Ms. Robin Edmiston-Bennett
ISB Environmental Network Leader
Owens Corning Insulation Systems, LLC
400 Case Avenue
Newark, OH 43055

RE: New Source Review Permit Amendment - Permit Number: 052016-003A
Public Project Number: 2016-12-066; Installation Number: 097-0176

Dear Ms. Edmiston-Bennett:

On December 29, 2016 the Air Pollution Control Program received confidential and public permit amendment applications requesting an increase in shot briquette cement sulfur content, the addition of a cupola startup burner, and a change to the blowing chamber stack test location. Increasing the sulfur content and adding a startup burner result in increased potential emissions, increased BACT limits, and revised ambient modeling. This is the public amendment to PSD permit 052016-003. A confidential version is available under project 2016-12-068.

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
Permits Section Chief

KBH:dlj

Enclosures

c: Southwest Regional Office
   PAMS File: 2016-12-066
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

1. Cupola (EU-05a)
   A. The fuel shall exclusively consist of any combination of metallurgical coke, carbon based anodes, and natural gas. The cupola startup burner shall be fired exclusively with natural gas. Solid fuel usage shall not exceed _tph at any time. Solid fuel usage shall not exceed _ tons on a 12-month period.
   1) Owens Corning Insulating Systems LLC (OCIS) shall install and operate a weigh belt/hopper or other means to continuously monitor and record the solid fuel usage.
   2) Coke sulfur content shall not exceed _% by weight at any time. Anode sulfur content shall not exceed _% by weight at any time.
   3) Anodes shall not exceed _% by weight of the fuel mix at any time. Anodes shall not exceed _% by weight of the fuel mix on a 12-month rolling average.
   4) OCIS shall keep vendor records on site representative of each solid fuel type and sulfur content. A change of materials or vendors requires new vendor records. As an alternative to vendor sulfur records, OCIS may conduct representative sulfur testing on each solid fuel delivery.
   5) OCIS shall record the anode type e.g. green, baked, or spent and industry e.g. primary aluminum, chlorine, silicon, ferroalloy, calcium carbide, yellow phosphorus, etc. OCIS shall calculate the project PTE for any change in anode type from spent primary aluminum prior to its usage. A project PTE exceeding the values in 10 CSR 10-6.061(3)(A)3. requires a construction permit prior to using the new anode type/industry.

   B. The melt material charging rate, i.e. total charge minus fuel, shall not exceed _tph at any time. The melt material charge shall not exceed _ tons on a 12-month period. OCIS shall install and operate a weigh belt/hopper or other means to continuously monitor and record the charge rate.

   C. The charge shall exclusively consist of any combination, including zero amounts, of iron/steel furnace slag, copper smelting slag, feldspar, basalt (trap rock), dolomite, limestone, and briquettes (shot bricks) consisting of up to three materials: recycled blowing chamber shot, mineral wool fibers, and Portland cement.
SPECIAL CONDITIONS:
The permittee is authorized to construct and operate subject to the following special conditions:

1) The following compositions by weight % shall not be exceeded:
   a) Iron/steel furnace slag: chromium __%, manganese __%, sulfur __%
   b) Copper slag: chromium __%, manganese __%, sulfur __%
   c) Feldspar: manganese __%
   d) Trap rock: manganese __%, chromium __%
   e) Shot bricks: shot sulfur __%, cement sulfur __%

2) OCIS shall keep vendor records on site representative of each material type and respective composition. A change of materials or vendors requires new vendor records. As an alternative to vendor weight % records, OCIS may conduct representative testing on each delivery.

3) OCIS shall keep records on site of each melt material’s usage rate, date, and time.

D. The cupola shall not be operated more than __ hours, inclusive of startup and shutdown, on a 12-month rolling average. Periods of non-operation do not count towards this limit. The cupola startup burner shall not be operated more than __ hours, on a 12-month rolling average. It shall only be used during startup.
   1) The total time in startup, normal operation, and shutdown shall be continuously recorded. The three modes of operation shall be indicated.
   2) Startup and shutdown shall have the same definitions as found in 40 CFR 63 Subpart DDD.
   3) OCIS shall not receive anodes into the combined coke/anode bunker for 24 hours prior to a planned shutdown and shall only commence receipt of anodes into the combined coke/anode bunker after planned startup. The anodes shall only be charged from the designated coke/anode bunker and designated coke/anode day bin in the mix building. OCIS shall keep records on site comparing planned startup and shutdown date and time to anode receipt date and time.
   4) OCIS shall record planned versus unplanned startups and shutdowns.

E. All emissions from the BC-10 conveyor transfer into cupola receiving hopper (EU-02.13), cupola receiving hopper (EU-05.5), cupola startup burner (EU-05f), and cupola (EU-05a) shall be captured and controlled by the following in series:
   1) Good combustion practices including, but not limited to:
      a) Combustion tuning, combustion temperature, air/fuel mixing.
      b) OCIS shall develop a written good combustion practices log for the cupola startup burner and cupola 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
SPECIAL CONDITIONS:
The permittee is authorized to construct and operate subject to the following special conditions:

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.

2) Maximum energy efficiency including but not limited to:
   a) Heat recovery/preheated air.
   b) Recycled material usage, as available.
   c) Oxygen supplementation.
   d) Cupola shell reflective and mass insulation.
   e) Minimization of air infiltration into the cupola.
   f) Insulating steam and condensate lines and fittings.
   g) Mechanical transport systems where possible, high efficiency motors, variable frequency drives, high efficiency fans, optimization of compressed air systems, efficient lighting.

h) OCIS shall develop a written energy efficiency log 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.

3) Cyclone (CD-01)
   a) The cyclone shall be operated and maintained in accordance with the manufacturer’s specifications which shall be kept on site.
   b) The cyclone shall be equipped with a gauge or meter to determine pressure drop. Pressure drop shall be maintained within the range established in the SOP report from Special Condition 22.K. Pressure drop shall be recorded at least once daily. Days of no operation shall be indicated.
   c) OCIS shall maintain an operating and maintenance log for the cyclone which shall include the following:
      i. Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
      ii. Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
SPECIAL CONDITIONS:
The permittee is authorized to construct and operate subject to the following special conditions:

iii. Dates of all above schedules, incidents, activities, and actions.

