

**BEFORE THE STATE
OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES**

In the Matter of)
USG Interiors LLC)
located at 208 Adeline Street)
Walworth, Wisconsin)

Administrative Order: AM-16-01

**FINDINGS OF FACT, CONCLUSIONS OF LAW,
AND ADMINISTRATIVE CONSENT ORDER**

FINDINGS OF FACT

Section I. Introduction

The Wisconsin Department of Natural Resources (Department) finds that:

- A) USG Interiors LLC, referenced hereinafter as the “operator,” or “USG”, operates a manufacturing facility located at 208 Adeline St, Walworth, Wisconsin (hereinafter, the “facility”) which is a “stationary source” as defined in s. 285.01(41), Wis. Stat.
- B) The facility identification (FID) number is 265006830.

Section II. Background on Applicable Sulfur Dioxide (SO₂) National Ambient Air Quality Standards (NAAQS) and Requirements

- A) On June 2, 2010, the U.S. Environmental Protection Agency (U.S. EPA) established a 1-Hour SO₂ NAAQS of 75 ppb (75 Fed. Reg. 35520) as codified at 40 C.F.R. s. 50.17.
- B) On March 2, 2015, the U.S. District Court for Northern District of California entered a Consent Decree in the case *Sierra Club and Natural Resources Defense Council v. Gina McCarthy*, Case No. 13-cv-3953, to resolve litigation concerning deadlines for completing 2010 1-Hour SO₂ NAAQS designations. Under the Consent Decree, U.S. EPA was required to designate certain areas as nonattainment, attainment, or unclassifiable in three phases.
- C) On August 21, 2015, U.S. EPA promulgated the Data Requirements Rule (DRR) for the 2010 1-Hour SO₂ NAAQS, (80 Fed. Reg. 51052), which established the minimum criteria for

identifying emissions sources and determining areas for which air agencies are required to characterize SO₂ air quality. The air quality data provided by air agencies pursuant to this rule may be used by U.S. EPA in area designations and redesignations, as appropriate.

- D) On April 12, 2016, U.S. EPA notified the Department that the facility required further air quality characterization under the DRR.
- E) On July 1, 2016, in consultation with USG, the Department notified U.S. EPA that it elected to perform air dispersion modeling of this facility to comply with the DRR's requirement to characterize SO₂ air quality. This demonstration must be provided to U.S. EPA by January 13, 2017.
- F) Based on air dispersion modeling for the facility, this Administrative Order, AM-16-01, establishes permanent and enforceable facility-wide SO₂ emission limitations that ensure attainment of the 2010 SO₂ NAAQS.

Section III. Facility Information

As of November, 2016, the facility operated the following SO₂ emission sources.

- A) *Mineral Wool Cupola, Process P30, Stack S12.* This process produces molten mineral from layers of coke, slag, silica, and additives. Coke and slag are the primary sources of sulfur in the process. The maximum heat input is described as 33.21mmBtu per hour and the maximum material throughput (including coke) is described as 11.5 tons per hour. Emissions are controlled by a natural gas-fired thermal oxidizer (control device C11) in series with a pulse-jet baghouse (control device C12).
- B) *Blow Chamber, Process P31, Stacks S21, S22 and S24.* A molten mineral wool mixture consisting of non-combustible coke constituents, minerals, and additives loaded to the cupola is drawn from the lower portion of the cupola. This molten material is introduced into a stream of air that passes through a spinning sprocket, producing mineral wool fibers and waste shot (molten mineral not formed into usable mineral wool fibers). The mineral wool fibers and waste material are identical in composition. The mineral wool fibers are collected on a traveling screen in the blow chamber. Flue gas from the blow chamber exhausts through one of three dry filters (control devices C03, C04, and C05) before exiting to the atmosphere through stacks S21, S22, and S24.
- C) *Cleaver Brooks Natural Gas Fired Boiler B10, Stack S11.* This boiler has a maximum rated capacity of 14.3 mmBtu per hour and is fired only by natural gas. The boiler provides hot water and steam for the molding lines. Emissions are uncontrolled.
- D) *Line No. 1 Acoustical Tile Dryer, Process P32, Stacks S13¹.* This is a process for drying acoustical tiles produced from the mineral wool substrate. The dryer has a maximum rated

¹ This process has multiple release points from the oven that were included as ten distinct stack locations in the air dispersion modeling conducted for purposes of establishing requirements under this Administrative Order.

capacity of 110 mmBtu per hour and is fired only by natural gas. Emissions are uncontrolled.

- E) *Line No. 1 Finishing Curing Ovens, Process 34A, Stack S25.* This process consists of two natural gas-fired convection ovens, each rated at 1.2 mmBtu per hour. Emissions are uncontrolled.
- F) *Line No. 2 Finishing Curing Ovens, Process 38A, Stack S26.* This process consists of two natural gas-fired convection ovens, each rated at 1.2 mmBtu per hour. Emissions are uncontrolled.

Section IV. Conditions Affecting Air Dispersion Modeling of the Facility Relative to the 2010 SO₂ NAAQS

The following facts and conditions are inherent to air dispersion modeling conducted by the Department in demonstrating attainment of the 2010 SO₂ NAAQS and determining air emission requirements in Section VI and VII of this Administrative Order².

- A) The mineral wool production process consists of a cupola (P30) followed by a blow chamber process (P31). The mineral wool process accounts for over 99 percent of the SO₂ emitted by all emission sources at the facility. The balance of SO₂ emitted from other processes, as listed in Section III, account for approximately 0.024 percent of facility-wide SO₂ emissions.
- B) The cupola is used to melt slag and other materials into a molten mixture which is transferred to the blow chamber, where it is formed into solid fibers. The cupola is fired by metallurgical coke which is loaded directly with various minerals and additives. The coke is integral to melting of the materials in the cupola. The material is in a molten state only at the bottom of cupola. As molten material exits the bottom of the cupola, all loaded materials move downward, with the coke heating and igniting during this process. Additional coke, slag, and additives are added at the top of the cupola as soon as room is available in the vessel. A complete round of coke and all materials are loaded to fill the cupola approximately every fifteen minutes. This material loading operation, along with consistent production of the melt (the molten material), constitutes a continuous process from the perspective of evaluating hourly SO₂ emissions.
- C) The Department evaluated historic daily coke and material loading data for 2013 through August 2016 for the cupola mineral wool production process. The Department found a maximum loading rate to the cupola for all materials combined (coke, minerals, and additives) of 10.67 tons per hour during this period. This evaluation also showed that the slag and coke together accounted for over 99 percent of the total mass of sulfur in materials loaded to the cupola. The slag is obtained as a by-product from metal production processes from other facilities. Due to the production of these metals from ores relying on specific formulations and materials, the resulting slag materials are relatively consistent in composition and sulfur content. Various other non-slag

² Air dispersion modeling for the USG Interiors – Walworth facility is documented in the Department memorandum *Sulfur Dioxide Dispersion Modeling Analysis, USG Interiors – Walworth, Wisconsin*, January, 2017.

minerals and additives, historically, account for the remaining sulfur (less than one percent) loaded to the cupola.

