rolling total;
c. Emissions from the line shall not exceed the following limits with respect to the corresponding emission point and pollutant;

Emission Unit	Emission Point	CO lb/TGP	NO_x lb/TGP	SO_2 lb/TGP	PM_{10} lb/TGP	PM_{10} lb/TGP	$PM_{2.5}$ lb/TGP	VOC* lb/TGP	NH_3 lb/TGP
ES22	EP22	0.52	3.00	0.78	0.25	0.25	0.25	0.20	
Total	EP23	1.64	3.21	0.81	2.92	3.58	3.58	1.21	4.29
ES22E, ES24A, ES24B	EP23/EP24	2.34	0.80	0.05	3.45	4.31	4.31	0.87	4.73
Total	EP24	1.22	0.59	0.03	0.88	1.10	1.10	0.39	0.44

*VOC emissions shall not include methane and ethane

d. Visible emissions from EP23 and EP24 shall not exceed 20%

f. Operate wet scrubbing device within specified pressure drop and liquid flow rate
l. Install, maintain, and continuously use low NO_X burners with flue gas circulation and combustion controls that minimize peak flame temperature. Tune up burners once per year.
m. If uncontrolled VOC emissions exceed limits in coniditon 4.1.2, route emissions to a closed vent system and to a thermal oxidizer, CD24A at all time. Maintain minimum temperature and use natural gas as supplemental fuel as needed.
o. Exhaust from cooling table shall be vented to a closed vent system that routes emissions to a venture scrubber (CD24B).

4.1.3 The following condition applies to both production lines.

b. A device that continuously measures and records pressure drop across the scrubber shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).
c. A device that continuously measures and records the scrubbing liquid flow to each wet scrubber shall be installed, calibrated, maintained, and operated for each venture scrubber (CD13A, CD13B, CD13C, CD23A, CD23B, CD23C, CD23D, CD24B).
d. A device that continuously measures and records the temperature of the combustion chamber for each thermal oxidizer (CD14A and CD24A) shall be installed, calibrated, maintained, and operated.

e. All monitoring devices in b and c shall be recalibrated quarterly.

4.1.4 The permitted shall, to the extent practicable, install maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary. **[45CSR§13-5.11.]**

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Applicable condition and summary provided below.

R14-0015M:
Condition 4.2.1 – Monitor and record hourly production data on a daily basis.
Condition 4.2.2 – Maintain records of monitoring data from stipulated control devices.
Condition 4.2.3 – Monitoring and record product LOI at least one every eight hours.
Condition 4.2.5 – Develop and implement means to verify combustion controls used to minimize flame temperature in the curing oven. Monitor at least four time per day.

Condition 4.3.1 – General testing requirements
Condition 4.3.5 – Initial performance testing within 180 days of startup of Line 2
Condition 4.3.3 – Testing every 5 years for CO and NO_X for the collection stack
Condition 4.3.4 – Testing every 5 years or within 180 days of LOI 1% greater than previous test for PM for the collection stack
Condition 4.3.6 – If testing conducted to avoid VOC controls in CD24A, conduct performance test at inlet.
Condition 4.5.1 – Submit semiannual reports of exceedance of operating parameters

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ES15A, ES15Aa ES15B, ES15C, ES15D, ES15E, ES15F, ES15G, ES15H, ES15I, ES15J (Group 008)	Facing, Sizing and Packaging for Line 1	CD15A, CD15C, CD15D CD13A, CD13B, CD13C (for ES15C)

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
After the cured fiberglass blanket comes out of the oven, facing paper is applied (if desired) then the blanket is cut to size and width per customer demand. The fiberglass is then packaged accordingly and shipped to the customer.

Manufacturer:	**Model number:**	**Serial number:**
Various	Various	
Construction date:	**Installation date:**	**Modification date(s):**
1998	07/25/1998	NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	39,420 TPY – glass production rate	The facility operates 24 hours a day 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ___Yes _**X**_ No	**If yes, is it?** ___ Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating:	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
NA

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
NA	NA	NA	NA

Emissions Data

Criteria Pollutants (Emissions split evenly between Line 1 and Line 2)	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0	0
Nitrogen Oxides (NO_X)	0	0
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0.35	1.5
Particulate Matter (PM_{10})	0.35	1.5
Total Particulate Matter (TSP)	0.35	1.5
Sulfur Dioxide (SO_2)	0	0

Volatile Organic Compounds (VOC)	2.95	12.9
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
NA	NA	NA

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).
A PM emission factor of 0.05 lbs PM per ton of wool processed is presented on page C-65 of "Wool Fiberglass Insulation Manufacturing - Background Information for Proposed Standards" USEPA-450-3-83-002A. A representative (or conservative) VOC emission factor of 1.86 lbs VOC per ton of asphalt blowing coating produced, which is used by the asphalt manufacturing industry, was obtained from the USEPA FIRE database to obtain emission numbers for the facing application.

VOC from inks and coatings, etc. are calculated using mass balance.

Potential particulate matter (PM) emissions from the sizing and packaging area are collected and controlled by two Air Tumbler control devices. The sizing and packaging area consists of trimming and rolling, the K&S Roll Machine, the blowing wool bagger, and packaging machinery. The Air Tumblers use cyclonic flow and wet impingement control techniques for the removal of particulates from the exhaust gas stream. The particulate matter removal efficiency for the Air Tumbler and scrubber are assumed to be 50% or greater. The PM exhaust concentration is assumed to be less than 0.005 lbs PM per 1000 lbs of exhaust air.

Potential PM emissions for the sizing and packaging area are estimated by multiplying the PM exhaust outlet concentration by the control devices rated volumetric air flowrate and by the control efficiency of 90% for the building as a process enclosure, as follows:

E =(0.005 lbs PM per 1000 lbs Air) x (Total Air Flowrate of control devices, cfm) x (units of conversion) x (1 - 90%)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

<u>Permit to Modify, R14-0015M</u>

5.1.3 The permittee shall install, maintain, and operate the Quentin Keeney Air Tumblers (CD15A), the Fisher Klosterman Scrubber (CD25A) and the bag filter dust collector (CD25B) in such a way that the PM and PM-10 emission from FP15 do not exceed 0.25 pounds per hour and/or 1.1 tons per year.

5.1.12 The permitted shall, to the extent practicable, install maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary. **[45CSR§13-5.11.]**

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Permit to Modify, R14-0015M

5.4.2. Record of maintenance of Air Pollution Control Equipment. For all pollution control equipment listed in Section 1.0, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.

5.4.3 Record of Malfunctions of Air Pollution control Equipment. For all air pollution control equipment listed in Section 1.0, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:

a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.

For each such case associated with an equipment malfunction, the additional information shall also be recorded:

e. The cause of the malfunction
f. Steps taken to correct the malfunction
g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___ No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ES25A, ES25B, ES25C, ES25D, ES25F, ES25G, ES25H, ES25I, ES25J, ES25L (Group 008)	Facing, Sizing and Packaging for Line 2	CD25A, CD25B, CD25C, CD25D CD23A-D (for ES25C) CD15A (for ES25I, ES25L)

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
After the cured fiberglass blanket comes out of the oven, facing paper is applied (if desired) then the blanket is cut to size and width per customer demand. The fiberglass is then packaged accordingly and shipped to the customer. For nonbonded product, after leaving the fiberizers, the glass is diced. The finished product is then sent to the blowing wool baggers and packaged accordingly.

Manufacturer:	**Model number:**	**Serial number:**
Various	Various	NA
Construction date:	**Installation date:**	**Modification date(s):**
2004	2004	NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
	58,400 TPY – glass production rate	The facility operates 24 hours a day 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ___Yes _**X**_ No	**If yes, is it?** ___ Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating: NA	**Type and Btu/hr rating of burners:** NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
NA

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
NA	NA	NA	NA

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0	0
Nitrogen Oxides (NO_X)	0	0
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0.35	1.5
Particulate Matter (PM_{10})	0.35	1.5

Total Particulate Matter (TSP)	0.35	1.5
Sulfur Dioxide (SO_2)	0	0
Volatile Organic Compounds (VOC)	2.95	12.9
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
NA	NA	NA

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).
A PM emission factor of 0.05 lbs PM per ton of wool processed is presented on page C-65 of "Wool Fiberglass Insulation Manufacturing - Background Information for Proposed Standards" USEPA-450-3-83-002A. A representative (or conservative) VOC emission factor of 1.86 lbs VOC per ton of asphalt blowing coating produced, which is used by the asphalt manufacturing industry, was obtained from the USEPA FIRE database to obtain emission numbers for the facing application.

VOC from inks and coatings, etc. are calculated using mass balance.

Potential particulate matter (PM) emissions from the sizing and packaging area are collected and controlled by two Air Tumbler control devices. The sizing and packaging area consists of trimming and rolling, the K&S Roll Machine, the blowing wool bagger, and packaging machinery. The Air Tumblers use cyclonic flow and wet impingement control techniques for the removal of particulates from the exhaust gas stream. The particulate matter removal efficiency for the Air Tumbler and scrubber are assumed to be 50% or greater. The PM exhaust concentration is assumed to be less than 0.005 lbs PM per 1000 lbs of exhaust air.

Potential PM emissions for the sizing and packaging area are estimated by multiplying the PM exhaust outlet concentration by the control devices rated volumetric air flowrate and by the control efficiency of 90% for the building as a process enclosure, as follows:

E =(0.005 lbs PM per 1000 lbs Air) x (Total Air Flowrate of control devices, cfm) x (units of conversion) x (1 - 90%)

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

<u>Permit to Modify, R14-0015M</u>

4.1.2. g. To minimize emissions from edge trimming and packaging, exhaust operations to control device CD25A and CD25B

5.1.3 The permittee shall install, maintain, and operate the Quentin Keeney Air Tumblers (CD15A), the Fisher Klosterman Scrubber (CD25A) and the bag filter dust collector (CD25B) in such a way that the PM and PM-10 emission from FP15 do not exceed 0.25 pounds per hour and/or 1.1 tons per year.

5.1.12 The permitted shall, to the extent practicable, install maintain, and operate all pollution control equipment listed in Section 1.0 and associated monitoring equipment in a manner consistent with safety and good air pollution control practices for minimizing emissions, or comply with any more stringent limits set forth in this permit or as set forth by any State rule, Federal regulation, or alternative control plan approved by the Secretary. **[45CSR§13-5.11.]**

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Permit to Modify, R14-0015K

5.4.2. Record of maintenance of Air Pollution Control Equipment. For all pollution control equipment listed in Section 1.0, the permittee shall maintain accurate records of all required pollution control equipment inspection and/or preventative maintenance procedures.

5.4.3 Record of Malfunctions of Air Pollution control Equipment. For all air pollution control equipment listed in Section 1.0, the permittee shall maintain records of the occurrence and duration of any malfunction or operational shutdown of the air pollution control equipment during which excess emissions occur. For each such case, the following information shall be recorded:

a. The equipment involved.
b. Steps taken to minimize emissions during the event.
c. The duration of the event.
d. The estimated increase in emissions during the event.

For each such case associated with an equipment malfunction, the additional information shall also be recorded:

e. The cause of the malfunction
f. Steps taken to correct the malfunction
g. Any changes or modifications to equipment or procedures that would help prevent future recurrences of the malfunction.

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ESDG12 ESDG13	Emergency Backup Generator For Line #1 Melter Emergency Backup Generator For Line #2 Melter	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Diesel-fired internal combustion engines.

