

**AIR EMISSION PERMIT NO. 16900012- 002**

**IS ISSUED TO**

**Badger Foundry Company**

Badger Foundry Company  
1058 East Mark Street  
Winona, Winona County, MN 55987

The emission units, control equipment and emission stacks at the stationary source authorized in this permit are as described in the following permit application(s):

| Permit Type                     | Application Date |
|---------------------------------|------------------|
| Total Facility Operating Permit | 06/15/1995       |
| Major Amendment                 | 07/02/2001       |

This permit authorizes the permittee to operate and construct the stationary source at the address listed above unless otherwise noted in Table A. The permittee must comply with all the conditions of the permit. Any changes or modifications to the stationary source must be performed in compliance with Minn. R. 7007.1150 to 7007.1500. Terms used in the permit as defined in the state air pollution control rules unless the term is explicitly defined in the permit.

**Permit Type:** Federal Pt 70; PSD/NSR

**Issue Date:** June 25, 1998

**Expiration:** June 25, 2003

**Major Amendment**

**Construction & Operation Issue Date: March 27, 2002**

**Operating Conditions Issue Date: May 20, 2002**

All Title I Conditions do not expire.

Don Smith for \_\_\_\_\_

Ann M. Foss

Major Facilities Section Manager

Majors and Remediation Division

for Karen A. Studders

Commissioner

Minnesota Pollution Control Agency

CT:lh

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**NOTICE TO THE PERMITTEE:**

Your stationary source may be subject to the requirements of the Minnesota Pollution Control Agency's (MPCA) solid waste, hazardous waste, and water quality programs. If you wish to obtain information on these programs, including information on obtaining any required permits, please contact the MPCA general information number at:

|                    |                |
|--------------------|----------------|
| Metro Area         | (651) 296-6300 |
| Outside Metro Area | 1-800-657-3864 |
| TTY                | (651) 282-5332 |

The rules governing these programs are contained in Minn. R. chs. 7000-7105. Written questions may be sent to: Minnesota Pollution Control Agency, 520 Lafayette Road North, St. Paul, Minnesota 55155-4194.

Questions about this air emission permit or about air quality requirements can also be directed to the telephone numbers and address listed above.

**PERMIT SHIELD:**

Subject to the limitations in Minn. R. 7007.1800, compliance with the conditions of this permit shall be deemed compliance with the specific provision of the applicable requirement identified in the permit as the basis of each condition. Subject to the limitations of Minn. R. 7007.1800 and 7017.0100, subp. 2, notwithstanding the conditions of this permit specifying compliance practices for applicable requirements, any person (including the Permittee) may also use other credible evidence to establish compliance or noncompliance with applicable requirements.

**FACILITY DESCRIPTION:**

Badger Foundry is a gray iron foundry with a scrubber and afterburner controlled cupola. The cupola has a rated capacity of 10 tons melted per hour. The facility has four phenolic urethane core making machines, one phenolic urethane mold making machine and multiple green sand mold making machines. The cores are currently dipped in a water-based core wash that is volatile organic compound (VOC) free.

Badger is an existing major source under 40 CFR § 52.21, Prevention of Significant Deterioration (PSD). Actual emissions from Badger have exceeded the 100 ton per year PSD major source threshold. The permit limits hazardous air pollutant (HAP) emissions to less than the major source thresholds of 10 tons per year for a single HAP and 25 tons per year for any combination of HAPs.

This permit action allows for the installation of a sand reclamation system for the no-bake core and mold making operations. To avoid classification as a “major modification” under the PSD rules, the permit limits the emissions increase to less than 40 tons per year of VOCs, 25 tons per year of particulate matter (PM) and 15 tons per year of PM with an aerodynamic diameter less than 10 microns (PM<sub>10</sub>). Emissions of PM and PM<sub>10</sub> will be controlled by a new fabric filter (CE 011). VOC emissions will be limited to 39 tons per year, with compliance demonstrated by record keeping and emission calculations.

As part of this permit action, one fabric filter (CE 005) will be removed. CE 005 currently controls emissions from a shot blaster (EU 046). Another existing fabric filter (CE 010) will be used to control emissions from EU 046. CE 010 formerly controlled emissions from EU 058. Emissions from EU 058 will be controlled by the new fabric filter (CE 011), which will also control emissions from the new sand reclaimer (EU 061) and the new sand handling system (EU 062).

New equipment to be installed is shown below:

| <b>EU #</b> | <b>SV #</b> | <b>CE #</b> | <b>Description</b>        | <b>Capacity</b> |
|-------------|-------------|-------------|---------------------------|-----------------|
| 061         | 020         | 011         | Vibra-Mill Sand Reclaimer | 10 ton/hour     |
| 062         | 020         | 011         | Sand Handling System      | 30 ton/hour     |
| 063         | 021         | ----        | Natural gas-fired boiler  | 0.42 MM Btu/hr  |
| 064         | 022         | ----        | Sand Mixer                | 30 ton/hour     |

The new emission unit/control equipment relationships for equipment (both new and existing equipment) affected by this permit action will be as follows:

| <b>EU #</b> | <b>SV #</b> | <b>CE #</b> | <b>Description</b>                          |
|-------------|-------------|-------------|---|
| 046         | 013         | 010         | Shot Blaster – 4 Wheel (existing equipment) |
| 058         | 020         | 011         | Shot Blaster – 3 Wheel (existing equipment) |
| 061         | 020         | 011         | Vibra-Mill Sand Reclaimer                   |
| 062         | 020         | 011         | Sand Handling System                        |
| 063         | 021         | ----        | Natural gas-fired boiler                    |
| 064         | 022         | ----        | Sand Mixer                                  |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Table A contains limits and other requirements with which your facility must comply. The limits are located in the first column of the table (What To do). The limits can be emission limits or operational limits. This column also contains the actions that you must take and the records you must keep to show that you are complying with the limits. The second column of Table A (Why to do it) lists the regulatory basis for these limits. Appendices included as conditions of your permit are listed in Table A under total facility requirements.**

| Subject Item:  | Total Facility   |
|--|--|
| What to do   | Why to do it   |
| A. EMISSION LIMITS   | hdr  |
| Single HAP: less than or equal to 9.5 tons/year using 12-month Rolling Sum   | To avoid major source classification under 40 CFR Section 63.2   |
| HAPs - Total: less than or equal to 24.5 tons/year using 12-month Rolling Sum . Total HAPs includes both particulate (metal) HAPs and gaseous HAPs.  | To avoid major source classification under 40 CFR Section 63.2   |
| B. OPERATIONAL LIMITS  | hdr  |
| Fugitive Emissions: Do not cause or permit the handling, use, transporting, or storage of any material in a manner which may allow avoidable amounts of particulate matter to become airborne. Comply with all other requirements listed in Minn. R. 7011.0150.  | Minn. R. 7011.0150   |
| Inspections: The Permittee shall comply with the inspection procedures and requirements as found in Minn. R. 7007.0800, subp. 9(A).  | Minn. R. 7007.0800, subp. 9(A)                                   |
| Noise: The Permittee shall comply with the noise standards set forth in Minn. R. 7030.0010 to 7030.0080 at all times during the operation of any emission units. This is a state only requirement and is not federally enforceable.  | Minn. R. 7030.0010 - 7030.0080                                   |
| The Permittee shall comply with the General Conditions listed in Minn. R. 7007.0800, subp. 16.   | Minn. R. 7007.0800, subp. 16                                     |
| C. POLLUTION CONTROL EQUIPMENT REQUIREMENTS  | hdr  |
| Operation and Maintenance Plan: Retain at the stationary source an operation and maintenance plan for all air pollution control equipment. The operation and maintenance plan shall specify what actions the Permittee will take for each piece of pollution control equipment if it is found to be operating outside of the operational parameters (pressure drop, water pressure, water flow rate).  | Minn. R. 7007.0800, subp. 14 and Minn. R. 7007.0800, subp. 16(J) |
| Circumvention: Do not install or use a device or means that conceals or dilutes emissions, which would otherwise violate a federal or state air pollution control rule, without reducing the total amount of pollutant emitted.  | Minn. R. 7011.0020   |
| If the Permittee observes any pollution control equipment operating outside of the operational parameters specified in this permit, the Permittee shall take corrective action as soon as possible to return the operation of the pollution control equipment to within the specified parameters.  | Minn. R. 7007.0800, subp. 14; Minn. R. 7007.0800, subp. 16(J)    |
| D. TESTING REQUIREMENTS  | hdr  |
| Performance Test: Conduct all performance tests in accordance with Minn. R. ch. 7017, unless otherwise noted in Tables A, B, or C.   | Minn. R. ch. 7017  |
| Operating and/or production limits may be placed on emission units based on operating conditions during compliance testing. Limits set as a result of a compliance test (conducted before or after permit issuance) apply until new operating/production limits are set following formal review of a performance test as specified by Minn. R. 7017.2025.  | Minn. R. 7017.2025   |
| E. MONITORING REQUIREMENTS   | hdr  |
| Monitoring Equipment: Install or make needed repairs to monitoring equipment within 60 days of issuance of the permit if monitoring equipment is not installed and operational on the date the permit is issued.   | Minn. R. 7007.0800, subp. 4(D)                                   |
| Monitoring Equipment Calibration: Annually calibrate all required monitoring equipment (any requirements applying to continuous emission monitors are listed separately in this permit).   | Minn. R. 7007.0800, subp. 4(D)                                   |
| Operation of Monitoring Equipment: Unless otherwise noted in Tables A, B, and/or C, monitoring a process or control equipment connected to that process is not necessary during periods when the process is shutdown, or during checks of the monitoring systems, such as calibration checks and zero and span adjustments. If monitoring records are required, they should reflect any such periods of process shutdown or checks of the monitoring system. | Minn. R. 7007.0800, subp. 4(D)                                   |
| F. RECORDKEEPING   | hdr  |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