4) Thermal oxidizer (CD-02)
   a) The thermal oxidizer shall be operated and maintained in accordance with the manufacturer's specifications and with the SOP report from Special Condition 22.K. A copy of the manufacturer's specifications shall be kept on site.
   b) The thermal oxidizer shall be equipped with a device measuring operating temperature and operate within the requirements of 40 CFR 63 Subpart DDD, National Emission Standards for Hazardous Air Pollutants for Mineral Wool Production.
   c) OCIS shall maintain an operating and maintenance log for the thermal oxidizer which shall include the following:
      i. Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
      ii. Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
      iii. Dates of all above schedules, incidents, activities, and actions.

5) Dry sorbent injection (DSI) (CD-03).
   a) The DSI system shall consist of two injection locations, located between the thermal oxidizer and heat exchanger, and located between the heat exchanger and cupola baghouse.
   b) OCIS shall keep vendor records on site of each sorbent delivery type.
   c) The sodium bicarbonate sorbent shall be milled to optimize control efficiency.
   d) The DSI shall be operated and maintained in accordance with the manufacturer's specifications and with the SOP report from Special Condition 22.K. A copy of the manufacturer's specifications shall be kept on site.
   e) The DSI sorbent injection rates shall be continuously monitored and recorded for each location.
   f) OCIS shall maintain an operating and maintenance log for the DSI which shall include the following:
      i. Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
      ii. Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
      iii. Dates of all above schedules, incidents, activities, and actions.

6) Baghouse (CD-04)
   a) The baghouse shall be operated and maintained in accordance with the manufacturer's specifications which shall be kept on site.
   b) The baghouse shall be equipped with a bag leak detection system
SPECIAL CONDITIONS:

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

and operate within the requirements of 40 CFR 63 Subpart DDD, National Emission Standards for Hazardous Air Pollutants for Mineral Wool Production.

c) Replacement filters for the baghouse shall be kept on hand at all times. The bags shall be made of material appropriate for operating conditions expected to occur (e.g. temperature limits, acidic and alkali resistance, and abrasion resistance). The replacement filter material type and weight shall meet or exceed the specifications of the existing filter. The air to cloth ratio or air to filter ratio shall not be increased when filter replacement is performed.

d) OCIS shall maintain an operating and maintenance log for the baghouse which shall include the following:
   i. Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
   ii. Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
   iii. Dates of all above schedules, incidents, activities, and actions.

7) The cupola startup burner shall be a low NOx design.

F. OCIS shall not exceed the following combined cupola startup burner/cupola temporary BACT emission limits. Final BACT limits shall be established according to Special Condition 25.

1) PM
   a) lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

2) PM<sub>10</sub> total
   a) lb/ton melt, inclusive of startup and shutdown, on a 24-hour period.
   b) lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

3) PM<sub>2.5</sub> total
   a) lb/ton melt, inclusive of startup and shutdown, on a 24-hour period.
   b) lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

4) SO<sub>2</sub>
   a) lb/ton melt, exclusive of startup and shutdown, on a 1-hour period.
   b) lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

5) NO<sub>x</sub>
   a) lb/ton melt, exclusive of startup and shutdown, on a 1-hour period.
SPECIAL CONDITIONS:
The permittee is authorized to construct and operate subject to the following special conditions:

b) ___ lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

6) VOC
   a) ___ lb/ton melt, exclusive of startup and shutdown, on a 3-hour period.
   b) ___ lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

7) CO
   a) ___ lb/ton melt, exclusive of startup and shutdown, on a 1-hour period.
   b) ___ lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

8) Reduced Sulfur Compounds (RSC)
   ___ lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

9) Sulfuric Acid Mist (SAM)
   ___ lb/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

10) GHG
    ___ lb CO₂e/ton melt, inclusive of startup and shutdown, on a 30-day rolling average.

G. OCIS shall not exceed the following combined cupola startup burner/cupola non-BACT emission limits, each inclusive of startup and shutdown:

1) PM₁₀ total
   a) 2.018 lb/hr on a 30-day period.
   b) 2.482 lb/hr on a 24-hr period.

2) PM₂.₅ total
   a) 1.930 lb/hr on a 30-day period.
   b) 2.415 lb/hr on a 24-hr period.

3) SO₂
   a) 25.099 lb/hr on a 30-day period.
   b) 27.664 lb/hr on a 1-hr period.

4) NOₓ
   a) 10.846 lb/hr on a 30-day period.
   b) 12.278 lb/hr on a 1-hr period.

5) CO
   1.764 lb/hr on a 1-hr period.

6) SAM
   19.334 lb/hr on a 30-day period.

4. Emission Limit Compliance – Blowing Chamber
A. Blowing chamber startup and shutdown shall have the same definitions as those for the cupola, respectively.
SPECIAL CONDITIONS:
The permittee is authorized to construct and operate subject to the following special conditions:

B. Compliance with the emission limits in Special Conditions 3.D., 3.E., 3.F., and 3.G. for the blowing chamber shall be demonstrated by use of the blowing chamber 3% LOI and 4% LOI stack tests. Values for the blowing chamber shall be calculated by subtracting the combined cupola/startup burner values from the combined cupola/startup burner/blowing chamber values, for the respective pollutant.

22. Emission (Stack) Testing
A. OCIS shall test each pollutant and location indicated in Table 3.

Table 3: Emission Testing, Pollutants and Locations

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Cupola</th>
<th>Common Stack 1, Downstream of Cupola and Blowing Chamber</th>
<th>Curing Oven</th>
<th>Curing Oven</th>
<th>Cooling Section</th>
<th>Saws Baghouse</th>
<th>Mix Building Baghouse</th>
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<tbody>
<tr>
<td>PM</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>PM\textsubscript{10} total</td>
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<tr>
<td>PM\textsubscript{2.5} total</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x filterable only</td>
<td>x filterable only</td>
<td>x filterable only</td>
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<tr>
<td>SO\textsubscript{2}</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>NO\textsubscript{x}</td>
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<td>x</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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<td>CO\textsubscript{2}</td>
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<td>CH\textsubscript{4}</td>
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<td>N\textsubscript{2}O</td>
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<td>x</td>
<td>x</td>
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<tr>
<td>VOC</td>
<td>x</td>
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<td>x</td>
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<td>RSC</td>
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<td>SAM</td>
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<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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<tr>
<td>Fluorides (minus HF)</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

F. 1) All cupola, blowing chamber, curing oven, cooling section, and saws tests shall be performed at the maximum melt to charge efficiency, i.e. no carbonate (dolomite or limestone) charge, except cupola CO\textsubscript{2} tests shall be performed with and without carbonates.