- D) The Department estimated SO₂ emissions from the mineral wool process, for purposes of supporting this Administrative Order, by performing a mass balance of the sulfur in material loaded to the cupola minus the sulfur in the mineral wool product and waste materials. This mass balance estimate was conservative for a number of reasons. First, the calculation of total sulfur input was based on maximum measured sulfur concentrations in the coke and various minerals. In addition, conservatively low sulfur content was used in calculating the amount of sulfur contained in the mineral wool and waste product. The use of estimated high sulfur input and low sulfur output in materials maximized the estimate of SO₂ emissions. Also, the balance of sulfur not contained in the mineral product or waste was assumed to be emitted entirely as SO₂. This last assumption is conservative in that not all sulfur in the flue gas is converted to SO₂. Some sulfur is emitted as carbonyl sulfide and reduced sulfur compounds, while some is further oxidized in the cupola and thermal oxidizer to sulfur trioxide (SO₃). Sulfur in particulate form is also removed by the existing baghouse control device.
- E) In response to requirements of this Administrative Order, the facility will remove the existing cupola (P30) stack (S12) and install a taller flue gas stack and variable speed fan to exhaust the cupola process. Since performance stack test results for flue gas flow measurements are not available for the new stack and flue gas system, the Department estimated minimum flue gas flow rates based on coke combustion in the cupola and natural gas firing of the thermal oxidizer. The Department calculated minimum flow rates at various coke and mineral loading points, using conservatively low coke heat content. This calculation of the flue gas flow rate does not account for additional flow, noted in par. (F), that would be necessary to maintain negative pressure across the cupola flue gas system. Minimum flue gas flow rates estimated using this conservative approach and the associated conservative estimate of SO₂ emissions, as described in par. (D), were applied in the air dispersion modeling analysis supporting this Administrative Order.
- F) The estimate of flue gas flow rates from the cupola process and stack is dependent on a number of parameters. The combustion of coke fuel requires a minimum amount of combustion air, and thus is one factor that must be accounted for in determining minimum flue gas flow rates for cupola operation. Other materials, however, used to produce mineral wool, including slag and other minerals and additives, do not add any significant heat value or additional flue gas flow to the process. Another significant contributor to the cupola system flue gas flow rate is the operation of a natural gas-fired thermal oxidizer (C11) used to control carbon monoxide, carbonyl sulfide, and reduced sulfur compounds emitted from the cupola. This oxidizer requires additional make-up air for combusting the natural gas and ensuring turbulent mixing and oxidation of emissions in the incineration chamber. Lastly, additional flue gas flow is necessary to maintain a negative pressure (draw) on the cupola and overcome the pressure losses of the baghouse and other components in the exhaust system. These operating conditions, together, establish a minimum flue gas flow rate from the cupola stack S12 flue gas system.

- G) SO₂ is emitted from two points in the mineral wool process; the cupola flue stack and the blow chamber flue stacks. The majority of sulfur goes to gaseous form as the coke and minerals heat and melt in the cupola; thus, the majority of sulfur in the mineral wool process is emitted from the cupola stack. As noted in par. (D), sulfur emitted from the cupola passes through a thermal oxidizer, converting sulfur to SO₂ and SO₃. The second pathway for SO₂ emissions is from the blow chamber due to a small fraction of sulfur contained in and carried with melted material from the cupola into the blow chamber. A performance stack test conducted on a similar USG mineral wool production process facility in Red Wing, Minnesota demonstrated that 95.4 percent of the SO₂ is emitted through the cupola process stack and 4.6 percent through the blow chamber exhaust stacks. The Department, for purposes of performing the air dispersion modeling to establish the requirements of this Administrative Order, accordingly apportioned 4.6 percent of total mineral wool process emissions for the USG Walworth facility as emissions from the blow chamber with the balance of emissions, 95.4 percent, from the new cupola stack S12.
- H) The Department performed air dispersion modeling for a variety of operating conditions representing a range of emission rates, in pounds per hour, at corresponding flue gas flow rates determined from historic data (as described in par. (D) through (F)). From this modeling, the Department determined that the maximum air quality impact occurs under maximum material loading and emission conditions. The Department also modeled higher emission rates than estimated for maximum material loading. On this basis, the Department determined that the following maximum emission rate and corresponding operating conditions for the mineral wool production process demonstrate attainment of the 2010 SO₂ NAAQS within the facility modeling domain.
1. A cupola flue gas system stack height of 175 feet above ground level.
 2. A mineral wool production process SO₂ emission limitation of 301.3 pounds of SO₂ per hour in conjunction with a cupola stack S12 flue gas flow rate of 23,200 actual cubic feet per minute (ACFM).
 3. The cupola flue gas flow rate demonstrating attainment for a specific SO₂ emission rate, in pounds per hour, is represented by the following equation³.

$$\text{Required Flue Gas Flow Rate (ACFM)} = [\text{SO}_2 \text{ Emission Rate } \left(\frac{\text{lbs}}{\text{hr}} \right) \times 79.192] - 664.62$$

The Department used the operating data and conservative assumptions in par. (D) through (F), to establish a minimum flowrate (determined by the equation in par. (H)3.) that is associated with each level of SO₂ emissions. The emission limitation of 301.3 pounds per hour incorporated into this Administrative Order is greater than the Department's estimate of emissions at the maximum material loading rate (11.5 tons per hour). This conservatively high emission limitation, with corresponding flowrate conditions, and the increased stack height of 175 feet demonstrates attainment of the NAAQS.

³ The equation reflecting the SO₂ emission and flue gas flow rates, used in the air dispersion modeling demonstrating attainment are presented in Attachment 1.

CONCLUSIONS OF LAW

Section V. Conclusions of Law

The Department concludes that:

- A) Under s. 285.13(2), Wis. Stats., the Department has the authority to issue orders to effectuate the purposes of ch. 285, Wis. Stats. and chs. NR 400-499, Wis. Adm. Code.
- B) This Administrative Order is necessary to accomplish the purposes of s. 285.13, Wis. Stats., and chs. NR 400 to NR 499, Wis. Adm. Code, and is enforceable by the Attorney General under ss. 299.95 and 299.97, Stats.
- C) The Department has authority under s. 285.11, Wis. Stats. to promulgate rules contained in chs. NR 400 to NR 499, Wis. Adm. Code, including, but not limited to establishing applicable emission limits and issuing air construction and operation permits.
- D) The Department has authority under ss. 285.11(6) and 285.13(2), Wis. Stats., to implement stationary source emission limitations for purposes of demonstrating and maintaining attainment for the 2010 1-Hour SO₂ NAAQS.
- E) This Administrative Order, AM-16-01, accomplishes the purposes set forth in chapter 285, Wis. Stats., and is enforceable under ss. 299.95 and 299.97, Wis. Stats.

ADMINISTRATIVE ORDER

Section VI. Requirements for the Operation of the Mineral Wool Production Process.

Based on the “Findings of Fact” and the “Conclusions of Law”, the parties to this Administrative Order hereby agree to the following provisions. Unless specifically stated, the operator shall meet all requirements of this Administrative Order on and after October 1, 2017.