Manufacturer:	**Model number:**	**Serial number:**
Caterpillar Line #1 Caterpiller Line #2	Gen. Set Engine: 3406 Gen. Set Engine: 3456	Line #1: 9DR02112 Line #2: CERO.0702
Construction date:	**Installation date:** Line #1 07/25/1998 Line #2 2004	**Modification date(s):**

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): ESDG12: 587 hp
ESDG13: 610 hp

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
NA	500 hrs/yr	

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? _X__Yes ___ No	**If yes, is it?** ___ Indirect Fired _x__Direct Fired
Maximum design heat input and/or maximum horsepower rating: Line #1, Engine Model 3406: 587 Brake Horsepower Line #2, Engine Model 3456: 610 Brake Horsepower	**Type and Btu/hr rating of burners:** NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Diesel is the primary fuel type and has an annual limit of 500 hours of operation per year.
Line #1, Engine Model 3406, 587 Brake Horsepower: 29.2 gph for 14,600 gallons annually
Line #2, Engine Model 3456: 610 Brake Horsepower: 27.6 gph for 13,800 gallons annually

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	< 500 ppm	< 0.01%	139,000

Emissions Data

Criteria Pollutants	Potential Emissions- Each	
	PPH	TPY
Carbon Monoxide (CO)	4. 8	1.2
Nitrogen Oxides (NO_X)	20.1	5.0

Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0.7	0.2
Particulate Matter (PM_{10})	0.7	0.2
Total Particulate Matter (TSP)	0.7	0.2
Sulfur Dioxide (SO_2)	3.9	1.0
Volatile Organic Compounds (VOC)	0.2	0.1
Hazardous Air Pollutants	Potential Emissions	
	lb/hr	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	lb/hr	TPY
Carbon Dioxide Equivalent (CO_2e)	1,300	320

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

Emissions for PM, NO_x, CO, SO_2 and VOC's came from R14-0015. Carbon dioxide equivalents were calculated following 40 CFR 98 Subpart C as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

<u>R14-0015M</u>**:**

5.1.4 Emissions of the following pollutants to the atmosphere from the associated emission points shall not exceed the following:

Caterpillar 3406 (Emission Point EP16)		
Pollutant	**Maximum Allowable Emission Rate**	
	lb/hr	TPY
Particulate Matter	0.58	0.15
Sulfur Dioxide	3.80	0.90
Nitrogen Oxides	9.13	2.3
Carbon Monoxide	4.16	1.0
Volatile Organic Compounds	0.10	0.03

Caterpillar 3456 (Emission Point EP17)		
Pollutant	**Maximum Allowable Emission Rate**	
	lb/hr	**TPY**
Particulate Matter	0.09	0.03

Sulfur Dioxide	3.80	0.90
Nitrogen Oxides	10.96	2.74
Carbon Monoxide	0.64	0.16
Volatile Organic Compounds	0.14	0.04

5.1.5 The two Caterpillar 3406 (ID. No. ESDG12 and ESDG13) and Cummins NT-855-F1 (ID. No. ESFW11) internal combustion engines shall not operate more than 500 hours per year, calculated as the sum during a consecutive 12-month period.

5.1.6. The two Caterpillar 3406 and Cummins NT-855-F1 internal combustion engines shall not consume a fuel with a sulfur content of greater than 0.5 percent by weight.

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting, which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

R14-0015M:

5.2.1. The permittee shall monitor and record the hours of operation of the engines for the generators and fire water pumps. Such records shall be maintain in accordance with 3.4.1.

5.4.4. The permittee shall maintain records of sulfur content of the fuel oil received and/or vendors contractual sulfur specifications for the fuel oil.

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description		
Emission unit ID number: ESDG14	**Emission unit name:** Emergency Backup Generator	**List any control devices associated with this emission unit:** None
Provide a description of the emission unit (type, method of operation, design parameters, etc.): Diesel-fired internal combustion engines.		
Manufacturer: Caterpillar	**Model number:** C18	**Serial number:**
Construction date: 2017	**Installation date:** 2017	**Modification date(s):**
Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 900 hp		
Maximum Hourly Throughput: NA	**Maximum Annual Throughput:** 500 hrs/yr	**Maximum Operating Schedule:**
Fuel Usage Data **(fill out all applicable fields)**		
Does this emission unit combust fuel? _X__Yes ___ No		**If yes, is it?** ___ Indirect Fired _x__Direct Fired
Maximum design heat input and/or maximum horsepower rating: 900 hp		**Type and Btu/hr rating of burners:** NA
List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each. Diesel is the primary fuel type.		

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	< 15 ppm	< 0.01%	139,000

Emissions Data

Criteria Pollutants	Potential Emissions- Each	
	PPH	TPY
Carbon Monoxide (CO)	1.73	0.43
Nitrogen Oxides (NO_X)	12.32	3.08
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0.18	0.04
Particulate Matter (PM_{10})	0.18	0.04

Total Particulate Matter (TSP)	0.18	0.04
Sulfur Dioxide (SO_2)	0.36	0.09
Volatile Organic Compounds (VOC)	0.14	0.04
Hazardous Air Pollutants	Potential Emissions	
	lb/hr	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	lb/hr	TPY
Carbon Dioxide Equivalent (CO_2e)	934	233

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

Emissions for NO_x from R14-0015. Carbon dioxide equivalents were calculated following 40 CFR 98 Subpart C as appropriate. Remaining emissions calculated using AP-42 factors.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

<u>R14-0015M</u>**:**
5.1.9 Restrictions for ESDG14 are:

a. Generator shall be used as an emergency stationary engine. Non-emergency use limited to 100 hours.
b. Generator shall be certified to meet NO_X limit of 6.21 g/bhp-hr at 100% load
c. Maintain engine in accordance with manufacturer's emissions related written instructions
d. The permittee may change only those emissions related settings allowed by the manufacturer.
e. The maximum nameplate horsepower shall not be greater than that in Table 1.0
f. The engine will be equipped with a non-resettable hour meter
g. The engine shall be fired with fuel that has a maximum sulfur content of no more than 15 ppm and minimum cetane or maximum aromatic content. Nonroad diesel meets this specification.

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting, which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

<u>R14-0015M:</u>
5.2.1. The permittee shall monitor and record the hours of operation of the engines for the generators and fire water pumps. Such records shall be maintain in accordance with 3.4.1.

5.4.4. The permittee shall maintain records of sulfur content of the fuel oil received and/or vendors contractual sulfur specifications for the fuel oil.

Are you in compliance with all applicable requirements for this emission unit? _<u>X</u>_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
ESFW11	Emergency Backup Fire Water Diesel Engine Driven Pump	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
The emergency backup fire water pump engine is a Cummins diesel Model NT-855-F1 with an estimated engine rating of 255 hp and consumes a maximum of 14 gals/hr of diesel fuel. The engine only runs during an emergency situation and maintenance.

Manufacturer:	**Model number:**	**Serial number:**
Cummins Engine Co. Columbus, Indiana	NT-855-F1	Engine No.:10472815
Construction date:	**Installation date:**	**Modification date(s):**
NA	1977	NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 255 hp

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
14 gals	500 hours/year 7,000 gallons diesel	

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? __X_Yes ___ No	**If yes, is it?** ___ Indirect Fired _X_Direct Fired
Maximum design heat input and/or maximum horsepower rating: This unit has horsepower of 255 HP.	**Type and Btu/hr rating of burners:** NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Diesel is the only fuel used in the engine. The maximum hourly usage is 14 gallons/hour and the maximum annual usage is 7,000 gallons, based on 14 gallons per hour times the permit limit of 500 hours per year.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Diesel	< 500 ppm	<0.01%	139,000

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	1.82	0.50
Nitrogen Oxides (NO_X)	8.5	2.10
Lead (Pb)	0	0

Particulate Matter ($PM_{2.5}$)	0.60	0.2
Particulate Matter (PM_{10})	0.60	0.2
Total Particulate Matter (TSP)	0.60	0.2
Sulfur Dioxide (SO_2)	0.56	0.14
Volatile Organic Compounds (VOC)	0.69	0.20
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Carbon Dioxide Equivalent (CO_2e)	316	79

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

The above emission factors were obtained from R14-0015. Carbon dioxide equivalents were calculated following 40 CFR 98 Subpart C and N as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or construction permit with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

Permit to Modify R14-0015K:

5.1.4 Emissions of the following pollutants to the atmosphere from the associated emission points shall not exceed the following:

Cummins NT-855-F1 (Emission Point EP18)		
Pollutant	**Maximum Allowable Emission Rate**	
	lb/hr	TPY
Particulate Matter	0.60	0.2
Sulfur Dioxide	0.56	0.14
Nitrogen Oxides	8.5	2.10
Carbon Monoxide	1.82	0.50
Volatile Organic Compounds	0.69	0.20

5.1.5. The two Caterpillar 3406 (ID. No. ESDG12 and ESDG13) and Cummins NT-855-F1 (ID. No. ESFW11) internal combustion engines shall not operate more than 500 hours per year, calculated as the sum during a consecutive 12 month period.

5.1.6.The two Caterpillar 3406 and Cummins NT-855-F1 internal combustion engines shall not consume a fuel with a sulfur content of greater than 0.5 percent by weight.

Table 2c work practice requirements for emergency CI engines (e.g., change oil and filter every 500 hours or annually, inspect air cleaner every 1000 hours or annually, and inspect hoses and belts every 500 hours or annually).

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

Permit to Modify R14-0015K:
5.2.3. The permittee shall monitor and record the hours of operation of the engines for the generators and fire water pumps. Such records shall be maintain in accordance with 3.4.1.

5.4.4. The permittee shall maintain records of sulfur content of the fuel oil received and/or vendors contractual sulfur specifications for the fuel oil.

Are you in compliance with all applicable requirements for this emission unit? _**X**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: ESSH15	**Emission unit name:** Line #1 Makeup Air Handling Unit	**List any control devices associated with this emission unit:** None

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Makeup air handling unit provides exterior ambient air to the interior of the plant year around. The MHU has a 8,525,000 BTU/HR natural gas heating unit component to heat the incoming exterior ambient air during the cold weather months.

Manufacturer: Rapid Engineering, Inc.	**Model number:** 4089 MUA	**Serial number:** 009598
Construction date: NA	**Installation date:** 07/25/1998	**Modification date(s):** NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 8.525 MMBtu/hr

Maximum Hourly Throughput: 0	**Maximum Annual Throughput:** NA	**Maximum Operating Schedule:** 24 hours a day and 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? _X__Yes ___ No	**If yes, is it?** ___ Indirect Fired _**X**_Direct Fired
Maximum design heat input and/or maximum horsepower rating: 8,525,000 BTU/HR	**Type and Btu/hr rating of burners:** Maxon NP-LE AIRFLOW LOW EMISSIONS Line Burner @8.525 MMBtu/hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas will be used at a maximum rate of 8,136.9 cu. Ft. per hour for no more than six (6) cold weather months per year for a total estimated 35,151,408 cu. Ft. per year.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	NA	NA	1020-1050

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.17	0.75
Nitrogen Oxides (NO_X)	0.85	3.73
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0.03	0.11
Particulate Matter (PM_{10})	0.03	0.11

Total Particulate Matter (TSP)	0.03	0.11
Sulfur Dioxide (SO_2)	0.005	0.02
Volatile Organic Compounds (VOC)	0.05	0.20
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.02	0.07
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Carbon Dioxide Equivalent (CO_2e)	998	4,372

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).
Using the EPA's FIRE database, SCC Code No. 1-05-002-06 for space heaters in industrial use. Carbon dioxide equivalents were calculated following 40 CFR 98 Subparts C as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.
<u>R14-0015M:</u>
5.1.7. The 8.5 MMBTU/hr makeup air handling unit (ID. No. ESSH15) and 7.875 MMBtu/hr air handling unit (ID No. ESSH16) shall only be fired with pipeline quality natural gas.

5.1.8. Emissions of the following pollutants to the atmosphere from the 8.5 MMBTU/hr makeup air handling unit (ID. No. ESSH15) shall not exceed the following:

Pollutant	**Hourly Emission Rate**	**Annual Emission Rate**
	lb/hr	TPY
Particulate Matter	0.03	0.1
Particulate Matter-10	0.03	0.1
Nitrogen Oxides	0.85	3.7
Carbon Monoxide	0.17	0.75
Volatile Organic Compounds	0.05	0.2

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)
NA

Are you in compliance with all applicable requirements for this emission unit? _**<u>X</u>**_Yes ___No
If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number: ESSH16	**Emission unit name:** Line #2 Makeup Air Handling Unit	**List any control devices associated with this emission unit:** None

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Makeup air handling unit provides exterior ambient air to the interior of the plant year around. The MHU has a 7,875,000 BTU/HR natural gas heating unit component to heat the incoming exterior ambient air during the cold weather months.