2) Testing shall be performed at the maximum capacity, \[ \text{tph nonfuel charge, tph coke, and tph anodes. If it is impractical to test at maximum capacity, emission units may be tested at less than the maximum capacity; in this case, subsequent operation of the emission unit(s) is limited to 110 percent of the test rate until a new test is conducted. Once the emission units are so limited, operation at higher capacities is allowed for no more than 15 total days for the purpose of} \]
SPECIAL CONDITIONS:

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

additional compliance testing to regain the authority to operate at the maximum capacity.

3) All cupola/startup burner and combined cupola/startup burner/blowing chamber tests shall be conducted simultaneously, respective per pollutant. A different pollutant can be sampled at a different time. E.g. PM$_{10}$ shall be sampled simultaneously at each the cupola and combined cupola/blowing chamber location. VOC shall be sampled simultaneously at each the cupola and combined cupola/blowing chamber location, but may be sampled at a different time than PM$_{10}$.

25. Temporary BACT
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).
4) LOI.
5) Charge rate (identify melt materials versus fuel), fiber rate, and finished product rate (tph).
6) Product name and individual target LOI.
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) At least three complete stack tests from each the cupola (only the cupola PM$_{10}$, PM$_{2.5}$, VOC, RSC, SAM, CH$_4$, and N$_2$O), blowing chamber, curing oven, and cooling section shall be conducted for each “3% LOI” and “4% LOI” ranges. At least two individual target LOIs shall be tested within each LOI range.
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.

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

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 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 special conditions 1, 4, 22A, 22F, and 25B found in the previously issued construction permit 052016-003 issued by the Air Pollution Control Program.
REVIEW OF APPLICATION FOR AUTHORITY TO AMEND
SECTION (8) REVIEW
Public Project: 2016-12-066
Installation ID: 097-0176
Permit: 052016-003A

Installation Address:
Owens Corning Insulation Systems, LLC
1983 State Line Road
Joplin, MO 64804

Parent Company:
Owens Corning
1 Owens Corning Pkwy
Toledo, OH 43659

Jasper County, S11, T27N, R34W

REVIEW SUMMARY

- Owens Corning Insulation Systems, LLC has applied for authority to increase shot briquette cement sulfur content, add a startup burner to the cupola, and change stack testing locations.

- The application was deemed complete on February 8, 2017.

- Several HAPs in the installation-wide PTE exceed the respective SMAL.

- 40 CFR 60 Subpart III, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines, applies to the emergency engine. The engine is Tier 3 rated or better.

- 40 CFR 60 Subpart VVa, Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006, does not apply. The installation will emit formaldehyde, methanol, phenol, and other chemicals listed in §60.489. However, the installation will not produce as an intermediate or final product any of those chemicals. Formaldehyde, methanol, and phenol are components of the purchased phenol-formaldehyde (phenolic) resin.

- 40 CFR 61 Subpart V, National Emission Standards for Equipment Leaks (Fugitive Emission Sources), does not apply. The phenolic resin contains the highest HAP weight %. The resin MSDS indicates the sum of formaldehyde and phenol is less than % by weight. Therefore, none of the equipment is in VHAP service and the installation is not subject.

- 40 CFR 63 Subpart FFFF, National Emission Standard for Hazardous Air Pollutants: Miscellaneous Organic Chemical Manufacturing, does not apply. The installation does manufacture an intermediate resin (binder urea resin SIC 282, or adhesive SIC 289) subject to §63.2435(b)(1)(i), and the installation processes, uses, or generates an organic HAP in (b)(2), and the binder preparation tanks are not subject to another
MACT in (b)(3). However, the manufactured binder is not an isolated intermediate, as the manufactured binder tanks TK-10, 11, 12, and 13 are used for mixing, not solely storing. There is no manufactured binder tank used solely for storage. Therefore the installation is not subject.

- 40 CFR 63 Subpart DDD, National Emission Standards for Hazardous Air Pollutants for Mineral Wool Production, applies to the installation. The cupola is open-top and includes slag as a raw material. The collection chamber is vertical.

- 40 CFR 63 Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines, applies to the emergency engines. However, according to §63.6590(c)(6) the engines must meet the requirements of this part by meeting the requirements of 40 CFR 60 Subpart III.

- Emissions are controlled by the add-on controls indicated in Table 4 in permit 052016-003. BACT requires additional controls including, but not limited to, good operating and combustion practices that are indicated in the special conditions.

- This review was conducted in accordance with Section (8) of Missouri State Rule 10 CSR 10-6.060, Construction Permits Required. Potential emissions of PM, PM\textsubscript{10}, PM\textsubscript{2.5}, SO\textsubscript{2}, NO\textsubscript{X}, VOC, CO, SAM, RSC, and CO\textsubscript{2}e exceed the respective PSD significant emission rate.

- This installation is located in Jasper County, an attainment area for all criteria pollutants.

- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tpy and fugitive emissions are not counted toward major source applicability.

- Revised ambient air quality modeling of NO\textsubscript{X} and SAM was performed for this amendment. Modeling conducted for other pollutants in permit 052016-003 remains valid.

- Emissions testing is required as part of permit 052016-003.

- Submittal of a Part 70 operating permit application is required within 1 year of startup for commercial operation.

- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Owens Corning Insulation Systems, LLC was permitted to construct a new mineral wool manufacturing installation under PSD construction permit 052016-003. Construction has commenced, but not operation.
PROJECT DESCRIPTION

This is an amendment to PSD permit 052016-003. The revised installation-wide potential emissions are evaluated towards permit applicability, not just the increase from this project. This amendment is not being placed on public notice or EPA review, at the discretion of the Air Pollution Control Program. A revised construction permit will be issued following commencement of operations that will require public notice and EPA review.