|  |   |
|--|---|
| <p>Total Facility Monthly HAP Emissions Record keeping: by the 30th day of each month calculate and record for the previous month the total facility:</p> <p>1) Single HAP emission rate, in tons per month, by summing the monthly single HAP emission rate for each HAP from EU 001, EU 003, EU064, EU 007 through EU 014 and EU 054 through EU 056, determined as specified below under "F. RECORDKEEPING" in this (Total Facility) Subject Item;</p> <p>2) Total HAP emission rate, in tons per month, by summing all monthly Single HAP emission rates calculated in item 1 of this requirement.</p> <p>Record all emissions data at the time of calculation.</p>   | <p>Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5</p> |
| <p>Total Facility 12-month Rolling Sum HAP Emissions Record keeping: by the 30th day of each month calculate and record for the total facility:</p> <p>1) the Single HAP emission rate for each HAP in tons per 12-month period, by summing the total facility monthly Single HAP emissions (calculated in item 1 of the previous requirement) for each HAP, during the previous 12-month period;</p> <p>2) the Total HAP emission rate in tons per 12-month period, by summing all values calculated in item 1 of this requirement, for the previous 12-month period.</p> <p>Record all emissions data at the time of calculation.</p>  | <p>Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5</p> |
| <p>Selection of Emission Factors for Emissions Calculations: If the Permittee conducts performance testing on an emission unit, the test-based emission factor for that emission unit shall be used in place of any other factor, upon the Permittee's receipt of written agency approval of the test results. If a test-based factor is not available, the Permittee shall use an emission factor from the Agency's Iron Foundry Emission Calculation Guidance. If the Permittee uses a factor in Attachments 1 or 2, and the source of the factor issues a revised factor, the Permittee shall use the revised factor unless a test-based factor is available as described above.</p> <p>If data from a MSDS or manufacturer's specification for a raw material used in emission calculations is expressed in a range, the Permittee shall use the highest value given in the range.</p>   | <p>Minn. R. 7007.0800, subp. 2</p>                              |
| <p>SV 001 and EU 056 Monthly HAP Emission Calculations: By the 30th day of each month:</p> <p>1) determine SV 001 benzene, total xylenes, phenol, toluene, arsenic, and manganese emissions (ton/mo), by multiplying tons of metal melted during the previous month (determined under SV 001) by the corresponding EPA emission factor. When available, use the SV 001 manganese emission factor determined by performance testing instead of the EPA emission factor;</p> <p>2) determine EU 056 manganese emissions (ton/mo), by multiplying tons of metal melted during the previous month (determined under EU 056) by the current EPA manganese emission factor.</p> <p>If emission factors for other SV 001 and EU 056 HAPs become available during the permit term, calculate emission rates (in ton/mo) for these additional HAPs by multiplying monthly metal melted by the corresponding emission factor.</p> <p>Record all emission data, including the emission factor used, at the time of calculation.</p> | <p>Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5</p> |
| <p>EU 003 Pouring and Cooling Green Sand Mold HAP Emissions Calculations. By the 30th day of each month:</p> <p>1) record Premix (seacoal) usage during the previous month (lb/mo) based on physical inventory;</p> <p>2) calculate and record emissions (lb/mo) of Acrolein, Benzene, Formaldehyde, Hydrogen Cyanide, M-Xylene, Naphthalene, O-Xylene, Phenol, Toluene, Total Aromatic Amines, and Total C2 to C5 Aldehydes by multiplying the corresponding emission factor in Attachment 1 by the monthly premix usage.</p> <p>If emission factors determined by facility performance testing are available, the permittee shall use the test-based factors in lieu of published factors. If no test-based factors are available, the permittee shall use the factor in Attachment 1 or a more-current factor if available. Record all emissions data, including the emission factor used, at the time of calculation.</p>  | <p>Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5</p> |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

|   |   |
|---|---|
| <p>EU 003 Pouring and Cooling Purchased Core HAP Emissions Calculations. By the 30th day of each month for the previous month:</p> <p>1) record the type and usage (lb/mo) of each purchased core type, based on purchase records;</p> <p>2) determine monthly usage (lb/mo) of each resin by multiplying monthly usage of each purchased core type by resin weight per core weight (obtained from supplier of each core type), and summing all values for the same resin;</p> <p>3) calculate monthly emissions (lb/mo) of Acrolein, Benzene, Formaldehyde, Hydrogen Cyanide, M-Xylene, Naphthalene, O-Xylene, Phenol, Toluene, Total Aromatic Amines, and Total C2 to C5 Aldehydes by multiplying corresponding HAP emission factor in Attachment 1 by monthly resin usage.</p> <p>If the Permittee conducts EU 003 HAP emissions testing, use test-based factors instead. The Permittee shall use revised emission factors when available. Record all emissions data, including emission factor used and core resin wt., at the time of calculation.</p> | <p>Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5</p>       |
| <p>EU 003 Pouring and Cooling Phenolic Urethane Resins Core HAP Emissions Calculations. By the 30th day of each month:</p> <p>1) record total resin usage for the previous month (lb/mo) based on physical inventory;</p> <p>2) determine the previous month emissions (lb/mo) of each of the following HAPs: Acrolein, Benzene, Formaldehyde, Hydrogen Cyanide, M-Xylene, Naphthalene, O-Xylene, Phenol, Total Aromatic Amines, and Total C2 to C5 Aldehydes, by multiplying the corresponding emission factor in Attachment 1, by the total monthly resin usage.</p> <p>The Permittee shall use revised emission factors as they become available. However, if the Permittee conducts HAP emissions testing on EU 003, emission factors based on testing shall be used instead of the factor in Attachment 1. If the Permittee changes binder systems, use the appropriate emission factor in Attachment 1. Record all emissions data, including the emission factor used, at the time of calculation.</p>  | <p>Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5</p>       |
| <p>EU 7, 8, 54, 55, and 64 Mixing Resin and Catalyst in Sand HAP Emissions Calculations. By the 30th day of each month:</p> <p>1) record the identity and weight (lb/mo) of each type of resin and each catalyst (binder system) used during the previous month, based on physical inventory;</p> <p>2) determine and record the weight percentage of each HAP in the binder system used during the previous month, based on MSDS or manufacturer specification;</p> <p>3) calculate and record previous month individual HAP emissions (lb/mo) by summing emissions of each HAP from each resin and catalyst used based on: a) monthly resin and catalyst usage; b) weight % for each HAPs in each catalyst and resin; c) The Permittee shall use the appropriate table in Attachment 2 to determine the percent of each HAP released during mixing.</p>   | <p>Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5</p>       |
| <p>EU 009 through EU 014 Core Dip/Wash HAP Emissions Calculations. By the 30th day of each month:</p> <p>1) record the identity and weight (lb/mo) of each type of core dip/wash used during the previous month based on physical inventory;</p> <p>2) determine and record the weight percent of each HAP in the core dip/wash used during the previous month, based on MSDS or manufacturer specifications</p> <p>3) calculate and record the amount of each HAP emitted during the previous month (lb/mo) by multiplying the weight of each core dip/wash used by the weight percent of each HAP, and summing all monthly values for each HAP.</p>   | <p>Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5</p>       |
| <p>Record keeping: Maintain records describing any insignificant modifications (as required by Minn. R. 7007. 1250, subp. 3) or changes contravening permit terms (as required by Minn. R. 7007.1350 subp. 2), including records of the emissions resulting from those changes.</p>   | <p>Minn. R. 7007. 0800, subp. 5(B)</p>                                |
| <p>Record keeping: Retain all records at the stationary source for a period of five (5) years from the date of monitoring, sample, measurement, or report. Records which must be retained at this location include all calibration and maintenance records, all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. Records must conform to the requirements listed in Minn. R. 7007.0800, subp. 5(A).</p>   | <p>Minn. R. 7007.0800, subp. 5(C)</p>                                 |
| <p>G. REPORTING</p>   | <p>hdr</p>  |
| <p>Computer Dispersion Modeling Compliance Schedule: If the final dispersion modeling report indicates the Permittee contributes to a predicted exceedance of an ambient air quality standard, the Permittee shall submit a compliance schedule addressing this as part of their permit application for permit reissuance. The Permittee may also propose conducting a model evaluation study as part of their compliance schedule.</p>   | <p>Minn. R. 7009.0020; Minn. R. 7007.0800, subp. 2; 40 CFR pt. 50</p> |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