- A) Mineral Wool Production Process Emission Requirements. The operator shall meet the following requirements at all times while operating the mineral wool production process.
 - 1) The mineral wool production process consists of the cupola (P30), thermal oxidizer (C11), pulse-jet baghouse (C12), blow chamber (P31), dry filters (C03, C04, and C05), and associated stacks serving these processes (stacks S12, S21, S22, and S24). Stack S12, currently discharging emissions from the cupola after treatment by C11 and C12, shall continue to be identified as S12 after the operator completes all modifications required under this Administrative Order.

- 2) The operator may not cause or allow SO₂ emissions from the mineral wool production process to exceed 301.3 pounds in any hour⁴.
- 3) The operator may not cause or allow SO₂ emissions from the mineral wool production process to exceed 238.0 pounds per hour on a 30-day rolling average basis. The emission limitation of 238.0 pounds per hour on a 30-day rolling average basis is equivalent to the emission limitation of 301.3 pounds per hour on an hourly basis⁵.
- 4) No later than October 1, 2017, stack S12 shall be a minimum height of 175 feet above ground level.
- 5) Flue gas flow rates exiting stack S12, in actual cubic feet per minute (ACFM), shall be equal to or greater than the flow rate calculated according to equation 1⁶.
Equation 1:

$$\begin{aligned} & \text{Required Flue Gas Flow Rate (ACFM)} \\ & = [\text{SO}_2 \text{ Emission Rate } \left(\frac{\text{lbs}}{\text{hr}} \right) \times 79.192] - 664.62 \end{aligned}$$

Where:

The SO₂ emission rate, in pounds per hour, is the emission rate determined according to par. (G)(7)b., for each performance stack test required under par. (B)(1).

- 6) All stacks discharging emissions from the mineral wool production process (Stacks S12, S21, S22, and S24) shall be discharged vertically and without obstruction.

B) Emission Limit Compliance Requirements.

- 1) *Performance Stack Testing.* The operator shall demonstrate compliance with the hourly SO₂ emission limitation in par. (A)(2), according to requirements and procedures in par. (G).
- 2) *Continuous Compliance Monitoring.* The operator shall demonstrate compliance with the emission limitation in par. (A)(3), on a 30-operating-day rolling average basis, by performing a mass balance calculation according to the procedures specified under par. (D).

⁴ The emission limitation of 301.3 pounds per hour maintains the 2010 SO₂ NAAQS as documented in the memorandum *Sulfur Dioxide Dispersion Modeling Analysis, USG Interiors – Walworth, Wisconsin*, January, 2017.

⁵ The 30-day rolling emission limitation is determined by multiplying the 1-hour emission limitation by a factor of 0.79 as identified by U.S. EPA as the adjustment factor for determining equivalent emission limitations between 1-hour and 30-day rolling average timeframes for uncontrolled coal-fired boilers based on a national analysis of utility coal boiler emissions. The U.S. EPA presented this factor in Appendix D of the Memorandum “Guidance for 1-Hour SO₂ Nonattainment Area SIP Submissions” from Stephen D. Page, Director to Regional Air Division Directors, Regions 1 – 10, April 23, 2014.

⁶ This relationship of flue gas flow rates maintains the 2010 SO₂ NAAQS as demonstrated by air dispersion modeling conducted by the Department. This air dispersion modeling is documented in the memorandum *Sulfur Dioxide Dispersion Modeling Analysis, USG Interiors – Walworth, Wisconsin*, January, 2017. A table of modeled values and the graphic of these values and equation is provided in attachment 1.

C) Stack S12 Flue Gas Flow Rate Compliance Requirements. The operator shall demonstrate compliance with the S12 flue gas flow rate requirements of par. (A)(5), according to the following procedures.

- 1) *Performance Stack Testing.* The operator shall conduct performance stack testing and determine flue gas flow rates according to requirements and procedures in par. (G).
- 2) *Continuous Compliance Monitoring.* The operator shall demonstrate compliance on a continuous basis with the S12 flue gas flow rate requirement in par. (A)(5), by meeting the following conditions.
 - a. *Fuel.* The operator shall use only coal-derived coke to fire the cupola (P30) and shall use only natural gas for purposes of igniting coke in the cupola. This limitation for natural gas use does not apply to the thermal oxidizer (C11).
 - b. *Thermal Oxidizer (C11) Operation.*
 1. The thermal oxidizer (C11) shall be operated whenever the cupola (P30) is fired.
 2. The operator shall install, calibrate, maintain, and operate a monitoring device to continuously measure the temperature of the combustion chamber of the thermal oxidizer (C11). Temperature in the combustion chamber shall be recorded, at a minimum, once every 15 minutes during operation.
 3. The operator shall maintain the temperature in the combustion chamber of the thermal oxidizer (C11) to be at or above 1,300 degrees Fahrenheit, averaged over any one hour operation period.
 4. The operator shall maintain an interlock system which only allows operation of the cupola (P30) if the incinerator chamber temperature of the thermal oxidizer is at or above 1,300 degrees Fahrenheit, averaged over any one hour period.
 - c. *Baghouse (C12) Operation.*
 1. The operator shall use the baghouse (C12) whenever the cupola (P30) is fired.
 2. The pressure drop across the baghouse (C12) shall be maintained between 0.5 and 10 inches of water column, or a range approved by the Department, in writing.
 3. The operator shall monitor the pressure drop across the baghouse once for every 8 hours of source operation or once per day, whichever yields the greater number of measurements.

d. *Cupola Process Monitoring.* The operator shall retain records of:

1. The coke heat content values, in Btu per pound, obtained from vendor supplied data or coke samples that are required under par. (E)(3).
2. The pounds per operating hour, each, for coke and total material loaded to the cupola (P30) for each operating day.

D) Mass Balance for Determining SO₂ Emissions from the Mineral Wool Production Process.

The operator shall perform the mass balance calculations required under par. (B)(2), for determining the 30-operating-day rolling average emission rate, in pounds per hour, using the following equations and procedures. A 30-operating-day rolling average emission rate is to be determined for each operating day by performing the mass balance calculation for that operating day and including the previous 29 operating days in the calculations⁷.

- 1) Equation 2 shall be used to calculate the 30-operating-day rolling average SO₂ emission rate.

Equation 2:

$$\begin{aligned}
 & \text{30 Operating Day Rolling Average SO}_2 \text{ Emission Rate } \left(\frac{\text{lbs}}{\text{hr}} \right) \\
 & = \left\{ \sum_{i=1}^{30} \left[\text{Sulfur Input } \left(\frac{\text{lbs}}{\text{day}} \right) - \text{Sulfur Output } \left(\frac{\text{lbs}}{\text{day}} \right) \right] \right. \\
 & \quad \left. \div \sum_{i=1}^{30} \left[\text{Operating Hours } \left(\frac{\text{hrs}}{\text{day}} \right) \right] \right\} \times (1.998)
 \end{aligned}$$

Where:

- a. The summations are for each operating day in the 30-operating-day rolling average period.
- b. Sulfur Input is the total amount of sulfur, in pounds, contained in all materials loaded to the cupola (P30) for each operating day. This mass is calculated according to equation 3.
- c. Sulfur Output is the total amount of sulfur, in pounds, contained in all mineral wool and waste material for each operating day. This mass is calculated according to equation 4.
- d. Operating hours is the number of hours the cupola (P30) operated in the 30-operating-day rolling average period for which SO₂ emissions are being calculated. The operating hours and operating days are defined and determined according to par. (E)(1).
- e. The value of 1.998 is the molecular weight ratio of SO₂ to sulfur, determined as 64.066 lb/lbmol of SO₂ divided by 32.066 lb/lbmol of sulfur.

