MAR 1 9 2018

Ms. Debra Probert
Plant Leader
Owens Corning Insulation Systems, LLC
1983 State Line Road
Joplin, MO 64804

RE: New Source Review Permit Amendment - Permit Number: 052016-003D
Project Number: 2017-06-085; Installation Number: 097-0176

Dear Ms. Probert:

This amendment addresses several items related to the PSD permit 052016-003 issued to Owens Corning Insulation Systems, LLC (OCIS).

- Changes to binder tanks.
  - The requirement has been removed for the emissions from resin tanks TK-1 and TK-2 to always be controlled by the curing oven's RTO. According to the amendment application, the RTO will not operate during two causes, when the manufacturing line is not operating, and for RTO maintenance. The existing special condition 16.A.2) required the resin tank emissions to always be controlled by the RTO. The special condition has been superseded so that when the RTO is down, the resin tank emissions will be controlled by the BACT requirement of good operating practices (GOP) according to the existing special condition 16.A.1). Emission increases are expected to be negligible.
  - TK-12: There will no longer be a third [redacted] gallon resin/urea react tank (TK-12). It will be replaced by one [redacted] gallon tank of premix (TK-12) for the alternative binder. Alternative binder was initially approved in permit amendment 052016-003C, however tank changes were needed to accommodate larger product runs. Alternative binder tanks are expected to emit less VOC and HAP compared to the traditional binder. Tank TK-12 is changed in special condition 16, table 2. The new TK-12 is subject to the BACT requirement of GOP.
  - TK-8: The [redacted] gallon tank will not contain oil emulsion as permitted. It will contain full concentration [redacted] as an ingredient for mixing [redacted] onsite, for the alternative binder. The tank will remain subject to the BACT requirement of GOP.
  - TK-21: This will be a new [redacted] gallon tank containing a diluted [redacted] as an

ingredient for mixing [redacted] onsite, for the alternative binder. The tank will be subject to the BACT requirement of GOP.

- TK-22: This will be a new [redacted] gallon tank used for mixing the [redacted] onsite. The tank will be subject to the BACT requirement of GOP.

- Permit 052016-003 requires capture efficiency demonstration at blowing chamber openings by using air velocity and static pressure. OCIS claims taking these measurements manually is not safe. Special condition 20.B. has been revised to require using a smoke pencil which indicates direction of air flow, not strength of the flow. By itself, direction of air flow may not meet 100% capture efficiency demonstration requirements. The requirement remains to conduct a study to determine the velocity and pressure needed to demonstrate 100% capture efficiency, although potentially unsafe measurement techniques are not explicitly required. For comparison, EPA Method 204, EPA training courses, and the ACGIH Industrial Ventilation Manual use velocity, area, pressure, etc. More advanced techniques such as tracer gas may be needed.

- Despite the cupola being in operation for several months, OCIS has not been able to certify the required CEMS. Reliable data is needed from the CEMS in order to begin the BACT study, which is needed to eventually replace the temporary BACT limits with traditional, final BACT limits. Special condition 25 has been amended to address CEMS certification timing and BACT study timing.

- The alternative binder has been added to the BACT study protocol.

- A NO_X monitoring site has been tentatively approved by the program. OCIS submittal of the QAPP is pending. This does not affect any permit special condition.

OCIS requested confidentiality for lb/ton BACT limits and site photographs. Confidentiality was granted. This is the redacted public permit amendment. A confidential version is available under project 2017-06-090.

If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the administrative hearing commission, whose contact information is: Administrative Hearing Commission, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.

If you have any questions regarding this amendment, please do not hesitate to contact David Little, at the department's Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale

Kendall B. Hale
Permits Section Chief

KBH:dlj

Enclosures

c: Southwest Regional Office
PAMS File: 2017-06-085

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

Owens Corning Insulation Systems, LLC
Jasper County, S11, T27N, R34W

16. Tanks and Binder Preparation
    A. All emissions from the tanks and binder preparation as indicated in Table 2 shall be captured and controlled by the following:
        1) Good operating practices including, but not limited to:
            a) Fixed roof tanks with proper breather vent settings
            b) Submerged fill
            c) White shell for tanks located outdoors
            d) A leak detection and repair program consisting of EPA Method 21 and the following:
                i. Identifying components
                ii. Leak definition
                iii. Monitoring components
                iv. Repairing components
                v. Recordkeeping
            e) OCIS shall develop a written good operating practices log for the tanks and binder preparation including the following items. The log shall be kept on site and a copy submitted with the initial and renewal operating permit applications.
                i. Manufacturer's specifications for the above parameters, site specific specifications for the above parameters obtained through stack testing, CEMS data, operational experience, etc.
                ii. Criteria for monitoring, inspecting, preventative maintenance, and training.
                iii. Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
                iv. Recommended frequency and dates performed of all above schedules, incidents, activities, and actions

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Table 2: Tanks and Binder Preparation Subject to GOP

Identifier	Description	Subject to GOP?
TK-01	Resin tank	Yes
TK-02	Resin tank	Yes
N/A	Ammonia tank	No
TK-09	Silicone tank	Yes
TK-08	Alternative binder mineral oil tank	Yes
N/A	Silane liquid IBC	No
TK-07	Silane hydrolyzation tank	Yes
TK-16	Silane usage tank	Yes
N/A	Ammonia sulfate bulk bag	No
N/A	Ammonia sulfate feeder	No
N/A	Ammonia sulfate hydrolyzation	No
N/A	Ammonia sulfate usage tank	No
N/A	Hydrolyzed urea tank	No
N/A	Hydrolyzed urea tank	No
TK-10	Resin/urea react tank	Yes
TK-11	Resin/urea react tank	Yes
TK-12	Alternative binder premix tank	Yes
TK-13	Mix tank	Yes
TK-21	Alternative binder lubricant tank	Yes
TK-22	Alternative binder mix tank	Yes

2) All emissions from the resin tanks TK-01 and TK-02 shall also be captured and controlled by the curing oven's RTO per Special Condition 5.B.6), except when the RTO is not operating. When the RTO is not operating TK-01 and TK-02 remain subject to the GOP in special condition 16.A.1).

20. Demonstration of 100% Capture Efficiency

B. Blowing chamber

1) OCIS shall monitor and record at least monthly the direction of air flow at the opening in the blowing chamber adjacent to the spinners. A smoke pencil or other device preapproved by the program shall be used. The air flow shall be into the blowing chamber at all times the blowing chamber is operating.

2) OCIS shall monitor and record at least monthly the direction of air flow at the opening in the blowing chamber where shot falls out. A smoke pencil or other device preapproved by the program shall be used. The air flow shall be into the blowing chamber at all times the blowing chamber is operating.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

3) OCIS shall conduct a study to determine the appropriate velocity and pressure at each location needed to demonstrate 100% capture efficiency. The study shall consider American Conference of Governmental Industrial Hygienists recommendations and EPA Method 204 requirements. A copy of the study, engineering calculations, and results shall be submitted in an amendment application not more than 180 days after the startup of commercial operation.
4) Exhaust fan motor amperage shall be operated within the range established in the SOP from Special Condition 22.K.(permit 052016-003). Fan motor amperage shall be recorded at least once daily.

25. Temporary BACT

A. OCIS shall submit a proposed BACT study to the Permits Section at least 30 days prior to startup for commercial operation. The proposal must be approved before beginning the BACT study. (The approved study protocol is provided in Attachment A. Where conflicting information exists in the protocol, the permit special conditions take hierarchy.) The respective BACT study for 3% LOI product, 4% LOI product, and alternative binder product shall begin after collecting reliable CEMS data as detailed below.

1) OCIS may conduct preliminary accuracy checks of the CEMS and exhaust flow meters to verify they are generally working as intended.
2) Following the preliminary accuracy checks, OCIS shall conduct initial certification testing of the CEMS in accordance with 40 CFR 60 Appendix B.
    a) OCIS shall notify the Compliance/Enforcement Section of the proposed RATA date(s) and protocol at least 30 days prior to conducting the RATA.
    b) OCIS shall complete all RATA by March 1, 2018.
    c) OCIS shall notify the Compliance/Enforcement Section of the actual RATA date(s) within 10 days after conducting the RATA.
    d) OCIS shall notify the Compliance/Enforcement Section of the complete RATA results and indication of if there is reliable data within 60 days of conducting the RATA.
        i. If the data is reliable, then the respective product BACT study shall begin during the RATA (e.g. continue collecting CEMS data after actual RATA date(s) prior to confirmation as reliable).

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

ii. If at any time OCIS knows the data is not reliable, then OCIS shall not wait 60 days and shall as soon as possible notify the Compliance/Enforcement Section.

e) OCIS shall submit all notifications to the email address: AirComplianceReporting@dnr.mo.gov

3) The respective BACT study for 3% LOI product, 4% LOI product, and alternative binder product shall end after the sum of 12 months of operation after commencing study of that respective product. The entire BACT study shall end no more than 24 consecutive months after commencing study of any product. (e.g. BACT study for alternative binder product took 18 consecutive calendar months to conduct, to be able to obtain 12 months of data specific to alternative binder.)