Manufacturer: Rapid Engineering, Inc.	**Model number:** 4089 MUA	**Serial number:** 049138
Construction date: NA	**Installation date:** 2004	**Modification date(s):** NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 7.875 MMBtu/hr

Maximum Hourly Throughput: 0	**Maximum Annual Throughput:** NA	**Maximum Operating Schedule:** 24 hours a day and 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? _X__Yes ___ No	**If yes, is it?** ___ Indirect Fired _**X**_Direct Fired
Maximum design heat input and/or maximum horsepower rating: 7,875,000 BTU/HR	**Type and Btu/hr rating of burners:** Maxon NP-LE AIRFLOW LOW EMISSIONS Line Burner @7.875 MMBtu/hr

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
Natural Gas will be used at a maximum rate of 7,516.5 cu. Ft. per hour for no more than six (6) cold weather months per year for a total estimated 32,471,280 cu. Ft. per year.

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
Natural Gas	NA	NA	1020-1050

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0.16	0.69
Nitrogen Oxides (NO_X)	0.79	3.45
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0.02	0.10

Particulate Matter (PM_{10})	0.02	0.10
Total Particulate Matter (TSP)	0.02	0.10
Sulfur Dioxide (SO_2)	0.005	0.02
Volatile Organic Compounds (VOC)	0.04	0.18
Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Total HAP	0.01	0.06
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
Carbon Dioxide Equivalent (CO_2e)	922	4,039

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

Using the EPA's FIRE database, SCC Code No. 1-05-002-06 for space heaters in industrial use. Carbon dioxide equivalents were calculated following 40 CFR 98 Subparts C as appropriate.

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

<u>R14-0015M:</u>
5.1.7. The 8.5 MMBTU/hr makeup air handling unit (ID. No. ESSH15) and 7.875 MMBtu/hr air handling unit (ID No. ESSH16) shall only be fired with pipeline quality natural gas.

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)
NA

Are you in compliance with all applicable requirements for this emission unit? _**<u>X</u>**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
M1, M2, M3, M4, M5, M6, M7	Mix Binder Tanks	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Six tanks positioned to storage and feed raw binder materials to a mix tank for distribution to production lines.

Manufacturer:	**Model number:**	**Serial number:**
	NA	NA
Construction date:	**Installation date:**	**Modification date(s):**
NA	07/25/1998	Various

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): M1-1,200 gallons; M2-1,500 gallons; M3-1,700 gallons; M4-1,750 gallons; M5-750 gallons; M6 - 1600 gallons, M7- 2600 gallons

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
		24 hours a day and 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ___Yes _**X**_ No	**If yes, is it?** ___ Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating: NA	**Type and Btu/hr rating of burners:** NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
NA

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
NA			

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0	0
Nitrogen Oxides (NO_X)	0	0
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0	0
Particulate Matter (PM_{10})	0	0
Total Particulate Matter (TSP)	0	0
Sulfur Dioxide (SO_2)	0	0
Volatile Organic Compounds (VOC)	negligible	negligible

Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
NA	NA	NA

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.
<u>NA:</u>

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)
<u>NA:</u>

Are you in compliance with all applicable requirements for this emission unit? _**<u>X</u>**_Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T3, T4, T5, T6	ECOSE Storage Tanks	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Storage tanks for the binder.

Manufacturer:	**Model number:**	**Serial number:**
NA	NA	NA
Construction date:	**Installation date:**	**Modification date(s):**
NA	07/25/1998	NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 5,131 gallons per tank

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
		24 hours a day and 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ___Yes _x__ No	**If yes, is it?** ___ Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating: NA	**Type and Btu/hr rating of burners:** NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
NA

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
NA			

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0	0
Nitrogen Oxides (NO_X)	0	0
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0	0
Particulate Matter (PM_{10})	0	0
Total Particulate Matter (TSP)	0	0
Sulfur Dioxide (SO_2)	0	0
Volatile Organic Compounds (VOC)	negligible	negligible

Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
NA	NA	NA

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.
<u>N/A</u>

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For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)
<u>NA</u>

Are you in compliance with all applicable requirements for this emission unit? _**<u>X</u>**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T7A, T7B	Wax Storage Tanks	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Storage tanks for the Wax that is used in the binder or applied to the product after the binder.

Manufacturer:	**Model number:** NA	**Serial number:** NA
Construction date: NA	**Installation date:** 2014	**Modification date(s):** Converted from dedusting oil to emulsion wax June 2007.

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 5,000 gallons per tank

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:** 24 hours a day and 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ___Yes _**X**_ No	**If yes, is it?** ___ Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating: NA	**Type and Btu/hr rating of burners:** NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
NA

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
NA			

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0	0
Nitrogen Oxides (NO_X)	0	0
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0	0
Particulate Matter (PM_{10})	0	0
Total Particulate Matter (TSP)	0	0
Sulfur Dioxide (SO_2)	0	0
Volatile Organic Compounds (VOC)	negligible	negligible

Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
NA	NA	NA

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.
<u>NA:</u>

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)
<u>NA:</u>

Are you in compliance with all applicable requirements for this emission unit? _**<u>X</u>**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
T8	Aqueous Ammonia Storage Tank	None

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Fiberglass, reinforced, storage tank for the Aqua Ammonia that is used in the binder.

Manufacturer:	**Model number:**	**Serial number:**
Construction date: 06/03	**Installation date:** 07/25/1998	**Modification date(s):** Tank Replaced 2003

Design Capacity (examples: furnaces - tons/hr, tanks - gallons): 6,000 gallons per tank

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:** 24 hours a day and 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ___Yes _**X**_ No	**If yes, is it?** ___ Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating: NA	**Type and Btu/hr rating of burners:** NA

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
NA

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
NA			

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	NA	NA
Nitrogen Oxides (NO_X)	NA	NA
Lead (Pb)	NA	NA
Particulate Matter ($PM_{2.5}$)	NA	NA
Particulate Matter (PM_{10})	NA	NA
Total Particulate Matter (TSP)	NA	NA
Sulfur Dioxide (SO_2)	NA	NA
Volatile Organic Compounds (VOC)	NA	NA

Hazardous Air Pollutants	Potential Emissions	
	PPH	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
NA	NA	NA

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

NA

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.
<u>NA:</u>

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)
NA

Are you in compliance with all applicable requirements for this emission unit? _**<u>X</u>**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT E - Emission Unit Form

Emission Unit Description

Emission unit ID number:	**Emission unit name:**	**List any control devices associated with this emission unit:**
CT1, CT2, CT3, CT4, CT5	Cooling Towers	Drift Eliminator (CT3-5)

Provide a description of the emission unit (type, method of operation, design parameters, etc.):
Cooling towers.

Manufacturer:	**Model number:**	**Serial number:**
NA	NA	
Construction date:	**Installation date:**	**Modification date(s):**
2017	2017	NA

Design Capacity (examples: furnaces - tons/hr, tanks - gallons):

Maximum Hourly Throughput:	**Maximum Annual Throughput:**	**Maximum Operating Schedule:**
		The facility operates 24 hours a day 365 days a year.

Fuel Usage Data **(fill out all applicable fields)**

Does this emission unit combust fuel? ___Yes _**X**_ No	**If yes, is it?** ___ Indirect Fired ___Direct Fired
Maximum design heat input and/or maximum horsepower rating:	**Type and Btu/hr rating of burners:**

List the primary fuel type(s) and if applicable, the secondary fuel type(s). For each fuel type listed, provide the maximum hourly and annual fuel usage for each.
NA

Describe each fuel expected to be used during the term of the permit.

Fuel Type	Max. Sulfur Content	Max. Ash Content	BTU Value
NA	NA	NA	NA

Emissions Data

Criteria Pollutants	Potential Emissions	
	PPH	TPY
Carbon Monoxide (CO)	0	0
Nitrogen Oxides (NO_X)	0	0
Lead (Pb)	0	0
Particulate Matter ($PM_{2.5}$)	0.001	0.004
Particulate Matter (PM_{10})	0.20	0.87
Total Particulate Matter (TSP)	0.23	1.01
Sulfur Dioxide (SO_2)	0	0
Volatile Organic Compounds (VOC)	0	0
Hazardous Air Pollutants	Potential Emissions	

	PPH	TPY
NA	NA	NA
Regulated Pollutants other than Criteria and HAP	Potential Emissions	
	PPH	TPY
NA	NA	NA

List the method(s) used to calculate the potential emissions (include dates of any stack tests conducted, versions of software used, source and dates of emission factors, etc.).

PM Emission Rate (lb/hr) = Water Circulation Rate (lb/hr) x Drift x TDS / 1,000,000

Applicable Requirements

List all applicable requirements for this emission unit. For each applicable requirement, include the underlying rule/regulation citation and/or <u>construction permit</u> with the condition number. (*Note: Title V permit condition numbers alone are not the underlying applicable requirements*). If an emission limit is calculated based on the type of source and design capacity or if a standard is based on a design parameter, this information should also be included.

<u>R14-0015M</u>
5.1.10 Cooling tower restrictions:
a. Emissions shall be controlled using a 0.005% drift eliminator or equivalent
b. PM emissions shall not exceed 0.05 lb/hr and 0.20 tpy per tower
c. PM_{10} and $PM_{2.5}$ emissions shall not exceed 0.04 lb/hr and 0.17 tpy per tower
d. Makeup water shall be supplied by the local public water system. If from another source, the TDS shall be below 750 ppm by weight.

____ Permit Shield

For all applicable requirements listed above, provide monitoring/testing/recordkeeping/reporting which shall be used to demonstrate compliance. If the method is based on a permit or rule, include the condition number or citation. (Note: Each requirement listed above must have an associated method of demonstrating compliance. If there is not already a required method in place, then a method must be proposed.)

<u>R14-0015M</u>
5.2.2. Records of water sampling, as applicable.

Are you in compliance with all applicable requirements for this emission unit? _**<u>X</u>**_ Yes ___No

If no, complete the **Schedule of Compliance Form** as **ATTACHMENT F**.

ATTACHMENT G

Air Pollution Control Device Forms

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD1A; CD1B; CD1D; CD1F; CD1G; & CD1I	**List all emission units associated with this control device.** ES1A (CD1A); ES1B & ES1C (CD1B); ES1D & ES1E (CD1D); ES1F & ES1J (CD1F); ES1G (CD1G) & ES1H & ES1I (CD1I)	
Manufacturer: Whirl-Air Flow Bin Vent	**Model number:** Bin Vent DC 195-42	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.). Control device utilizes 195 square feet of filter cloth media with an air to cloth ratio of 3:1 for an acfm of 585.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Potential uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD1K	**List all emission units associated with this control device.** ES1K	
Manufacturer: Whirl-Air Flow	**Model number:** Bin Vent DC Model 55-30	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.). Control device utilizes 55 square feet of filter cloth media with an air to cloth ratio of 3:1 for an acfm of 165.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Potential uncontrolled emissions less than major source thresholds.