- 2) Equation 3 shall be used to calculate the Sulfur Input applied in par. (D)(1), equation 2.

Equation 3:

⁷ The calculation of the emission rate excludes days when the cupola is not operating or operation does not reach three operating hours as defined in par. (E)(1), and as specified in par. (D)(2)b.

$$\begin{aligned}
\text{Sulfur Input} \left(\frac{\text{lbs}}{\text{day}} \right) &= [\text{Coke Input} \left(\frac{\text{lbs}}{\text{day}} \right) \times \text{Coke \% Sulfur}] \\
&+ \sum_{i=1}^n [\text{Material Input} \left(\frac{\text{lbs}}{\text{day}} \right) \times \text{Material \% Sulfur}]
\end{aligned}$$

Where:

- a. Sulfur Input is the total amount of sulfur, in pounds, contained in all coke and materials loaded to the cupola (P30) for each operating day.
- b. The mass of coke and material is the total amount, in pounds, of coke and each material loaded to the cupola for each operating day. The total amount includes all coke and materials input during initial loading of the cupola for mineral wool production when the cupola operates for more than three continuous operating hours. Any amount of coke and materials loaded to the cupola for a period in which the cupola does not operate for three or more continuous hours can be excluded from the calculation.
- c. “n” is equal to the total number of material inputs which include slag, additives, and any other materials added to the cupola (P30) for each operating day.
- d. The Coke % Sulfur applied in the calculation shall be one of the following:
 1. The highest percent sulfur by weight, based on the certificate of analysis provided by the vendor as required under par. (E)(3)a., of the five most recent shipments of coke received prior to or on the day for which emissions are being calculated.
 2. The percent sulfur by weight value of the most recent sample collected according to par. (E)(3)b., which is obtained prior to or on the day for which emissions are being calculated.
 3. The 98th percentile percent sulfur by weight value of the vendor supplied information and samples collected according to par. (E)(3), during the six calendar month period, or a shorter calendar period approved in the compliance and monitoring plan, prior to the day for which emissions are being calculated. The 98th percentile sulfur content shall, at a minimum, be updated on a monthly calendar basis.
- e. The Material % Sulfur applied in the calculation is the percent sulfur by weight for each material loaded to the cupola (P30) and shall be determined as follows:
 1. Except as provided under subd. e. 2., one of the following:
 - i. The percent sulfur by weight of the sample for each material collected according to par. (E)(4) and (5), most recently obtained on or prior to the day for which emissions are being calculated.
 - ii. The 98th percentile percent sulfur by weight of the samples for each material collected according to par. (E)(4) and (5), obtained during the six calendar month period, or a shorter calendar period approved in the compliance and monitoring plan, prior to or on the day for which emissions are being calculated. The 98th percentile sulfur content shall be updated, at a minimum, on a monthly calendar basis.
 2. For a material qualified according to par. (E)(6) as a “low sulfur” material., one of the following:
 - i. The percent sulfur by weight of the sample collected according to par. (E)(4) and (6), most recently obtained prior to or on the day for which emissions are being calculated.
 - ii. If all sample values, collected according to par. (E)(4) and (5), for that material are

less than 0.01 percent, the operator may apply a value of 0.01 percent sulfur by weight (wet or dry) in the calculations.

- f. All percent sulfur by weight values applied in the calculation must be corrected for moisture to the same basis (wet or dry) as the Coke Input or Material Input percent sulfur by weight values applied in the calculation.

3) Equation 4 shall be used to calculate the Sulfur Output applied in par. (D)(1), equation 2.

Equation 4:

$$\text{Sulfur Output} \left(\frac{\text{lbs}}{\text{day}} \right) = \sum_i^n [\text{Material Input} \left(\frac{\text{lbs}}{\text{day}} \right)] \times \text{Mineral Wool \% Sulfur}$$

Where:

- a. Sulfur Output is the total amount of sulfur, in pounds, contained in all mineral wool and waste material for each operating day.
- b. Material Input mass shall be corrected to a dry basis to correspond to the basis of the mineral wool percent sulfur by weight measurement. The percent moisture used to correct the amount of material input to a dry basis shall be one of the following
 - i. The percent moisture content of the sample for each material collected according to par. (E)(4), (5), and (6), most recently obtained prior to or on the day for which emissions are being calculated.
 - ii. The average percent moisture for each material for all samples, collected according to par. (E)(4), (5), and (6), obtained during the six calendar months, or a shorter calendar period approved in the compliance and monitoring plan, prior to or on the day for which emissions are being calculated. The percent moisture value shall be updated, at a minimum, on a monthly calendar basis.
- c. The Mineral Wool % Sulfur applied in the equation shall be one of the following:
 - i. The percent sulfur by weight of the sample for mineral wool collected according to par. (E)(7), most recently obtained prior to or on the day for which emissions are being calculated.
 - ii. The 10th percentile percent sulfur by weight value of all samples obtained during the six calendar months, or a shorter calendar period approved in the compliance and monitoring plan, prior to or on the day for which emissions are being calculated. The mineral wool percent sulfur value shall be updated, at a minimum, on a monthly calendar basis.

E) Monitoring and Sampling. The operator shall determine and maintain records of the inputs for the mass balance calculation required under par. (D), and the data required for cupola (P30) monitoring under par. (C)(2)d., as follows.

- 1) *Operating Hours and Operating Days.* The operator shall record the number of operating hours in each calendar day that the cupola (P30) is operated and the calendar days determined to be an operating day as required for calculations in par. (D)(1)d.
 - a. Operating hours for the cupola are all hours beginning when mineral wool is first produced and ending when the molten mineral wool mixture no longer exits the cupola