B. OCIS shall monitor and record the following information during the BACT study:

1) Usage rate of all cupola raw materials and their sulfur wt%.
2) Usage rate of all fuels (tph, MMBtu/hr input), and their sulfur wt%.
3) All binder raw materials (tph), binder usage rate (tph), binder sulfur wt %.
4) LOI.
5) Charge rate (identify melt materials versus fuel), fiber rate, and finished product rate (tph).
6) Product name, individual target LOI within each LOI range, classification as "3% LOI" range, "4% LOI" range or "alternative binder".
7) All criteria from the SOP report.
8) CEMS and Compliance/Enforcement Section verified stack tested emission rates in the units of measure of the limits required for this permit.
9) Stack tests according to the following table,

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

Emission Unit	Pollutants	Minimum number of complete tests per pollutant		
Cupola	total PM_{10}, total $PM_{2.5}$, VOC, RSC, SAM, CH_4, N_2O (PM filt, SO_2, NOx, CO, CO_2 have CEMS and need not be tested for temporary BACT study)	3		
Blowing Chamber	PM filt, total PM_{10}, total $PM_{2.5}$, SO_2, NO_X, VOC, CO, SAM, RSC, CO_2, CH_4, N_2O	3 tests in 3% LOI range	3 tests in 4% LOI range	3 tests in alternative binder
Curing Oven	PM filt, total PM_{10}, total $PM_{2.5}$, SO_2, NO_X, VOC, CO, SAM, RSC, CO_2, CH_4, N_2O	3 tests in 3% LOI range	3 tests in 4% LOI range	3 tests in alternative binder
Cooling Section	PM filt, total PM_{10}, total $PM_{2.5}$, SO_2, NO_X, VOC, CO, SAM, RSC, CO_2, CH_4, N_2O	3 tests in 3% LOI range	3 tests in 4% LOI range	3 tests in alternative binder

For all above emission units, a complete test is at least three individual sample runs of 1-hour each or longer. (e.g. the cupola needs nine individual runs per pollutant. The blowing chamber needs nine individual runs per pollutant per each of two LOI ranges and one alternative binder for a total of 27 individual runs per pollutant.)

For all above emission units, initial testing required by Special Condition 22 may be used for one temporary BACT complete test if the parameters required by Special Condition 25.B. were monitored and recorded during the initial test.

For the blowing chamber, curing oven, and cooling section, at least two individual target LOIs shall be tested within each "3% LOI" range, "4% LOI" range, and "alternative binder".

10) Startup and shutdown periods.
11) A comparison of combined cupola/startup burner lb/hr emission rates on a 1-hour average, comparing startup to normal operation.
12) Times and dates linking all of the above.

C. OCIS shall submit an application to amend this permit within 180 days of the completion of the BACT study. In addition to the material necessary to deem an application complete, the application shall include the following information:

1) A copy of the BACT study.
2) A copy of the SOP report from Special Condition 22.K.
3) An evaluation of each temporary BACT limit in this permit, considering

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

if permitted emission limits, the basis of the limit, and the averaging periods are appropriate, and if amended or additional emission limits, basis, and averaging periods are necessary. (E.g. the blowing chamber, curing oven, and cooling section are permitted with zero SAM emissions, but stack testing may show an emission rate. Also changing from melt based to binder based limits.) At a minimum, the evaluation shall rely upon:

a) All respective information in the BACT study.
b) A statistical analysis including but not limited to the mean, standard deviation, regression analysis, data outliers and the reason why they are outliers. Where CEMS are used, the emissions mean and standard deviation shall be calculated for every 15 minute period.
c) A prediction of emission rates based upon monitored parameters.

4) Where limits are requested to be increased, the criteria in the November 19, 1987 EPA document, *Request for Determination on Best Available Control Technology (BACT) Issues -- Ogden Martin Tulsa Municipal Waste Incinerator Facility*, shall first be satisfied. The criteria include all of the following:
   a) The units were constructed in conformity with the permit.
   b) Errors, faulty data, or incorrect assumptions contained in the permit application resulted in inappropriate BACT emission limits and the applicant did not intentionally act to misrepresent of conceal data.
   c) The applicant investigated and reported all available options to reduce emissions to a lower, if not the permitted limit.
5) The permit amendment shall be publically noticed.

26. Record Keeping Requirements
OCIS shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include MSDS/SDS or certified product data sheets for all materials used.

27. Reporting Requirements
A. OCIS shall report all CEMS monitored emissions in the semi-annual monitoring report and in the annual compliance certification.

B. OCIS shall electronically submit all Relative Accuracy Test Audit (RATA), quality assurance, and quality control reports used to demonstrate compliance with all CEMS monitored emission limits with the semi-annual

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

monitoring report and with the annual compliance certification for the 3-year period beginning with commencement of operations under this permit. After the 3-year period, the reports shall be kept on site.

C. OCIS shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 days after the end of the month during which any record required by this permit shows an exceedance of a limitation imposed by this permit.

28. Superseding Condition
The conditions of this permit supersede the following special conditions in permits 052016-003, 052016-003A, 052016-003B, and 052016-003C.

Special Condition	Change Summary
16.A. Table 2	Remove and add tanks for alternative binder
20.B.	Blowing chamber capture efficiency demonstration method
25.A.	CEMS RATA timing

2. OVERVIEW OF BACT STUDY

This document serves as OCIS's BACT Study proposal. A detailed description of how OCIS plans to conduct the BACT study is included in the remaining sections of this document. Overall, the BACT Study is designed to evaluate the temporary BACT limits for the following:

1. Cupola temporary BACT limits
2. Blowing Chamber temporary BACT limits for traditional binder and 3% LOI range
3. Blowing Chamber temporary BACT limits for traditional binder and 4% LOI range
4. Blowing Chamber temporary BACT limits for alternative binder
5. Curing Oven temporary BACT limits for traditional binder and 3% LOI range
6. Curing Oven temporary BACT limits for traditional binder and 4% LOI range
7. Curing Oven temporary BACT limits for alternative binder
8. Cooling Section temporary BACT limits for traditional binder and 3% LOI range
9. Cooling Section temporary BACT limits for traditional binder and 4% LOI range
10. Cooling Section temporary BACT limits for alternative binder

The purpose of the BACT study is for OCIS to evaluate the site-specific performance of the Cupola, Blowing Chamber, Curing Oven, and Cooling Section and their respective air pollution control devices for a number of air pollutants in order to determine if the existing temporary BACT limits are appropriate. The study will consider the impact of process variables and as well as the control device variables on emissions.

The study for the traditional binder covering the 3% LOI range will be completed over the course of 12 months (likely non-consecutive months, but not to exceed 24 months from the start of the study) where OC is operating on traditional binder and making 3% LOI product. Similarly, the study for the traditional binder covering the 4% LOI range will be completed over the course of 12 months (likely non-consecutive months, but not to exceed 24 months from the start of the study) where OC is operating on traditional binder and making 4% LOI product, and the study for alternative binder will be completed over the course of 12 months (likely non-consecutive months, but not to exceed 24 months from the start of the study) where OC is operating on alternative binder.

Over the course of the BACT study, OCIS will operate CEMS and conduct stack testing to determine the emission rates of pollutants subject to a review of the temporary BACT limits. As the emissions data is being collected, OCIS will also collect data on the operating parameters.

Following the data collection, OCIS will review the emissions data and operations data to look for correlations between emissions and operating parameters. OCIS will evaluate each temporary BACT limit in the PSD permit and consider if permitted emission limits, the basis of the limits, and the averaging periods are appropriate, or if amended or additional emission limits, basis, or averaging periods are necessary. Should

OCIS determine that the BACT limits need to be increased, OCIS will justify the increases based on the criteria in the November 18, 1987 EPA document *Request for Determination on BACT Issues - Ogden Martin Tulsa Municipal Waste Incinerator Facility* shall first be satisfied.

All stack testing included as part of the BACT study will be performed after OCIS has verified that the units are achieving 100% capture as specified in the PSD permit. This verification requires OCIS to do the following:

1. Continuously monitor the static pressure at the beginning of the Cupola exhaust duct and at a point directly above the Cupola where charge is fed into the Cupola to ensure that the static pressure at both locations is negative.

2. OCIS shall monitor and record at least weekly the direction of air flow at the opening in the blowing chamber adjacent to the spinners. A smoke pencil or other device preapproved by the program shall be used. The air flow shall be into the blowing chamber at all times the blowing chamber is operating.

3. OCIS shall monitor and record at least weekly the direction of air flow at the opening in the blowing chamber where shot falls out. A smoke pencil or other device preapproved by the program shall be used. The air flow shall be into the blowing chamber at all times the blowing chamber is operating.

