

**AIR EMISSION PERMIT NO. 16900012- 003**

**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):

<b>Permit Type</b>	<b>Application Date</b>	<b>Issuance Date</b>
Total Facility Operating Permit	June 15, 1995	June 25, 1998
Major Amendment	July 2, 2001	May 20, 2002
Major Amendment	December 31, 2002	See Below

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 are as defined in the state air pollution control rules unless the term is explicitly defined in the permit.

**Permit Type:** Federal Part 70; Major Source under PSD/NSR

**Major Amendment Issue Date:** January 3, 2005

**Expiration:** Upon Re-Issuance of a Part 70 (Title V) Permit  
All Title I Conditions do not expire.

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Richard J. Sandberg, Manager  
Air Quality Permits Section  
Industrial Division

for Sheryl A. Corrigan  
Commissioner  
Minnesota Pollution Control Agency

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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.

**Permit Action 002:**

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:

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

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

**Permit Action 003:**

The project involves the installation of a fabric filter (CE 012) to control particulate matter / PM<sub>10</sub> emissions from certain sources at the facility. Emissions from the fabric filter will be vented to stack / vent SV 023. The project also involves the removal of several stacks / vents and the alteration of other stacks / vents at the facility to increase dispersion of emissions. The project is necessary to demonstrate modeled compliance with the state and national ambient air quality standards for particulate matter less than 10 microns (PM<sub>10</sub>).

Below is a description of the changes made to the permit with this permit action (PER 003):

- 1) A condition is added under the Total Facility section of the permit which references the parameters used in the dispersion modeling. The parameters are added as Appendix II to the permit.
- 2) The permit requires stack / vent SV 012 to be altered so the stack is vented vertically with a stack height of 13 feet. The permit also requires that the roof over SV 012 be removed. The permit requires these actions to be completed by October 31, 2004.
- 3) The permit requires that a new fabric filter (CE 012) be installed to control emissions from EUs 003, 004, 005, 023 and 024. CE 012 must be installed and operational by August 7, 2006.
- 4) Upon installation of the new fabric filter CE 012, the permit requires emissions from EU 003 to be vented to CE 012 and requires that SV 003 be removed.
- 5) Upon installation of the new fabric filter CE 012, the permit requires emissions from EU 004 to be vented to CE 012 and requires that SV 004 and SV 005 be removed.
- 6) Upon installation of the new fabric filter CE 012, the permit requires emissions from EU 005 to be vented to CE 012 and requires that SV 006 be removed.
- 7) The permit requires that, by October 31, 2005, the Permittee install an air cleaning system to control emissions from EU 007 and vent emissions from EU 007 inside of the building 100 percent of the time. Upon venting emissions inside of the building, the stack for EU 007 (SV 008) is required to be removed.
- 8) The permit requires that, by October 31, 2005, the Permittee install an air cleaning system to control emissions from EU 008 and vent emissions from EU 008 inside of the building 100 percent of the time. Upon venting emissions inside of the building, the stack for EU 008 (SV 009) is required to be removed.
- 9) The permit requires that, by June 25, 2007, the Permittee complete construction of a structure to completely enclose the coke storage pile.
- 10) The permit requires that, by June 25, 2007, the Permittee complete construction of a structure to completely enclose the limestone storage pile.
- 11) The permit requires that, by August 7, 2006, all stacks and vents at the facility be vented vertically with no rain caps or other air flow obstructions installed.

After completion of the changes authorized by permit action 003, the equipment configuration will be as follows:

<b>Emission Unit ID</b>	<b>Emission Unit Description</b>	<b>Control Equipment ID*</b>	<b>Stack / Vent Number</b>
EU 001	Cupola	CE 001, CE 002	SV 001
EU 002	Charge Handling		SV 002
EU 003	Pouring / Cooling	CE 012	SV 023
EU 004	Mold Dump	CE 012	SV 023
EU 005	Casting Shakeout / Dump	CE 004, CE 012	SV 012, SV 023
EU 007	Core Making		**
EU 008	Core Making		**
EU 015	Mold-Making Machines	CE 003	**
EU 016	Mold-Making Machines	CE 003	**
EU 017	Mold-Making Machines	CE 003	**
EU 018	Mold-Making Machines	CE 003	**
EU 019	Mold-Making Machines	CE 003	**
EU 020	Mold-Making Machines	CE 003	**
EU 023	Sand Handling System	CE 003, CE 012	SV 023
EU 024	Mold Sand Mullor	CE 003, CE 004, CE 012	SV 012, SV 023
EU 025	Multiple Hand Grinding Stations	CE 004, CE 011	SV 012, SV 020
EU 044	Shot Blaster – 1 Wheel	CE 004	SV 012
EU 045	Shot Blaster – 2 Wheel	CE 004	SV012
EU 046	Shot Blaster – 4Wheel	CE 010	SV 013
EU 049	Cupola Start Up Torches	CE 001, CE 002	SV 001
EU 054	Omega Line Sand Mixer / Mold Production		**
EU 055	Kloster Line Sand Mixer / Core Production		**
EU 056	Electric Induction Melting Furnace	CE 012	SV 023

EU 057	Ductile Treatment Operations	CE 011	SV 020
EU 058	Shot Blaster – 3 Wheel	CE 011	SV 020
EU 061	Nobake Vibra Mill Sand Reclaimer	CE 011	SV 020
EU 062	Nobake Sand Handling System	CE 011	SV 020
EU 065	Scrap pre-heating for Ductile Line	CE 011	SV 020

\* Control equipment is described below.

\*\* Emissions from EU 007 and EU 008 will be vented to a particulate matter control device and will be vented inside of the building 100 percent of the time. Emissions from EU 015-020 are controlled by the moisture content of the sand and will be vented into the building 100 percent of the time. Emissions for EU 054 and EU 055 are vented inside the building 100 percent of the time.

After completion of the changes authorized by permit action 003, the control equipment at the facility will be as follows:

<b>Control Equipment ID</b>	<b>Description</b>
CE 001	Venturi Scrubber
CE 002	Direct Flame Afterburner
CE 003	2-3% Moisture Content
CE 004	Fabric Filter
CE 010	Fabric Filter
CE 011	Fabric Filter
CE 012	Fabric Filter

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

<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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

<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, Toluene, 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><b>G. REPORTING</b></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**

01/10/05

Facility Name: Badger Foundry Company

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<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>
<p>The following condition is applicable after the installation/operation of fabric filter CE 012, which is required to be installed and operational by August 7, 2006.</p> <p>Parameters Used in Modeling: The parameters used in the modeling performed to demonstrate compliance with the Ambient Air Quality Standards for PM-10 are listed in Appendix III of this permit. If the Permittee intends to change any of these parameters, the Permittee must submit the revised parameters to the Commissioner and receive written approval before making any changes. The revised parameter information submittal must include, but is not limited to: the locations, heights and diameters of the stacks; locations and dimensions of nearby buildings; velocity and temperatures of the gases emitted; and the emission rates.</p>	<p>Minn. R. 7009.0020; Minn. R. 7007.0800, subp. 2</p>

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

<p>CONTINUED:</p> <p>The plume dispersion characteristics due to the parameter revisions must equal or exceed the dispersion characteristics modeled for this permit, and the Permittee shall demonstrate this in the proposal.</p> <p>If the information does not demonstrate equivalent or better dispersion characteristics, or if a conclusion cannot readily be made about the dispersion, the Permittee must remodel.</p> <p>For changes that do not involve an increase in an emission rate and that do not require a permit amendment, the proposal must be submitted as soon as practicable, but no less than 60 days before making the change to any parameter.</p> <p>For changes involving increases in emission rates and that require a minor permit amendment, the proposal must be submitted as soon as practicable, but no less than 60 days before making the change to any parameter.</p>	<p>Minn. R. 7009.0020; Minn. R. 7007.0800, subp. 2</p>
<p>Compliance Schedule: Complete the actions outlined in the Compliance Schedule in Appendix II of this permit.</p>	<p>Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)</p>
<p>Stack / Vent Requirements: By August 7, 2006, all stacks and vents at the facility shall be vented vertically with no rain caps or other obstructions installed.</p>	<p>Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)</p>