OCIS requested and was originally permitted for a shot briquette cement sulfur content of \( \text{wt}\% \). They have determined more sulfur is needed in order to make the briquettes less brittle. Small material can fill voids and reduce air flow among the other charged material in a cupola, reducing melting efficiency. For this amendment OCIS requested a maximum of \( \text{wt}\% \) sulfur in the cement.

OCIS requested to add a natural gas, indirect- fired, startup burner (EU-05f) to the cupola. It will be rated at \( \text{MMBtu/hr} \) according to manufacturer’s documentation. It is limited to \( \text{hours} \) of operation per consecutive 12-month period calculated from \( \text{startups per year at up to} \) \( \text{hours} \) each. The first approximately \( \text{hours} \) will be prior to coke ignition in the cupola. Coke will be ignited during the last approximate \( \text{hours} \) of the startup burner operation. The last \( \text{hours} \) will be concurrent with the MACT DDD and this permit’s definition of cupola startup. Ignition of the coke will occur by clean combustion air indirectly heated from the hot cupola exhaust stream via a heat exchanger between the startup burner chamber and stack. The startup burner will fire into a burner chamber. The cupola exhaust will pass through this chamber on its way to the stack such that the exhaust from the burner directly adds heat to the cupola exhaust. The hot gases that are exiting the stack are then used to indirectly-preheat combustion air and the hot combustion air will ignite the cupola fuel.

OCIS requested to change the stack test location of the blowing chamber from four individual header ducts to further downstream. The revised location is the combined cupola/blowing chamber stack. Cupola and combined cupola/blowing chamber stack tests will be conducted simultaneously. Blowing chamber emissions will be calculated by subtracting the values.

The cupola CO BACT was originally permitted at \( \text{lb/ton} \) of melt, inclusive of startup and shutdown, on a 1-hour period. No limit exclusive of startup and shutdown was issued. During this amendment’s review it was found that the limit is not enforceable. Per the MACT DDD and the permit’s definition of startup, no melt is flowing from the cupola during startup, but the cupola has been ignited and emissions are present. It may take longer than one hour for melt to flow. During this time the measured emissions would be recorded by zero throughput for comparison to the limit. This amendment changes the \( \text{lb/ton} \) 1-hour limit to match MACT DDD, that being exclusive of startup and shutdown, and adds an inclusive \( \text{lb/ton} \) limit based upon a 30-day average.

The cupola VOC BACT limit had a similar situation as the CO BACT limit. The VOC limit had a short averaging time of 3-hours, originating from three 1-hour stack tests.
The limit was inclusive of cupola startup and shutdown. However, cupola startup may last more than three hours. Possibly no melt will be present to use in the compliance calculation. Therefore, the 3-hour limit was changed to be exclusive of startup and shutdown. An inclusive 30-day limit was added with the same limit value.

The blowing chamber BACT limits are lb/ton melt with 3-hour averaging, inclusive of startup and shutdown. Stack testing will only be conducted during normal operation. Blowing chamber startup has the same definition as the cupola, e.g. no melt present during startup. The limits are a short 3-hour basis, with startup possibly occurring longer. During startup there will be no melt throughput to use in the compliance calculation. Therefore compliance demonstration during startup is mathematically impossible. However, there will be no melt-associated emissions during startup. Also, little to no binder will be present during startup, and binder-associated emissions should be much less than during normal operation. Blowing chamber emissions during startup should be much less than during normal operation. Even though compliance cannot be calculated towards the lb/ton melt limits during startup and shutdown, the limits are enforceable during startup and shutdown through engineering judgement. If compliance is demonstrated during normal operation, then compliance is demonstrated inclusive of startup and shutdown.

The averaging periods for the curing oven and cooling section limits remain enforceable. Their startup definitions should encompass times much less than 3-hours. Therefore, melt will be present for use in the compliance calculations. If startup is longer, and no throughput is present, then the curing oven and cooling section limits should still be enforceable through engineering judgement.

EMISSIONS/CONTROLS EVALUATION

The amendment results in the following changes to lb/ton BACT limits and non-BACT lb/hr emission limits. The increased sulfur content increases the BACT limits for SO₂, RSC, and SAM and the non-BACT lb/hr limits for SO₂ and SAM. The startup burner increases the BACT limit for CO₂e and the non-BACT lb/hr limits for NOₓ.

This amendment does not permit emission increases at melt/fiber handling processes downstream of the cupola. Table 5A summarizes the emission limit changes as a result of this amendment.
### Table 5A: Emission Limit Changes

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Period</th>
<th>Cupola/Startup Burner BACT (lb/ton melt material charged)</th>
<th>Cupola/Startup Burner non-BACT (lb/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Permit Amendment 052016-003</td>
<td>Amendment 052016-003A</td>
</tr>
<tr>
<td>PM</td>
<td>30 days</td>
<td>N/A</td>
<td>2.481</td>
</tr>
<tr>
<td>PM(_{10})</td>
<td>24 hrs</td>
<td>N/A</td>
<td>2.018</td>
</tr>
<tr>
<td>PM(_{10})</td>
<td>30 days</td>
<td>N/A</td>
<td>2.415</td>
</tr>
<tr>
<td>PM(_{2.5})</td>
<td>24 hrs</td>
<td>N/A</td>
<td>1.930</td>
</tr>
<tr>
<td>PM(_{2.5})</td>
<td>30 days</td>
<td>N/A</td>
<td>21.750</td>
</tr>
<tr>
<td>SO(_{2})</td>
<td>1 hour exclusive</td>
<td>N/A</td>
<td>19.185</td>
</tr>
<tr>
<td>SO(_{2})</td>
<td>30 days</td>
<td>N/A</td>
<td>11.474</td>
</tr>
<tr>
<td>NO(_{X})</td>
<td>1 hour exclusive</td>
<td>N/A</td>
<td>10.782</td>
</tr>
<tr>
<td>NO(_{X})</td>
<td>30 days</td>
<td>N/A</td>
<td>1.764</td>
</tr>
<tr>
<td>VOC</td>
<td>3 hrs exclusive</td>
<td>N/A</td>
<td>1.674</td>
</tr>
<tr>
<td>CO</td>
<td>1 hr exclusive</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>CO</td>
<td>30 days</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>RSC</td>
<td>30 days</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SAM</td>
<td>30 days</td>
<td>N/A</td>
<td>16.750</td>
</tr>
<tr>
<td>CO(_{2e})</td>
<td>30 days</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

BACT limits are inclusive of startup and shutdown unless noted. All non-BACT lb/hr limits are inclusive of startup and shutdown.