|   |  |
|---|--|
| <p>Shutdown Notifications: Notify the Commissioner at least 24 hours in advance of a planned shutdown of any control equipment or process equipment if the shutdown would cause any increase in the emissions of any regulated air pollutant. If the owner or operator does not have advance knowledge of the shutdown, notification shall be made to the Commissioner as soon as possible after the shutdown. However, notification is not required in the circumstances outlined in Items A, B and C of Minn. R. 7019.1000, subp. 3.</p> <p>At the time of notification, the owner or operator shall inform the Commissioner of the cause of the shutdown and the estimated duration. The owner or operator shall notify the Commissioner when the shutdown is over.</p>                  | <p>Minn. R. 7019.1000, subp. 1</p>                   |
| <p>Breakdown Notifications: Notify the Commissioner within 24 hours of a breakdown of more than one hour duration of any control equipment or process equipment if the breakdown causes any increase in the emissions of any regulated air pollutant. The 24-hour time period starts when the breakdown was discovered or reasonably should have been discovered by the owner or operator. However, notification is not required in the circumstances outlined in Items A, B and C of Minn. R. 7019.1000, subp. 2.</p> <p>At the time of notification or as soon as possible thereafter, the owner or operator shall inform the Commissioner of the cause of the breakdown and the estimated duration. The owner or operator shall notify the Commissioner when the breakdown is over.</p>  | <p>Minn. R. 7019.1000, subp. 2</p>                   |
| <p>Notification of Deviations Endangering Human Health or the Environment Report: Within 2 working days of discovery, notify the Commissioner in writing of any deviation from permit conditions which could endanger human health or the environment. Include the following information in this written description:</p> <ol style="list-style-type: none"> <li>1. the cause of the deviation;</li> <li>2. the exact dates of the period of the deviation, if the deviation has been corrected;</li> <li>3. whether or not the deviation has been corrected;</li> <li>4. the anticipated time by which the deviation is expected to be corrected, if not yet corrected; and</li> <li>5. steps taken or planned to reduce, eliminate, and prevent reoccurrence of the deviation.</li> </ol> | <p>Minn. R. 7019.1000, subp. 1</p>                   |
| <p>Notification of Deviations Endangering Human Health or the Environment: As soon as possible after discovery, notify the Commissioner or the state duty officer, either orally or by facsimile, of any deviation from permit conditions which could endanger human health or the environment.</p>   | <p>Minn. R. 7019.1000, subp. 1</p>                   |
| <p>Application for Permit Amendment: If a permit amendment is needed, submit an application in accordance with the requirements of Minn. R. 7007.1150 through Minn. R. 7007.1500. Submittal dates vary, depending on the type of amendment needed.</p>  | <p>Minn. R. 7007.1150 through Minn. R. 7007.1500</p> |
| <p>Extension Requests: The Permittee may apply for an Administrative Amendment to extend a deadline in a permit by no more than 120 days, provided the proposed deadline extension meets the requirements of Minn. R. 7007.1400, subp. 1(H).</p>  | <p>Minn. R. 7007.1400, subp. 1(H)</p>                |
| <p>Emissions Inventory Report: due 91 days after the end of each calendar year (April 1). To be submitted on a form approved by the Commissioner.</p>   | <p>Minn. R. 7019.3000 through Minn. R. 7019.3010</p> |
| <p>Emission Fees: due 60 days after receipt of an MPCA bill.</p>  | <p>Minn. R. 7002.0005 through Minn. R. 7002.0095</p> |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: GP 001 Core Dip Tanks**

| <b>What to do</b>  | <b>Why to do it</b>  |
|--|--|
| Equipment Installation: due before 12/01/98 install all required equipment and make all required facility modifications needed for operation of BACT.  | Title I Condition: requirement to implement process determined as BACT under 40 CFR Section 52.21                        |
| Total Organic Compounds: less than or equal to 5 percent by weight in the core dipping mixture (after BACT is implemented).  | Title I Condition: 40 CFR Section 52.21 BACT limit   |
| Core dipping mixture (after BACT is implemented) Material Usage: less than or equal to 2132000 lbs/year using 12-month Rolling Sum   | Title I Condition: 40 CFR Section 52.21 BACT limit   |
| Record keeping (following the implementation of BACT): by the 30th day of each month, record the weight of core dipping mixture used during the previous month (lb/mo), and calculate and record the weight of core dipping mixture used during the previous 12-month period (lb/12-month period). The records shall also specify the VOC content (in weight percent) of each core dipping mixture used at the facility. | Title I Condition: recordkeeping for pollutant subject to a 40 CFR Section 52.21 BACT limit; Minn. R. 7007.0800, subp. 5 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** GP 002 Omega-Kloster Line

**Associated Items:** EU 054 Omega Line Sand Mixer/Mold Production

EU 055 Kloster Line Sand Mixer/Core Production

| What to do   | Why to do it   |
|--|--|
| <p>Volatile Organic Compounds: less than or equal to 39 tons/year using 12-month Rolling Sum calculated monthly.</p>   | <p>Title I Condition: limit to avoid classification as a major modification under 40 CFR Section 52.21</p>                                       |
| <p>GP 002 VOC Emissions Record Keeping. Record the initial VOC content of each resin used, and the weight percent resin in the resin/catalyst recipe. Once each day:<br/>                     1) record the weight (lb/day) of each catalyst used in EU 054 and EU 055 during the previous day;<br/>                     2) record the VOC content of each resin and the percent resin in the catalyst/resin recipe, if the content or recipe has changed since the previous day.</p>  | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>GP 002 Sand-and-Resin-Mixing Monthly VOC Emissions Record Keeping:<br/>                     By the 30th day of each month, calculate and record the following for the previous month:<br/>                     1) determine usage (lb/mo) of each catalyst by summing daily usage of each catalyst during the previous month;<br/>                     2) calculate resin usage (lb/mo) based on the weight percent resin in the catalyst/resin recipe;<br/>                     3) multiply the monthly usage of each resin and catalyst by the corresponding VOC weight percent and sum all results;<br/>                     4) multiply the sum by .50 (emission factor) and divide by 2000 to determine GP 002 sand-and-resin-mixing VOC emissions (ton/mo);<br/>                     5) if a different binder system is used, the Permittee shall use the applicable emission factor in Attachment 2, and record the factor in all monthly VOC emissions calculation.</p> | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>GP 002 Pouring-and-Cooling Monthly VOC Emissions Record Keeping:<br/>                     By the 30th day of each month, calculate and record total GP 002 pouring-and-cooling VOC emissions by multiplying the previous monthly resin usage (as determined above) by the emission factor for Total Hydrocarbons in Attachment 1.<br/>                     Record the emission factor used at the time of calculation.</p>  | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>TOTAL GP 002 monthly and 12-month rolling sum VOC emissions Record Keeping:<br/>                     By the 30th day of each month calculate and record:<br/>                     1) the monthly TOTAL GP 002 VOC emissions by summing the monthly GP 002 sand-and-resin-mixing VOC emissions, and the monthly GP 002 pouring-and-cooling VOC emissions for the previous month;<br/>                     2) the 12-month rolling sum TOTAL GP 002 VOC emissions by summing the monthly TOTAL GP 002 VOC emissions (determined above in item 1 of this requirement) for the previous 12-month period.</p>  | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: GP 004 Grinding and Cleaning Operations**

- Associated Items:**
- CE 004 Fabric Filter - Low Temperature, i.e., T<180 Degrees F
  - CE 006 Fabric Filter - Medium Temperature i.e., 180 F<T<250 F
  - CE 010 Fabric Filter - Low Temperature, i.e., T<180 Degrees F
  - CE 011 Fabric Filter - Low Temperature, i.e., T<180 Degrees F
  - EU 025 Multiple Hand Grinding Stations
  - EU 044 Shot Blaster - 1 Wheel
  - EU 045 Shot Blaster - 2 Wheel
  - EU 046 Shot Blaster - 4 Wheel
  - EU 058 Shot Blaster - 3 wheel
  - SV 011
  - SV 012
  - SV 013
  - SV 019

| What to do  | Why to do it                        |
|---|-------------------------------------|
| <p>The Permittee is allowed to install additional grinding and cleaning equipment (grinding stations, shot blasters and tumble blasters) in GP 004 at any time during the life of this permit providing:</p> <p>1) there is no increase in melting capacity (no additional melting equipment is installed); 2) emissions from new shot blasters and tumble blasters must be contained in a total enclosure with 100% capture efficiency; 3) emissions from new grinding tools must be captured by a certified hood with 80% capture efficiency; 4) emissions captured from new equipment shall be vented to a baghouse with 99% collection efficiency.</p> <p>The Permittee shall maintain on-site a process flow diagram showing all GP 004 stack/vents, emission units, and control equipment. The diagram shall be updated no later than 15 days after any emission unit is added to GP 004.</p> | <p>Minn. R. 7007.0800, subp. 11</p> |
| <p>The Permittee may relocate any emission units listed in the Associated Items of GP 004 providing emissions from the emission unit are controlled by any of the control equipment listed in the Associated Items in GP 004. The exhaust from any of the listed control equipment in the Associated Items in GP 004 may be rerouted through any of the stack/vents listed in the Associated Items in GP 004.</p> <p>The Permittee shall maintain on-site a process flow diagram showing all GP 004 Associated Items stack/vents, emission units, and control equipment. The diagram shall be updated no later than 15 days after relocating any emission unit or rerouting any control equipment through another stack/vent.</p>   | <p>Minn. R. 7007.0800, subp. 11</p> |
| <p>Grinding and cleaning equipment at foundries is subject to frequent replacement because of wear. Grinding and cleaning emissions are directly proportional to the tons of metal melted. Therefore, the permittee has been granted the operational flexibility above with the caveat that the permittee does not increase the maximum melting capacity of the foundry.</p>  | <p>NOTE:</p>                        |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: GP 006 Opacity and PM Limit-Applies to each SV**