Describe the parameters monitored and/or methods used to indicate performance of this control device.
NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD1L; CD1M; & CD1N	**List all emission units associated with this control device.** ES1L (CD1L); ES1M (CD1M); & ES1N (CD1N)	
Manufacturer: Donaldson Dust Collection Group	**Model number:** DLMV	**Installation date:** 2017

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99.9%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Potential uncontrolled emissions are less than major source thresholds.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD11a and CD11b	**List all emission units associated with this control device.** ES11a and ES11b (Line 2 Day bin)	
Manufacturer: Donaldson Dust Collection	**Model number:** DLMV	**Installation date:** 2017

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

1000 acfm (each)

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD12A	**List all emission units associated with this control device.** ES12A (Batch Mixer's Receiving Bin For 1st & 2nd Lines)	
Manufacturer: Whirl-Air Flow	**Model number:** Bin Vent DC Model 345-56	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.). Control device utilizes 345 square feet of filter cloth media with an air to cloth ratio of 3:1 for an acfm of 1,035.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD12B	**List all emission units associated with this control device.** ES12C (Melter Hood For 1st Line)	
Manufacturer: MAC Equipment Co.	**Model number:** MactFlo 4MTF96	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	99%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

1. 15,000 acfm
2. Closed Pressure Configuration
3. 96 Polyester Cartridge Filters
4. 10,560 ft^2 of filter area
5. Cartridges Cleaned By Pulse Air

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**__ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.**

1. Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR Section 64.1 CAM APPLICABILITY DETERMINATION (1.b. bullet 4)

Describe the parameters monitored and/or methods used to indicate performance of this control device.
Differential Pressure, Incoming air temperature and Discharge Air pico Amps are all monitored. A bag leak detection system is installed and monitored accordingly.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD12Bb (Backup To CD12B)	**List all emission units associated with this control device.** ES12C (Melter Hood For 1st Line)	
Manufacturer: MAC Equipment Co.	**Model number:** MactFlo 4MTF32	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	99%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

1. 10,000 acfm
2. Closed Pressure Configuration
3. 32 Polyester Cartridge Filters
4. 3,530 ft^2 of filter area
5. Cartridges Cleaned By Pulse Air

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**__ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.**

1. Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR Section 64.1 CAM APPLICABILITY DETERMINATION (1.b. bullet 4)

Describe the parameters monitored and/or methods used to indicate performance of this control device.
Differential Pressure, Incoming air temperature and Discharge Air pico Amps are all monitored. A bag leak detection system is installed and monitored accordingly.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD12C	**List all emission units associated with this control device.** ES12D (Mixed Batch Storage Day Bin For 1st Line (3" Line)	
Manufacturer: Whirl-Air-Flow.	**Model number:** Bin Vent DC Model 230-56	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.). Control device utilizes 230 square feet of filter cloth media with an air to cloth ratio of 3:1 for an acfm of 690.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD12Cb	**List all emission units associated with this control device.** ES12Db (Mixed Batch Storage Day Bin For 1st Line (3" Line)	
Manufacturer: Whirl-Air Flow	**Model number:** Bin Vent DC Model 265-42	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.). Control device utilizes 265 square feet of filter cloth media with an air to cloth ratio of 3:1 for an acfm of 795.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD12D	**List all emission units associated with this control device.** ES12B (Mixed Batch Storage Backup Day Bin For 1st Line (5" Line)	
Manufacturer: Whirl-Air-Flow.	**Model number:** Bin Vent DC Model 130-42	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.). Control device utilizes 130 square feet of filter cloth media with an air to cloth ratio of 3:1 for an acfm of 390.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD13A, CD13B, CD13C	**List all emission units associated with this control device.** ES12E (Forehearth For 1st Line); ES13A (Fiber Forming Units), ES15C (Edge Trimmer and Dicers)	
Manufacturer: .	**Model number:**	**Installation date:** 2015

Type of Air Pollution Control Device:

__ _ Baghouse/Fabric Filter	__X_ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	_ _ Other (describe)
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	99%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).
53,000 acfm

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.**

1. Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR Section 64.1 CAM APPLICABILITY DETERMINATION (1.b. bullet 4)

Describe the parameters monitored and/or methods used to indicate performance of this control device.

The pressure drop across the scrubber in inches water and the liquid flow rate in GPM is recorded to indicate performance.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD14A	**List all emission units associated with this control device.** ES14A (3 Zone Curing Oven For 1st Line), ES14B (Cooling Table for 1st Line)	
Manufacturer: United McGill Corp.	**Model number:** 2-151C306	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

_ _ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
_X_ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
VOC	99%	95%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).
1.785 $MMft^3/hr$ @ 250.0°F with a minimum operating temperature set by stack testing. The RTO also has an auto shutoff for flow, flame loss or over temperature.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** 1. Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR Section 64.1 CAM APPLICABILITY DETERMINATION (1.b. bullet 4)

Describe the parameters monitored and/or methods used to indicate performance of this control device.

A 3-Hour Average Combustion Chamber Temperature is recorded.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD15A	**List all emission units associated with this control device.** ES15Aa, ES15B; ES15D; ES15E; ES15F; ES15G; ES15J ES25I, ES25L	
Manufacturer: Quentin Keeney	**Model number:** 35-W-C	**Installation date:** 07/25/1998

Type of Air Pollution Control Device:

___ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	_**X**_ Other (describe) _ Wet Collection System (Dynamic Separator)
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	80%	90%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

The air tumbler is a dynamic wet dust collector. Its action depends on the energy of the air flowing through it and the use of water to trap the particulate matter.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ____ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD15C and CD15D	**List all emission units associated with this control device.** ES15H; ES15I	
Manufacturer: OMNI S.P.A	**Model number:** ARP 2400	**Installation date:** 2006

Type of Air Pollution Control Device:

___ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	__X_ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	_X__ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	_X_ Other (describe) screens
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	80%	90%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

The unit separates out any airborne fiberglass particles and send the collected material to the screen room.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ____ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD22A	**List all emission units associated with this control device.** ES22A (Batch Mixer Receiving Bin For 2nd Line)	
Manufacturer: IAC	**Model number:** Bin Vent Model 96TB-FRIP	**Installation date:** 2004

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.). Control device utilizes 623 square feet of filter cloth media with an air to cloth ratio of 4.6 for an acfm of 2,917.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source thresholds.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD22B	**List all emission units associated with this control device.** ES22 (Melter Hood for 2nd Line)	
Manufacturer: Scheuch Technology	**Model number:** Sfw 05/12-5-05	**Installation date:** 2017

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter (TSP)	99%	98%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

1. 28,100 acfm
2. PTFE filter materuial
3. 6,714 ft^2 of filter area
4. Cartridges Cleaned By Pulse Air

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.**

1. Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR Section 64.1 CAM APPLICABILITY DETERMINATION (1.b. bullet 4)

Describe the parameters monitored and/or methods used to indicate performance of this control device.
A bag leak detection system is installed and monitored accordingly.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD22C	**List all emission units associated with this control device.** ES22B (Mixed Batch Storage Day Bin For 2nd Line [1 Hour]); ES22Bb (Mixed Batch Storage Backup Day Bin for 2nd Line [8 hour])	
Manufacturer: IAC	**Model number:** Bin Vent Model 96TB-FRIP	**Installation date:** 2004

Type of Air Pollution Control Device:

_X_ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	100%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.). Control device utilizes 623 square feet of filter cloth media with an air to cloth ratio of 4.6 for an acfm of 2,917.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD23A; CD23B; CD23C; CD23D	**List all emission units associated with this control device.** ES22E , ES25C	
Manufacturer: Fisher-Klosterman	**Model number:** MS-1300	**Installation date:** 2017

Type of Air Pollution Control Device:

__ _ Baghouse/Fabric Filter	_X_ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	99%	~98%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.)..
65,000 acfm (each)

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.**

1. Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR Section 64.1 CAM APPLICABILITY DETERMINATION (1.b. bullet 4)

Describe the parameters monitored and/or methods used to indicate performance of this control device.
The differential pressure in inches H_2O and the liquid flow rate in GPM are recorded to indicate performance.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD24A	**List all emission units associated with this control device.** ES24A (5 Zone Curing Oven For 2nd Line)	
Manufacturer: McGill AirClean	**Model number:** MCT 30.0	**Installation date:** 2004

Type of Air Pollution Control Device:

__ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
_X_ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
VOC	99%	95%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).
1.785 $MMft^3/hr$ @ 250.0°F. The RTO has an auto-shutoff feature for flow, flame loss or over temperature.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.**

1. Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR Section 64.1 CAM APPLICABILITY DETERMINATION (1.b. bullet 4)

Describe the parameters monitored and/or methods used to indicate performance of this control device.
A 3-Hour Average Combustion Chamber Temperature is recorded.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD24B	**List all emission units associated with this control device.** ES24B (Cooling Table For 2nd Line)	
Manufacturer: Fisher-Klosterman, Inc.	**Model number:**	**Installation date:**

Type of Air Pollution Control Device:

___ Baghouse/Fabric Filter	_X_ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	___ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	99%	77%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.**

1. Emission Limitations or Standards for which a WVDEP Division of Air Quality Title V permit specifies a continuous compliance determination method, as defined in 40 CFR Section 64.1 CAM APPLICABILITY DETERMINATION (1.b. bullet 4)

Describe the parameters monitored and/or methods used to indicate performance of this control device.
The liquid pressure and differential pressure are monitored to indicate performance.

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD25A/CD25Aa (cyclone/filter combination)	**List all emission units associated with this control device.** ES25B; ES25D; ES25F	
Manufacturer:	**Model number:**	**Installation date:** 2017

Type of Air Pollution Control Device:

_X__ Baghouse/Fabric Filter	_ _ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	__X_ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	___ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	___ Other (describe) _____
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	99%	99%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

Is this device subject to the CAM requirements of 40 C.F.R. 64? ___ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit discharges to the ambient plant air. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT G - Air Pollution Control Device Form

Control device ID number: CD25C and CD25D	**List all emission units associated with this control device.** ES25G, ES25H, ES25J	
Manufacturer: Van Dommele	**Model number:**	**Installation date:** 2004

Type of Air Pollution Control Device:

___ Baghouse/Fabric Filter	___ Venturi Scrubber	___ Multiclone
___ Carbon Bed Adsorber	___ Packed Tower Scrubber	__X_ Single Cyclone
___ Carbon Drum(s)	___ Other Wet Scrubber	___ Cyclone Bank
___ Catalytic Incinerator	_X__ Condenser	___ Settling Chamber
___ Thermal Incinerator	___ Flare	_ _ Other (describe)
___ Wet Plate Electrostatic Precipitator		___ Dry Plate Electrostatic Precipitator

List the pollutants for which this device is intended to control and the capture and control efficiencies.

Pollutant	Capture Efficiency	Control Efficiency
Particulate Matter	80%	90%

Explain the characteristic design parameters of this control device (flow rates, pressure drops, number of bags, size, temperatures, etc.).

The unit separates out any airborne fiberglass particles.

Is this device subject to the CAM requirements of 40 C.F.R. 64? ____ Yes _**X**_ No

If Yes, **Complete ATTACHMENT H**

If No**, Provide justification.** The control device is a fugitive emission point and does not discharge to the atmosphere as the unit is enclosed. Uncontrolled emissions less than major source threshold.

Describe the parameters monitored and/or methods used to indicate performance of this control device.

NA

ATTACHMENT I

Emission Calculations

Table 1. Facility-Wide Emissions Summary

Emission Unit/Description	Emission Point(s) ID	PM		PM_{10}		$PM_{2.5}$		SO_2		NO_X		CO		VOC		Ammonia	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Raw Materials Handling (Group 001)	FP23, FP11, EP11a, EP11b	0.27	1.10	0.13	0.55	0.13	0.55										
Melting and Refining - Line #1 (Group 2)	EP12, EP13	0.32	1.38	0.32	1.38	0.32	1.38	0.00	0.00	0.14	0.59	3.29	14.39	0.99	4.34		
Forming and Collecting - Line #1 (Group 4)	EP13	15.71	68.79	15.71	68.79	15.71	68.79	0.00	0.02	16.25	71.15	16.20	70.96	11.43	50.06	20.88	91.45
Curing and Cooling - Line #1 (Group 006)	EP14																
Melting and Refining - Line #2 (Group 3)	EP23	1.67	7.30	1.67	7.30	1.67	7.30	5.20	22.78	20.00	87.60	3.47	15.18	1.33	5.84		
Forming and Collecting - Line #2 (Group 5)	EP23	17.12	74.99	21.40	93.73	21.40	93.73	0.20	0.88	1.40	6.13	7.47	32.70	3.20	14.02	28.60	125.27
Curing and Cooling - Line #2 (Group 007)	EP24	5.87	25.70	7.33	32.12	7.33	32.12	0.20	0.88	3.93	17.23	8.13	35.62	2.60	11.39	2.93	12.85
Facing ,Sizing, Packaging - Line #1&2 (Group 008)	FP23, FP15	0.70	3.06	0.70	3.06	0.70	3.06							5.91	25.90		
Emergency Generator (ESDG12)	EP16	0.58	0.15	0.58	0.15	0.58	0.15	2.02	0.51	9.13	2.28	4.16	1.04	0.10	0.03		
Emergency Generator (ESDG13)	EP17	0.09	0.02	0.09	0.02	0.09	0.02	1.91	0.48	10.96	2.74	0.62	0.16	0.11	0.03		
Emergency Generator (ESDG14)	NewGEN	0.18	0.04	0.18	0.04	0.18	0.04	0.36	0.09	12.32	3.08	1.73	0.43	0.14	0.04		
Fire Pump Engine (ESFW11)	EP18	0.60	0.15	0.60	0.15	0.60	0.15	0.56	0.14	8.46	2.11	1.82	0.46	0.69	0.17		
Makeup Air Unit (ESSSH15)	EP19	0.03	0.11	0.03	0.11	0.03	0.11	0.01	0.02	0.85	3.73	0.17	0.75	0.05	0.20		
Makeup Air Unit (ESSSH16)	EP22	0.02	0.10	0.02	0.10	0.02	0.10	0.00	0.02	0.79	3.45	0.16	0.69	0.04	0.18		
Cooling Towers	CT1-5	0.23	1.01	0.20	0.87	0.00	0.00										
Roads	N/A		3.28		0.80		0.11										
Total		**43.36**	**187.17**	**48.94**	**209.18**	**48.75**	**207.63**	**10.46**	**25.81**	**84.22**	**200.10**	**47.21**	**172.37**	**26.59**	**112.18**	**52.41**	**229.57**

1. Line #1 forming, collection, and curing exhaust through a common stack and the emissions for these sources are combined.