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**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:                      1) record the weight (lb/day) of each catalyst used in EU 054 and EU 055 during the previous day;                      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:                      By the 30th day of each month, calculate and record the following for the previous month:                      1) determine usage (lb/mo) of each catalyst by summing daily usage of each catalyst during the previous month;                      2) calculate resin usage (lb/mo) based on the weight percent resin in the catalyst/resin recipe;                      3) multiply the monthly usage of each resin and catalyst by the corresponding VOC weight percent and sum all results;                      4) multiply the sum by .50 (emission factor) and divide by 2000 to determine GP 002 sand-and-resin-mixing VOC emissions (ton/mo);                      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:                      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.                      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:                      By the 30th day of each month calculate and record:                      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;                      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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

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

- Associated Items:** CE 004 Fabric Filter - Low Temperature, i.e., T<180 Degrees 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 012  
 SV 013  
 SV 020 Baghouse for no-bake sand

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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**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 facility vent  
 SV 012  
 SV 013  
 SV 020 Baghouse for no-bake sand  
 SV 023 Baghouse for Pouring, Cooling, Shakeout and Muller

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 SV 003 - See monitoring requirements under CE 003 SV 004 - Roof Vent, No Control Equipment SV 005 - Roof Vent, No Control Equipment 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.) SV 008 - Roof Vent, No Control Equipment SV 009 - Roof Vent, No Control Equipment SV 011 - Roof Vent, No Control Equipment SV 012 - See monitoring requirements under CE 004 SV 013 - See monitoring requirements under CE 010 SV 020 - See monitoring requirements under CE 011 SV 023 - See monitoring requirements under CE 012	NOTE:
After installation and operation of CE 012 (vented to SV 023), the stack/vent configuration will be as follows:  SV 002 - Roof Vent, No Control Equipment SV 012 - See monitoring requirements under CE 004 SV 013 - See monitoring requirements under CE 010 SV 020 - See monitoring requirements under CE 011 SV 023 - See monitoring requirements under CE 012	NOTE:

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**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> <ol style="list-style-type: none"> <li>1) record the weight (lb/day) of each catalyst used in EU 064 during the previous day;</li> <li>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.</li> </ol>	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> <ol style="list-style-type: none"> <li>1) determine usage (lb/mo) of each catalyst by summing daily usage of each catalyst during the previous month;</li> <li>2) calculate resin usage (lb/mo) based on the weight percent resin in the catalyst/resin 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 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>	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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item:** SV 001

**Associated Items:** EU 001 Cupola

EU 049 Cupola Start Up 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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item: SV 008****Associated Items:** GP 006 Opacity and PM Limit-Applies to each SV

<b>What to do</b>	<b>Why to do it</b>
Equipment Removal and/or Dismantlement: due before 10/31/2005, SV 008 shall be removed.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item:** SV 009**Associated Items:** GP 006 Opacity and PM Limit-Applies to each SV

<b>What to do</b>	<b>Why to do it</b>
Equipment Removal and/or Dismantlement: due before 10/31/2005, SV 009 shall be removed.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item: SV 012****Associated Items:** EU 005 Casting Shakeout/Dump

EU 024 Mold Sand Mullor

EU 025 Multiple Hand Grinding Stations

EU 044 Shot Blaster - 1 Wheel

EU 045 Shot Blaster - 2 Wheel

GP 004 Grinding and Cleaning Operations

GP 006 Opacity and PM Limit-Applies to each SV

<b>What to do</b>	<b>Why to do it</b>
Install: due before 10/31/2004, the Permittee shall alter SV 012 so the stack is vented vertically with a stack height of 13 feet. The roof over SV 012 (1 and 2 Wheel Blaster Baghouse - CE 004) shall also be removed.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item: SV 023 Baghouse for Pouring, Cooling, Shakeout and Muller**

- Associated Items:** EU 003 Pouring/Cooling  
 EU 004 Mold Dump  
 EU 005 Casting Shakeout/Dump  
 EU 023 Sand Handling System  
 EU 024 Mold Sand Mullor  
 EU 056 Electric Induction Melting Furnace  
 GP 006 Opacity and PM Limit-Applies to each SV