**Associated Items:** SV 002

SV 003

SV 004

SV 005

SV 006

SV 008

SV 009

SV 011

SV 012

SV 013

SV 016

SV 017

SV 018

SV 019

SV 020 Baghouse for no-bake sand

SV 022 Facility vent for 75 mixer

| What to do   | Why to do it                   |
|--|--------------------------------|
| Opacity: less than or equal to 20 percent opacity . This limit applies individually to each stack/vent listed in the Associated Items in GP 006.   | Minn. R. 7011.0715, subp. 1(B) |
| Total Particulate Matter: less than or equal to 0.3 grains/dry standard cubic foot unless required to reduce emissions to less than or equal to either the amount allowed by Minn. R. 7011.0730 or the concentration allowed by Minn. R. 7011.0735.  | Minn. R. 7011.0715, subp. 1(A) |
| SV 002 - Roof Vent, No Control Equipment<br>SV 003 - See monitoring requirements under CE 003<br>SV 004 - Roof Vent, No Control Equipment<br>SV 005 - Roof Vent, No Control Equipment<br>SV 006 - See monitoring requirements under CE 008 (Facility was not given credit for having this pollution control device in the emission calculations because the capture hood is not designed to capture at least 80% of the emissions.)<br>SV 008 - Roof Vent, No Control Equipment<br>SV 009 - Roof Vent, No Control Equipment<br>SV 011 - Roof Vent, No Control Equipment<br>SV 012 - See monitoring requirements under CE 004<br>SV 013 - See monitoring requirements under CE 005<br>SV 016 - Roof Vent, No Control Equipment<br>SV 017 - Roof Vent, No Control Equipment<br>SV 018 - See monitoring requirements under CE 006<br>SV 019 - See monitoring requirements under CE 010<br>SV 020 - See monitoring requirements under CE 011<br>SV 022 - Roof Vent, No Control Equipment | NOTE:                          |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** GP 007 No-bake sand reclaim system

**Associated Items:** EU 061 Nobake Vibra Mill Sand Reclaimer

EU 062 Nobake Sand Handling System

EU 064 Nobake core mixer

| What to do  | Why to do it  |
|---|---|
| EMISSION LIMITS   | hdr   |
| Total Particulate Matter: less than or equal to 0.3 grains/dry standard cubic foot of exhaust gas unless required to further reduce emissions to comply with the less stringent limit of either Minn. R. 7011.0730 or Minn. R. 7011. 0735.  | Minn. R. 7011.0715, subp. 1(A)  |
| Opacity: less than or equal to 20 percent   | Minn. R. 7011.0715, subp. 1(B)  |
| Particulate Matter < 10 micron: greater than or equal to 99 percent collection efficiency and 80 percent capture efficiency.  | Title I Condition: limit to avoid classification as a major modification under 40 CFR Section 52.21                                       |
| Total Particulate Matter: greater than or equal to 99 percent collection efficiency and 80% capture efficiency.   | Title I Condition: limit to avoid classification as a major modification under 40 CFR Section 52.21                                       |
| Volatile Organic Compounds: less than or equal to 39 tons/year using 12-month Rolling Sum calculated monthly.   | Title I Condition: limit to avoid classification as a major modification under 40 CFR Section 52.21                                       |
| OPERATING CONDITIONS  | hdr   |
| Vent all emissions from EU061and 062 through a fabric filter (CE011.)   | Title I Condition: operating condition to meet above control requirements   |
| RECORDKEEPING   | hdr   |
| <p>GP 007 VOC Emissions Record Keeping. Record the initial VOC content of each resin used, and the weight percent resin in the resin/catalyst recipe. Once each day:</p> <p>1) record the weight (lb/day) of each catalyst used in EU 064 during the previous day;</p> <p>2) record the VOC content of each resin and the percent resin in the catalyst/resin recipe, if the content or recipe has changed since the previous day.</p>  | Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5 |
| <p>GP 007 Sand and Resin Mixing Monthly VOC Emissions Record Keeping:</p> <p>By the 30th day of each month, calculate and record the following for the previous month:</p> <p>1) determine usage (lb/mo) of each catalyst by summing daily usage of each catalyst during the previous month;</p> <p>2) calculate resin usage (lb/mo) based on the weight percent resin in the catalyst/resin recipe;</p> <p>3) multiply the monthly usage of each resin and catalyst by the corresponding VOC weight percent and sum all results;</p> <p>4) multiply the sum by the applicable emission factor in Attachment 2 and divide by 2000 to determine GP 007 sand and resin mixing VOC emissions (ton/mo). The emission factor used shall be recorded in all monthly VOC emissions calculations.</p> | Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5 |
| <p>TOTAL GP 007 monthly and 12-month rolling sum VOC emissions Record Keeping:</p> <p>By the 30th day of each month calculate and record the 12-month rolling sum of VOC emissions by summing the monthly VOC emissions for the previous 12 months.</p>   | Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** SV 001

**Associated Items:** EU 001 Cupola

EU 049 Cupola Torches

| What to do  | Why to do it  |
|---|---|
| Opacity: less than or equal to 20 percent opacity except that a maximum of 60 percent opacity shall be permissible for four minutes in any 60-minute period and that a maximum of 40 percent opacity shall be permissible for four additional minutes in any 60-minute period.  | Minn. R. 7011.0610, subp. 1(A)(2)   |
| Total Particulate Matter: less than or equal to 0.3 grains/dry standard cubic foot unless required to reduce emissions to less than or equal to either the amount allowed by Minn. R. 7011.0730 or the concentration allowed by Minn. R. 7011.0735.   | Minn. R. 7011.0610, subp. 1(A)(1)   |
| Record keeping: once each day, record the tons of metal melted in EU 001 during the previous day. By the 30th day of each month, calculate and record the tons of metal melted during the previous month.   | Minn. R. 7007.0800, subp. 4 and 5   |
| Performance Test: due before end of each 60 months starting 11/15/2000 to measure emissions of Total Particulate Matter and opacity from SV 001. The first test required by this condition is to be completed by 11/15/2005. If a test result shows a total particulate matter emission rate greater than 90% of the applicable total particulate matter emission limit, a performance test shall be conducted annually until a test result less than 90% of the emission limit is obtained. If a test result shows a total particulate matter emission rate greater than 60% but less than 90% of the applicable total particulate matter emission limit, a performance test shall be conducted every 36 months until a test result less than 60% of the emission limit is obtained. | Minn. R. 7017.2020, subp. 1   |
| <p>Performance Test Notifications and Submittals:</p> <p>Performance Test Notification (written): due 30 days before each Performance Test</p> <p>Performance Test Plan: due 30 days before each Performance Test</p> <p>Performance Test Pre-test Meeting: due 7 days before each Performance Test</p> <p>Performance Test Report: due 45 days after each Performance Test</p> <p>Performance Test Report - Microfiche* Copy: due 105 days after each Performance Test</p> <p>* Or an alternative format, such as a computer disk or CD-ROM, as allowed under Minn. R. 7017.2018.</p>  | Minn. R. 7017.2030, subp. 1-4, Minn. R. 7017.2035, subp. 1-2 and Minn. R. 7017.2018 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: EU 007 Chemically Set Core: 150**