4. OCIS shall conduct a study to determine the appropriate velocity and pressure at each 1) the opening of the Blowing Chamber adjacent to the spinners and 2) at the Blowing Chamber where shot falls out, needed to demonstrate 100% capture efficiency. The study shall consider American Conference of Governmental Industrial Hygienists recommendations and EPA Method 204 requirements. A copy of the study, engineering calculations, and results shall be submitted in an amendment application not more than 180 days after the startup of commercial operation.

5. Daily monitoring of the Blowing Chamber exhaust fan amperage to ensure the amperage falls in the range that was determined to result in 100% capture (as determined by a study conducted within 180 days of start of commercial operation and documented in the SOP required by Permit Condition 22.K.2)

6. Weekly monitoring of the air velocity at the openings in the Curing Oven for the uncured pack charge and cured pack to ensure that flow is going into the oven and that the velocity is at or above the minimum velocity determined to be needed to achieve 100% capture (as determined by a study conducted within 180 days of start of commercial operation.

7. Daily monitoring of the Curing Oven exhaust fan amperage to ensure the amperage falls in the range that was determined to result in 100% capture (as determined by a study conducted within 180 days of start of commercial operation and documented in the SOP required by Permit Condition 22.K.3).

8. Weekly monitoring of the velocity at two locations above the cured pack in the Cooling Section to ensure that the flow is downward and that the velocity is at or above the minimum velocity determined to be needed to achieve 100% capture (as determined by a study conducted within 180 days of start of commercial operation).

9. Daily monitoring of the Cooling Section exhaust fan amperage to ensure the amperage falls in the range that was determined to result in 100% capture (as determined by a study conducted within 180 days of start of commercial operation and documented in the SOP required by Permit Condition 22.K.4).

3. CUPOLA (EU-05A)

3.1. PROCESS DESCRIPTION

The first step in the mineral wool making process is the melting of raw materials in the Cupola. Raw materials may include various slags such as those from iron/steel and copper smelting operations, trap rock, limestone, feldspar, dolomite, and briquettes. Fuels include coke and anodes. Raw materials and fuel are loaded into the Cupola in alternating layers. The fuel is ignited and burned using preheated combustion air, also known as blast air, and an oxygen boost. The raw materials are heated to a molten state before being directed to a set of rotating wheels which attenuate the melt into fibers. The formed fibers are directed to the Blowing Chamber.

The exhaust from the Cupola is routed first to a cyclone and then to a Dry Sorbent Injection (DSI) system that removes SO_2 and other acid gases. Following the DSI system, the exhaust is routed through a Thermal Oxidizer (TO) to control CO, VOC, and organic condensable PM emissions and then routed to a heat exchanger to simultaneously cool the flue gas and pre-heat heat the incoming combustion air. After the heat exchanger, the exhaust is treated in a second DSI system to remove additional SO_2 and other acid gases. Finally, the Cupola exhaust gas is routed to a baghouse for control of filterable particulate matter of various sizes. A block flow diagram showing the Cupola and the air pollution control devices is included in Appendix A of this document.

OCIS will produce a variety of mineral wool products using a single production line that begins with the Cupola. The production of each product is referred to as a product campaign. A product campaign typically consists of a 3 to 14 day continuous run. At the end of each product campaign, OCIS will shut down the Cupola for cleaning, inspection, and maintenance before restarting it on another product campaign. A Cupola shutdown will take approximately [redacted] hours. During the shutdown process, the Cupola melter will initially stay on and the Cupola will be "burned down". This means that the addition of raw materials will be tapered off, but the Cupola will still be melting the top of the Cupola charge so that the charge goes down (i.e. it "burns down"). Eventually the melting will stop, the Cupola will sit idle to cool off, and finally the shutter style doors on the bottom of the cupola will open and any residual material will fall out of the Cupola. Following the shutdown of the Cupola, the Cupola will be cleaned, inspected, and maintained, as needed. OCIS has estimated they will have up to [redacted] shutdowns in a year. Assuming [redacted] hours per shutdown, this is a total of [redacted] hours.

The process of restarting the Cupola after a shutdown involves burning natural gas in a startup burner to preheat the Cupola fuel to its ignition temperature. The preheat process can take up to [redacted] hours. Once the Cupola fuel is ignited, the Cupola is considered to be in "startup mode"[2]. During startup mode, the raw materials will be melted. It takes about [redacted] hours from the time the fuel is ignited until the time the Cupola starts producing melt.
Startup ends when melt is produced. OCIS has estimated they will have up to [redacted] startups in a year. Assuming [redacted] hours per startup, this is a total of [redacted] hours in startup.

OCIS is permitted to operate the Cupola for up to [redacted] hours per rolling 12 months, inclusive of startups and shutdowns. If OCIS operates the plant for its maximum number of hours ([redacted]) and has the maximum anticipated startups and shutdown hours (startup = [redacted] hours, shutdown = [redacted] hours, total = [redacted] hours), the startup and shutdown hours will make up about [redacted]% of the total operating time for the Cupola.

[2] 40 CFR 63.1197(c) defines startup as "*Startup begins when fuels are ignited in the cupola. Startup ends when the cupola produces molten material*".

3.2. TEMPORARY BACT LIMITS

Pollutants with temporary BACT limits that are required to be addressed by the BACT study for the Cupola include PM, PM_{10}, $PM_{2.5}$, NO_x, SO_2, CO, VOC, SAM, RSC (consisting of COS, H_2S, and CS_2), and CO_{2e} (consisting of CO_2, CH_4, and N_2O). Table 3-1 summarizes the temporary BACT limits for the Cupola. Note that all of the limits are inclusive of emissions from startup and shutdown, unless noted otherwise.

Table 3-1. Temporary BACT Limits for the Cupola

Emission Unit	Emission Unit Description	Pollutant	Limit	Limit Units	Limit Averaging Period
EU-05a	Cupola	PM (filterable only)	confidential	lb/ton melt	30-day rolling average
		PM_{10} (total)		lb/ton melt	24-hour
				lb/ton melt	30-day rolling average
		$PM_{2.5}$ (total)		lb/ton melt	24-hour rolling average
				lb/ton melt	30-day rolling average
		SO_2		lb/ton melt	1-hour average
				lb/ton melt	30-day rolling average
		NO_x		lb/ton melt	1-hour average
				lb/ton melt	30-day rolling average
		VOC		lb/ton melt	3-hour average
				lb/ton melt	30-day rolling average
		CO		lb/ton melt	1-hour average
				lb/ton melt	30-day rolling average
		RSC (COS, H_2S, and CS_2)		lb/ton melt	30-day rolling average
		SAM		lb/ton melt	30-day rolling average
		CO_{2e} (CO_2, CH_4, and N_2O)		lb /ton melt	30-day rolling average

*Excludes startup and shutdown.

3.3. EMISSIONS DATA COLLECTION

3.3.1. CEMS and Exhaust Flow Meter Data

Throughout the one-year duration of the BACT study, OCIS will utilize CEMS to monitor the concentrations of filterable PM, NO_x, SO_2, CO, and CO_2 from the Cupola. The CEMS will continuously measure the pollutant concentrations during all modes of operation (normal, startup, and shutdown) for all product campaigns.

Prior to initiating the BACT study, OC will conduct initial certification testing on the CEMS in accordance with the applicable performance specifications in 40 CFR Part 60, Appendix B. Throughout the study, OC will perform QAQC activities on the CEMS in accordance with the procedures outlines in 40 CFR Part 60, Appendix F.

In addition to a CEMS for measuring pollutant concentrations, OCIS will also continuously measure the exhaust flow rate of the Cupola using an exhaust flow meter. OCIS will use the exhaust flow rates measured by the exhaust flow meter to convert the CEMS pollutant concentration measurements to pollutant mass flow rates. The CEMS data handling software will be capable of determining the pollutant mass emissions rates on a 1-hour basis or other averaging periods, as needed.

3.3.2. Initial Performance Testing

OCIS will conduct initial performance testing (IPT) within 180 days of starting commercial operations to determine the initial performance of the Cupola. The IPT will include the following fourteen pollutants, some of which are also being continuously measured by a CEMS:

- Filterable PM (Used to evaluate BACT for PM)
- Filterable PM_{10} (Used to evaluate BACT for total PM_{10})
- Filterable $PM_{2.5}$ (Used to evaluate BACT for total $PM_{2.5}$)
- Condensable PM (Used to evaluate BACT for total PM_{10} and total $PM_{2.5}$)
- SO_2
- NO_x
- VOC
- CO
- COS (Used to evaluate BACT RSCs)
- H_2S (Used to evaluate BACT for RSCs)
- CS_2 (Used to evaluate BACT for RSCs)
- Sulfuric Acid
- CO_2 (Used to evaluate BACT for GHGs as $CO_{2,e}$)
- CH_4 (Used to evaluate BACT for GHGs as $CO_{2,e}$)
- N_2O (Used to evaluate BACT for GHGs as $CO_{2,e}$)

While the PSD permit does not explicitly require the initial performance testing to be part of the BACT study, the PSD permit allows the initial test for a given pollutant to satisfy one of the three tests for this pollutant that is required for the BACT study. Thus, OCIS anticipates that the IPT will serve as one of the three tests for the BACT study.