Emission Unit/Description	Emission Point(s) ID	CO_2		CH_4		N_2O		CO_2e		n-hexane		Total HAP	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Raw Materials Handling (Group 001)	FP23, FP11, EP11a, EP11b	1,146.4	5,021.1					1,146.4	5,021.1				
Melting and Refining - Line #1 (Group 2)	EP12, EP13	643.4	2,818.0	0.01	0.05	0.00	0.01	644.0	2,820.9	0.01	0.04	0.01	0.04
Forming and Collecting - Line #1 (Group 4)	EP13	1,520.7	6,660.6	0.03	0.13	0.00	0.01	1,522.3	6,667.5	0.02	0.10	0.02	0.10
Curing and Cooling - Line #1 (Group 006)	EP14	2,105.6	9,222.4	0.04	0.17	0.00	0.02	2,107.7	9,231.9	0.03	0.14	0.03	0.14
Melting and Refining - Line #2 (Group 3)	EP23	3,064.8	13,423.7	0.06	0.25	0.01	0.03	3,067.9	13,437.6	0.05	0.21	0.05	0.21
Forming and Collecting - Line #2 (Group 5)	EP23	2,339.5	10,247.1	0.04	0.19	0.00	0.02	2,341.9	10,257.7	0.04	0.16	0.04	0.16
Curing and Cooling - Line #2 (Group 007)	EP24	2,947.8	12,911.4	0.06	0.24	0.01	0.02	2,950.8	12,924.7	0.05	0.20	0.05	0.20
Facing ,Sizing, Packaging - Line #1&2 (Group 008)	FP23, FP15												
Emergency Generator (ESDG12)	EP16	657.0	164.3	0.03	0.01	0.01	0.00	659.3	164.8			0.03	0.01
Emergency Generator (ESDG13)	EP17	621.0	155.3	0.03	0.01	0.01	0.00	623.2	155.8			0.02	0.01
Emergency Generator (ESDG14)	NewGEN	930.3	232.6	0.04	0.01	0.01	0.00	933.6	233.4			0.01	0.00
Fire Pump Engine (ESFW11)	EP18	315.0	78.8	0.01	0.00	0.00	0.00	316.1	79.0			0.01	0.00
Makeup Air Unit (ESSSH15)	EP19	997.2	4,367.8	0.02	0.08	0.00	0.01	998.3	4,372.3	0.02	0.07	0.02	0.07
Makeup Air Unit (ESSSH16)	EP22	921.2	4,034.8	0.02	0.08	0.00	0.01	922.1	4,039.0	0.01	0.06	0.01	0.06
Cooling Towers	CT1-5												
Roads	N/A												
Total		**18,209.9**	**69,337.7**	**0.38**	**1.23**	**0.05**	**0.13**	**18,233.7**	**69,405.7**	**0.22**	**0.98**	**0.30**	**1.01**

1. Raw material carbon dioxide emissions are from raw material processing in the production lines.

Table 2. Raw Materials Handling Emission Calculations (Emission Points FP-11, FP23, EP11a and EP11b)

Source	Emission Factor[1] (lbs/ton of material processed)	
	PM	PM_{10}
Unloading and conveying (SCC 3-05-012-21)	3.0	1.5
Storage bins (SCC 3-05-012-22)	0.2	0.1
Mixing and weighing (SCC 3-05-012-23)	0.6	0.3

1. EPA AP-42, Section 11.13, Table 11.13-2 for PM data. PM10 data from EPA WebFIRE database based on SCC code.

The tons of raw material processed is equivalent to 115% of the maximum production capacity specified.
The maximum production capacity is **22,333** lb/hr and **97,820** tons per year (tpy) based on 8,760 operational hours per year.
Therefore, the maximum raw material processed is equal to **25,683** lb/hr and **112,493** tpy based on 8,760 operational hours per year.

The particulate matter emissions from raw material handling are controlled with bag filter dust collectors, as well as process enclosures.
The use of process enclosures and bag filter dust collectors were determined to have a minimum overall control device efficiency of **99%**

In addition, due to the slight negative on the building, these emissions, which are vented indoors, will be routed to the forming section and, ultimately, the forming and collection stack (EP23). As such, the emissions will be further controlled by the fiber collection chamber. The additional control is estimate at **50%**

E_{PM} = (Production Rate, tons per unit time) x (PM Emission Factor) x (1 - 0.99)

Source	Uncontrolled						Controlled					
	PM		PM_{10}		$PM_{2.5}$[1]		PM		PM_{10}		$PM_{2.5}$[1]	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Unloading and conveying (SCC 3-05-012-21)	38.53	168.74	19.26	84.37	19.26	84.37	0.19	0.84	0.10	0.42	0.10	0.42
Storage bins (SCC 3-05-012-22)	2.57	11.25	1.28	5.62	1.28	5.62	0.01	0.06	0.01	0.03	0.01	0.03
Mixing and weighing (SCC 3-05-012-23)	7.71	33.75	3.85	16.87	3.85	16.87	0.04	0.17	0.02	0.08	0.02	0.08
Total	48.80	213.74	24.40	106.87	24.40	106.87	0.24	1.07	0.12	0.53	0.12	0.53

1. Assumes all PM_{10} is $PM_{2.5}$

New Storage bin Throughputs:
Throughput: 176 tpd of batch (total for two bins)
Each Bin: 32120 tpy

Storage bins are controlled by bin vents. Estimated minimum control device efficiency of **99%**

New Day Bins - Dedicated Release Points (Bin Vents) - ES11a, ES11b

Source	Uncontrolled						Controlled					
	PM		PM_{10}		$PM_{2.5}$[1]		PM		PM_{10}		$PM_{2.5}$[1]	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Storage bins (SCC 3-05-012-22), each	2.20	3.21	1.10	1.61	1.10	1.61	0.022	0.032	0.011	0.016	0.011	0.016

1. Assumes all PM_{10} is $PM_{2.5}$
2. Hourly emissions assume 8 hours of operation per day.

Table 3. Melting and Refining - Line #1 (Emission Point EP12)

Operational hours	8,760	hr/yr
Line 2 Total Production Rate	9,000	lb/hr
Line 2 Total Production Pull Rate	39,420	ton/yr

Pollutant	Emission Factor (lbs/ton of glass pulled)	Source	Emissions lb/hr	Emissions tpy
NO_X	0.03	1	0.14	0.59
CO	0.73	1	3.29	14.39
Filterable PM	0.07	1	0.32	1.38
PM_{10}	0.07	1	0.32	1.38
$PM_{2.5}$	0.07	1	0.32	1.38
VOC	0.22	2	0.99	4.34
SO_2	1.34E-04	2	0.00	0.00

1. Permit Limit
2. Source test data

Table 4. Melting and Refining - Line #2 (Emission Point EP23)

Operational hours	8,760	hr/yr
Line 2 Total Production Rate	13,333	lb/hr
Line 2 Total Production Pull Rate	58,400	ton/yr

Pollutant	Emission Factor (lbs/ton of glass pulled)	Source	Emissions lb/hr	Emissions tpy
NO_X	3.00	1	20.00	87.60
CO	0.52	1	3.47	15.18
Filterable PM	0.25	1	1.67	7.30
PM_{10}	0.25	1	1.67	7.30
$PM_{2.5}$	0.25	1	1.67	7.30
VOC	0.20	1	1.33	5.84
SO_2	0.78	1	5.20	22.78

1. Permit limit.

Table 5. Forming Emission Calculations - Line #1 (Emission Point EP13)

Operational hours	8,760	hr/yr
Line 2 Total Production Rate	9,000	lb/hr
Line 2 Total Production Pull Rate	39,420	ton/yr

Pollutant	Emission Factor (lbs/ton of glass pulled)	Source	Emissions lb/hr	Emissions tpy
NO_X	3.61	1	16.25	71.15
CO	3.60	1	16.20	70.96
Filterable PM	3.49	1	15.71	68.79
PM_{10}	3.49	1	15.71	68.79
$PM_{2.5}$	3.49	1	15.71	68.79
VOC	2.54	1	11.43	50.06
SO_2	1.01E-03	2	4.53E-03	0.02
NH_3	4.64	1	20.88	91.45

1. Permit limit (note that some limits are applicable to combined stacks and emissions may be divided between several sources).
2. From stack test data

Table 6. Forming Emission Calculations - Line #2 (Emission Point EP23)

Operational hours	8,760	hr/yr
Line 2 Total Production Rate	13,333	lb/hr
Line 2 Total Production Pull Rate	58,400	ton/yr

Pollutant	Emission Factor (lbs/ton of glass pulled)	Source	Emissions lb/hr	Emissions tpy
NO_X	0.21	1	1.40	6.13
CO	1.12	1	7.47	32.70
Filterable PM	2.57	1	17.12	74.99
PM_{10}	3.21	1	21.40	93.73
$PM_{2.5}$	3.21	1	21.40	93.73
VOC	0.48	1	3.20	14.02
SO_2	0.03	1	0.20	0.88
NH_3	4.29	1	28.60	125.27

1. Permit limit (note that some limits are applicable to combined stacks and emissions may be divided between several sources).

Table 7. Curing and Cooling Emission Calculations - Line #1 (Emission Point EP14)

Operational hours	8,760	hr/yr
Line 2 Total Production Rate	9,000	lb/hr
Line 2 Total Production Pull Rate	39,420	ton/yr

Pollutant	Emission Factor (lbs/ton of glass pulled)	Source	Emissions lb/hr	Emissions tpy
NO_X	3.61	1	16.25	71.15
CO	3.60	1	16.20	70.96
Filterable PM	3.49	1	15.71	68.79
PM_{10}	3.49	1	15.71	68.79
$PM_{2.5}$	3.49	1	15.71	68.79
VOC	2.54	1	11.43	50.06
SO_2	7.72E-05	2	3.47E-04	1.52E-03
NH_3	4.64	1	20.88	91.45

1. Permit limit (note that some limits are applicable to combined stacks and emissions may be divided between several sources).
2. From stack test data

Table 8. Curing and Cooling Emission Calculations - Line #2 (Emission Point EP24)

Operational hours	8,760	hr/yr
Line 2 Total Production Rate	13,333	lb/hr
Line 2 Total Production Pull Rate	58,400	ton/yr

Pollutant	Emission Factor (lbs/ton of glass pulled)	Source	Emissions lb/hr	Emissions tpy
NO_X	0.59	1	3.93	17.23
CO	1.22	1	8.13	35.62
Filterable PM	0.88	1	5.87	25.70
PM_{10}	1.10	1	7.33	32.12
$PM_{2.5}$	1.10	1	7.33	32.12
VOC	0.39	1	2.60	11.39
SO_2	0.03	1	0.20	0.88
NH_3	0.44	1	2.93	12.85

1. Permit limit (note that some limits are applicable to combined stacks and emissions may be divided between several sources).