What to do	Why to do it
Initial Performance Test: due 90 days after Initial Startup of CE 012, for particulate matter and opacity from SV 023.	Minn. R. 7017.2020, subp. 1
Initial Performance Test: due 180 days after Initial Startup of CE 012, for particulate matter and opacity.  The results of the performance tests shall be used to demonstrate compliance with the particulate matter and opacity limits established by Minn. R. 7011.0715.	Minn. R. 7017.2020
Performance Test Notifications and Submittals;  Performance Test Notification (written): due 30 days before each Performance Test Performance Test Plan: due 30 days before each Performance Test Performance Test Pre-Test Meeting: due 7 day before each Performance Test Performance Test Report: due 45 days after each Performance Test Performance Test Report - Microfiche Copy or CD: due 105 day after each Performance Test. The Notification, Test Plan, and Test Report may be submitted in alternative format as allowed by Minn. R. 7017.2018.	Minn. R. 7017.2030, subp. 1-4; Minn. R. 7017.2018 and Minn. R. 7017.2035, subp. 1-2
Performance Test Notifications and Submittals;  Performance Test Notification (written): due 30 days before each Performance Test Performance Test Plan: due 30 days before each Performance Test Performance Test Pre-Test Meeting: due 7 day before each Performance Test Performance Test Report: due 45 days after each Performance Test Performance Test Report - Microfiche Copy or CD: due 105 day after each Performance Test. The Notification, Test Plan, and Test Report may be submitted in alternative format as allowed by Minn. R. 7017.2018.	Minn. R. 7017.2030, subp. 1-4; Minn. R. 7017.2018 and Minn. R. 7017.2035, subp. 1-2

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item:** EU 003 Pouring/Cooling**Associated Items:** CE 012 Fabric Filter - Low Temperature, i.e., T<180 Degrees F

SV 023 Baghouse for Pouring, Cooling, Shakeout and Muller

<b>What to do</b>	<b>Why to do it</b>
Upon installation/operation of fabric filter CE 012, emissions from EU 003 shall be vented to CE 012 and stack SV 003 shall be removed. Emissions from EU 003 may be vented to SV 003 until fabric filter CE 012 is installed and operational.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item:** EU 004 Mold Dump**Associated Items:** CE 012 Fabric Filter - Low Temperature, i.e., T<180 Degrees F

SV 023 Baghouse for Pouring, Cooling, Shakeout and Muller

<b>What to do</b>	<b>Why to do it</b>
Upon installation/operation of baghouse CE 012, emissions from EU 004 shall be vented to CE 012 and stacks SV 004 and SV 005 shall be removed. Emissions from EU 004 may be vented to SV 004 and SV 005 until fabric filter CE 012 is installed and operational.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item:** EU 005 Casting Shakeout/Dump**Associated Items:** CE 004 Fabric Filter - Low Temperature, i.e., T<180 Degrees F

CE 012 Fabric Filter - Low Temperature, i.e., T&lt;180 Degrees F

SV 012

SV 023 Baghouse for Pouring, Cooling, Shakeout and Muller

<b>What to do</b>	<b>Why to do it</b>
Upon installation/operation of baghouse CE 012, emissions from EU 005 shall be vented to CE 012 and stack SV 006 shall be removed. Emissions from EU 005 may be vented to SV 006 until fabric filter CE 012 is installed and operational.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

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

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>
<p>Install: due before 10/31/2005, the Permittee shall install an air cleaning system to control emissions from EU 007 and shall vent the emissions from EU 007 inside of the building 100 percent of the time. Upon venting emissions inside of the building, the stack for EU 007 (SV 008) shall be removed.</p>	<p>Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)</p>

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

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

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>
<p>Install: due before 10/31/2005, the Permittee shall install an air cleaning system to control emissions from EU 008 and shall vent the emissions from EU 008 inside of the building 100 percent of the time. Upon venting emissions inside of the building, the stack for EU 008 (SV 009) shall be removed.</p>	<p>Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)</p>