3.3.3. Other Stack Testing

OCIS will complete three rounds of stack testing in the first 12 months following commercial operation on any product. The three rounds of stack testing will consist of the same stack tests that are conducted as part of the initial performance testing, except that no testing will be done for pollutants that have CEMS so the number of pollutants tested will drop from fourteen to nine.

3.4. OPERATIONS DATA COLLECTION

The PSD permit requires OCIS to monitor a number of operating parameters, including process parameters and parameters related to the performance of various pollution control devices that are believed to have an impact on the Cupola emissions. Thus, OCIS will monitor the following during the BACT study:

- Charge rate of each raw material in tons per hour (Permit Condition 1.C.3, 22.I.1.a, and 25.B.1)
- Charge rate of each fuel in tons per hour (Permit Condition 1.A.1, 22.I.1.b, and 25.B.2)
- Fiber rate and finished product rate in tons per hour (Permit Condition 25.B.5)
- Sulfur content of each raw material in weight % (Permit Condition 22.I.1.c)
- Sulfur content of each fuel in weight % (Permit Condition 1.A.4 and 22.I.1.d)
- Pressure drop across the Cupola cyclone (Permit Condition 1.E.3.b and 22.K.1)
- Pressure drop across the Cupola baghouse (Permit Condition 22.K.1)
- Operating temperature of the thermal oxidizer (Permit Condition 1.E.4.b and 22.K.1)
- Sorbent injection type (lime, sodium bicarbonate, etc.) and usage rate in DSI system location #1, the location associated with the thermal oxidizer (Permit Condition 1.E.5.e and 22.K.1)

- Sorbent injection type and usage rate in DSI system location #2, the location following the heat recovery system for the thermal oxidizer and before the baghouse (Permit Condition 1.E.5.e and 22.K.1)
- Product Name and target LOI ((Permit Condition 25.B.3)

The emission rates and operating parameters associated with the initial performance testing will be used to develop an SOP for the Cupola. The operating ranges that are established in the SOP will be re-evaluated as part of the evaluation of the temporary BACT limits described in the last section of this document.

3.5. OVERVIEW OF POLLUTANTS

3.5.1. PM, PM_{10}, and $PM_{2.5}$

As shown in Table 3-1, the PSD permit includes a limit on the amount of filterable PM, total PM_{10}, and total $PM_{2.5}$ from the Cupola, where total PM_{10} is the sum of the filterable PM_{10} and condensable PM, and total $PM_{2.5}$ is the sum of filterable $PM_{2.5}$ and condensable PM.

3.5.1.1. Filterable PM, PM_{10}, and $PM_{2.5}$

Emissions of filterable PM, PM_{10}, and $PM_{2.5}$ from the Cupola result from the loading of raw materials and solid fuel, the combustion of solid fuel and natural gas, and the melting of the raw materials. The two DSI systems are also a source of filterable PM, PM_{10}, and $PM_{2.5}$, as the sorbent reacts with sulfur compounds and forms solid particles. A much smaller source of filterable PM, PM_{10}, and $PM_{2.5}$ is the combustion of natural gas in the thermal oxidizer.

Both the cyclone that precedes the thermal oxidizer and the baghouse that is the last control before the Cupola exhaust is routed to the stack reduce the filterable PM, PM_{10}, and $PM_{2.5}$ coming from the Cupola. OCIS will be monitoring the pressure drop across the cyclone and the baghouse as indicators of the performance of the cyclone and baghouse.

As stated previously, OCIS is using a CEMS to continuously measure emissions of filterable PM from the Cupola. OCIS is also conducting an initial performance test for PM. OCIS is using an initial performance test plus three other stack tests to measure filterable PM_{10} and filterable $PM_{2.5}$. At the conclusion of the BACT study, OCIS will have hourly emissions data for filterable PM for each hour of the study and will have twelve hours of emissions data for filterable PM_{10} and filterable $PM_{2.5}$ (one initial performance test consisting of three one hour runs and three other stack tests consisting of three one hour runs).

3.5.1.2. Condensable PM

Emissions of condensable PM from the Cupola result from the combustion of solid fuel and natural gas and the melting of the raw materials. The specific condensable PM compounds that are formed are unknown, but are expected to consist of both organic and inorganic compounds. Organic condensable PM from the Cupola is expected to be reduced by the thermal oxidizer. Inorganic condensable PM from the Cupola is expected to be reduced by the two DSI systems. At the conclusion of the BACT study, OCIS will have twelve hours of emissions data for condensable PM (one initial performance test consisting of three one hour runs and three other stack tests consisting of three one hour runs).

3.5.2. SO_2 and SAM

Emissions of SO_2 and H_2SO_4 from the Cupola primarily result from the oxidation of sulfur contained in the raw materials and solid fuels, including the sulfur in the shot and Portland cement that make up the briquettes, and the sulfur in the recycled mineral wool fibers. A minor source of SO_2 is the oxidation of any sulfur in the natural gas that is combusted in the startup burner or the thermal oxidizer.

Two DSI systems, one located between the thermal oxidizer and heat exchanger and one located after the heat exchanger but before the baghouse, reduce the acid gases coming from the Cupola, such as SO_2 and H_2SO_4. OCIS will be monitoring the sorbent injection rates for both DSI locations as indicators of the performance of the DSI.

As stated previously, OCIS is using a CEMS to continuously measure emissions of SO_2 from the Cupola. OCIS is also conducting an initial performance test for SO_2. At the conclusion of the BACT study, OCIS will have hourly emissions data for SO_2 for each hour of the study and will have three hours of additional emissions data for SO_2 (one initial performance test consisting of three one hour runs).

For SAM, OCIS is conducting an initial performance test for each pollutant plus three other stack tests. At the conclusion of the BACT study, OCIS will have twelve hours of emissions data for SAM (one initial performance test consisting of three one hour runs and three other stack tests consisting of three one hour runs).

3.5.3. NO_x

Emissions of NO_x from the Cupola are primarily generated by the oxidation of the nitrogen in the combustion air used in the Cupola and the Cupola startup burner. As stated previously, OCIS is using a CEMS to continuously measure emissions of NO_x from the Cupola. OCIS is also conducting an initial performance test for NO_x. At the conclusion of the BACT study, OCIS will have hourly emissions data for NO_x for each hour of the study and will have three hours of additional emissions data for NO_x (one initial performance test consisting of three one hour runs).

3.5.4. VOC

Emissions of VOC are produced from the combustion of solid fuel in the Cupola, combustion of natural gas in the thermal oxidizer, and from the release of organic compounds that are tramp contaminants in the Cupola raw materials and fuels. A thermal oxidizer reduces the emissions of VOC. OCIS will be monitoring the operating temperature of the thermal oxidizer as an indicator of performance for the oxidizer. At the conclusion of the BACT study, OCIS will have twelve hours of emissions data for VOC (one initial performance test consisting of three one hour runs and three other stack tests consisting of three one hour runs).

3.5.5. CO

Emissions of CO are produced from the incomplete combustion of solid fuel in the Cupola and the incomplete combustion of natural gas in the startup burner. A thermal oxidizer reduces the emissions of CO. OCIS will be monitoring the operating temperature of the thermal oxidizer as an indicator of performance for the oxidizer. As stated previously, OCIS is using a CEMS to continuously measure emissions of CO from the Cupola. OCIS is also conducting an initial performance test for CO. At the conclusion of the BACT study, OCIS will have hourly emissions data for CO for each hour of the study and will have three hours of additional emissions data for CO (one initial performance test consisting of three one hour runs).

3.5.6. RSCs (COS, H_2S, CS_2)

COS is an organic RSC that is present in the exhaust from the Cupola. H_2S is an inorganic RSC that may present in the exhaust from Cupolas. There are no controls specifically designed to reduce RSCs, but the thermal oxidizer will be effective at reducing COS and the DSI systems could be effective at reducing the H_2S.

For COS, H_2S, and CS_2, OCIS is conducting an initial performance test for each pollutant plus three other stack tests. At the conclusion of the BACT study, OCIS will have twelve hours of emissions data for COS, H_2S, and CS_2 (one initial performance test consisting of three one hour runs and three other stack tests consisting of three one hour runs).

3.5.7. GHG (CO_2, CH_4, and N_2O)

Emissions of CO_2 are produced from the combustion of solid fuel in the Cupola and the combustion of natural gas in the startup burner. Additional CO_2 is produced in the Cupola when a product recipe includes dolomite or limestone [(dolomite releases 44.81% by weight as CO_2 and limestone releases 43.97% by weight as CO_2). As stated previously, OCIS is using a CEMS to continuously measure emissions of CO_2 from the Cupola. OCIS is also conducting an initial performance test for CO_2 under two "operating conditions", one condition where there are no carbonates (dolomite and limestone) in the product recipe and one condition where there is a maximum amount of carbonates in the product recipe.