- (P30) immediately prior to completing a production run of mineral wool⁸.
- b. An operating day is any calendar day in which the cupola (P30) operates for three or more continuous operating hours. The operating day shall be from 7:00 am one day to 7:00 am the next calendar day, unless an alternative 24-hour period is specified in the compliance and monitoring plan required under par. (H). An operating day is any applicable twenty-four hour period designated by the operator and applied consistently to each operating day. Any 30-operating-day averaging period shall end at the same daily hour as it began for purposes of obtaining data and performing the mass balance calculations under par. (D).
- 2) *Coke and Material Usage.* The operator shall measure and record the pounds of coke and each material loaded to the cupola (P30), including all coke and material loaded prior to the start of operating hours, as required under par. (D)(2)b. for purposes of emission calculations.
 - 3) *Coke Sampling.* Except as provided in par. (E)(9), the operator shall determine the percent sulfur and moisture by weight, as required in par. (D)(2)d., for purposes of emission calculations and determine the heat content, in Btu per pound, for coke used in the cupola (P30) operation, as required in par. (C)(2)d., for purposes of cupola process monitoring, according to one of the following.
 - a. The operator shall obtain a certification of analysis providing the percent sulfur and moisture by weight and the heat content, in Btu per pound, from the coke vendor for each shipment of coke received at the facility. The operator shall obtain certification from the vendor indicating that the data has been collected and analyzed according to applicable methods in par. (F). The operator shall have all vendor supplied certificate information on site within 45 days of receiving the shipment of coke and maintain a record of the certificates as required by this Administrative Order. The operator shall notify the Department if vendor supplied data is missing for 5 or more shipments of coke during any twelve calendar month period. If missing more than 5 certificates in any twelve calendar month period, the Department may require additional sampling.
 - b. The operator shall collect a minimum of one sample of coke as loaded to the cupola (P30) during each 15-operating-day period and analyze for percent sulfur and moisture by weight. The operator shall collect a minimum of one sample of coke as loaded to the cupola during each 30-operating-day period and analyze for heat content, in Btu per pound.
 - 4) *Initial Material Sampling.* The operator shall determine the initial percent sulfur and moisture content by weight, as required in par. (D)(2)e., for purposes of emission calculations and required in par. (E)(6), for purposes of qualifying a low sulfur material, by performing

⁸ This definition is based on information provided by USG stating that the cupola is not maintained in a warm or minimal idling mode between production runs (campaigns). The operator completely removes material from the cupola at the end of each campaign to perform cleaning and inspection.

initial sampling and analysis of each material, including slag and other additives used in producing mineral wool, according to the following.

- a. The operator shall collect and analyze a minimum of three samples of each material used in mineral wool production prior to October 1, 2017 by that date and of any new material after October 1, 2017 prior to its use in mineral wool production. A new material is one being used for the first time in the mineral wool process, one that has not previously undergone initial material sampling, or one which is obtained from a different source process or supplier.
 - b. The percent sulfur by weight value applied in the emission calculations in par. (D)(2)e., and in the qualification of a low sulfur material according to par. (E)(6), shall be the average value of all samples obtained for initial sampling required by subd. a.
- 5) *Ongoing Material Sampling.* Except as provided under par. (E)(6), (8) and (9), the operator shall collect a minimum of one sample of each material, including slag and other additives, as loaded to the cupola (P30) during each 7-operating-day period and analyze for percent sulfur and moisture by weight, as required for emission calculations in par. (D)(2)e.
- 6) *Ongoing Low Sulfur Material Sampling.* The operator may qualify a material contributing one percent or less to the total mass of sulfur contained in materials loaded to the cupola (P30) as a low sulfur material and collect and analyze samples of a low sulfur material for percent sulfur and moisture by weight, as required for emission calculations in par. (D)(2)e., according to the following.
- a. The operator shall qualify a material as a low sulfur material by determining the percent sulfur contribution of a material relative to the total sulfur loaded to the cupola based on all coke and material sulfur input during a representative period (baseline). As part of the determination, the operator shall account for the addition of the new material and any substitution of materials by the new material. The operator shall, at a minimum, use the percent sulfur by weight information required by initial material sampling under par. (E)(4), in calculating the percent sulfur contribution. The methodology for determining a low sulfur material shall be provided in the compliance and monitoring plan required under par. (H). The operator shall retain records of all information and calculations used in determining the percent sulfur contribution of a qualifying material.
 - b. After initial sampling required under par. (E)(4), the operator shall collect and analyze a minimum of one sample during each 12 calendar month period.
- 7) *Mineral Wool Product and Waste Sampling.* Except as provided in par. (E)(8), the operator shall collect and analyze a minimum of one sample during each 7-operating-day period of either the mineral wool product or waste material and determine the percent of sulfur content by weight, as required for emission calculations in par. (D)(3)c.

- 8) *Missing Sample Data.* If the operator is not able to obtain a sample as required under par. (E)(5),(7), or (9)a., the operator may: 1) substitute analysis results of the sample most recently obtained prior to the applicable operating day period specified by par. (E)(5), (7), or (9)a. of the missing sample; or 2) obtain two samples during the applicable operating day period specified by par. (E)(5), (7), or (9)a. following the missing sample period. The operator shall notify the Department if substituting for missing required sample values more than once in any twelve calendar month period. If missing more than one required sample in any twelve calendar month period, the Department may require additional sampling. All substituted values shall be identified in the data record.
- 9) *Alternate Sampling Frequency.* Alternate sampling frequency applies as follows:
- a. If the 30-operating-day rolling average SO₂ emission rate determined according to par. (D), is equal to or greater than 95 percent of the 30-operating-day rolling average emission limitation under par. (A)(3), for three or more operating days during the previous 12 calendar months, the operator shall increase the coke and material sampling and analysis frequency according to the following schedule. The operator may return to the original sampling and analysis frequency once the 30-operating-day rolling average emission rate determined according to par. (D), is less than 95 percent of the 30-operating-day rolling average emission limitation for 12 consecutive calendar months or with written approval by the Department.
 1. For coke analysis under par. (E)(3)b., the sampling frequency shall be increased to a minimum of one sample collected and analyzed during each 7-operating-day period for purposes of analyzing percent sulfur and moisture by weight and a minimum of one sample during each 15-operating-day period for purposes of analyzing heat content, in Btu per pound.
 2. For ongoing material sampling under par. (E)(5), the sampling frequency shall be one sample collected and analyzed during each 4-operating-day period.
 - b. If all 30-operating-day rolling average SO₂ emission rates for the mineral wool production process determined according to par. (D), are equal to or less than 70 percent of the emission limitation in par. (A)(3), for 12 consecutive months, the operator may collect and analyze samples according to the following schedule. If the 30-operating-day rolling average SO₂ emission rate exceeds 70 percent of the emission limitation in par. (A)(3), for three or more operating days, the operator shall resume sampling according to the original sampling schedule.
 1. For coke, a minimum of one sample during each 30-calendar-day period for purposes of analyzing percent sulfur and moisture by weight and a minimum of one sample for purposes of analyzing heat content, in Btu per pounds, during each 60-calendar-day period. This sampling shall not apply when no operating hours occur during the applicable calendar period.

2. For ongoing material sampling as required under par. (E)(5), a minimum of one sample for each material during each 10-operating-day period.

10) All sampling and analysis required under par. (E), shall be performed according to the methods specified in par. (F).

F) Coke and Material Sampling Methods. All coke and material sampling and analysis required by this Administrative Order shall be performed according to the methods specified below or their future updated or replacement methods as specified by ASTM International, formerly known as the American Society for Testing and Materials (ASTM). The operator may use alternative methods equivalent to the methods of this paragraph with written approval by the Department that includes consultation with the U.S. EPA.

1) *On-Site Sample Collection and Preparation.* Coke and material samples collected on-site shall be collected and prepared according to the following methods.