1 The 1-hour CO BACT limit and 3-hour VOC BACT limit were originally inclusive of startup and shutdown, but has been amended to be exclusive.

2 There is slight change in the PM\(_{10}\) limit due to a rounding error.

Tables 5B and 5C show why most BACT limits and lb/hr limits weren't increased due to the addition of the startup burner.

### Table 5B: Startup Burner BACT Summary

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Period</th>
<th>(^1)Uncontrolled Emission Factor (lb/mmcf natural gas)</th>
<th>(^2)Emission Factor BACT (lb/ton melt)</th>
<th>BACT Limit Increased due to Burner?</th>
<th>Why Not Increase?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>30 days</td>
<td>No</td>
<td>3,5,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM(_{10})</td>
<td>24 hrs</td>
<td>No</td>
<td>3,5,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM(_{10})</td>
<td>30 days</td>
<td>No</td>
<td>3,5,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM(_{2.5})</td>
<td>24 hrs</td>
<td>No</td>
<td>3,5,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PM(_{2.5})</td>
<td>30 days</td>
<td>No</td>
<td>3,5,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO(_{2})</td>
<td>1 hour exclusive</td>
<td>No</td>
<td>3,4,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SO(_{2})</td>
<td>30 days</td>
<td>No</td>
<td>3,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO(_{X})</td>
<td>1 hour exclusive</td>
<td>No</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NO(_{X})</td>
<td>30 days</td>
<td>No</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOC</td>
<td>3 hrs exclusive</td>
<td>No</td>
<td>3,4,6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOC</td>
<td>30 days</td>
<td>No</td>
<td>New limit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>1 hr exclusive</td>
<td>No</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>30 days</td>
<td>No</td>
<td>New limit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RSC</td>
<td>30 days</td>
<td>No</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAM</td>
<td>30 days</td>
<td>No</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO(_{2e})</td>
<td>30 days</td>
<td>Yes</td>
<td>Increase</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Uncontrolled emission factor meaning prior to post-combustion controls in the cupola's flue. Values are not BACT limits. Controlled factors for PM, PM\(_{10}\), PM\(_{2.5}\), SO\(_{2}\), and VOC would be lower.

\(^2\) There are no BACT (lb/ton) limits solely for the startup burner. Startup burner emissions are combined with the cupola. Values are given to demonstrate the contribution to the combined cupola/startup burner.
BACT (lb/ton) limits. Values calculated by dividing the uncontrolled lb/hr emissions by the melt [496x713] tpm. Values for 30-day averaging periods were further calculated by multiplying by the annual ratio of startup burner hours to cupola operation plus startup and shutdown hours (1/3), approximately 1%. 

Negligible increase, possibly within the tolerance of the CEMS and cupola weigh belt.

The limit is exclusive of startup.

No filterable increase due to MACT DDR limit, and condensable increase is insignificant.

Controlled emissions would be even lower.

### Table 5C: Startup Burner lb/hr Summary

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Period</th>
<th>1 Uncontrolled Emission Factor (lb/mmcf natural gas)</th>
<th>2 Emissions (lb/hr)</th>
<th>(lb/hr) Limit Increased due to Burner?</th>
<th>Why Not Increase?</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>30 days</td>
<td>0.002 No limit</td>
<td>No limit</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>PM₁₀</td>
<td>24 hrs</td>
<td>0.122 No</td>
<td>No limit</td>
<td>3,4</td>
<td></td>
</tr>
<tr>
<td>PM₂₀</td>
<td>30 days</td>
<td>0.10 No</td>
<td>No limit</td>
<td>3,4</td>
<td></td>
</tr>
<tr>
<td>PM₂₅</td>
<td>24 hrs</td>
<td>0.01 No</td>
<td>No limit</td>
<td>3,4</td>
<td></td>
</tr>
<tr>
<td>SO₂</td>
<td>30 days</td>
<td>confidential</td>
<td>Yes Increase</td>
<td>Increase</td>
<td></td>
</tr>
<tr>
<td>SO₂</td>
<td>1 hour exclusive</td>
<td>0.001 No</td>
<td>No limit</td>
<td>3,4</td>
<td></td>
</tr>
<tr>
<td>NOₓ</td>
<td>30 days</td>
<td>0.804 Yes</td>
<td>Increase</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>NOₓ</td>
<td>1 hour exclusive</td>
<td>0.064 Yes</td>
<td>Increase</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>VOC</td>
<td>30 days</td>
<td>0.088 No limit</td>
<td>No limit</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>1 hr exclusive</td>
<td>1.351 No</td>
<td>No limit</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>30 days</td>
<td>0.007 No limit</td>
<td>No limit</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>RSC</td>
<td>30 days</td>
<td>0.108 No limit</td>
<td>No limit</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>SAM</td>
<td>30 days</td>
<td>N/A No limit</td>
<td>No limit</td>
<td>No limit</td>
<td></td>
</tr>
<tr>
<td>CO₂ₑ</td>
<td>30 days</td>
<td>154.672 No limit</td>
<td>No limit</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

1 Uncontrolled emission factor meaning prior to post-combustion controls in the cupola’s flue. Values are not limits. Controlled emission factors for PM, PM₁₀, PM₂₅, SO₂, and VOC would be lower.

2 There are no (lb/hr) limits solely for the startup burner. Startup burner emissions are combined with the cupola. Values are given to demonstrate the contribution to the combined cupola/startup burner (lb/hr) limits. Values calculated by multiplying the MHD by the emission factor. Values for 30-day averaging periods were further calculated by multiplying by the annual ratio of startup burner hours to cupola operation plus startup and shutdown hours (1/3), approximately 1%.

Negligible increase, possibly within the tolerance of the CEMS and stack test.

Controlled emissions would be even lower.

Burner operates while it is assumed that not all coke is ignited nor all charge melting. Combined stack emissions assumed offset by reduced cupola emissions.

No SAM emissions from startup burner.