Very minor amounts of CH_4 and N_2O are produced from the combustion of solid fuel in the Cupola and the combustion of natural gas in the startup burner.

At the conclusion of the BACT study, OCIS will have hourly emissions data for CO_2 for each hour of the study and will have six hours of additional emissions data for CO_2 (an initial performance test consisting of three one hour runs for both a recipe with no carbonates and a recipe with the maximum carbonates). OCIS will also have twelve hours of emissions data for CH_4 and N_2O (one initial performance test consisting of three one hour runs and three other stack tests consisting of three one hour runs).

4. BLOWING CHAMBER (EU-05B)

4.1. PROCESS DESCRIPTION

Following the spinners that attenuate the melt into fibers, the fibers are directed to the Blowing Chamber, where binder is sprayed onto the fibers. The binder is either a traditional phenol/formaldehyde (PF) binder or an alternative binder. The binder-coated fibers are collected on a pack former which forms the fibers into a thin pack or mat. The mat is then peeled away from the pack former screen and layered by a Pendulum into a thicker, uncured pack that is then conveyed to the CuringOven.

Loss on ignition (LOI) is a production parameter available to mineral wool manufacturers that determines the amount of binder present in the finished cured product. LOI, which is represented as a percentage, is derived by dividing the weight of cured binder in the finished product by the weight of the finished product. The greater the LOI, the greater the resulting binder-related emissions are from a given process. OCIS currently anticipates making products that have between 3 and 4% LOI.

The exhaust from the Blowing Chamber is routed through a stone wool filter to control filterable PM, PM_{10}, and $PM_{2.5}$. A block flow diagram showing the Blowing Chamber and stone wool filter is included in Appendix A of this document.

4.2. TEMPORARY BACT LIMITS

Pollutants with temporary BACT limits that are required to be addressed by the BACT study for the Blowing Chamber include PM, PM_{10}, $PM_{2.5}$, NO_x, SO_2, CO, VOC, SAM, RSC (consisting of COS, H_2S, and CS_2), and CO_{2e} (consisting of CO_2, CH_4, and N_2O). Table 4-1 summarizes the temporary BACT limits for the Blowing Chamber. Note that all of the limits are inclusive of emissions from startup and shutdown, as applicable.

Table 4-1. Temporary BACT Limits for the Blowing Chamber

Emission Unit	Emission Unit Description	Pollutant	Limit	Limit Units	Limit Averaging Period
EU-05b	Blowing Chamber Traditional Binder (3 to 3.5% LOI product)	PM (filterable only)	confidential	lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S, and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour
	Blowing Chamber Traditional Binder (3.5 to 4% LOI product)	PM		lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S, and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour
	Blowing Chamber Alt Binder	PM		lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S, and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour

As shown in Table 4-1, the following pollutants have different limits depending on the product LOI: filterable PM, total PM_{10}, total $PM_{2.5}$, and VOC. Additional considerations for LOI with respect to the BACT study are discussed below.

4.3. EMISSIONS DATA COLLECTION

4.3.1. Initial Performance Testing

OCIS will conduct initial performance testing (IPT) within 180 days of starting commercial operation of products in the following three categories to determine the initial performance of the Blowing Chamber:

1. Products made with traditional binder and 3% LOI range,

2. Products made with traditional binder and 4% LOI range, and

3. Products made with alternative binder.

The testing will be completed on the common stack, where the exhaust from both the Cupola and the Blowing Chamber is released to the atmosphere, at the same time that OCIS is conducting stack testing of the Cupola. OCIS will determine the emission rate of each pollutant from the Blowing Chamber by subtracting the emission rate for the Cupola from the emission rate for the common stack. The testing will include the same fourteen pollutants that OCIS is testing for the Cupola.

While the PSD permit does not explicitly require the initial performance testing to be part of the BACT study, the PSD permit allows the initial test for a given pollutant to satisfy one of the three tests for this pollutant that is required for the BACT study. Thus, OCIS anticipates that the IPT will serve as one of the three tests for the BACT study.

4.3.2. Other Stack Testing

OCIS will complete three rounds of stack testing for three product categories: products made with traditional binder in the 3% LOI range, products made with traditional binder in the 4% LOI range, and products made with alternative binder. The testing of each the product categories will be completed prior to OCIS accruing 12 months of operation on a product in a given category, but not to exceed 24 total calendar months. The three rounds of stack testing will consist of the same stack tests that are conducted as part of the initial performance testing.

Similar to the initial performance testing, OCIS will conduct testing of the common stack at the same time that OCIS is conducting testing of the Cupola. OCIS will determine the emission rate of each pollutant from the Blowing Chamber by subtracting the emission rate for the Cupola from the emission rate for the common stack.

4.4. OPERATIONS DATA COLLECTION

The PSD permit requires OCIS to monitor a number of operating parameters during the stack testing described above, including process parameters and parameters related to the performance of various pollution control devices that are believed to have an impact on the Blowing Chamber emissions. Thus, OCIS will monitor the following during the stack testing:

- Charge rate of each raw material in tons per hour (Permit Condition 1.C.3 and 22.I.2.a)

- Charge rate of each fuel in tons per hour (Permit Condition 1.A.1 and 22.I.2.b)
- Finished product rate in tons per hour (Permit Condition 25.B.5)
- Sulfur content of each raw material in weight % (Permit Condition 22.I.2.c)
- Sulfur content of each fuel in weight % (Permit Condition 1.A.4 and 22.I.2.d)
- Unbonded fiber rate in tons per hour (Permit Condition 22.I.2.e)
- Usage rate of each binder raw material in tons per hour (Permit Condition 3.B and 22.I.2.f)
- Binder solids rate (Permit Condition 3.B)
- Product LOI (Permit Condition 3.B and 22.I.2.g)
- Finished product in tons per hour and name (Permit Condition 22.I.2.h)
- Pressure drop across the Blowing Chamber stone wool filter (Permit Condition 3.C.3.c and Permit Condition 22.K.2)
- Replacement schedule for Blowing Chamber stone wool filter (Permit Condition 22.K.2)
- Amperage of the Blowing Chamber exhaust fan (Permit Condition 20.B.4)

The emission rates and operating parameters associated with the initial performance testing will be used to develop an SOP for the Cupola. The operating ranges that are established in the SOP will be re-evaluated as part of the evaluation of the temporary BACT limits described in the last section of this document.

4.5. OVERVIEW OF POLLUTANTS

4.5.1. PM, PM_{10}, and $PM_{2.5}$

4.5.1.1. Filterable PM, PM_{10}, and $PM_{2.5}$

Emissions of filterable PM, PM_{10}, and $PM_{2.5}$ from the Blowing Chamber result from small mineral fibers, mineral dust, and over-sprayed binder liquid aerosol droplets.

A stone wool filter reduces the filterable PM, PM_{10}, and $PM_{2.5}$ coming from the Blowing Chamber. OC will be monitoring the pressure drop across the filter and also monitoring the replacement frequency of the filter as indicators of the performance of the filter.

4.5.1.2. Condensable PM

Emissions of condensable PM from the Blowing Chamber result from binder volatiles that condense to liquid aerosols. The specific condensable PM compounds that are formed are unknown, but are expected to consist of both organic and inorganic compounds.

4.5.2. SO_2 and SAM

Emissions of SO_2 from the Blowing Chamber includes SO_2 that is generated in the Cupola but that drifts into the Blowing Chamber from the melt leaving the Cupola and entering the spinners. The temperature of the Blowing Chamber is likely not high enough to promote oxidation of any appreciable amount of the very small amount of sulfur-bearing compounds in the binder.

OCIS did not represent any SAM emissions from the Blowing Chamber in the permit application. There is no temporary BACT limit for SAM. The PSD permit requires testing for SAM to verify the presence of the pollutant and whether the pollutant should subject to BACT.

4.5.3. NO_x

Emissions of NO_x from the Blowing Chamber include NO_x produced from the oxidation of a portion of the nitrogen-bearing compounds in the binder and also NO_x that was generated in the Cupola but that drifts into the Blowing Chamber from the melt leaving the Cupola and entering the spinners. OCIS believes the NO_x drift from the Cupola is likely the dominant source of NO_x.

4.5.4. VOC

Emissions of VOC from the Blowing Chamber are produced from the volatilization of the binder that is sprayed onto the mineral wool fibers to bind the fibers. Some VOC could also be VOC that was generated in the Cupola but that drifts into the Blowing Chamber from the melt leaving the Cupola and entering the spinners.

4.5.5. CO

Emissions of CO from the Blowing Chamber are likely CO that was generated in the Cupola but that drifts into the Blowing Chamber from the melt leaving the Cupola and entering the spinners. The temperature of the Blowing Chamber is likely not high enough to promote incomplete oxidation of any appreciable amount of the organic compounds in the binder.