- a. Samples required under par. (E)(3) and (5), for coke or a material “as loaded” to the cupola (P30) shall be obtained from coke or materials that has been removed from the storage pile or container for placement into the cupola loading bin.
- b. Samples required under par. (E)(4), for initial sampling of material, low sulfur material sampling under par. (E)(6), or any other sample that is not “as loaded” to the cupola shall be collected in a manner representative of materials to be used in the cupola process (P30) during the applicable sampling period for which emissions are being calculated in accordance with par. (D).
- c. Samples of mineral wool shall be collected from material produced during the required period of sampling.
- d. Each sample subject to subd a. through c., shall consist of three comparably sized increments. The increments shall be collected using procedures which are equivalent to ASTM 2234M Table 1 sampling criteria II-D-1, defined as human discretion stationary sampling with systematic spacing of increments. All increments comprising an “as loaded” sample shall be collected within the same operating hour. An “as loaded” sample may be a composite of multiple individual samples, however, the operator is not required to perform composite sampling beyond obtaining the three increments necessary for an individual sample.
- e. The sample shall be crushed to uniformly sized particulate and thoroughly mixed in one container. A sample of the homogenous material shall be removed for analysis.
- f. The operator shall identify the on-site sample collection frequency, preparation methods, analysis methods, and a description of how representative samples are to be collected in the compliance and monitoring plan required under par. (H).

- 2) *Vendor Supplied Data.* For data supplied by a vendor, the operator shall obtain certification from the vendor that the samples have been collected and prepared according to methods equivalent to the procedures specified in par. (F)(1), or according to the following methods, as applicable.
 - a. For coke, each coke sample has been collected according either ASTM D2234M, Standard Practice for Collection of a Gross Sample of Coal, or ASTM D7430-08, Standard Practice for Mechanical Sampling of Coal. Each coke sample has been prepared and composited according to ASTM D2013-01 Standard Practice of Preparing Coal Samples for Analysis.
 - b. For non-coke materials to be used for mineral wool production, each material sample shall be collected and prepared in a manner equivalent to the methods specified in par. (F)(1)b., d., and e.
- 3) *Coke Sulfur Content.* Coke samples shall be analyzed for percent sulfur by weight using one of the following methods.
 - a. ASTM D3177, Standard Test Methods for Total Sulfur in the Analysis Sample of Coal and Coke.
 - b. ASTM D3176, Standard Practice for Ultimate Analysis of Coal and Coke.
 - c. ASTM D4239-85 or -04a, Standard Methods for Sulfur in the Analysis Sample of Coal and Coke using High Temperature Tube Furnace Combustion Methods.
 - d. ASTM E1621-13, Standard Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry. The sample shall be prepared for analysis without the application of heat except for purposes of drying the sample.
- 4) *Coke Heat Content.* Coke samples shall be analyzed for heat content, in Btu per pound, according to one of the following methods.
 - c. ASTM D2015-85, Standard Test Method for Gross Calorific Value of Coal and Coke by the Adiabatic Bomb Calorimeter.
 - d. ASTM D5865-13, Standard Test Method for Gross Calorific Value of Coal and Coke.
- 5) *Material Sulfur Content.* Material samples shall be analyzed for percent sulfur by weight using the methods in par. (4), as applicable, or one of the following methods.
 - a. ASTM E1621-13, Standard Guide for Elemental Analysis by Wavelength Dispersive X-Ray Fluorescence Spectrometry. The sample shall be prepared for analysis without the application of heat, except for purposes of drying the sample.

- b. An ASTM method which specifically quantifies total sulfur content in a material and is applied according to quality assurance plans in a certified laboratory.
- 6) *Moisture Content.* Coke and mineral samples shall be analyzed for percent moisture by weight according to one of the following methods, as applicable.
- a. For any sample collected and analyzed on site and for the value applied in calculating emissions according to par. (D), or for purposes of performance stack testing requirements under par. (G), the moisture content of a sample shall be determined gravimetrically by weighing the sample as collected and after drying the sample. The sample shall be dried until the weight values no longer change. The final percent moisture by weight value shall be recorded.
 - b. ASTM D3173-02, Standard Test Methods for Moisture in the Analysis Sample of Coal and Coke.
 - c. ASTM D3302, Standard Test Method for Total Moisture in Coal
- 7) *Data Availability.* The operator shall obtain all sample results for vendor supplied data within 45 days of receiving a shipment of material. The operator shall obtain all data results for off-site analysis within 60 days.
- G) Performance Stack Testing for the Mineral Wool Production Process. The operator shall conduct and determine the results of each performance stack test required under this Administrative Order according to the following procedures.
- 1) The operator shall perform an initial performance stack test conducted no later than April 1, 2018⁹ and perform periodic performance stack tests conducted every five years within 90 days of the anniversary date of the initial performance test (i.e., the first periodic stack test will be conducted within 90 days of April 1, 2023).
 - 2) The performance stack test shall be performed according to all applicable procedures and methods under ss. NR 439.07 and NR 439.075(4), Wis. Adm. Code, unless otherwise specified in this Administrative Order.
 - 3) The performance stack test shall be conducted after the mineral wool process has reached steady state conditions at full load. Full load conditions are represented by loading materials to full operating levels in the cupola at least once every fifteen minutes, as practicable within physical constraints and without compromising the production of the mineral wool.
 - 4) The operator shall measure and record the following flue gas parameters for Stack S12 exiting flue gas exhaust according to the listed methods or according to their future updated methods or methods specified by the U.S. EPA.

⁹ This date is 180 days after the compliance date of October 1, 2017 specified by the Administrative Order.

- a. The SO₂ concentrations measured according to U.S EPA Method 6C.
 - b. The flue gas flow rate measured in standard and actual conditions according to U.S. EPA Method 2.
 - c. Temperature.
 - d. Moisture content according to U.S. EPA Method 4.
 - e. Oxygen concentration according to U.S. EPA Method 3A.
- 5) The operator shall measure and record the baghouse pressure differential in accordance with par. (C)(2)c.
- 6) The operator shall measure and record the following mineral wool process operating parameters during each performance stack test according to applicable methods in par. (F).
- a. The pounds of coke and each material as loaded to the cupola (P30) during each stack test run.
 - b. The percent sulfur and moisture by weight for coke, for each material subject to sampling under par. (E)(5), as loaded to the cupola, and for mineral wool produced¹⁰ during the performance stack test in accordance with the following.
 1. One sample shall be collected for coke, each material, and mineral wool during each run of the performance stack test. The respective samples shall be composited into one sample, each, for coke, each material, and mineral wool. Alternatively, to a composite sample, the operator may analyze three individual samples collected during each test run for each of coke, each material, and the mineral wool and apply the average value in determining performance stack test results.
 2. Each sample of coke, each material, and mineral wool shall be analyzed for percent sulfur by weight and each sample of coke analyzed for heat content, in Btu per pound, by an off-site laboratory.
 3. The operator shall analyze the coke, each material, and mineral wool samples required under subd. b.2., using the on-site laboratory for any parameter of percent sulfur by weight or heat content that was analyzed by the on-site laboratory and applied in calculating a 30-operating-day emission rate for purposes of demonstrating

¹⁰ The mineral wool waste is identical material to the mineral wool product and thus one sample is representative of both.

compliance, in accordance with par. (B)(2), since the last performance stack test¹¹.