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

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

CE 012 Fabric Filter - Low Temperature, i.e., T&lt;180 Degrees F

SV 023 Baghouse for Pouring, Cooling, Shakeout and Muller

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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item:** CE 001 Venturi Scrubber

**Associated Items:** EU 001 Cupola

EU 049 Cupola Start Up Torches

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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

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

**Associated Items:** EU 001 Cupola

EU 049 Cupola Start Up Torches

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 05/20/2002 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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**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

<b>What to do</b>	<b>Why to do it</b>
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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

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

- Associated Items:** EU 005 Casting Shakeout/Dump  
 EU 024 Mold Sand Mullor  
 EU 025 Multiple Hand Grinding Stations  
 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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

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

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.  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
Equipment Removal: Upon installation and operation of baghouse CE 012, CE 007 is no longer required to be used to control emissions from the Sand Mullor (EU 024) and emissions from EU 024 shall be vented to CE 012. Until CE 012 is installed, CE 007 shall be used to control emissions from EU 024.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item: CE 008 Wet Cyclonic Separator - Wet Cyclone**

<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
Equipment Removal: Upon installation and operation of baghouse CE 012, CE 008 is no longer required to be used to control emissions from the Casting Shakeout / Dump (EU 005) and emissions from EU 005 shall be vented to CE 012. Until CE 012 is installed, CE 008 shall be used to control emissions from EU 005.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

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

- Associated Items:**
- EU 025 Multiple Hand Grinding Stations
  - EU 057 Ductile Treatment Operations
  - EU 058 Shot Blaster - 3 wheel
  - EU 061 Nobake Vibra Mill Sand Reclaimer
  - EU 062 Nobake Sand Handling System
  - EU 065 Scrap pre-heating for Ductile Line
  - 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 A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item: CE 012 Fabric Filter - Low Temperature, i.e., T<180 Degrees F**

- Associated Items:** EU 003 Pouring/Cooling  
 EU 004 Mold Dump  
 EU 005 Casting Shakeout/Dump  
 EU 023 Sand Handling System  
 EU 024 Mold Sand Mullor  
 EU 056 Electric Induction Melting Furnace

What to do	Why to do it
Installation of Control Equipment: On or before June 25, 2006, the Permittee shall install and operate CE 012 to control emissions from EU 003, EU 004, EU 005, EU 015, EU 016, EU 017, EU 018, EU 019, EU 020, EU 023 and EU 024. After June 25, 2006, emissions from the listed emission units shall be vented to CE 012.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)
The control equipment is considered listed control equipment under Minn. R. 7011.0060 to 7011.0080. The Permittee shall operate and maintain the fabric filter at all times that any process equipment controlled by the fabric filter is operating.	Minn. R. 7011.0065, subp. 2(A)
Hood Certifications: The Permittee shall complete the hood evaluation requirements of Minn. R. 7011.0070, subp. 1 for the hoods used to capture emissions from EU 003, EU 004, EU 005, EU 023, EU 024 and EU 056. The hood certification meeting the requirements of Minn. R. 7011.0070, subp. 3 shall be sent to the Agency within 180 days after start-up of CE 012. A copy of the hood evaluation form containing the elements listed in Minn. R. 7011.0070, subp. 4 shall be kept on site.	Minn. R. 7011.0070, subp. 1
Total Particulate Matter: greater than or equal to 99 percent collection efficiency and greater than or equal to 80 percent capture efficiency.	Minn. R. 7011.0065, subp. 1(A); To comply with the particulate matter limits established in Minn. R. 7011.0715
Particulate Matter < 10 micron: greater than or equal to 99 percent collection efficiency and greater than or equal to 80 percent capture efficiency.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)
Corrective Actions: The Permittee shall take corrective action as soon as possible if any of the following occur: - An excursion or exceedance of the appropriate range(s) or designated condition(s) is detected for one of the indicators of emission control performance for CE 012. The indicators shall be established in the monitoring plan submitted in accordance with 40 CFR Section 64.4. - the fabric filter (CE 012) or any of its components are found during the inspections to need repair. Corrective actions shall return the indicator(s) of emission control performance to the appropriate range(s) or condition(s) and/or include completion of necessary repairs identified during the inspection, as applicable. Corrective actions include, but are not limited to, those outlined in the O & M Plan for the fabric filter. The Permittee shall keep a record of the type and date of any corrective action taken for each filter.	40 CFR 64.7(d)
Monitoring Equipment: The Permittee shall install and maintain as necessary the monitoring equipment for measuring and recording the indicator range(s) or designated condition(s) established in the monitoring plan submitted in accordance with 40 CFR Section 64.4. The monitoring equipment must be installed, in use, and properly maintained when the monitored fabric filter is in operation.	Minn. R. 7007.0800, subp. 4 and 40 CFR 64.7(b) and (c)
With the semi-annual deviations report due for the facility (specified in Table B), the following shall be included:  (i) Summary information on the number, duration and cause (including unknown cause if applicable) of excursions or exceedances, as applicable, and the corrective actions taken;  (ii) Summary information on the number, duration and cause (including unknown cause, if applicable) for monitor downtime incidents (other than downtime associated with zero and span or other calibration checks, if applicable).	40 CFR 64.9(a)(2)
The Permittee shall operate and maintain the fabric filter in accordance with the Operation and Maintenance (O & M) Plan. The Permittee shall keep copies of the O & M Plan available on site for use by staff and MPCA staff.	Minn. R. 7007.0800, subp. 14
The Permittee shall perform and external inspection of the baghouse monthly. The Permittee shall perform an internal inspection at least annually, or at a greater frequency if the baghouse manufacturer recommends such. The Permittee shall correct or repair any abnormal condition identified in the inspection as required.	Minn. R. 7007.0800, subp. 4, 5 and 14
Stack Height: Emissions from CE 012 shall be vented vertically from a minimum stack height of 50 feet.	Minn. R. 7009.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item: FS 001 PM10 Coke pile, 0.089 acres in surficial area**