4.5.6. RSC (COS, H_2S, and CS_2)

COS is an organic RSC that is present in the exhaust from the Cupola. It is possible some COS may drift into the Blowing Chamber from the melt leaving the Cupola and entering the spinners. H_2S may be present in the Cupola. If H_2S is present in the Cupola, it may also drift into the Blowing Chamber.

4.5.7. GHG (CO_2, CH_4, and N_2O)

Emissions of GHGs from the Blowing Chamber are likely GHGs that were generated in the Cupola but that drift into the Blowing Chamber from the melt leaving the Cupola and entering the spinners.

5. CURING OVEN (EU-07A)

5.1. PROCESS DESCRIPTION

The mats coming from the pendulum that follows the Blowing Chamber are conveyed to a natural gas-fired Curing Oven, where any water in the mats is evaporated and the binder is cured.

The exhaust from the Curing Oven is first routed through a stone wool filter to reduce filterable PM, PM_{10}, and $PM_{2.5}$ and is then routed to an RTO to reduce CO, VOC, and organic condensable PM. A block flow diagram showing the Curing Oven and the air pollution control devices is included in Appendix A of this document.

5.2. TEMPORARY BACT LIMITS

Pollutants with temporary BACT limits that are required to be addressed by the BACT study for the Curing Oven include PM, PM_{10}, $PM_{2.5}$, NO_x, SO_2, CO, VOC, SAM, RSC (consisting of COS, H_2S, and CS_2), and CO_{2e} (consisting of CO_2, CH_4, and N_2O). Table 5-1 summarizes the temporary BACT limits for the Blowing Chamber. Note that all of the limits are inclusive of emissions from startup and shutdown, as applicable.

Table 5-1. Temporary BACT Limits for the Curing Oven

Emission Unit	Emission Unit Description	Pollutant	Limit	Limit Units	Limit Averaging Period
EU-07a	Curing Oven Traditional Binder (3 to 3.5% LOI product)	PM (filterable only)	confidential	lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour
	Curing Oven Traditional Binder (3.5 to 4% LOI product)	PM		lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour
	Curing Oven Alt Binder	PM		lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour

5.3. EMISSIONS DATA COLLECTION

5.3.1. Initial Performance Testing

OCIS will conduct initial performance testing (IPT) within 180 days of starting commercial operations of products in the following three categories to determine the initial performance of the Curing Oven:

1. Products made with traditional binder and 3% LOI range,
2. Products made with traditional binder and 4% LOI range, and
3. Products made with alternative binder.

The testing will include the same fourteen pollutants that OC is testing for the Cupola.

While the PSD permit does not explicitly require the initial performance testing to be part of the BACT study, the PSD permit allows the initial test for a given pollutant to satisfy one of the three tests for this pollutant that is required for the BACT study. Thus, OCIS anticipates that the IPT will serve as one of the three tests for the BACT study.

5.3.2. Other Stack Testing

OCIS will complete three rounds of stack testing for three product categories: products made with traditional binder in the 3% LOI range, products made with traditional binder in the 4% LOI range, and products made with alternative binder. The testing of each the product categories will be completed prior to OCIS accruing 12 months of operation on a product in a given category, but not to exceed 24 total calendar months. The three rounds of stack testing will consist of the same stack tests that are conducted as part of the initial performance testing.

5.4. OPERATIONS DATA COLLECTION

The PSD permit requires OCIS to monitor a number of operating parameters during the stack testing described above, including process parameters and parameters related to the performance of various pollution control devices that are believed to have an impact on the Curing Oven emissions. Thus, OCIS will monitor the following during the BACT study:

- Charge rate of each raw material in tons per hour (Permit Condition 1.C.3 and 22.I.3.a)
- Unbonded fiber rate in tons per hour (Permit Condition 22.I.3.b)
- Usage rate of each binder raw material in tons per hour (Permit Condition 3.B and 22.I.3.c)
- Binder solids rate (Permit Condition 3.B
- LOI (Permit Condition 3.B and 22.I.3.d)
- Finished product in tons per hour and name (Permit Condition 22.I.3.e)
- Operating temperature of the RTO (Permit Condition 5.B.6.b and 22.K.3)
- Replacement schedule for the RTO bed (Permit Condition 22.K.3)
- Pressure drop across the Curing Oven stone wool filter (Permit Condition 5.B.5.c and Permit Condition 22.K.3)
- Replacement schedule for Curing Oven stone wool filter (Permit Condition 22.K.3)
- Amperage of the Curing Oven exhaust fan (Permit Condition 20.C.3)

The emission rates and operating parameters associated with the initial performance testing will be used to develop an SOP for the Cupola. The operating ranges that are established in the SOP will be re-evaluated as part of the evaluation of the temporary BACT limits described in the last section of this document.

5.5. OVERVIEW OF POLLUTANTS

5.5.1. PM, PM_{10}, and $PM_{2.5}$

5.5.1.1. Filterable PM, PM_{10}, and $PM_{2.5}$

Emissions of filterable PM, PM_{10}, and $PM_{2.5}$ from the Curing Oven result from the combustion of natural gas in the oven zone burner and the RTO and the release of small mineral fibers, mineral dust, and organic particles.

A stone wool filter reduces the filterable PM, PM_{10}, and $PM_{2.5}$ coming from the Blowing Chamber. OC will be monitoring the pressure drop across the filter and also monitoring the replacement frequency of the filter as indicators of the performance of the filter.

5.5.1.2. Condensable PM

Emissions of condensable PM from the Curing Oven result from binder volatiles that condense to liquid aerosols.

5.5.2. SO_2 and SAM

Emissions of SO_2 from the Curing Oven result from the combustion of natural gas in the oven zone burner and the RTO and the thermal decomposition of the binder's ammonium sulphate.

OCIS did not represent any emissions of SAM from the Curing Oven in the permit application. There are no temporary BACT limits that consider this pollutant. The permit requires testing for SAM to verify the presence of the pollutant and whether the pollutant should subject to BACT.

5.5.3. NO_x

Emissions of NO_x from the Curing Oven result from the combustion of natural gas in the oven zone burner and the RTO and the oxidation of some of the ammonia that is generated in the oven chamber from the binder's urea and the thermal decomposition of the binder's ammonium sulphate.

5.5.4. VOC

Emissions of VOC from the Curing Oven are produced from the combustion of natural gas in the oven zone burner and the RTO and also from the release of binder volatiles. A thermal oxidizer reduces the emissions of VOC. OCIS will be monitoring the operating temperature of the thermal oxidizer bed along with the replacement schedule for the bed as indicators of performance for the oxidizer.

5.5.5. CO

Emissions of CO from the Curing Oven are produced from the incomplete combustion of natural gas in the oven zone burner and the RTO and the incomplete combustion of organic volatiles in the oven and thermal oxidizer burners. A thermal oxidizer reduces the emissions of CO. OCIS will be monitoring the operating temperature of the thermal oxidizer as an indicator of performance for the oxidizer.

5.5.6. RSCs (COS, H_2S, and CS_2)

OCIS did not represent any emissions of COS, H_2S, or CS_2 from the Curing Oven in the permit application, but the permit includes a temporary BACT limit for RSC. Further, the permit requires testing for COS, H_2S, and CS_2 to verify whether there are detectable levels of these pollutants.

5.5.7. GHG (CO_2, CH_4, and N_2O)

Emissions of CO_2 from the Curing Oven are produced from the combustion of natural gas in the oven zone burner and the RTO and also from the oxidation of binder-related organic compounds in the RTO.

6. COOLING SECTION (EU-07B)

6.1. PROCESS DESCRIPTION

The mats coming from the Curing Oven are conveyed through the Cooling Section. In the Cooling Section, air is pulled through the mat to cool the mat to room temperature prior to processing and packing.

The exhaust from the Cooling Section is routed to a stone wool filter to reduce filterable PM, PM_{10}, and $PM_{2.5}$. A block flow diagram showing the Cooling Section and the stone wool filter is included in Appendix A of this document.

6.2. TEMPORARY BACT LIMITS

Pollutants with temporary BACT limits that are required to be addressed by the BACT study for the Cooling Section include PM, PM_{10}, $PM_{2.5}$, NO_x, SO_2, CO, VOC, SAM, RSC (consisting of COS, H_2S, and CS_2), and CO_{2e} (consisting of CO_2, CH_4, and N_2O). Table 6-1 summarizes the temporary BACT limits for the Blowing Chamber. Note that all of the limits are inclusive of emissions from startup and shutdown, as applicable.