4. Each sample of coke, each material, and mineral wool required under subd. b.2., shall be analyzed for moisture by either the on-site or off-site laboratory.
 5. Samples shall be collected and prepared according to requirements of par. (F)(1)a., c., d., and e., as applicable, and analyzed according procedures in par. (F)(3) through (6), as applicable.
 6. The sampling and analysis procedures for samples collected during performance stack tests shall be described in the compliance and monitoring plan required under par. (H). The operator shall also describe in the plan the methodology for splitting, handling, and retaining samples that are analyzed both on and off-site.
- 7) The operator shall calculate the following parameters based on the results of the performance stack test. A parameter value calculated for purposes of compliance shall be the mean value of the three test runs conducted during the stack test.
- a. The cupola SO₂ emission rate, in pounds per hour, measured during the performance stack test for S12.
 - b. The mineral wool production process SO₂ emission rate, in pounds per hour, according to Equation 5, based on the measured performance stack test results.

Equation 5.

$$\begin{aligned} \text{Mineral Wool Production Process SO}_2 \text{ Emission Rate } \left(\frac{\text{lbs}}{\text{hr}} \right) \\ = \text{Cupola SO}_2 \text{ Emission Rate } \left(\frac{\text{lbs}}{\text{hr}} \right) \div (1 - BC/100) \end{aligned}$$

Where:

- a. The cupola SO₂ emission rate is the SO₂ emission rate identified in subd.a.
- b. BC is 4.6 percent, the percentage of SO₂ emitted through the blow chamber process (P31)¹².
- c. The mineral wool production process SO₂ emission rate, in pounds per hour, based on a sulfur mass balance of SO₂ emissions using the total amount of coke and materials loaded

¹¹ The operator is not required to analyze a sample using the on-site laboratory for a parameter that was not analyzed on-site during the ongoing compliance demonstration. For example, if the operator uses vendor information or off-site analysis for obtaining coke sulfur by weight or heat content, the operator would not be required to perform on-site analysis of that parameter for purposes of the performance stack test.

¹² The total amount of SO₂ emissions from the blow chamber process for purposes of the air dispersion modeling conducted by the Department was represented as 4.6 percent of the total amount of emissions for the mineral wool process, determined using the mass balance method. The Department's air dispersion modeling is documented in the memorandum *Sulfur Dioxide Dispersion Modeling Analysis, USG Interiors – Walworth, Wisconsin*, January, 2017.

to the cupola during the performance stack test and the percent sulfur by weight values determined from samples of coke, materials input to the cupola, and mineral wool collected during the performance stack test. For each low sulfur material, the mass balance shall be calculated using either sulfur content data collected during the test or the maximum previously sampled sulfur content.

- d. The S12 flue gas flow rate, in standard and actual cubic feet per minute, measured during the performance stack test for S12.
- H) Compliance and Monitoring Plan. The operator shall submit a compliance and monitoring plan to the Department by October 1, 2017. The plan shall identify all of the following: the SO₂ emission limitations (as specified in this Administrative Order), representative sampling and analysis methods, sampling frequencies, monitoring requirements, and compliance calculations. The plan shall include a list of records to be maintained and the format of the compliance reports. The plan, and any subsequent changes to the plan, must be approved by the Department in writing and provided to the U.S. EPA.
- I) Record Keeping Requirements The operator shall maintain records required under this Administrative Order, including the following list of records, on site for a minimum period of five years.
1. All performance stack test and sampling data, calculations, and determinations of SO₂ emission rates and flue gas flow rates required for each applicable performance stack test.
 2. The number of operating hours in each calendar day, fuel and material loading data, and percent sulfur by weight, percent moisture by weight, and heat content, as required under par. (C)(2)d., and par. (E), and the date of all on-site sampling and received shipments of coke as required under par. (E).
 3. A record of the mass balance and the 30-operating-day rolling average SO₂ emission rate in pounds per hour calculated according to par. (D), for each operating day.
 4. A record of the percent value of each 30-operating-day rolling average SO₂ emission rate determined under par. (D), divided by the 30-operating-day rolling average SO₂ emission limitation under par. (A)(3), for each operating day.
 5. A record of thermal oxidizer chamber temperatures and baghouse pressure drop values required under par. (C)(2).
 6. A record of data and calculations applied in determining a low sulfur material according to par. (E)(6).
 7. A record of days with missing vendor data required under par. (E)(3)a., or missing sample data required under par. (E)(8), as applicable.

- J) Reporting Requirements. The operator shall submit the information required for the semi-annual monitoring report under this paragraph as part of the semi-annual compliance report required for the facility. The operator shall comply with the following reporting requirements.
- 1) The operator shall submit an initial compliance report by February 15, 2018 for the requirements of this Administrative Order.
 - 2) The time period to be addressed by the initial compliance report is the period from October 1, 2017 to December 31, 2017.
 - 3) The time periods to be addressed by the semi-annual monitoring reports after the initial semi-annual monitoring reports are the period from January 1 to June 30 and the period from July 1 to December 31.
 - 4) The operator shall submit a semi-annual monitoring report to the Department within 60 days after the end of each reporting period.
 - 5) All reports shall be submitted to the Wisconsin Department of Natural Resources, Southeast Region Air Program, Waukesha Service Center, or an alternative address provided by the facility's assigned compliance inspector.
 - 6) Each submittal shall be certified by a responsible official as to the truth, accuracy and completeness of the report.
 - 7) All deviations from and violations of applicable requirements shall be clearly identified in each report.
 - 8) Each report shall include the following information.
 - a. A certification that each 30-operating-day rolling average SO₂ emission rate calculated under par. (D), is equal to or less than the emission limitation in par. (A)(3), or the number and the 30-operating-day rolling average emission rate of the days the 30-operating-day rolling average emission rate exceeds the 30-operating-day rolling average SO₂ emission limitation in par. (A)(3).
 - b. A notification and description of occurrences when any condition identified under par. (C)(2)b. or c., is not met.
 - c. The compliance determination and results regarding any performance stack test conducted during the reporting period for compliance with the hourly SO₂ emission limitation in par. (A)(2), and compliance with the flue gas flow rate requirement in par. (A)(5).
 - d. All days and values for when the percent value of the 30-operating-day rolling average SO₂ emission rate determined under par. (D), is equal to or greater than 95 percent of the

30-operating-day rolling average SO₂ emission limitation under par. (A)(3).