**Associated Items: SV 008**

| What to do   | Why to do it   |
|--|--|
| <p>Volatile Organic Compounds: less than or equal to 39 tons/year using 12-month Rolling Sum calculated monthly.</p>   | <p>Title I Condition: limit to avoid classification as a major modification under 40 CFR Section 52.21</p>                                       |
| <p>EU 007 VOC Emissions Record Keeping. Record the initial VOC content of each resin and each catalyst used, and the weight percentages of resin, catalyst, and sand in the resin/catalyst/sand recipe.</p> <p>Once each day:</p> <ol style="list-style-type: none"> <li>1) record the weight (lb/day) of sand used in EU 007 during the previous day;</li> <li>2) record the VOC content of each resin and each catalyst;</li> <li>3) record the weight percentages of resin, catalyst, and sand in the catalyst/resin/sand recipe, if the content or recipe has changed since the previous day.</li> </ol>   | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>EU 007 Sand-and-Resin-Mixing Monthly VOC Emissions Record Keeping:</p> <p>By the 30th day of each month, calculate and record the following for the previous month:</p> <ol style="list-style-type: none"> <li>1) determine usage (lb/mo) of sand in EU 007 by summing daily usage of sand during the previous month;</li> <li>2) calculate resin usage (lb/mo) and catalyst usage (lb/mo) based on weight percent of each in the catalyst/resin/sand recipe;</li> <li>3) multiply the monthly usage of each resin and catalyst by the corresponding VOC weight percent and sum all results;</li> <li>4) multiply the sum by the applicable emission factor in Attachment 2 and divide by 2000 to determine EU 007 sand-and-resin-mixing VOC emissions (ton/mo). The Permittee shall record the emission factor used in all monthly VOC emission calculations.</li> </ol> | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>EU 007 Pouring-and-Cooling Monthly VOC Emissions Record Keeping:</p> <p>By the 30th day of each month, calculate and record total EU 007 pouring-and-cooling VOC emissions by multiplying the previous monthly resin usage (as determined above) by the emission factor for Total Hydrocarbons in Attachment 1.</p> <p>Record the emission factor used at the time of calculation.</p>  | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>TOTAL EU 007 Monthly and 12-month Rolling Sum VOC Emissions Record Keeping:</p> <p>By the 30th day of each month calculate and record:</p> <ol style="list-style-type: none"> <li>1) the monthly TOTAL EU 007 VOC emissions by summing the monthly EU 007 sand-and-resin-mixing VOC emissions, and the monthly EU 007 pouring-and-cooling VOC emissions for the previous month;</li> <li>2) the 12-month rolling sum TOTAL EU 007 VOC emissions by summing the monthly TOTAL EU 007 VOC emissions (determined above in item 1 of this requirement) for the previous 12-month period.</li> </ol>   | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: EU 008 Chemically Set Core: 250**

**Associated Items: SV 009**

| What to do  | Why to do it   |
|---|--|
| <p>Volatile Organic Compounds: less than or equal to 39 tons/year using 12-month Rolling Sum calculated monthly.</p>  | <p>Title I Condition: limit to avoid classification as a major modification under 40 CFR Section 52.21</p>                                       |
| <p>EU 008 VOC Emissions Record Keeping. Record the initial VOC content of each resin and each catalyst used, and the weight percentages of resin, catalyst, and sand in the resin/catalyst/sand recipe.</p> <p>Once each day:</p> <ol style="list-style-type: none"> <li>1) record the weight (lb/day) of sand used in EU 008 during the previous day;</li> <li>2) record the VOC content of each resin and each catalyst;</li> <li>3) record the weight percentages of resin, catalyst, and sand in the catalyst/resin/sand recipe, if the content or recipe has changed since the previous day.</li> </ol>  | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>EU 008 Sand-and-Resin-Mixing Monthly VOC Emissions Record Keeping:</p> <p>By the 30th day of each month, calculate and record the following for the previous month:</p> <ol style="list-style-type: none"> <li>1) determine usage (lb/mo) of sand in EU 008 by summing daily usage of sand during the previous month;</li> <li>2) calculate resin usage (lb/mo) and catalyst usage (lb/mo) based on the weight percentages of each in the catalyst/resin/sand recipe;</li> <li>3) multiply the monthly usage of each resin and catalyst by the corresponding VOC weight percentage and sum all results;</li> <li>4) multiply the sum by the applicable emission factor in Attachment 2 and divide by 2000 to determine GP 007 sand-and-resin-mixing VOC emissions (ton/mo). The emission factor used shall be recorded in all monthly VOC emissions calculations.</li> </ol> | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>EU 008 Pouring-and-Cooling Monthly VOC Emissions Record Keeping:</p> <p>By the 30th day of each month, calculate and record total EU 008 pouring-and-cooling VOC emissions by multiplying the previous monthly resin usage (as determined above) by the emission factor for Total Hydrocarbons in Attachment 1.</p> <p>Record the emission factor used at the time of calculation.</p>   | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |
| <p>TOTAL EU 008 Monthly and 12-month Rolling Sum VOC Emissions Record Keeping:</p> <p>By the 30th day of each month calculate and record:</p> <ol style="list-style-type: none"> <li>1) the monthly TOTAL EU 008 VOC emissions by summing the monthly EU 008 sand-and-resin-mixing VOC emissions, and the monthly EU 007 pouring-and-cooling VOC emissions for the previous month;</li> <li>2) the 12-month rolling sum TOTAL EU 008 VOC emissions by summing the monthly TOTAL EU 008 VOC emissions (determined above in item 1 of this requirement) for the previous 12-month period.</li> </ol>  | <p>Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5</p> |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** EU 056 Electric Induction Melting Furnace**Associated Items:** CE 006 Fabric Filter - Medium Temperature i.e., 180 F<T<250 F  
SV 018

| What to do  | Why to do it  |
|---|---|
| Process Throughput: less than or equal to 5000 tons/year using 12-month Rolling Sum of metal melted. The Permittee shall not melt more than 416 tons per month in each of the first 11 months of operation.                                       | Title I Condition: limit to avoid classification as a major modification under 40 CFR Section 52.21                                       |
| Record Keeping: once each day, record the tons of metal melted in EU 056 during the previous day. By the 30th day of each month, calculate and record the tons of metal melted during the previous month and during the previous 12-month period. | Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: CE 001 Venturi Scrubber****Associated Items: EU 001 Cupola**

| What to do   | Why to do it                 |
|--|------------------------------|
| Pressure Drop: greater than or equal to 52 inches of water column or the value measured during the most recent PM performance test with results equal to or less than the applicable limit under SV 001.   | Minn. R. 7007.0800, subp. 4  |
| Venturi Scrubber Supply Water pressure: greater than or equal to 50 psi (gauge)  | Minn. R. 7007.0800, subp. 4  |
| Record pressure drop and water supply pressure once each day of operation. The record shall indicate the time and date of each reading. Records shall also indicate each day for which there was no operation of EU 001.   | Minn. R. 7007.0800, subp 5   |
| Recordkeeping of Corrective Actions: If the observed pressure drop and/or water supply pressure deviate from the required minimum levels stated above, the Permittee shall follow the Operation and Maintenance Plan for CE 001 and take corrective actions as soon as possible to correct the deviation. The Permittee shall keep a dated record of the deviation and the corrective actions. | Minn. R. 7007.0800, subp 5   |
| Operation and Maintenance of the Venturi Scrubber: The Permittee shall operate and maintain the venturi scrubber according to the control equipment manufacturer's specifications or the current O & M Plan.   | Minn. R. 7007.0800, subp. 14 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: CE 002 Direct Flame Afterburner**

**Associated Items: EU 001 Cupola**

| What to do   | Why to do it                   |
|--|--------------------------------|
| Operation and Maintenance of the Afterburner: The Permittee shall operate and maintain the afterburner according to the control equipment manufacturer's specifications or the current O & M Plan. The afterburner shall be in operation during all periods in which a molten charge is present in the furnace.  | Minn. R. 7007.0800, subp. 14   |
| Temperature: greater than or equal to 1200 degrees F with a residence time of 0.3 seconds or greater. Temperatures below 1200 degrees F are permitted for the first 15 minutes after the start-up of the EU 001 combustion blower.   | Minn. R. 7007.0800, subp. 4    |
| Temperature: continuously monitor combustion temperature in the upper stack with a chart recorder or take manual readings once every 15 minutes during operation of EU 001.  | Minn. R. 7007.0800, subp. 5    |
| Record Keeping of Corrective Actions: If the afterburner temperature deviates from the minimum 1200 degrees Fahrenheit requirement during operation of EU 001 (except for the permitted 8 minute warm-up period), the Permittee shall follow the Operation and Maintenance Plan for the afterburner and take corrective actions as soon as possible to correct the deviation. The Permittee shall keep a dated record and description of the corrective actions taken. | Minn. R. 7007.0800, subp. 5    |
| Install: due 15 days after Permit Issuance a continuous dual recorder that simultaneously records the upper stack afterburner temperature and the EU 001 combustion blower operation status.   | Minn. R. 7007.0800, subp. 4(D) |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: CE 003 2 - 3 % Moisture Content**

- Associated Items:**
- EU 015 Mold-Making Machines
  - EU 016 Mold-Making Machines
  - EU 017 Mold-Making Machines
  - EU 018 Mold-Making Machines
  - EU 019 Mold-Making Machines
  - EU 020 Mold-Making Machines
  - EU 023 Sand Handling System
  - EU 024 Mold Sand Mullor

| What to do   | Why to do it  |
|--|---|
| Mold Sand Moisture Content: greater than or equal to 2% by weight.   | Title I condition: limit to avoid classification as a major modification under 40 CFR Section 52.21   |
| The Permittee shall measure the moisture content of each batch of green mold sand after mixing. The Permittee shall record the minimum (worst case) moisture content observed each day of operation and maintain the records on site for 5 years from the date of recording. | Title I condition: limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** CE 004 Fabric Filter - Low Temperature, i.e., T<180 Degrees F