Table 6-1. Temporary BACT Limits for the Cooling Section

Emission Unit	Emission Unit Description	Pollutant	Limit	Limit Units	Limit Averaging Period
EU-07b	Cooling Section Traditional Binder (3 to 3.5% LOI product)	PM	confidential	lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S, and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour
	Cooling Section Traditional Binder (3.5 to 4% LOI product)	PM		lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S, and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour
	Cooling Section Alt Binder	PM		lb/ton melt	3-hour
		PM_{10} (total)		lb/ton melt	3-hour
		$PM_{2.5}$ (total)		lb/ton melt	3-hour
		SO_2		lb/ton melt	3-hour
		NO_x		lb/ton melt	3-hour
		VOC		lb/ton melt	3-hour
		CO		lb/ton melt	3-hour
		RSC (COS, H_2S, and CS_2)		lb/ton melt	3-hour
		CO_{2e} (CO_2, CH_4, and N_2O)		lb/ton melt	3-hour

6.3. EMISSIONS DATA COLLECTION

6.3.1. Initial Performance Testing

OCIS will conduct initial performance testing (IPT) within 180 days of starting commercial operations of products in the following three categories to determine the initial performance of the Cooling Section:

1. Products made with traditional binder and 3% LOI range,
2. Products made with traditional binder and 4% LOI range, and
3. Products made with alternative binder.

The testing will include the same fourteen pollutants that OC is testing for the Cupola.

While the PSD permit does not explicitly require the initial performance testing to be part of the BACT study, the PSD permit allows the initial test for a given pollutant to satisfy one of the three tests for this pollutant that is required for the BACT study. Thus, OCIS anticipates that the IPT will serve as one of the three tests for the BACT study.

6.3.2. Other Stack Testing

OCIS will complete three rounds of stack testing for three product categories: products made with traditional binder in the 3% LOI range, products made with traditional binder in the 4% LOI range, and products made with alternative binder. The testing of each the product categories will be completed prior to OCIS accruing 12 months of operation on a product in a given category, but not to exceed 24 total calendar months. The three rounds of stack testing will consist of the same stack tests that are conducted as part of the initial performance testing.

6.4. OPERATIONS DATA COLLECTION

The PSD permit requires OCIS to monitor a number of operating parameters during the stack testing described above, including process parameters and parameters related to the performance of various pollution control devices that are believed to have an impact on the Cooling Section emissions. Thus, OCIS will monitor the following during the BACT study:

- Charge rate of each raw material in tons per hour (Permit Condition 1.C.3 and 22.I.4.a)
- Unbonded fiber rate in tons per hour (Permit Condition 22.I.4.b)
- Usage rate of each binder raw material in tons per hour (Permit Condition 3.B and 22.I.4.c)
- Binder solids rate (Permit Condition 3.B)
- LOI (Permit Condition 3.B and 22.I.4.d)
- Finished product in tons per hour and name (Permit Condition 22.I.4.e)
- Pressure drop across the Cooling Section stone wool filter (Permit Condition 7.B.3.c and Permit Condition 22.K.4)
- Replacement schedule for Cooling Section stone wool filter (Permit Condition 22.K.4)
- Amperage of the Cooling Section exhaust fan (Permit Condition 20.D.3.)

The emission rates and operating parameters associated with the initial performance testing will be used to develop an SOP for the Cupola. The operating ranges that are established in the SOP will be re-evaluated as part of the evaluation of the temporary BACT limits described in the last section of this document.

6.5. OVERVIEW OF POLLUTANTS

6.5.1. PM, PM_{10}, and $PM_{2.5}$

6.5.1.1. Filterable PM, PM_{10}, and $PM_{2.5}$

Emissions of filterable PM, PM_{10}, and $PM_{2.5}$ from the Cooling Section include mineral fibers and dust, binder dust, and liquid aerosols of some binder ingredients that are stripped from the cured pack as it travels over the Cooling Section suction box.

6.5.1.2. Condensable PM

Emissions of condensable PM from the Cooling Section result from binder volatiles that condense to liquid aerosols.

6.5.2. SO_2 and SAM

Emissions of SO_2 from the Cooling Section primarily result from SO_2 that is stripped from the cured pack as it travels over the Cooling Section suction box. OCIS did not represent any emissions of SAM from the Curing Oven in the permit application. There are no temporary BACT limits that consider this pollutant. The permit requires testing for SAM to verify the presence of the pollutant and whether the pollutant should subject to BACT.

6.5.3. NO_x

Emissions of NO_x from the Cooling Section includes NO_x that is stripped from the cured pack as it travels over the Cooling Section suction box.

6.5.4. VOC

Emissions of VOC from the Cooling Section include binder volatiles that are stripped from the cured pack as it travels over the Cooling Section suction box. There also could be some VOC that did not volatilize in the Curing Oven but that will volatilize in the Cooling Section, since the front end of the Cooling Section is directly adjacent to the discharge end of the Curing Oven.

6.5.5. CO

Emissions of CO from the Cooling Section include CO that is stripped from the cured pack as it travels over the Cooling Section suction box.

6.5.6. RSCs (COS, H_2S, CS_2)

OCIS did not represent any emissions of H_2S from the Curing Oven in the permit application, but the permit includes a temporary BACT limit for RSC. Further, the permit requires testing for COS, H_2S,and CS_2 to verify whether there are detectable levels of these pollutants.

6.5.7. GHGs (CO_2, CH_4, and N_2O)

Emissions of GHGs from the Cooling Section include GHGs that are stripped from the cured pack as it travels over the Cooling Section suction box.

7. DATA ANALYSIS

The data collected during the BACT Study will be analyzed to evaluate all of the temporary BACT limits. The BACT Study will ultimately consist of 10 individual studies of the temporary BACT limits as follows:

1. Study for Cupola Temporary BACT limits
2. Study for Blowing Chamber Temporary BACT limits for traditional binder 3%LOI
3. Study for Blowing Chamber Temporary BACT limits for traditional binder 4%LOI
4. Study for Blowing Chamber Temporary BACT limits for alternative binder
5. Study for Curing Oven Temporary BACT limits for traditional binder 3% LOI
6. Study for Curing Oven Temporary BACT limits for traditional binder 4% LOI
7. Study for Curing Oven Temporary BACT limits for alternative binder
8. Study for Cooling Section Temporary BACT limits for traditional binder 3% LOI
9. Study for Cooling Section Temporary BACT limits for traditional binder 4% LOI
10. Study for Cooling Section Temporary BACT limits for alternative binder

All of the hourly emissions rates will be converted to lbs per ton of melt, but other units may be considered, as described later in this section. The data analysis will consist of visualizing the data for each pollutant on charts or graphs to identify trends in the operating parameters and emission rates and conducting statistical analyses to understand the variability in the data set.

7.1. INITIAL DATA REVIEW

As part of the initial data review, OCIS will review the emissions data and operating data to identify erroneous and/or outlier values. This review will primarily focus on the hourly CEMS data and operating parameters, since OCIS does not anticipate eliminating any of the stack test data. If erroneous or outlier values are identified, they will be removed from the data set with a note about why they were removed. Note, if a pollutant whose emissions are being measured by a CEMS is missing an hourly emission rate, OCIS does not intend to substitute any data to represent an hourly rate.

7.2. VISUALIZING THE DATA

OCIS will plot emission rates against various operating parameters. The operating data relied upon in the plots for the Blowing Chamber, Curing Oven, and Cooling Section will include data on the Cupola. This is due to the fact that some of the emissions that are generated in the Cupola may drift from the Cupola and be emitted downstream from the Cupola.

7.2.1. Data plots for pollutants with CEMS for Cupola

7.2.1.1. Normal Operations

OCIS will plot the filterable PM emission rates in lb/ton melt for each hour where melt is produced and a quality assured filterable PM emission rate is available from the CEMS. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material, charge rate of each fuel, cyclone pressure drop, baghouse pressure drop, amperage of Cupola exhaust fan, lime and sodium bicarbonate injection rates at each of two injection locations, and hours where the baghouse filters are replaced.

OCIS will plot the SO_2 emission rates in lb/ton melt for each hour where melt is produced and where a quality assured SO_2 emission rate is available from the CEMS. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material, total sulfur input to the kiln (based on the charge rate of each solid fuel and the corresponding sulfur content of each solid fuel and based on the charge rate of each raw material and the corresponding sulfur content of each raw material), and sorbent type and sorbent injection rate at both DSI locations.

OCIS will plot the NO_x emission rates in lb/ton melt for each hour where melt is produced and where a quality assured NO_x emission rate is available from the CEMS. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material, charge rate of each fuel, and natural gas usage in the startup burner.

OCIS will plot the CO emission rates in lb/ton melt for each hour where melt is produced and where a quality assured CO emission rate is available from the CEMS. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material, charge rate of each fuel, and temperature of the thermal oxidizer.

OCIS will plot the CO_2 emission rates in lb/ton melt for each hour where melt is produced and where a quality assured CO_2 emission rate is available from the CEMS. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material, charge rate of each fuel, natural gas usage in the startup burner, and temperature of the thermal oxidizer.

7.2.1.2. Startup/Shutdown

OCIS will plot the lb/hr emissions rates for all hours and indicate for each hour whether the Cupola was in startup, normal, or shutdown mode.

7.2.2. Data plots for pollutants without CEMS

Cupola

OCIS will plot the filterable PM_{10} and $PM_{2.5}$ emission rates and the condensable PM rate in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material, charge rate of each fuel, cyclone pressure drop, baghouse pressure drop, amperage of Cupola exhaust fan, lime and sodium bicarbonate injection rates at each of two injection locations, and hours where the baghouse filters are replaced.