- e. The beginning date for reduced sampling frequency allowed under par. (E)(9)b., due to the percent value of the 30-operating-day rolling average SO₂ emission rate determined under par. (D), being equal to or less than 70 percent of the 30-operating-day rolling average SO₂ emission limitation under par. (A)(3), for 12 consecutive calendar months.
 - f. The number of days of missing vendor data required under par. (E)(3)a., or missing sample data under par. (E)(8), as applicable. This information, as applicable, shall be first provided for the twelve month calendar period ending October 1, 2018.
- 9) The operator shall report to the Department within one business day after a determination is made of one of the following.
- a. The 30-operating-day rolling average SO₂ emission rate calculated according to par. (D), exceeds the 30-operating-day rolling average emission limitation in par. (A)(3).
 - b. Either the hourly SO₂ emission rate or flue gas flow rate determined from an applicable performance stack test are not in compliance with the limitations in par. (A)(2) and (5), respectively.

K) Alternative Monitoring and Compliance Requirements

The operator may use alternatives to any requirement in par. (B) through (J), with written approval by both the Department and U.S. EPA. The Department will provide U.S. EPA with the requested alternatives proposed by the operator for review and will communicate the U.S. EPA decision to the operator.

Section VII. Requirements for Other SO₂ Emission Sources.

The parties to this Administrative Order agree to the following.

- A) The operator shall fire only natural gas for the following emission sources.
- 1) Boiler B10
 - 2) Acoustical Tile Dryer P32
 - 3) Finishing Curing Ovens P34A and P38A
- B) The operator shall retain records for a period of five years describing the fuel fired each month for the sources listed in par. (A).

Section VIII. Title V Operating Permits

USG Interiors LLC shall submit a revision request to incorporate applicable requirements of Section VI and VII., of this Administrative Order into the facility's operating permit by June 23, 2019. For any requested change to this Administrative Order requiring Department and U.S. EPA approval, the operator shall submit a revision request for incorporating the change into the facility operating permit. The Department will provide U.S. EPA with the requested changes by the operator for review and will communicate the U.S. EPA decision to the operator. The request for incorporation of changes to the operating permit can be included as part of the request for the Administrative Order changes or supplied upon receipt of approval by the Department and U.S. EPA.

WAIVER AND STIPULATION

Section IX. Waiver and Stipulation

USG Interiors LLC consents to, and agrees not to contest, the Department's jurisdiction to issue this Administrative Order and to enforce its terms. To that end, USG Interiors LLC stipulates to the issuance of this Administrative Order and hereby waives further notice or hearing before the Department regarding the foregoing Findings of Fact, Conclusions of Law and Administrative Order, and waives its rights, if any, to challenge this Administrative Order in circuit court under ss. 227.52 and 227.53, Stat., or any other provision of law. USG Interiors LLC further stipulates and agrees that this Administrative Order is effective and enforceable after being signed by both parties and that it may be enforced in accordance with ss. 299.95, and 299.97, Stat.

USG Interiors LLC understands that the Department intends to submit this Administrative Order to U.S. EPA for purposes of satisfying Wisconsin requirements for the SO₂ DRR, USG Interiors LLC stipulates and agrees that this Administrative Order is federally enforceable by U.S. EPA upon U.S. EPA approval and incorporation of this Administrative Order into the Wisconsin SIP. The undersigned further certifies that he or she is authorized to execute such Administrative Order, Waiver and Stipulation on behalf of USG Interiors LLC.

Nothing in this Administrative Order, however, shall be construed as an admission on the part of USG Interiors LLC for any purpose other than for an action taken by the Department or the U.S. EPA for failure to comply with the terms of this Order. This stipulation and waiver does not affect the right of USG Interiors LLC to assert any equitable or legal defense or to challenge the interpretation or application of this Administrative Order in any challenge or alleging of violation brought by a party other than the Wisconsin Department of Natural Resources or the U.S. EPA.

STATE OF WISCONSIN DEPARTMENT OF NATURAL RESOURCES for the
Secretary

By: Gail E Good
Gail Good
Director, Air Management

11/31/2017
Date

USG INTERIORS LLC

By: Michael Spreitzer
Michael Spreitzer
Plant Manager, Duly Authorized Representative
USG Interiors, LLC, Walworth Plant

1/27/17
Date

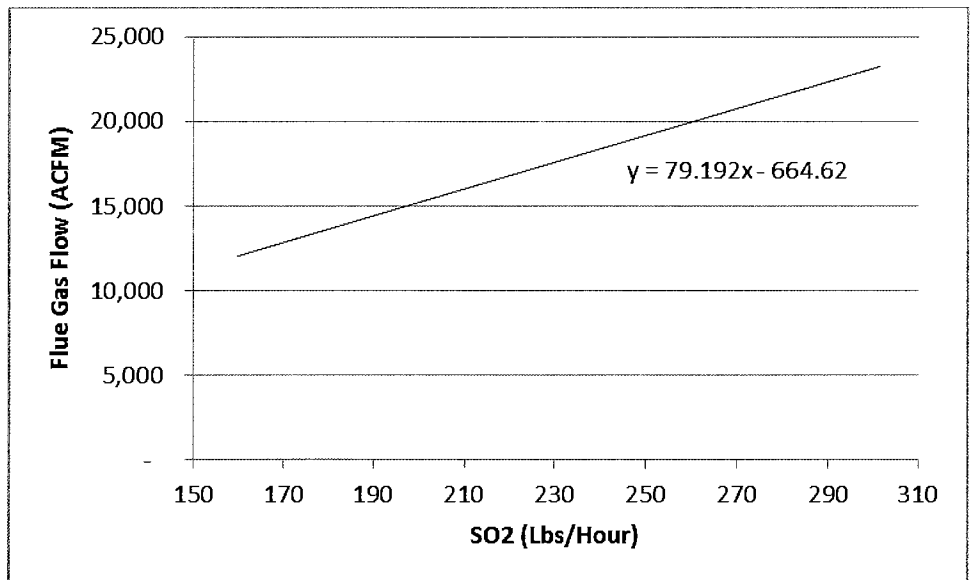
Attachment 1
To
Administrative Order AM-16-01

For
 USG Interiors LLC
 Facility ID 265006830

The Wisconsin Department of Natural Resources (Department) performed air dispersion modeling to establish facility SO₂ emission and operating requirements in Administrative Order AM-16-01 that demonstrate attainment of the 2010 SO₂ NAAQS^{13,14}.

The air dispersion modeling performed by the Department demonstrates that the flue gas flowrates for the cupola process, P30, must increase as SO₂ emissions increase in order to maintain attainment of the 2010 SO₂ NAAQS. The table and graphic below show this relationship. The presented flue gas flow rates are for the cupola process, while the SO₂ emissions are for the entire mineral wool production process (cupola and blow chamber). The SO₂ emissions are presented for the total process to be consistent with the compliance demonstration in the order.

SO2 (lbs/hr)	ACFM
160	12,006
170	12,798
180	13,590
190	14,382
200	15,174
210	15,966
220	16,758
230	17,550
240	18,341
250	19,133
260	19,925
270	20,717
280	21,509
286	21,984
290	22,301
300	23,093



¹³ WDNR, 2017, memorandum *Sulfur Dioxide Dispersion Modeling Analysis, USG Interiors – Walworth, Wisconsin*, Bureau of Air Management, Wisconsin Department of Natural Resources, January, 2017.

¹⁴ The air dispersion modeling is conducted for a cupola stack S12 height of 175 feet.