<b>What to do</b>	<b>Why to do it</b>
Install: due before 06/25/2007, the Permittee shall complete construction of a structure to completely enclose the coke storage pile.	Minn. R. 7007.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE A: LIMITS AND OTHER REQUIREMENTS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

**Subject Item: FS 002 PM10 Limestone pile, 0.089 acres in surficial area**

<b>What to do</b>	<b>Why to do it</b>
Install: due before 06/25/2007, the Permittee shall complete construction of a structure to completely enclose the limestone storage pile.	Minn. R. 7007.0020 (to not cause or contribute to a violation of the ambient air quality standards for PM-10)

**TABLE B: SUBMITTALS**

01/10/05

Facility Name: Badger Foundry Company  
Permit Number: 16900012 - 003

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**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

<b>What to send</b>	<b>When to send</b>	<b>Portion of Facility Affected</b>
Application for Permit Reissuance	due 180 days before expiration of Existing Permit	Total Facility
Submittal	due 180 days after Initial Startup of CE 012, the Permittee shall submit to the MPCA monitoring that satisfies the requirements of 40 CFR Section 64.3. The submittal shall include the information required by 40 CFR Section 64.4. The required monitoring information shall be submitted with a permit application to amend the permit to incorporate the monitoring requirements into the permit. Upon submittal of the permit application, the Permittee shall follow the monitoring outlined in the submittal.	CE012
Testing Frequency Plan	due 60 days after Initial Performance Test. The plan shall specify a testing frequency based on the test data and MPCA guidance. Future performance tests based on one-year (12 month), 36 month, and 60 month intervals, or as applicable, shall be required upon written approval of the MPCA.	SV023

**TABLE B: RECURRENT SUBMITTALS**

01/10/05

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 003

What to send	When to send	Portion of Facility Affected
Progress Report	due 15 days after end of each calendar quarter starting 06/25/1998 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.	GP001
Progress Report	due 30 days after end of each calendar half-year following Permit Issuance. The progress report shall describe the actions which have been taken to complete the actions required in the Compliance Schedule included in Appendix II of this permit.	Total Facility
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 starting 06/25/1998 (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: 16900012-003