Table 9. Facing, Sizing and Packaging Emission Calculations (Emission Points FP15, FP23)

Historical asphalt facing application has been	0.045	ton per ton glass pulled based on recent production history (maximum value from 2007-2013).
The facility glass pull rate is	97,820	tpy
The use of asphalt facing application is	4,402	tpy of facing material processed.

The emissions from the facing application are uncontrolled and released to the in-plant environment. Due to the slight negative pressure on the building, these emissions, which are vented indoors, will be routed to the forming section and, ultimately, the form and collection stack (EP23). As such, the emissions will be further controlled by the fiber collection chamber.
Therefore, the estimated PM emissions released to the in-plant environment from the facing was reduced by 90%

Sample Calculation:

E = (Material Rate, tons per unit time) x (Emission Factor) x (1 - PM Control Efficiency, 90)

Pollutant	Emission Factor[1,2] (lbs/ton of material processed)	Emissions[3] lb/hr	Emissions[3] tpy
PM	0.05	0.06	0.24
VOC	1.86	0.93	4.09

1. PM emission factor is lb per ton of wool processed from page C-65 of "Wool Fiberglass Insulation Manufacturing - Background Information for Proposed Standards" USEPA-450-3-82-022a. Assumes all PM is $PM_{2.5}$
2. A representative (conservative) VOC emission factor of 1.86 lbs VOC per ton of asphalt blowing coating produced, which is used by the asphalt manufacturing industry, was obtained from the USEPA FIRE database.
3. Assumes continuous operation (i.e., 8,760 hr/yr).

Material	Density lb/gal	VOC Content lb/gal	Usage gal/yr	VOC Emissions lb/hr	VOC Emissions tpy
Dedusting Agent	8.17	0.0043	1,196,868	0.59	2.57
Ink-Jet ID	6.81	6.43	5935	4.36	19.08
Solvent	6.66	6.66	47	0.04	0.16
Total				**4.98**	**21.81**

Particulate dust control

Potential particulate matter (PM) emissions from the sizing and packaging area are collected and controlled by cartridge filters. Due to the slight negative on the building, these emissions, which are vented indoors, will be routed to the forming section and, ultimately the forming and collection stack (EP23). As such, the emissions will be further controlled by the fiber collection chamber. The additional control is estimated at 50%. The sizing and packaging areas consist of trimming, baggers, packaging equipment, choppers and dicers.

Emissions are calculated using the estimated air flow through the control devices and a grain loading of 0.005 gr/dscf

Air flow rate
New: 30000 acfm

Control efficiency due to fiber collection chamber: 50%

Sample Calculation: PM = Total Air Flow (cfm) x grain loading (gr/cf) x 60 min/hr x 1lb/7000 gr * (1 - Control efficiency)

Pollutant	lb/hr	tpy
Particulate Matter (PM)	0.64	2.82

Table 10. Support Facility Emission Calculations (Emission Points EP16, EP17, EP18, EP19, EP22)

Diesel-fired Internal Combustion Engines for Emergency Electricity and Emergency Fire Water

The emergency generators are Caterpillar, model #3406 & 3456 diesel engines with the following rated speed "Not to exceed emission data" in lbs/hr and estimated fuel usage:

	Model 3406 Electrical Generator (ESDG12)				Model 3456 Electrical Generator (ESDG13)			
% Load	CO	NOx	PM	HC	CO	NOx	PM	HC
100%	4.16	9.13	0.58	0.1	0.62	10.96	0.09	0.11
10%	0.53	1.5	0.09	0.1	0.64	2.76	0.05	0.14

	Fuel Usage (gal/hr)	
Model #:	3406	3456
100%load:	29.2	27.6
10% load:	5	5.2

For potential emission calculations, assume 100% load.

The fuel usage is calculated estimated on the amount of time and load on each generator.

Model 3406: Total hours usage: 500 Hours at 100% load: 500 Hours at 10% load: 0

Model 3456: Total hours usage: 500.000 Hours at 100% load: 500 Hours at 10% load: 0

This gives an estimated fuel usage of: 14600 gal/yr for Model 3406 and an average hourly fuel usage of: 29.20 gal/hr

13800 gal/yr for Model 3456 and an average hourly fuel usage of: 27.60 gal/hr

Determination of SO2 emissions for the emergency generators were estimated using Table 3.4-1 of AP-42, where S equals 0.5%w sulfur content (permit limit).

The emergency fire water pump engine is a Cummins diesel Model NT-855-F1 with an estimated engine rating of 255 hp and consumes a maximum of 14 gals/hr of diesel fuel. Using the EPA's FIRE database, SCC Code No. 2-03-001-01 for reciprocating internal combustion engines in industrial use presents an emission factor of 130 lbs of CO, 49.3 lbs of VOCs, 604 lbs of NOx, 39.7 lbs of SO2 and 42.5 lbs of PM10 per 1000 gallons of diesel fuel burned.

For potential emission calculations 500 hr/yr was used.

The following is a summary of the calculated emissions emitted by the diesel engines:

	ESDG12		ESDG13		ESFW11	
Pollutant	Emissions (lb/hr)	Emissions (tpy)	Emissions (lb/hr)	Emissions (tpy)	Emissions (lb/hr)	Emissions (tpy)
CO	4.16	1.04	0.62	0.16	1.82	0.46
NO_X	9.13	2.28	10.96	2.74	8.46	2.11
PM	0.58	0.15	0.09	0.02	0.60	0.15
VOC	0.10	0.03	0.11	0.03	0.69	0.17
SO_2	2.02	0.51	1.91	0.48	0.56	0.14

	Emission Factor[1]	Electrical Generator EP16		Electrical Generator EP17		Fire Water Pump EP18	
Pollutant	lb/Mmbtu	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Benzene	9.33E-04	3.73E-03	9.33E-04	3.53E-03	8.82E-04	1.79E-03	4.47E-04
Toluene	4.09E-04	1.64E-03	4.09E-04	1.55E-03	3.87E-04	7.84E-04	1.96E-04
Xylene	2.85E-04	1.14E-03	2.85E-04	1.08E-03	2.69E-04	5.47E-04	1.37E-04
Propylene	2.58E-03	1.03E-02	2.58E-03	9.76E-03	2.44E-03	4.95E-03	1.24E-03
1,3 Butadiene	3.91E-05	1.56E-04	3.91E-05	1.48E-04	3.70E-05	7.50E-05	1.87E-05
Formaldehyde	1.18E-03	4.72E-03	1.18E-03	4.46E-03	1.12E-03	2.26E-03	5.66E-04
Acetaldehyde	7.67E-04	3.07E-03	7.67E-04	2.90E-03	7.25E-04	1.47E-03	3.68E-04
Acrolein	9.25E-05	3.70E-04	9.25E-05	3.50E-04	8.74E-05	1.77E-04	4.44E-05
Benzo(a)pyrene	1.88E-07	7.52E-07	1.88E-07	7.11E-07	1.78E-07	3.61E-07	9.01E-08
PAH	1.68E-04	6.72E-04	1.68E-04	6.35E-04	1.59E-04	3.22E-04	8.06E-05

1. Unless otherwise noted, emission factors taken from AP-42, Fifth Edition, Section 3.3, Gasoline & Diesel Industrial Engines (10/96), Tables 3.3-1 and 3.3-2.

Diesel fuel heat content assumed to be 137000 Btu/gal

Make-up Air Space Heaters, EP-19 & EP -22

Emission factors from EPA's FIRE database, SCC Code No. 1-05-002-06 for space heaters in commercial/industrial use.

Assume 1000 Btu/scf

Makeup Air Unit (ESSSH15) 8.525 MMBtu/hr

Makeup Air Unit (ESSSH16) 7.875 MMBtu/hr

	Emission Factor	ESSH15		ESSH16	
Pollutant	(lb/MMscf)	Emissions (lb/hr)	Emissions (tpy)	Emissions (lb/hr)	Emissions (tpy)
CO	20	0.17	0.75	0.16	0.69
NO_X	100	0.85	3.73	0.79	3.45
PM	3	0.03	0.11	0.02	0.10
VOC	5.3	0.05	0.20	0.04	0.18
SO_2	0.6	0.01	0.02	0.00	0.02

Table 11. New Diesel-Fired Emergency Generator Emission Calculations (Emission Point NewGEN)

Engine Model:	Caterpillar C18		
Operational hours:	500	hr/yr	
Engine Size (100% load):	900	bhp	
Engine Size (75% load):	674	bhp	
Engine Size (50% load):	454	bhp	
Fuel Consumption (100% load):	42.7	gal/hr	
Engine Heat Input:	5.85	MMBtu/hr	(based on 137,000 Btu/gal from AP-42 Appendix A)

			Emissions		
Criteria Pollutant Emissions	**Emission Factor**	**Units**	**lb/hr**	**tpy**	**Reference**
NO_X	6.21	g/bhp-hr	12.32	3.08	Vendor performance data at 100% load
CO	0.87	g/bhp-hr	1.73	0.43	Vendor performance data at 100% load
Filterable PM	0.12	g/bhp-hr	0.18	0.04	Vendor performance data at 75% load
PM_{10}	0.12	g/bhp-hr	0.18	0.04	Vendor performance data at 75% load
$PM_{2.5}$	0.12	g/bhp-hr	0.18	0.04	Vendor performance data at 75% load
VOC	0.14	g/bhp-hr	0.14	0.04	Vendor performance data at 50% load (total HC)
SO_2	4.05E-04	lb/bhp-hr	0.36	0.09	EPA AP-42 Table 3.4-1

Sulfur content of diesel oil: 0.05 % (500 ppm S consistent with NSPS IIII diesel fuel requirements)

			Emissions		
Greenhouse Gas Emissions	**Emission Factor**	**Units**	**lb/hr**	**tpy**	**Reference**
CO2	930.34	lb/hr	930.34	232.59	Vendor performance data at 100% load
CH_4	6.61E-03	lb/MMBtu	0.04	0.01	40 CFR 98, Subpart C
N_2O	1.32E-03	lb/MMBtu	0.01	0.00	40 CFR 98, Subpart C
CO_2e			933.61	233.40	

			Emissions		
HAP Emissions	**Emission Factor**	**Units**	**lb/hr**	**tpy**	**Reference**
Benzene	7.76E-04	lb/MMBtu	4.54E-03	1.13E-03	AP-42, Table 3.4-3 (10/96)
Toluene	2.81E-04	lb/MMBtu	1.64E-03	4.11E-04	AP-42, Table 3.4-3 (10/96)
Xylenes	1.93E-04	lb/MMBtu	1.13E-03	2.82E-04	AP-42, Table 3.4-3 (10/96)
Formaldehyde	7.89E-05	lb/MMBtu	4.62E-04	1.15E-04	AP-42, Table 3.4-3 (10/96)
Acetaldehyde	2.52E-05	lb/MMBtu	1.47E-04	3.69E-05	AP-42, Table 3.4-3 (10/96)
Acrolein	7.88E-06	lb/MMBtu	4.61E-05	1.15E-05	AP-42, Table 3.4-3 (10/96)
Naphthalene	1.30E-04	lb/MMBtu	7.60E-04	1.90E-04	AP-42, Table 3.4-4 (10/96)
Total HAP			0.01	0.002	

Engine Load Calculations:

Criteria Pollutant Emission Factors	**Emission Factor for Given % Load (g/hp-hr)**				
	100	**75**	**50**	**25**	**10**
NO_X	6.21	3.64	3.02	7.41	10.21
CO	0.87	0.86	0.47	0.93	3.15
Filterable PM	0.07	0.12	0.1	0.08	0.15
PM_{10}	0.07	0.12	0.1	0.08	0.15
$PM_{2.5}$	0.07	0.12	0.1	0.08	0.15
VOC (Total HC)	0.02	0.04	0.14	0.15	0.32

	Emissions (lb/hr) at Given % Load				
Criteria Pollutant Emissions	**100**	**75**	**50**	**25**	**10**
NO_X	*12.32*	5.41	3.02	3.68	2.03
CO	*1.73*	1.28	0.47	0.46	0.63
Filterable PM	0.14	*0.18*	0.10	0.04	0.03
PM_{10}	0.14	*0.18*	0.10	0.04	0.03
$PM_{2.5}$	0.14	*0.18*	0.10	0.04	0.03
VOC (Total HC)	0.04	0.06	*0.14*	0.07	0.06

Table 12. Cooling Tower Emissions (Emission Points CT1-5)

Cooling Tower Reference Data

Unit	Water Circulation Rate gal/min	Water Circulation Rate lb/hr	Annual Operating Hrs	Drift [1] (%)	TDS [2] (ppmw)	TDS Specific Gravity [3]
Cooling Tower 1	2,532	1,267,013	8,760	0.005%	750	2.2
Cooling Tower 2	2,532	1,267,013	8,760	0.005%	750	2.2
Cooling Tower 3	2,412	1,206,965	8,760	0.005%	750	2.2
Cooling Tower 4	2,412	1,206,965	8,760	0.005%	750	2.2
Cooling Tower 5	2,412	1,206,965	8,760	0.005%	750	2.2

[1] Drift rate assumed based on industry standard.