**Associated Items:** EU 044 Shot Blaster - 1 Wheel

EU 045 Shot Blaster - 2 Wheel

GP 004 Grinding and Cleaning Operations

| What to do  | Why to do it   |
|---|--|
| Operate and maintain the fabric filter to achieve a control efficiency (100% capture efficiency X control equipment collection efficiency) for Total Particulate Matter: greater than or equal to 99 percent control efficiency       | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Operate and maintain the fabric filter to achieve a control efficiency (100% capture efficiency X control equipment collection efficiency) for Particulate Matter < 10 micron: greater than or equal to 99 percent control efficiency | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Operate and maintain the fabric filter according to the associated control equipment manufacturer's specifications (if available), except for the pressure drop specified below.  | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Pressure Drop: greater than or equal to 4 inches of water column and less than or equal to 7 inches of water column   | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |
| Record the pressure drop once every 24 hours when in operation.   | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item: CE 006 Fabric Filter - Medium Temperature i.e., 180 F<T<250 F**

**Associated Items:** EU 056 Electric Induction Melting Furnace

EU 057 Refining Operations

GP 004 Grinding and Cleaning Operations

| What to do   | Why to do it   |
|--|--|
| Pressure Drop: greater than or equal to 2 inches of water column and less than or equal to 7 inches of water column  | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |
| Record the pressure drop once every 24 hours when in operation.  | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |
| Operate and maintain the fabric filter such that it removes the following percentage of PM exhausted to it. Total Particulate Matter: greater than or equal to 99 percent control efficiency   | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21                                |
| Operate and maintain the fabric filter such that it removes the following percentage of PM10 exhausted to it. Particulate Matter < 10 micron: greater than or equal to 99 percent control efficiency                                     | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21                                |
| Total Particulate Matter: greater than or equal to 80 percent capture efficiency . Operate and maintain the control equipment and hoods so that 80 percent of the exhaust from EU 057 and EU 056 is captured and routed to CE 006.       | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21                                |
| Particulate Matter < 10 micron: greater than or equal to 80 percent capture efficiency . Operate and maintain the control equipment and hoods so that 80 percent of the exhaust from EU 057 and EU 056 is captured and routed to CE 006. | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21                                |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** CE 007 Wet Cyclonic Separator - Wet Cyclone

**Associated Items:** EU 024 Mold Sand Mullor

| What to do  | Why to do it   |
|---|--|
| Rotoclone Supply Water flow rate: greater than or equal to 21 gallons/minute  | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |
| Record the number of strokes per minute (as measured by counting the number of strokes during one minute of pump operation) once every 24 hours when in operation.<br><br>Calculate and record the water flow rate to CE 007 in gallons/minute by multiplying the observed number of strokes per minute by the pump constant of 0.43 gallons/stroke once each day of operation. | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |
| Operate and maintain the Rotoclone to achieve a control efficiency (100% capture efficiency X control equipment collection efficiency) for Total Particulate Matter: greater than or equal to 98 percent collection efficiency  | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21                                |
| Operate and maintain the Rotoclone to achieve a control efficiency (100% capture efficiency X control equipment collection efficiency) for Particulate Matter < 10 micron: greater than or equal to 98 percent control efficiency   | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21                                |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** CE 008 Wet Cyclonic Separator - Wet Cyclone**Associated Items:** EU 005 Casting Shakeout/Dump

| <b>What to do</b>   | <b>Why to do it</b>          |
|---|------------------------------|
| Operation and Maintenance of the Rotoclone: The Permittee shall operate and maintain the Rotoclone according to the control equipment manufacturer's specifications (if available). | Minn. R. 7007.0800, subp. 14 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** CE 010 Fabric Filter - Low Temperature, i.e., T<180 Degrees F

**Associated Items:** EU 046 Shot Blaster - 4 Wheel

GP 004 Grinding and Cleaning Operations

| What to do  | Why to do it   |
|---|--|
| Operate and maintain the fabric filter to achieve a control efficiency (100% capture efficiency X control equipment collection efficiency) for Total Particulate Matter: greater than or equal to 99 percent control efficiency       | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Operate and maintain the fabric filter to achieve a control efficiency (100% capture efficiency X control equipment collection efficiency) for Particulate Matter < 10 micron: greater than or equal to 99 percent control efficiency | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Operate and maintain the fabric filter according to the associated control equipment manufacturer's specifications (if available), except for the pressure drop specified below.  | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Pressure Drop: greater than or equal to 3 inches of water column and less than or equal to 6 inches of water column   | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |
| Record the pressure drop once every 24 hours when in operation.   | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

**Subject Item:** CE 011 Fabric Filter - Low Temperature, i.e., T<180 Degrees F

- Associated Items:** EU 058 Shot Blaster - 3 wheel  
 EU 061 Nobake Vibra Mill Sand Reclaimer  
 EU 062 Nobake Sand Handling System  
 GP 004 Grinding and Cleaning Operations

| What to do   | Why to do it   |
|--|--|
| Total Particulate Matter: greater than or equal to 99 percent collection efficiency and greater than or equal to 80 percent capture efficiency.  | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Particulate Matter < 10 micron: greater than or equal to 99 percent collection efficiency and greater than or equal to 80 percent capture efficiency.                                  | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Operate and maintain the fabric filter in accordance with the associated control equipment manufacturer's specifications (if available), except for the pressure drop specified below. | Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 14  |
| Pressure Drop: greater than or equal to 3 inches of water column and less than or equal to 7 inches of water column  | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |
| Record the pressure drop once every 24 hours when in operation.  | Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21 |

**TABLE B: SUBMITTALS**

05/20/02

Facility Name: Badger Foundry Company  
Permit Number: 16900012 - 002

Table B lists most of the submittals required by this permit. Please note that some submittal requirements may appear in Table A or, if applicable, within a compliance schedule located in Table C. Table B is divided into two sections in order to separately list one-time only and recurrent submittal requirements.

Each submittal must be postmarked or received by the date specified in the applicable Table. Those submittals required by parts 7007.0100 to 7007.1850 must be certified by a responsible official, defined in Minn. R. 7007.0100, subp. 21. Other submittals shall be certified as appropriate if certification is required by an applicable rule or permit condition.

Send any application for a permit or permit amendment to:

Permit Technical Advisor  
Permit Section  
Air Quality Division  
Minnesota Pollution Control Agency  
520 Lafayette Road North  
St. Paul, Minnesota 55155-4194

Also, where required by an applicable rule or permit condition, send to the Permit Technical Advisor notices of:

- accumulated insignificant activities,
- installation of control equipment,
- replacement of an emissions unit, and
- changes that contravene a permit term.

Unless another person is identified in the applicable Table, send all other submittals to:

Supervisor  
Compliance Determination Unit  
Air Quality Division  
Minnesota Pollution Control Agency  
520 Lafayette Road North  
St. Paul, Minnesota 55155-4194

Send submittals that are required to be submitted to the U.S. EPA regional office to:

Mr. George Czerniak  
Air and Radiation Branch  
EPA Region V  
77 West Jackson Boulevard  
Chicago, Illinois 60604

Send submittals that are required by the Acid Rain Program to:

U.S. Environmental Protection Agency  
Clean Air Markets Division  
1200 Pennsylvania Avenue NW (6204N)  
Washington, D.C. 20460

**TABLE B: ONE TIME SUBMITTALS OR NOTIFICATIONS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

| What to send                          | When to send   | Portion of Facility Affected |
|---------------------------------------|--|------------------------------|
| Application for Permit Reissuance     | due 180 days before expiration of Existing Permit  | Total Facility               |
| Computer Dispersion Modeling Protocol | <p>due 60 days after Permit Issuance for emissions of PM-10.</p> <p>The dispersion modeling protocol must be approved by the MPCA prior to submittal of the Computer Dispersion Modeling Results.</p>  | Total Facility               |
| Computer Dispersion Modeling Results  | <p>due 120 days after receipt of written MPCA approval of the Computer Dispersion Modeling Protocol.</p> <p>The dispersion modeling results must demonstrate modeled compliance with the ambient air quality standards for PM-10 using MPCA-approved methods.</p> <p>If modeled compliance with the ambient air quality standards for PM-10 is based on any of the following:</p> <ol style="list-style-type: none"> <li>1) A restriction (emission limit, production limit, etc.) which is not an enforceable condition of the existing permit, or</li> <li>2) New or updated facility information (revised or increased stack heights, revised emission unit/stack vent relationships, etc.), or</li> <li>3) Any other restriction or condition which is not an enforceable condition of the existing permit;</li> </ol> <p>then the Permittee shall submit a permit application by January 1, 2003. The purpose of the permit application will be to request an amendment to the existing permit to add, as enforceable condition(s) of the permit, any new condition(s) necessary to ensure compliance with the ambient air quality standards for PM-10.</p> | Total Facility               |