The following table provides an annual emissions summary for this installation. PTE (tpy) increases were calculated from the startup burner based upon if a 30-day lb/hr modeling limit increased (burner NOₓ only, as SO₂ and SAM had lb/hr increase but were dictated by cement sulfur increase) or 30-day lb/ton BACT limit increased (SO₂, RSC, SAM, CO₂ₑ). PTE (tpy) increases were not based upon preliminary calculations using the startup burner’s uncontrolled emission factors.
Table 5D: PTE Summary (tpy)

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Regulatory De Minimis Levels</th>
<th>Potential Emissions of Permit 052016-003</th>
<th>Increase</th>
<th>Potential Emissions of the Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM</td>
<td>25.0</td>
<td>93.46</td>
<td>N/A</td>
<td>93.46</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>15.0</td>
<td>265.19</td>
<td>N/A</td>
<td>265.19</td>
</tr>
<tr>
<td>PM$_{2.5}$</td>
<td>10.0</td>
<td>236.23</td>
<td>N/A</td>
<td>236.23</td>
</tr>
<tr>
<td>SO$_2$</td>
<td>40.0</td>
<td>81.25</td>
<td>24.63</td>
<td>105.88</td>
</tr>
<tr>
<td>NO$_x$</td>
<td>40.0</td>
<td>125.84</td>
<td>0.27</td>
<td>126.10</td>
</tr>
<tr>
<td>VOC</td>
<td>40.0</td>
<td>472.68</td>
<td>N/A</td>
<td>472.68</td>
</tr>
<tr>
<td>CO</td>
<td>100.0</td>
<td>138.39</td>
<td>N/A</td>
<td>138.39</td>
</tr>
<tr>
<td>Lead</td>
<td>0.6</td>
<td>0.08</td>
<td>N/A</td>
<td>0.08</td>
</tr>
<tr>
<td>Fluorides (excluding HF)</td>
<td>3.0</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>SAM</td>
<td>7.0</td>
<td>61.51</td>
<td>19.01</td>
<td>80.52</td>
</tr>
<tr>
<td>H$_2$S</td>
<td>10.0</td>
<td>1.23</td>
<td>0.37</td>
<td>1.60</td>
</tr>
<tr>
<td>TRS</td>
<td>10.0</td>
<td>1.23</td>
<td>0.37</td>
<td>1.60</td>
</tr>
<tr>
<td>RSC</td>
<td>10.0</td>
<td>32.06</td>
<td>9.50</td>
<td>41.56</td>
</tr>
<tr>
<td>GHG (CO$_2$e)</td>
<td>75,000</td>
<td>3 90,979.85</td>
<td>465.47</td>
<td>91,445.33</td>
</tr>
<tr>
<td>GHG (mass)</td>
<td>0.0</td>
<td>3 89,303.33</td>
<td>464.60</td>
<td>89,767.93</td>
</tr>
<tr>
<td>Combined HAPs</td>
<td>25.0</td>
<td>275.24</td>
<td>9.13</td>
<td>284.37</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>2.0</td>
<td>178.46</td>
<td>2.79E-04</td>
<td>178.46</td>
</tr>
<tr>
<td>Methanol</td>
<td>10.0</td>
<td>35.49</td>
<td>N/A</td>
<td>35.49</td>
</tr>
<tr>
<td>Phenol</td>
<td>0.1</td>
<td>27.42</td>
<td>N/A</td>
<td>27.42</td>
</tr>
<tr>
<td>COS</td>
<td>5.0</td>
<td>30.84</td>
<td>9.13</td>
<td>39.96</td>
</tr>
<tr>
<td>Arsenic Compounds</td>
<td>0.005</td>
<td>0.05</td>
<td>N/A</td>
<td>0.05</td>
</tr>
<tr>
<td>Chromium VI Comp.</td>
<td>0.002</td>
<td>2.18E-03</td>
<td>N/A</td>
<td>2.18E-03</td>
</tr>
<tr>
<td>Dioxins/Furans</td>
<td>6E-07</td>
<td>9.57E-07</td>
<td>N/A</td>
<td>9.57E-07</td>
</tr>
<tr>
<td>Hydrogen Chloride</td>
<td>10.0</td>
<td>0.88</td>
<td>N/A</td>
<td>0.88</td>
</tr>
<tr>
<td>Hydrogen Fluoride</td>
<td>0.1</td>
<td>1.10</td>
<td>N/A</td>
<td>1.10</td>
</tr>
<tr>
<td>Lead Compounds</td>
<td>0.01</td>
<td>0.08</td>
<td>N/A</td>
<td>0.08</td>
</tr>
<tr>
<td>Manganese Compounds</td>
<td>0.8</td>
<td>0.25</td>
<td>N/A</td>
<td>0.25</td>
</tr>
<tr>
<td>Mercury Compounds</td>
<td>0.01</td>
<td>7.31E-03</td>
<td>N/A</td>
<td>7.31E-03</td>
</tr>
<tr>
<td>Selenium Compounds</td>
<td>0.1</td>
<td>0.38</td>
<td>N/A</td>
<td>0.38</td>
</tr>
</tbody>
</table>

N/A = Not applicable
Other individual HAP species have potential emissions.
Natural gas combustion at the cupola startup burner contributes negligible amounts of some metal HAPs.
1 SMAL
2 As this is an amendment there is no project emission increase, but rather an updated installation PTE. The increase is shown for informational purposes.
3 GHG PTE has been corrected to include the carbonates and the scrubber.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (8) of Missouri State Rule 10 CSR 10-6.060, Construction Permits Required. Potential emissions of PM, PM$_{10}$,
PM$_{2.5}$, SO$_2$, NO$_x$, VOC, CO, SAM, RSC, and CO$_2$e exceed the respective PSD significant emission rate.

**APPLICABLE REQUIREMENTS**

Owens Corning Insulation Systems, LLC shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

**GENERAL REQUIREMENTS**

- *Submission of Emission Data, Emission Fees and Process Information, 10 CSR 10-6.110*
  - Per 10 CSR 10-6.110(4)(B)2.B(II) and (4)(B)2.C(II) a full EIQ is required for the first full calendar year the equipment (or modifications) approved by this permit are in operation.