[2] Total dissolved solids (TDS) assumed based on public water standard for West Virginia.

[3] TDS specific gravity corresponding to NaCl.

Calculations

Cooling Tower Particulate Emissions Size Distribution
(based on paper by Reisman and Frisbie, "Calculating Realistic PM10 Emissions from Cooling Tower")

Volume of drift droplet = $(4/3)\pi(D_d/2)^3$ [Eq. 1]

Mass of solids in drift droplet = $(TDS)(\rho_w)$(Volume of drift droplet) [Eq. 2]

Solid particle volume = (Particle mass of solids) / (ρ_{TDS}) [Eq. 3]

$D_p = D_d [(TDS)(\rho_w/\rho_{TDS})]^{1/3}$ [Eq. 4]

where:

D_p = diameter of solid particle (µm)

D_d = diameter of drift droplet (µm)

TDS = total dissolved solids content (ppmw)

ρ_w = density of water = 1E-6 µg/µm^3

ρ_{TDS} = density of solid particles (assume NaCl)

Size Distribution for Cooling Tower Particulate Emissions

EPRI Droplet Diameter [4] (µm)	Droplet Volume [5] (µm^3)	Particle Mass (Solids) [6] (µg)	Solid Particle Volume [7] (µm^3)	Solid Particle Diameter [8] (µm)	EPRI % Mass Smaller [4]
10	524	3.93.E-07	0.18	0.70	0.00
20	4189	3.14.E-06	1.43	1.40	0.20
30	14137	1.06.E-05	4.8	2.10	0.23
40	33510	2.51.E-05	11.4	2.79	0.51
50	65450	4.91.E-05	22	3.49	1.82
60	113097	8.48.E-05	39	4.19	5.70
70	179594	1.35.E-04	61	4.89	21.35
90	381704	2.86.E-04	130	6.3	49.81
110	696910	5.23.E-04	238	7.7	70.51
130	1150347	8.63.E-04	392	9.1	82.02
150	1767146	1.33.E-03	602	10.5	88.01
180	3053628	2.29.E-03	1,041	12.6	91.03
210	4849048	3.64.E-03	1,653	14.7	92.47
240	7238229	5.43.E-03	2,468	16.8	94.09
270	10305995	7.73.E-03	3,513	18.9	94.69
300	14137167	1.06.E-02	4,819	21.0	96.29
350	22449298	1.68.E-02	7,653	24.5	97.01
400	33510322	2.51.E-02	11,424	27.9	98.34
450	47712938	3.58.E-02	16,266	31.4	99.07
500	65449847	4.91.E-02	22,312	34.9	99.07
600	113097336	8.48.E-02	38,556	41.9	100.00

[4] Based on particle size distrubution test data in Reisman, J. and Frisbie, G., "Calculating Realistic PM10 Emissions from Cooling Towers".

[5] Calculated using Equation 1.

[6] Calculated using Equation 2.

[7] Calculated using Equation 3.

[8] Calculated using Equation 4.

PM_{10} and $PM_{2.5}$ Fractions Interpolated from Size Distribution

$PM_{2.5}$ Fraction of Total PM (%)	PM_{10} Fraction of Total PM (%)
0.39	86.0

Particulate Emission Rates

PM Emission Rate (lb/hr) = Water Circulation Rate (lb/hr) x Drift x TDS / 1,000,000

PM_{10} Emission Rate (lb/hr) = PM Emission Rate x PM_{10} Fraction

$PM_{2.5}$ Emission Rate (lb/hr) = PM Emission Rate x $PM_{2.5}$ Fraction

Annual Emission Rates (tons/yr) = Short-term Emission Rates (lbs/hr) x 8,760 hours/year / 2,000 lbs per ton

Unit	PM (lb/hr)	PM (tpy)	PM_{10} (lb/hr)	PM_{10} (tpy)	$PM_{2.5}$ (lb/hr)	$PM_{2.5}$ (tpy)
Cooling Tower 1	0.05	0.21	0.04	0.18	0.0002	0.001
Cooling Tower 2	0.05	0.21	0.04	0.18	0.0002	0.001
Cooling Tower 3	0.05	0.20	0.04	0.17	0.0002	0.001
Cooling Tower 4	0.05	0.20	0.04	0.17	0.0002	0.001
Cooling Tower 5	0.05	0.20	0.04	0.17	0.0002	0.001
Total	**0.23**	**1.01**	**0.20**	**0.87**	**0.0009**	**0.004**

Table 13. Estimation of Emissions from Roadways

Paved Roads

AP-42 13.2.1.3
E= [k(sL)^0.91 x (W)^1.02] x (1-P/4N

			Reference	
k (PM)	0.011	lb/VMT	Table 13.2-1.1	
k (PM10)	0.0022	lb/VMT	Table 13.2-1.1	
k (PM2.5)	0.00054	lb/VMT	Table 13.2-1.1	
P	140	days	Figure 13.2.1-2	
sL	7.4	g/m2	Table 13.2-1.3	Municipal Solid Waste Landfill
W	40,000	lbs		
W	20.00	tons		
N	365	days/yr		
E (PM)	1.31	lb/VMT		
E (PM10)	0.26	lb/VMT		
E (PM2.5)	0.06	lb/VMT		
VMT	2,400	ft/trip		
	11	trucks/day		
	1,825	miles/yr		

	Emissions		
Pollutant	**lb/hr[1]**	**lb/yr**	**tpy**
PM	0.82	2,381.93	1.19
PM_{10}	0.16	476.39	0.24
$PM_{2.5}$	0.04	116.93	0.06

1. Assumes 8 hr/day, 7 days a week

Unpaved Roads

AP-42 13.2.2
E= [k(s/12)^a x (W/3)^b] x [(365-P)/365]

			Reference	
k (PM)	4.9	lb/VMT	Table 13.2.2-2	
k (PM10)	1.5	lb/VMT	Table 13.2.2-2	
k (PM2.5)	0.15	lb/VMT	Table 13.2.2-2	
P	140	days	Figure 13.2.2-2	
s	6.4	%	Table 13.2.2-1	Municipal Solid Waste Landfill
W	40,000	lbs		
W	20.00	tons		
a (PM)	0.70	lb/VMT	Table 13.2.2-2	
a (PM10)	0.90	lb/VMT	Table 13.2.2-2	
a (PM2.5)	0.90	lb/VMT	Table 13.2.2-2	
b (PM)	0.45	lb/VMT	Table 13.2.2-2	
b (PM10)	0.45	lb/VMT	Table 13.2.2-2	
b (PM2.5)	0.45	lb/VMT	Table 13.2.2-2	
VMT	1,200	ft/trip		
	11	trucks/day		
	913	miles/yr		

	Emissions		
Pollutant	**lb/hr[1]**	**lb/yr**	**tpy**
PM	1.43	4,168.47	2.08
PM_{10}	0.39	1,125.31	0.56
$PM_{2.5}$	0.04	112.53	0.06

1. Assumes 8 hr/day, 7 days a week

Table 14. Greenhouse Gas (GHG) Emissions Summary

Pollutant	Emission Factor (lb/MMbtu)	
	Natural Gas	Diesel
CO_2	116.98	163.05
CH_4	2.20E-03	6.61E-03
N_2O	2.20E-04	1.32E-03

1. 40 CFR 98 Subpart C, Table 1-A and 1-B

Global Warming Potential (Table A-1 from 40 CFR 98 Subpart A)
N_2O 298
CH_4 25
Conversion: 0.138 MMBtu/gal from 40 CFR 98 Subpart C, Table 1-A.

Emission Source	Total Heat Input Rating (MMBtu/hr)	CO_2		CH_4		N_2O		CO_2e	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Furnace - Line 2 (ES22)	26.2	3,064.77	13,423.71	5.78E-02	0.25	5.78E-03	0.03	3,067.94	13,437.57
Forming - Line 2 (ES22E)	20.0	2,339.52	10,247.10	4.41E-02	0.19	4.41E-03	0.02	2,341.94	10,257.69
Oven - Line 2 (ES24A)	25.2	2,947.80	12,911.35	5.56E-02	0.24	5.56E-03	0.02	2,950.84	12,924.69
Furnace - Line 1 (ES12E)	5.5	643.37	2,817.95	1.21E-02	0.05	1.21E-03	0.01	644.03	2,820.86
Forming - Line 1 (ES13A)	13.0	1,520.69	6,660.62	2.87E-02	0.13	2.87E-03	0.01	1,522.26	6,667.50
Oven - Line 1 (ES14A)	18.0	2,105.57	9,222.39	3.97E-02	0.17	3.97E-03	0.02	2,107.74	9,231.92
Makeup Air Unit (ESSSH15)	8.525	997.22	4,367.83	1.88E-02	0.08	1.88E-03	0.01	998.25	4,372.34
Makeup Air Unit (ESSSH16)	7.875	921.19	4,034.80	1.74E-02	0.08	1.74E-03	0.01	922.14	4,038.96
Total		**14,540.13**	**63,685.75**	**0.27**	**1.20**	**0.03**	**0.12**	**14,555.14**	**63,751.53**

Emission Source	Fuel Usage (gal/hr)	Operation (hr/yr)	CO_2		CH_4		N_2O		CO_2e	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Emergency Generator (ESDG12)	29.2	500	657.04	164.26	0.03	0.01	5.33E-03	0.00	659.29	164.82
Emergency Generator (ESDG13)	27.6	500	621.03	155.26	0.03	0.01	5.04E-03	0.00	623.16	155.79
Emergency Generator (ESDG14)	42.7	500	930.34	232.59	0.04	0.01	7.79E-03	0.00	933.64	233.41
Fire Water Pump (ESFW11)	14.0	500	315.02	78.75	0.01	0.00	2.56E-03	0.00	316.10	79.02
Total			**2,523.43**	**630.86**	**0.10**	**0.03**	**0.02**	**0.01**	**2,532.19**	**633.05**

1. ESDG14 emissions for CO2 are provided by the vendor.

GHG Emission Rates from Raw Material Processing

Raw Material Inputs		
Throughput	25,683	lbs/hr
	112,493	tpy
Limestone	5	lbs CO_2/ton melted[1]
	0.036	Fraction of total throughput that is limestone[2]
Soda Ash	830	lbs CO_2/ton melted[1]
	0.107	Fraction of total throughput that is soda ash[2]

[1] Emission factors supplied by raw materials supplier to Knauf as per 40 CFR 98 Subpart N.

[2] Estimated composition of batch from November 2014 Line 2 R14 Application.