**TABLE B: RECURRENT SUBMITTALS**

05/20/02

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 002

| What to send                 | When to send   | Portion of Facility Affected |
|------------------------------|--|------------------------------|
| Progress Report              | due 15 days after end of each calendar quarter following Permit Issuance until BACT is installed and in operation. All progress reports shall describe the actions the Permittee has taken during the previous quarter, and the activities scheduled to be taken during the upcoming quarter to replace the IPA/Velvacoat core dipping mixture with a 5% VOC or less mixture. All progress reports shall be sent by certified mail, return receipt requested and addressed to the MPCA Project Leader (Rhonda Land.) | GP001                        |
| Semiannual Deviations Report | due 30 days after end of each calendar half-year starting 06/25/1998. The first semiannual report submitted by the Permittee shall cover the calendar half-year in which the permit is issued. The first report of each calendar year covers January 1 - June 30. The second report of each calendar year covers July 1 - December 31. If no deviations have occurred, the Permittee shall submit the report stating no deviations.  | Total Facility               |
| Compliance Certification     | due 30 days after end of each calendar year following Permit Issuance (for the previous calendar year). To be submitted on a form approved by the Commissioner. The report covers all deviations experienced during the calendar year.   | Total Facility               |

APPENDIX MATERIAL

Facility Name:Badger Foundry Company

Permit Number: 16900012-002

**Appendix I**

**Insignificant Activities and Applicable Requirements**

| <b>Minn. R.<br/>7007.1300,<br/>subpart</b> | <b>Activity</b>   | <b>Applicable Requirement(s)</b> |
|--|---|----------------------------------|
| 3(l)                                       | Natural gas-fired boiler for the no bake heater/cooler with a rated heat input capacity of 0.42 million Btu/hr. | Minn. R. 7011.0515               |

**TECHNICAL SUPPORT DOCUMENT**  
**For**  
**AIR EMISSION PERMIT NO. 16900012-002**

This technical support document is for all the interested parties of the permit. The purpose of this document is to set forth the legal and factual basis for the permit conditions, including references to the applicable statutory or regulatory provisions.

## 1. General Information

### 1.1. Applicant and Stationary Source Location:

| Owner/Operator Address and Phone Number  | Facility Address<br>(SIC Code: 3321)           |
|--|--|
| Badger Foundry Company<br>1058 East Mark Street<br>Winona, MN 55987<br><br>Bryce Marcott<br>507/452-5760 | 1058 East Mark Street<br>Winona, Winona County |

### 1.2. Description of the Facility

Badger Foundry is a gray iron foundry with a scrubber and afterburner controlled cupola. They currently melt about 15000 tons per year (TPY), which represents about 20 percent of their maximum possible capacity. Badger installed an induction furnace and magnesium treatment area with the previous permit action in order to make ductile iron. Badger uses primarily green sand molds and phenolic urethane cores. In general, the major emissions from foundries are Particulate Matter (PM) and Volatile Organic Chemicals (VOC). PM is generated from virtually all of the operations at a foundry. VOC's are generated when the molten metal comes in contact with the green sand molds and the cores and when mold and core sand is mixed with binders. The PM emissions from the blasting cabinets that clean the castings are controlled by baghouses. PM emissions from sand handling are controlled by the moisture content of the sand. The PM from the shake-out area and the mold sand muller is controlled by wet rotoclones. The VOC emissions are uncontrolled at Badger.

### 1.3 Description of the Activities Allowed By This Permit Action

This permit allows for the installation of a sand reclamation system for the no-bake core and mold making operations. The potential emissions generated from this modification exceed the minor modification thresholds, and Badger has proposed restrictions in the permit that limit potential emissions to less than significant net emission thresholds given in the new source review regulations. New equipment is summarized below:

| EU # | SV # | CE # | Description               | Capacity       |
|------|------|------|---------------------------|----------------|
| 061  | 020  | 011* | Vibra-Mill Sand Reclaimer | 10 ton/hour    |
| 062  | 020  | 011* | Sand Handling System      | 30 ton/hour    |
| 063  | 021  | ---- | Natural gas-fired boiler  | 0.42 MM Btu/hr |
| 064  | 022  | ---- | Sand Mixer                | 30 ton/hour    |

\* Baghouse.

VOCs will be limited by a 39 tpy limit; compliance demonstrated by mass balance and emission factors.

Also as part of this permit action, one fabric filter (CE 005) will be removed. CE 005 currently controls emissions from a shot blaster (EU 046). Another existing fabric filter (CE 010) will be used to control emissions from EU 046. CE 010 formerly controlled emissions from EU 058. Emissions from EU 058 will be controlled by the new fabric filter (CE 011), which will also control emissions from the new sand reclaimer (EU 061) and the new sand handling system (EU 062).

The new emission unit/control equipment relationships for equipment (both new and existing equipment) affected by this permit action will be as follows:

| EU # | SV # | CE # | Description                                 |
|------|------|------|---|
| 046  | 013  | 010  | Shot Blaster – 4 Wheel (existing equipment) |
| 058  | 020  | 011  | Shot Blaster – 3 Wheel (existing equipment) |
| 061  | 020  | 011  | Vibra-Mill Sand Reclaimer                   |
| 062  | 020  | 011  | Sand Handling System                        |
| 063  | 021  | ---- | Natural gas-fired boiler                    |
| 064  | 022  | ---- | Sand Mixer                                  |

Table 1. Modification Potential to Emit Summary:

| EU #      | SV # | Emission Unit Description                  | PM Tpy | PM10 tpy | SO2 tpy | NOx tpy | CO tpy | VOC tpy | Pb tpy | Singl e HAP Tpy | All HAPs tpy |
|-----------|------|--|--------|----------|---------|---------|--------|---------|--------|-----------------|--------------|
| 061 & 062 | 20   | Sand Reclaim (061) and Sand Handling (062) | 10.25  | 1.54     |         |         |        |         |        |                 |              |
| 063       | 021  | Boiler                                     | 0.01   | 0.01     | 0.0     | 0.18    | 0.1    | 0.01    |        |                 |              |
| 064       | 022  | Sand Mixer                                 |        |          |         |         |        | 39.0*   |        | 0.9**           | 0.9          |

\* Facility vent.

\*\* Emissions are limited to 39.0 tpy. See Section 3.6 for a discussion of emission calculations.

\*\*\* Naphthalene. Emissions are based on the current resin used. See Section 3.6 for a discussion of emission calculations.

|   | PM Tpy | PM10 tpy | SO2 tpy | NOx tpy | CO tpy | VOC tpy | Pb tpy | Single HAP Tpy | All HAPs tpy |
|---|--------|----------|---------|---------|--------|---------|--------|----------------|--------------|
| Limited Potential Emissions from the Modification | 10.3   | 1.5      | 0.0     | 0.18    | 0.15   | 39.0*   | 0.0    | 9.5**          | 24.5**       |

\* Emissions are restricted to 39.0 tpy of VOCs.

\*\* Emissions of Hazardous Air Pollutant (HAPs) from the entire facility are limited to 9.5 tpy of any single HAP and 24.5 tpy of any combination of HAPs.

Table 2. Permit Action Classification

| Classification (put x in appropriate box) | Major/Affected Source | *Synthetic Minor    | *Minor |
|---|-----------------------|---------------------|--------|
| PSD                                       |                       | VOC, PM10           |        |
| NAAR Not Applicable                       |                       |                     |        |
| Part 70 Permit Program                    |                       | VOC, PM10, HAPs, PM |        |

\* Refers to potential emissions that are less than those specified as major by 40 CFR 52.21, 40 CFR pt. 51 Appendix S, and 40 CFR pt. 70.

## 2. Regulatory and/or Statutory Basis

Summary Regulatory and/or Statutory Basis of the Emission or operational Limit

### Regulatory Overview of Units Affected by the Modification

| *EU, GRP, or SV # | Applicable Regulations                 | **Comments  |
|-------------------|--|---|
| GP007<br>SV020    | 40 CFR 52.21<br><br>Minn. R. 7011.0715 | Limits taken on VOC of 39 tpy, and requirement for baghouse (CE 011) operation to limit PM/PM10 emissions such that emissions from the modification are less than the significant net emission increase levels.<br><br>Limits on particulate matter and opacity set by the industrial process equipment rule. |

## 3. Technical Information

### 3.1 Emissions from EU 061 and EU 062 (sand handling)

The emissions calculations for sand handling submitted with the application appear to have underestimated the PM and PM10 emission rates from sand handling. Sand handling emissions are calculated as follows:

#### **PM Emissions**

$$\begin{aligned} \text{PM emissions (EU 061 \& 062, captured)} &= 3.6 \text{ lb/ton}(12.5 \text{ ton/hr}^*)(80\% \text{ capture})(1-0.99) \\ &= 0.36 \text{ lb/hr} \\ \text{PM emissions (EU 061 \& 062, uncaptured)} &= 3.6 \text{ lb/ton}(12.5 \text{ ton/hr}^*)(20\% \text{ uncaptured})(1-0.78^{**}) \\ &= 1.98 \text{ lb/hr} \end{aligned}$$

$$\text{Total PM emissions (EU 061 \& 062, lb/hr)} = (0.36+1.98) \text{ lb/hr} = 2.34 \text{ lb/hr}$$

$$\text{Total PM emissions (EU 061 \& 062, tpy)} = 2.34 \text{ lb/hr}(8,760 \text{ hr/yr})(1 \text{ ton}/2,000 \text{ lb}) = \underline{10.25 \text{ tpy}}$$