- *Operating Permits, 10 CSR 10-6.065*

- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin, 10 CSR 10-6.170*

- *Restriction of Emission of Visible Air Contaminants, 10 CSR 10-6.220*

- *Restriction of Emission of Odors, 10 CSR 10-6.165*

**SPECIFIC REQUIREMENTS**

- *Restriction of Emission of Particulate Matter From Industrial Processes, 10 CSR 10-6.400* does not apply. All emission units are either fugitive, emit less than 0.5 lb/hr of PM filterable, or are subject to a federally enforceable requirement to operate a control device that removes 90% of PM filterable emissions. However, the blowing chamber, curing oven, and cooling section are controlled by stone wool filters. Stone wool filters are very efficient at removing PM filterable according to the European BAT document, however a tested control efficiency could not be obtained. OCIS assumed 99+% removal, via engineering estimate. This permit assumed at least 90% was achievable.

- *New Source Performance Regulations, 10 CSR 10-6.070*
  - 40 CFR 60 Subpart III, *Standards of Performance for Stationary*
Compression Ignition Internal Combustion Engines

- **MACT Regulations**, 10 CSR 10-6.075

- **Control of Sulfur Dioxide Emissions**, 10 CSR 10-6.261 applies to the cupola, blowing chamber, curing oven, and cooling section. However, no emission limits exist in the rule for these units. The natural gas fired miscellaneous HVAC units are exempt. The ultra-low sulfur diesel fired emergency engines are exempt.

  - 10 CSR 10-6.260 was rescinded on November 30, 2015, in the code of state regulations by 10 CSR 10-6.261, *Control of Sulfur Dioxide Emissions*. 10 CSR 10-6.260 remains federally enforceable until the SIP is updated to remove the rule. In the meantime, both 6.260 and 6.261 apply.
  - The SO$_2$ limit for stack 1 (cupola and blowing chamber) and stack 2 (curing oven, cooling section, saws) are 500 ppmv for each stack. The SO$_3$ and sulfuric acid mist limits are each 35 mg/m$^3$. If stack 1’s SO$_2$ potential emissions are 27.69 lb/hr, and the flowrate is ___ SCFM, then the concentration is 12.73 ppmv. The concentration is well below the rule limit of 500 ppmv and compliance is assumed. If stack 1’s sulfuric acid mist potential emissions are 19.33 lb/hr, then the concentration is 23.70 mg/m$^3$. The concentration is below the rule limit of 35 mg/m$^3$ and compliance is assumed.
  - Stack 2 is assumed to be in compliance according to (3)(A)4. by their low sulfur emission rates and high air flowrates.
  - The natural gas fired miscellaneous HVAC units are exempt.
  - The emergency engines will be in compliance when combusting ultra low sulfur diesel.

- **Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating**, 10 CSR 10-6.405 does not apply. The cupola provides indirect heat to binder preparation tanks. However, that is not the primary purpose of the cupola. Therefore, according to 10 CSR 10-6.405(1)(B) the rule does not apply to the cupola. The installation will include small natural gas fired water heaters. However, they are the only applicable units. Therefore, according to 10 CSR 10-6.405(1)(D) the installation is exempt.

**BACT ANALYSIS**

The increase in shot briquette sulfur content increases the cupola SO$_2$, RSC, SAM BACT limits. Revised limits were calculated using the equations from the original permit.
calculations, with an increase in sulfur content from 2% to 1%. Otherwise the BACT analysis is unchanged. The SO\(_2\), RSC, and SAM control devices selected in the original permit remain unchanged.

The startup burner is subject to BACT. However, its emissions will be combined with the cupola and are indistinguishable during normal operation. If the cupola were empty, then the startup burner emissions could be represented by the cupola CEMS and stack tests. The burner emissions are included with the cupola for comparison to the revised BACT limits, except when the burner is not operating, i.e. limits that are exclusive of startup and shutdown don't include the burner.

The startup burner BACT analysis submitted with the application is incorporated by reference in this amendment. No additional post-combustion control devices are warranted beyond those required for the cupola in the original permit. A low NO\(_X\) design is required for the startup burner. The PM, PM\(_{10}\), and PM\(_{2.5}\) emissions will be subject to the cupola's baghouse and thermal oxidizer. The uncontrolled SO\(_2\) emissions will be quite low and will be controlled by the cupola's dry sorbent injection. VOC will be subject to the cupola's thermal oxidizer. The CO and CO\(_2\) emissions will be controlled by good combustion practices. The burner is not expected to contribute to SAM or RSC.

**Startup Burner NO\(_X\)**

**Available Controls**

Combustion controls (low NO\(_X\) burner, flue gas recirculation (FGR)), selective catalytic reduction (SCR), and selective non-catalytic reduction (SNCR)

**Technically Feasible**

all

<table>
<thead>
<tr>
<th>Rank</th>
<th>Technology</th>
<th>Emission Factor (lb/MMbtu)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SCR + Combustion Controls</td>
<td>0.0085</td>
</tr>
<tr>
<td></td>
<td>SNCR + Combustion Controls</td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td>SCR</td>
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<tr>
<td></td>
<td>SNCR</td>
<td>0.087</td>
</tr>
<tr>
<td></td>
<td>No Control</td>
<td>0.11 to 0.22</td>
</tr>
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</table>


**Economic, Environmental, Energy, Soils, Vegetation, and Growth Impacts**

A low NO\(_X\) burner was selected. Due to the relatively small burner size, installing add-on controls likely results in a cost per ton of reduction far exceeding $10,000, thus being eliminated as economically infeasible (see the permit amendment application's BACT analysis). No additional energy, soils, vegetation, or growth impacts are expected.

**Select BACT**

The RBLC was searched for natural gas boilers and natural gas burners up to
approximately 30 MMBtu/hr input. Eighteen entries were selected. The lb/mmcf emission factors ranged from 7.65 to 51. There were eight entries above 40 lb/mmbtu, with six entries above 45, and four entries of 50. The emission factor of lb/mmcf was selected, or lb/MMBtu. The BACT limits are changing from “cupola” to “combined cupola with cupola startup burner”. There is no increase in the previous cupola NOX (lb/ton) BACT limits of lb/ton melt, 1-hour, exclusive of startup and shutdown and lb/ton melt, 30-day, inclusive of startup and shutdown. The 1-hour limit is exclusive of startup, therefore the burner’s NOX was not added. The 30-day limit was not increased because the startup burner’s projected operating time contributed only a small increase towards a lb/ton melt basis. No stack testing or CEMS are required specifically for the startup burner at this time. Monitoring the startup burner lb/hr emission rates is required as part of the BACT study. These are temporary BACT limits.