Melting Raw Materials	Raw Material (tons)	Potential CO_2 Emissions	
		(lbs/hr)	(tpy)
Limestone	4,093	2.34	10.2
Soda Ash	12,074	1,144.03	5,010.9

CO_2		CH_4		N_2O		CO_2e	
lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
18,209.92	69,337.70	3.78E-01	1.23	4.81E-02	0.13	18,233.70	69,405.67

Table 15. Natural Gas Combustion Hazardous Air Pollutant (HAP) Emissions Summary

Emission Source	Total Heat Input Rating (MMBtu/hr)
Furnace - Line 2 (ES22)	26.2
Forming - Line 2 (ES22E)	20.0
Oven - Line 2 (ES24A)	25.2
Furnace - Line 1 (ES12E)	5.5
Forming - Line 1 (ES13A)	13.0
Oven - Line 1 (ES14A)	18.0
Makeup Air Unit (ESSSH15)	8.525
Makeup Air Unit (ESSSH16)	7.875

Assumes heat content of 1000 Btu/scf of natural gas

Pollutant	Emission Factor (lb/MMscf)	Furnace - Line 2 (ES22)		Forming - Line 2 (ES22E)		Oven - Line 2 (ES24A)		Furnace - Line 1 (ES12E)		Forming - Line 1 (ES13A)		Oven - Line 1 (ES14A)		Makeup Air Unit (ESSSH15)		Makeup Air Unit (ESSSH16)		Total	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
2-Methylnaphthalene	2.40E-05	6.29E-07	2.75E-06	4.80E-07	2.10E-06	6.05E-07	2.65E-06	1.32E-07	5.78E-07	3.12E-07	1.37E-06	4.32E-07	1.89E-06	2.05E-07	8.96E-07	1.89E-07	8.28E-07	2.98E-06	1.31E-05
3-Methylchloranthrene	1.80E-06	4.72E-08	2.07E-07	3.60E-08	1.58E-07	4.54E-08	1.99E-07	9.90E-09	4.34E-08	2.34E-08	1.02E-07	3.24E-08	1.42E-07	1.53E-08	6.72E-08	1.42E-08	6.21E-08	2.24E-07	9.80E-07
7,12-Dimethylbenz(a)anthracene	1.60E-05	4.19E-07	1.84E-06	3.20E-07	1.40E-06	4.03E-07	1.77E-06	8.80E-08	3.85E-07	2.08E-07	9.11E-07	2.88E-07	1.26E-06	1.36E-07	5.97E-07	1.26E-07	5.52E-07	1.99E-06	8.71E-06
Acenapthene	1.80E-06	4.72E-08	2.07E-07	3.60E-08	1.58E-07	4.54E-08	1.99E-07	9.90E-09	4.34E-08	2.34E-08	1.02E-07	3.24E-08	1.42E-07	1.53E-08	6.72E-08	1.42E-08	6.21E-08	2.24E-07	9.80E-07
Acenapthylene	1.80E-06	4.72E-08	2.07E-07	3.60E-08	1.58E-07	4.54E-08	1.99E-07	9.90E-09	4.34E-08	2.34E-08	1.02E-07	3.24E-08	1.42E-07	1.53E-08	6.72E-08	1.42E-08	6.21E-08	2.24E-07	9.80E-07
Anthracene	2.40E-06	6.29E-08	2.75E-07	4.80E-08	2.10E-07	6.05E-08	2.65E-07	1.32E-08	5.78E-08	3.12E-08	1.37E-07	4.32E-08	1.89E-07	2.05E-08	8.96E-08	1.89E-08	8.28E-08	2.98E-07	1.31E-06
Benz(a)anthracene	1.80E-06	4.72E-08	2.07E-07	3.60E-08	1.58E-07	4.54E-08	1.99E-07	9.90E-09	4.34E-08	2.34E-08	1.02E-07	3.24E-08	1.42E-07	1.53E-08	6.72E-08	1.42E-08	6.21E-08	2.24E-07	9.80E-07
Benzene	2.10E-03	5.50E-05	2.41E-04	4.20E-05	1.84E-04	5.29E-05	2.32E-04	1.16E-05	5.06E-05	2.73E-05	1.20E-04	3.78E-05	1.66E-04	1.79E-05	7.84E-05	1.65E-05	7.24E-05	2.61E-04	1.14E-03
Benzo(a)pyrene	1.20E-06	3.14E-08	1.38E-07	2.40E-08	1.05E-07	3.02E-08	1.32E-07	6.60E-09	2.89E-08	1.56E-08	6.83E-08	2.16E-08	9.46E-08	1.02E-08	4.48E-08	9.45E-09	4.14E-08	1.49E-07	6.53E-07
Benzo(b)fluoranthene	1.80E-06	4.72E-08	2.07E-07	3.60E-08	1.58E-07	4.54E-08	1.99E-07	9.90E-09	4.34E-08	2.34E-08	1.02E-07	3.24E-08	1.42E-07	1.53E-08	6.72E-08	1.42E-08	6.21E-08	2.24E-07	9.80E-07
Benzo(g,h,i)perylene	1.20E-06	3.14E-08	1.38E-07	2.40E-08	1.05E-07	3.02E-08	1.32E-07	6.60E-09	2.89E-08	1.56E-08	6.83E-08	2.16E-08	9.46E-08	1.02E-08	4.48E-08	9.45E-09	4.14E-08	1.49E-07	6.53E-07
Benzo(k)fluoranthene	1.80E-06	4.72E-08	2.07E-07	3.60E-08	1.58E-07	4.54E-08	1.99E-07	9.90E-09	4.34E-08	2.34E-08	1.02E-07	3.24E-08	1.42E-07	1.53E-08	6.72E-08	1.42E-08	6.21E-08	2.24E-07	9.80E-07
Chrysene	1.80E-06	4.72E-08	2.07E-07	3.60E-08	1.58E-07	4.54E-08	1.99E-07	9.90E-09	4.34E-08	2.34E-08	1.02E-07	3.24E-08	1.42E-07	1.53E-08	6.72E-08	1.42E-08	6.21E-08	2.24E-07	9.80E-07
Dibenzo(a,h)anthracene	1.20E-06	3.14E-08	1.38E-07	2.40E-08	1.05E-07	3.02E-08	1.32E-07	6.60E-09	2.89E-08	1.56E-08	6.83E-08	2.16E-08	9.46E-08	1.02E-08	4.48E-08	9.45E-09	4.14E-08	1.49E-07	6.53E-07
Dichlorobenzene	1.20E-03	3.14E-05	1.38E-04	2.40E-05	1.05E-04	3.02E-05	1.32E-04	6.60E-06	2.89E-05	1.56E-05	6.83E-05	2.16E-05	9.46E-05	1.02E-05	4.48E-05	9.45E-06	4.14E-05	1.49E-04	6.53E-04
Fluoranthene	3.00E-06	7.86E-08	3.44E-07	6.00E-08	2.63E-07	7.56E-08	3.31E-07	1.65E-08	7.23E-08	3.90E-08	1.71E-07	5.40E-08	2.37E-07	2.56E-08	1.12E-07	2.36E-08	1.03E-07	3.73E-07	1.63E-06
Fluorene	2.80E-06	7.34E-08	3.21E-07	5.60E-08	2.45E-07	7.06E-08	3.09E-07	1.54E-08	6.75E-08	3.64E-08	1.59E-07	5.04E-08	2.21E-07	2.39E-08	1.05E-07	2.21E-08	9.66E-08	3.48E-07	1.52E-06
n-Hexane	1.80E+00	4.72E-02	2.07E-01	3.60E-02	1.58E-01	4.54E-02	1.99E-01	9.90E-03	4.34E-02	2.34E-02	1.02E-01	3.24E-02	1.42E-01	1.53E-02	6.72E-02	1.42E-02	6.21E-02	2.24E-01	9.80E-01
Indeno(1,2,3-c,d)pyrene	1.80E-06	4.72E-08	2.07E-07	3.60E-08	1.58E-07	4.54E-08	1.99E-07	9.90E-09	4.34E-08	2.34E-08	1.02E-07	3.24E-08	1.42E-07	1.53E-08	6.72E-08	1.42E-08	6.21E-08	2.24E-07	9.80E-07
Naphthalene	6.10E-04	1.60E-05	7.00E-05	1.22E-05	5.34E-05	1.54E-05	6.73E-05	3.36E-06	1.47E-05	7.93E-06	3.47E-05	1.10E-05	4.81E-05	5.20E-06	2.28E-05	4.80E-06	2.10E-05	7.58E-05	3.32E-04
Phenanthrene	1.70E-05	4.45E-07	1.95E-06	3.40E-07	1.49E-06	4.28E-07	1.88E-06	9.35E-08	4.10E-07	2.21E-07	9.68E-07	3.06E-07	1.34E-06	1.45E-07	6.35E-07	1.34E-07	5.86E-07	2.11E-06	9.26E-06
Pyrene	5.00E-06	1.31E-07	5.74E-07	1.00E-07	4.38E-07	1.26E-07	5.52E-07	2.75E-08	1.20E-07	6.50E-08	2.85E-07	9.00E-08	3.94E-07	4.26E-08	1.87E-07	3.94E-08	1.72E-07	6.22E-07	2.72E-06
Toluene	3.40E-03	8.91E-05	3.90E-04	6.80E-05	2.98E-04	8.57E-05	3.75E-04	1.87E-05	8.19E-05	4.42E-05	1.94E-04	6.12E-05	2.68E-04	2.90E-05	1.27E-04	2.68E-05	1.17E-04	4.23E-04	1.85E-03
Arsenic	2.00E-04	5.24E-06	2.30E-05	4.00E-06	1.75E-05	5.04E-06	2.21E-05	1.10E-06	4.82E-06	2.60E-06	1.14E-05	3.60E-06	1.58E-05	1.71E-06	7.47E-06	1.58E-06	6.90E-06	2.49E-05	1.09E-04
Beryllium	4.40E-03	1.15E-04	5.05E-04	8.80E-05	3.85E-04	1.11E-04	4.86E-04	2.42E-05	1.06E-04	5.72E-05	2.51E-04	7.92E-05	3.47E-04	3.75E-05	1.64E-04	3.47E-05	1.52E-04	5.47E-04	2.40E-03
Cadmium	1.10E-03	2.88E-05	1.26E-04	2.20E-05	9.64E-05	2.77E-05	1.21E-04	6.05E-06	2.65E-05	1.43E-05	6.26E-05	1.98E-05	8.67E-05	9.38E-06	4.11E-05	8.66E-06	3.79E-05	1.37E-04	5.99E-04
Chromium	1.40E-03	3.67E-05	1.61E-04	2.80E-05	1.23E-04	3.53E-05	1.55E-04	7.70E-06	3.37E-05	1.82E-05	7.97E-05	2.52E-05	1.10E-04	1.19E-05	5.23E-05	1.10E-05	4.83E-05	1.74E-04	7.62E-04
Cobalt	8.40E-05	2.20E-06	9.64E-06	1.68E-06	7.36E-06	2.12E-06	9.27E-06	4.62E-07	2.02E-06	1.09E-06	4.78E-06	1.51E-06	6.62E-06	7.16E-07	3.14E-06	6.62E-07	2.90E-06	1.04E-05	4.57E-05
Lead	5.00E-04	1.31E-05	5.74E-05	1.00E-05	4.38E-05	1.26E-05	5.52E-05	2.75E-06	1.20E-05	6.50E-06	2.85E-05	9.00E-06	3.94E-05	4.26E-06	1.87E-05	3.94E-06	1.72E-05	6.22E-05	2.72E-04
Manganese	3.80E-04	9.96E-06	4.36E-05	7.60E-06	3.33E-05	9.58E-06	4.19E-05	2.09E-06	9.15E-06	4.94E-06	2.16E-05	6.84E-06	3.00E-05	3.24E-06	1.42E-05	2.99E-06	1.31E-05	4.72E-05	2.07E-04
Mercury	2.60E-04	6.81E-06	2.98E-05	5.20E-06	2.28E-05	6.55E-06	2.87E-05	1.43E-06	6.26E-06	3.38E-06	1.48E-05	4.68E-06	2.05E-05	2.22E-06	9.71E-06	2.05E-06	8.97E-06	3.23E-05	1.42E-04
Nickel	2.10E-03	5.50E-05	2.41E-04	4.20E-05	1.84E-04	5.29E-05	2.32E-04	1.16E-05	5.06E-05	2.73E-05	1.20E-04	3.78E-05	1.66E-04	1.79E-05	7.84E-05	1.65E-05	7.24E-05	2.61E-04	1.14E-03
Selenium	2.40E-05	6.29E-07	2.75E-06	4.80E-07	2.10E-06	6.05E-07	2.65E-06	1.32E-07	5.78E-07	3.12E-07	1.37E-06	4.32E-07	1.89E-06	2.05E-07	8.96E-07	1.89E-07	8.28E-07	2.98E-06	1.31E-05

1. Emission factors from AP-42, Table 1.4-3 (Jul-1998).