#### **PM10 Emissions**

$$\begin{aligned} \text{PM10 emissions (EU 061 \& 062, captured)} &= 0.54 \text{ lb/ton}(12.5 \text{ ton/hr}^*)(80\% \text{ capture})(1-0.99) \\ &= 0.054 \text{ lb/hr} \\ \text{PM10 emissions (EU 061 \& 062, uncaptured)} &= 0.54 \text{ lb/ton}(12.5 \text{ ton/hr}^*)(20\% \text{ uncaptured})(1-0.78^{**}) \\ &= 0.297 \text{ lb/hr} \end{aligned}$$

$$\text{Total PM10 emissions (EU 061 \& 062, lb/hr)} = (0.054+0.297) \text{ lb/hr} = 0.35 \text{ lb/hr}$$

$$\text{Total PM10 emissions (EU 061 \& 062, tpy)} = 0.35 \text{ lb/hr}(8,760 \text{ hr/yr})(1 \text{ ton}/2,000 \text{ lb}) = \underline{1.54 \text{ tpy}}$$

\* Sand handling is limited by the 10 ton/hr capacity of EU 061. Sand is mixed in the sand mixer at a ratio of 20:80 (20% new, 80% reclaimed), so 12.5 ton/hr capacity is used for sand handling.

\*\* 78% settling factor from the 5/6/98 Minnesota Pollution Control Agency (MPCA) Iron Foundry Emissions Calculations Guidance.

### 3.2 Compliance with Minn. R. 7011.0715

Minn. R. 7011.0715 limits emissions by the following equation:

$$\text{Allowable PM emissions (lb/hr)} = 3.59(P)^{0.62}$$

Where P = process weight rate in ton/hr

$$\text{Allowable PM emissions from SV 020, lb/hr} = 3.59(12.5)^{0.62} = 17.2 \text{ lb/hr}$$

$$\text{Expected PM emission rate from SV 020 lb/hr} = \underline{2.34 \text{ lb/hr} < 17.2 \text{ lb/hr}}$$

Minn. R. 7011.0715 also limits emissions to less than or equal to 0.3 gr/dscf. When calculating emissions to determine the PM concentration, it is assumed that all emissions from sand handling are captured by the baghouse. Since the gas exiting the baghouse will be at room temperature, it is also assumed that actual cubic feet of gas flow is equal to dry standard cubic feet. The PM concentration is calculated as follows:

PM emission rate (SV 020, lb/hr\*) = 12.5 tph(3.6 lb/ton)(1-0.99) = 0.45 lb/hr

\* Assuming all PM is captured by the baghouse.

PM concentration (SV 020, gr/dscf) = 0.45 lb/hr(hr/60 min)(7,000 gr/lb)(min/35,000 dscf)  
 = 0.0015 gr/dscf < 0.3 gr/dscf

Minn. R. 7011.0715 also limits emissions to less than 20% opacity. At the expected emission rate, emissions are expected to be well below the 20% opacity standard.

### 3.3 Dispersion Modeling Requirements

The current permit (Air Emission Permit No. 16900012-001) includes requirements to submit a dispersion modeling protocol and dispersion modeling results for PM-10 and lead. The protocol and results for lead are only required if a required performance test for lead shows that lead emissions are greater than 0.51 lb/ton of metal melted. A November 14, 2000, performance test gave a lead emission rate of 0.0055 lb/ton, so modeling for lead has been removed from the permit.

The previous permit issued on June 25, 1998, required submittal of computer dispersion modeling for PM<sub>10</sub>. The preliminary modeling results predict PM<sub>10</sub> concentrations above the ambient air quality standards (AAQS) for PM<sub>10</sub>. As a result, requirements have been added to the permit which require submittal of a new dispersion modeling protocol (due 60 days after permit issuance) and new computer dispersion modeling results (due 120 days after MPCA approval of the modeling protocol) which demonstrate modeled compliance with the AAQS for PM<sub>10</sub>. If modeled compliance is based on a new condition or restriction which is not an enforceable condition of the existing permit, then the Permittee is required to submit a permit application to add, as an enforceable permit condition, any new conditions necessary to ensure compliance with the AAQS for PM<sub>10</sub>.

### 3.4 Performance Testing Requirements

The most recent PM test results for SV 001 are shown below:

| Date     | PM Test Results (lb/hr) | PM Allowable Emission Rate (lb/hr) | Scrubber Pressure Drop (" w.c.) | Scrubber Water Pressure (psi) | Afterburner Temp. (F) |
|----------|-------------------------|------------------------------------|---------------------------------|-------------------------------|-----------------------|
| 8/20/96  | 18.6                    | 13.7                               | 28-30                           | 50                            | 1666-1698             |
| 12/17/96 | 16.5                    | 14.2                               | 28-29                           | 48-49                         | 1570-1678             |
| 8/14/97  | 5.7                     | 14.0                               | 57.9                            | 52                            | ~ 1400                |
| 11/15/00 | 5.5                     | 15.3                               | 52-63                           | 56                            | Unknown               |

The PM emission rate from the November 15, 2000 test is approximately 36% of the allowable emission rate (5.5 lb/hr divided by 15.33 lb/hr). Current guidance allows for a 60-month stack testing frequency if test results indicate an emission rate less than 60% of the applicable emission limit. Based upon this guidance and the results of the last two performance tests, a 60-month testing frequency is established in the permit.

### 3.5 Attachment 2 to the Permit (Emission Factors)

Attachment 2 to the permit gives information to allow for calculation of the amount of individual HAPs and total VOCs that are emitted when sand is mixed with binder, but before the mold or core is exposed to molten metal. In the previous permit (Air Emission Permit No. 16900012-001), this information was obtained from a 1992 article entitled "Form R Reporting of Binder Chemicals Used in Foundries", published by the American Foundrymen's Society. In this permit (Air Emission Permit No. 16900012-002), these factors have been updated based on the document entitled, "Form R Reporting of Binder Chemicals Used in Foundries," Second Edition (1998), published by the American Foundrymen's Society, Inc. and the Casting Industry Suppliers Association.

### 3.6 VOC & HAP Emission Calculations

The application includes emission calculations for VOCs and HAPs from both EU 064 (Sand Mixer) as well as "Pouring, Cooling and Shakeout" emissions, which result from the contacting of molten metal with the core or mold. A November 30, 2001, email (attached) from Pinnacle Engineering (the environmental consultant for Badger) indicates that the sand handling equipment is physically separated from the pouring and cooling portion of the process and that the new equipment does not allow for an increase in throughput for the pouring and cooling portion of the process (i.e., no "debottlenecking" will occur). Based upon this information, it does not appear that the modification will result in any emission increases elsewhere at the facility; therefore, it is only necessary to calculate VOC and HAP emission increases due to the new equipment (EU 064 only, since no significant VOC or HAP emissions are expected from EU 061, 062 or 063).

### **VOC Emissions**

VOC emissions calculations submitted with the application are attached. The emission calculations are based on the type of resin expected to be used. Based upon this resin, maximum expected VOC emissions are 21.20 tons/year (as discussed above, VOC emissions from pouring, cooling and shakeout are not included in the calculation). Use of a different binder system may result in higher VOC emissions based upon the factors in Attachment 2 to the permit. Therefore, it is necessary to limit VOC emissions from EU 061 to EU 064 to 39.0 tons/year to avoid classification as a "major modification" under PSD.

## **HAP Emissions**

Using the same rationale discussed above, only HAP emissions from the new equipment are included in the calculation of the HAP emissions increase. The emission calculations submitted with the application are attached and show a potential emissions increase of 0.92 ton/year of naphthalene and 0.01 ton/year of MDI. As with VOC emissions, use of a different binder system may result in higher HAP emissions based upon the factors in Attachment 2 to the permit. To avoid construction of a “major source” of HAPs and applicability of the 112(g) rules, HAP emissions from the new equipment must be limited to less than 10 tons/year of any single HAP or 25 tons/year of any combination of HAPs. Emissions from the entire facility are and will continue to be limited to no more than 9.5 tons/year of any single HAP and no more than 24.5 tons/year of any combination of HAPs. Since emissions from the entire facility are limited to less than the major source levels of 112(g), it is not necessary to limit HAP emissions from the new equipment.

## **4. Conclusion**

Based on the information provided by Badger Foundry, the MPCA has reasonable assurance that the proposed operation of the emission facility, as described in the Air Emission Permit No. 16900012-002 and this technical support document, will not cause or contribute to a violation of applicable federal regulations and Minnesota rules.

Staff Members on Permit Team: Craig Thorstenson, Jim Kolar, Greg Berger, Rhonda Land

Attachment: VOC/HAP Calculations

November 30, 2001, Email from Pinnacle Engineering to the MPCA