AMBIENT AIR QUALITY IMPACT ANALYSIS

Concerning only those pollutants with modeling applicability for this installation, this amendment results in an increase in PM\(_{10}\), PM\(_{2.5}\), \(\text{SO}_2\), NOX, CO, and sulfuric acid mist emission rates from the cupola/startup burner. Those pollutants were modeled in the original permit. This amendment modeled only for NOX and sulfuric acid mist. Revised NOX emissions are from the addition of the cupola startup burner. Revised sulfuric acid mist emissions are from the increase in shot briquette cement sulfur content.

PM\(_{10}\), and PM\(_{2.5}\) were not modeled in this amendment because the potential emission increases from adding the natural gas fired startup burner were very low, and revised modeling will be conducted following the BACT study. The lb/hr limits were not increased from the original permit.

By adding the startup burner, the potential CO increase was more substantial than the particulate emission increase. However, the startup burner will emit into the cupola and combined CO emissions will be monitored by the cupola CEMS. The 30 day CO BACT, which is inclusive of startup and shutdown, is not increasing. The 1-hour CO BACT is also not increasing. Therefore, there is no permitted increase in CO. Revised CO modeling will be conducted following the BACT study. The lb/hr emission limit was not increased from the original permit.

\(\text{SO}_2\) was not modeled for this amendment. Although there is an increase in sulfur emissions (original permit is approximately 19 to 22 lb/hr dependent upon averaging period) from the original permit, the revised emission rates (approximately 25 to 28 lb/hr) are less than values (approximately 41 to 44 lb/hr) which were used to demonstrate compliance with the ambient standards in the original permit. Revised \(\text{SO}_2\) modeling will be conducted following the BACT study. The lb/hr emission limits were increased from the original permit to the exact values in the approximate 25 to 28 lb/hr range.

The lb/hr NOX and SAM limits were increased and modeled compliance. For details see the attached memo, Section 8 Ambient Air Quality Impact Analysis (AAQIA) for the
Owens Corning Insulating Systems, LLC (Owens Corning) – December Amendment, December 28, 2016. Further amended NOx rates are in Section 8 Ambient Air Quality Impact Analysis (AAQIA) for the Owens Corning Insulating Systems, LLC (Owens Corning) – December Amendment – Addendum, February 15, 2016.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (8), Missouri State Rule 10 CSR 10-6.060, Construction Permits Required, it is recommended that this amendment be granted with special conditions.

PERMIT DOCUMENTS

The following documents received from Owens Corning Insulation Systems, LLC are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated December 21, 2016, received December 29, 2016, designating Owens Corning Insulation Systems, LLC as the owner and operator of the installation.

The following documents are also incorporated by reference into this permit:

- Email communication among Owens Corning Insulation Systems, LLC, Trinity Consultants, and the program.
- 2016-12-066 draft 1.pdf
- Section 8 Ambient Air Quality Impact Analysis (AAQIA) for the Owens Corning Insulating Systems, LLC (Owens Corning) – December Amendment, Kelly Robson, December 28, 2016.
- Section 8 Ambient Air Quality Impact Analysis (AAQIA) for the Owens Corning Insulating Systems, LLC (Owens Corning) – December Amendment – Addendum, February 15, 2016.

The following documents are permit references:

- EPA RACT/BACT/LAER Clearinghouse (RBCL) https://cfpub.epa.gov/rbcl/
APPENDIX A

Abbreviations and Acronyms

% ........... percent
°F ........... degrees Fahrenheit
acfm .......... actual cubic feet per minute
BACT ....... Best Available Control Technology
BMPs ....... Best Management Practices
BTU .......... British thermal unit
CAM ........ Compliance Assurance Monitoring
CAS ........ Chemical Abstracts Service
CEMS ........ Continuous Emission Monitor System
CFR .......... Code of Federal Regulations
CO ........... carbon monoxide
CO₂ .......... carbon dioxide
CO₂e ........ carbon dioxide equivalent
COMS .......... Continuous Opacity Monitoring System
CSR .......... Code of State Regulations
dscf ........ dry standard cubic feet
EIQ ........ Emission Inventory Questionnaire
EP .......... Emission Point
EPA .......... Environmental Protection Agency
EU .......... Emission Unit
fps .......... feet per second
ft ............ feet
GACT ...... Generally Available Control Technology
GHG .......... Greenhouse Gas
gpm .......... gallons per minute
gr ............ grains
GWP .......... Global Warming Potential
HAP .......... Hazardous Air Pollutant
hr .......... hour
hp .......... horsepower
lb .......... pound
lbs/hr ...... pounds per hour
MACT ....... Maximum Achievable Control Technology
μg/m³ ...... micrograms per cubic meter
m/s .......... meters per second
Mgal ........ 1,000 gallons
MW .......... megawatt
MHDR ....... maximum hourly design rate
MMBtu ...... Million British thermal units
MMCF ...... million cubic feet
MSDS ...... Material Safety Data Sheet
NAAQS .... National Ambient Air Quality Standards
NESHAPs National Emissions Standards for Hazardous Air Pollutants
NOₓ .......... nitrogen oxides
NSPS ........ New Source Performance Standards
NSR .......... New Source Review
PM .......... particulate matter
PM₂.₅ ....... particulate matter less than 2.5 microns in aerodynamic diameter
PM₁₀ ....... particulate matter less than 10 microns in aerodynamic diameter
ppm ........ parts per million
PSD ........ Prevention of Significant Deterioration
PTE ........ potential to emit
RACT ...... Reasonable Available Control Technology
RAL ...... Risk Assessment Level
SCC .......... Source Classification Code
scfm .......... standard cubic feet per minute
SDS .......... Safety Data Sheet
SIC .......... Standard Industrial Classification
SIP .......... State Implementation Plan
SMAL ...... Screening Model Action Levels
SOₓ .......... sulfur oxides
SO₂ .......... sulfur dioxide
tph .......... tons per hour
tpy .......... tons per year
VMT .......... vehicle miles traveled
VOC .......... Volatile Organic Compound