OCIS will plot the COS and H_2S emission rates, if detected, in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), total sulfur input to the Cupola.

OCIS will plot the CO_2, CH_4 and N_2O emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to the Cupola and charge rate of each fuel to the Cupola (solid fuel and natural gas).

Blowing Chamber

OCIS will plot the filterable PM, PM_{10} and $PM_{2.5}$ emission rates and the condensable PM rate in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), unbonded fiber rate, binder usage rate, composition of the binder, product type, target product LOI, sulfur input to Cupola, sorbent injection in Cupola, pressure drop across the stone wool filter, and amperage of the Blowing Chamber exhaust fan.

OCIS will plot the SO_2 and SAM emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel (solid fuel and natural gas) to Cupola, sulfur input to the Cupola, sorbent injection in Cupola, binder usage rate, and composition of the binder.

OCIS will plot the NO_x emission rates in lb/ton melt for each for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to Cupola, charge rate of each fuel to Cupola (solid fuel and natural gas), binder usage rate, composition of the binder, product type, and target product LOI.

OCIS will plot the CO emission rates in lb/ton melt for each for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, and charge rate of each fuel to the Cupola (solid fuel and natural gas).

OCIS will plot the VOC emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), binder usage rate, composition of the binder, product type, target product LOI, and temperature of the thermal oxidizer.

OCIS will plot the COS and H_2S emission rates, if detected, in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), total sulfur input to the Cupola, sorbent type, sorbent injection rate, binder usage rate, composition of the binder, product type, target product LOI, and temperature of the thermal oxidizer.

OCIS will plot the CO_2, CH_4 and N_2O emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to the Cupola and charge rate of each fuel to the Cupola (solid fuel and natural gas).

Curing Oven

OCIS will plot the filterable PM, PM_{10} and $PM_{2.5}$ emission rates and the condensable PM rate in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), binder usage rate and type of binder (NAF binder vs alternative binder), composition of the binder, natural gas usage rate in Curing Oven and RTO, temperature of the RTO, product type, target product LOI, sulfur input to the Cupola, sorbent injection in the Cupola, pressure drop across the stone wool filter, and amperage of the Curing Oven exhaust fan.

OCIS will plot the SO_2 and SAM emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), natural gas usage rate in Curing Oven and RTO, sorbent injection in Cupola, binder usage rate, and composition of the binder.

OCIS will plot the NO_x emission rates in lb/ton melt for each for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel (solid fuel and natural gas), natural gas usage rate in Curing Oven and RTO, binder usage rate, composition of the binder, product type, and target product LOI.

OCIS will plot the CO emission rates in lb/ton melt for each for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas) natural gas usage rate in Curing Oven and RTO, binder usage rate, composition of the binder, product type, target product LOI, and temperature of RTO.

OCIS will plot the VOC emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas) natural gas usage rate in Curing Oven and RTO, binder usage rate and type of binder (NAF binder vs alternative binder), composition of the binder, product type, target product LOI, and temperature of RTO.

OCIS will plot the COS and H_2S emission rates, if detected, in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), total sulfur input to the Cupola, sorbent type, sorbent injection rate, binder usage rate and type of binder (NAF binder vs alternative binder), composition of the binder, product type, target product LOI, and temperature of the thermal oxidizer.

OCIS will plot the CO_2, CH_4 and N_2O emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material and charge rate of each fuel (solid fuel and natural gas).

<u>Cooling Section</u>
OCIS will plot the filterable PM, PM_{10} and $PM_{2.5}$ emission rates and the condensable PM rate in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), binder usage rate, composition of the binder, product type, target product LOI, sulfur input to the Cupola, sorbent injection in the Cupola, pressure drop across the stone wool filter, and amperage of the Cooling Section exhaust fan.

OCIS will plot the SO_2 and SAM emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), natural gas usage rate in Curing Oven and RTO, sorbent injection in Cupola, binder usage rate, and composition of the binder.

OCIS will plot the NO_x emission rates in lb/ton melt for each for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel (solid fuel and natural gas), binder usage rate, composition of the binder, product type, and target product LOI.

OCIS will plot the CO emission rates in lb/ton melt for each for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), binder usage rate, composition of the binder, product type, and target product LOI.

OCIS will plot the VOC emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: operating mode for the Cupola (startup, shutdown, or normal), charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), binder usage rate, composition of the binder, product type, and target product LOI.

OCIS will plot the COS and H_2S emission rates, if detected, in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material to the Cupola, charge rate of each fuel to the Cupola (solid fuel and natural gas), total sulfur input to the Cupola, sorbent type, sorbent injection rate, binder usage rate, composition of the binder, product type, and target product LOI.

OCIS will plot the CO_2, CH_4 and N_2O emission rates in lb/ton melt for each stack test run. OCIS will add the following operating data to the plot for each hour: charge rate of each raw material and charge rate of each fuel (solid fuel and natural gas).

7.3. STATISTICAL ANALYSIS

Prior to performing statistical analyses on the data sets, OCIS will characterize the data sets to lay the foundation for the statistical analyses. As there will be both large data sets (CEMS data) and small data sets (stack test data), the size of the data set will be taken into consideration as part of characterizing the data set. As an example, a data set could be characterized as having a "normal distribution" and as such may lend itself to statistics that are relevant for this type of data set.

OCIS will conduct statistical analyses to understand the variability in the emission rates for both pollutants with a CEMS and pollutants without a CEMS. The statistical analyses will calculate the 15 minute average emissions rates (and potentially other longer averaging periods), the standard deviations of the data sets, the 99% confidence intervals, the 95% confidence intervals, and other metrics as appropriate.

For pollutants with a CEMS, OCIS will compare the average hourly emission rates for startup (use of the startup burner) to the average hourly emission rates for normal operation.

7.4. EVALUATE THE TEMPORARY BACT LIMITS

OCIS will evaluate each of the temporary BACT limits. OCIS will consider, based on all of the data collected as part of the study and the corresponding data analysis described above, whether the temporary limits are BACT or whether other emissions rates, other forms of a limit, or other averaging periods should replace the temporary limits. OCIS will pay specific attention to the impacts of binder usage and LOI ratings on the form of the BACT limits. It is possible that OCIS may determine that other forms of emission limits may be more appropriate than lbs/ton melt for the Blowing Chamber, Curing Oven, and Cooling Section, such as lbs/ton binder usage, lbs per ton binder solids, etc.

OCIS will consider all aspects of the data analyses to determine an emission rate that meets the definition of BACT. BACT is defined in the PSD regulations as:

> *...an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case□by□case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and Technologies, including fuel cleaning or treatment or innovative fuel combustion Technologies for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61.*
>
> *If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment, work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology.*
> *Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.* [3]

In addition to the above definition of BACT, there are a number of EPA memorandums, white papers, etc, that contain interpretations of what constitutes BACT. OCIS will review past EPA precedent, guidance, and other determinations, as needed, in evaluating an emission rates that meets BACT.

OCIS will also evaluate the SOP that is prepared following the completion of the initial performance testing described in this document. OCIS will consider whether the operating ranges represented in the SOP are appropriate or whether the operating ranges should be revised.

7.5. BACT STUDY REPORT

OCIS will prepare a report for the MDNR that evaluates the temporary BACT limits and proposes replacements for the temporary limits, as needed. The report will summarize the BACT study and the conclusions of the BACT study. Specifically, the report will include the following, as required by Permit Condition 25.C.2

a. A copy of the BACT study protocol

b. A copy of the SOP report from Special Condition 22.K, modified as a result of the BACT study.

c. An evaluation of each temporary BACT limit in the permit considering if permitted emission limits, the basis of the limits, and the averaging periods are appropriate, and if amended or additional emission limits, basis, or averaging periods are necessary (e.g. the Blowing Chamber, Curing Oven, and Cooling Section are permitted with zero sulfur acid emissions, but stack testing may show an emission rate. Also changing from melt to binder based emission limits). At a minimum, the evaluation shall reply upon:

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[3] 40 CFR 52.21(b)(12)

i. All respective information in the BACT Study.

ii. A statistical analysis including but not limited to mean, standard deviation, regression analyses, data outliers and the reason why there are outliers. Where CEMS are used, the emissions mean and standard deviation shall be calculated for every 15 minute period.

iii. A prediction of emission rates based on monitored parameters.

d. Where limits are requested to be increased, the criteria in the November 18, 1987 EPA document *Request for Determination on BACT Issues* □ *Ogden Martin Tulsa Municipal Waste Incinerator Facility* shall first be satisfied. The criteria include all of the following:

i. The units were constructed in conformity with the permit.

ii. Errors, faulty data, or incorrect assumptions contained in the permit application resulted in inappropriate BACT emissions limits and the applicant did not intentionally act to misrepresent or conceal data.

iii. The applicant investigated and reported all available options to reduce to a lower limit, if not the permitted limit.