**Appendix I**

**Insignificant Activities and Applicable Requirements**

<b>Minn. R. 7007.1300, 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

APPENDIX MATERIAL

Facility Name:Badger Foundry Company

Permit Number: 16900012-003

**Appendix II**

**Compliance Schedule**

<b>Compliance Date</b>	<b>Action(s)</b>
June 25, 2004	Complete all related engineering for installation of CE 012
	Research feasible equipment suppliers for CE 012
	Obtain equipment and construction quotations for CE 012
	Select equipment supplier and construction crews for CE 012
	Place purchase orders based on long term progressive payments for CE 012
October 31, 2004	Remove roof over SV 012 (1 and 2 Wheel Blaster Baghouse – CE 004) and vent unit straight up without a rain cap.
June 25, 2005	Complete any needed building reinforcement for CE 012
	Complete foundations and concrete work for CE 012
October 31, 2005	Remove SV 008 and SV 009. Replace with dust collector(s) that are vented inside the building 100% of the time.
August 7, 2006	Installation of equipment and ductwork modification to be completed for CE 012.
	Final connection of CE 012
	CE 012 equipment in operation first day after shutdown
	Remove wet Rotocyclone collector to be replaced with CE 012
June 25, 2007	Complete construction of the structures to completely enclose the coke and limestone storage piles.

APPENDIX MATERIAL

Facility Name:Badger Foundry Company

Permit Number: 16900012-003

**Appendix III**

**Parameters Used in the Modeling**

Stack / Vent	Description	PM-10 Emission Rate (lb/hr)	Stack Height (feet)	Release Height (feet)	Stack Diameter (feet)	Stack Temperature (F)	Stack Flow Rate (acfm)	Direction	Rain Hat?
SV 001	Cupola	5.7	81.7		2.77	165	24,000	Up	No
SV 002	Charge Handling – volume source	1.2	NA	7.5	NA	NA	NA	NA	NA
SV 012	Shot Blasting (1 and 2 Wheel)	0.06	13		4.14	75	53,000	Up	No
SV 013	Shot Blasting (4-Wheel)	0.06	46.1		2.17	75	10,000	Up	No
SV 020	Vibramill and Shot Blasting (3-Wheel)	0.06	40		2.5	75	35,000	Up	No
SV 023	New Fabric Filter – Pouring, Cooling and Shakeout	0.36	50		4.33	75	60,000	Up	No
FS 002	Waste Sand Pile	0.02	NA	3.28	NA	NA	NA	NA	NA
FS 003A	Unpaved West	0.18	NA	3.28	NA	NA	NA	NA	NA
FS 003B	Unpaved East	0.18	NA	3.28	NA	NA	NA	NA	NA
FS 004	Paved Road	0.01	NA	3.28	NA	NA	NA	NA	NA



**Attachment 1 - Badger Foundry Permit No. 16900012-003**

The following tables were taken from: "Calculating Emission Factors for Pouring, Cooling and Shakeout". This article was published in the October 1994 edition of "Modern Casting" which is a monthly publication of the American Foundrymen's Society.

The emission factors in tables 1-11 give emission factors for several criteria pollutants and several Hazardous Air Pollutants

***Fig. 3. This figure illustrates the benzene emissions for a foundry using green sand molds and furan hotbox cores.***

Binder system:	Green Sand
Index:	Seacoal
Index use rate:	2,000,000 lb per year
Benzene emission factor:	0.000611 lb per lb of index
Annual benzene emissions:	$0.000611 \times 2,000,000 \text{ lb} = 1222 \text{ lb}$
Binder system:	Furan hotbox
Index:	Resin
Index use rate:	100,000 lb of resin per year
Benzene emission factor:	0.000537 lb per lb of index
Annual benzene emissions:	$0.000537 \times 100,000 \text{ lb} = 54 \text{ lb}$

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**Table 1. Phenolic Nobake Binder**

Pouring-Cooling-Shakeout

Binder System Phenolic Nobake Index: Resin	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.000039
Hydrogen Sulfide	0.001462
Nitrogen Oxides	0.000029
Sulfur Dioxide	0.015107
Total Hydrocarbons <sup>[4]</sup>	0.012159
Acrolein	0.000005
Benzene	0.011209
Formaldehyde	0.000010
Hydrogen Cyanide	0.000029
M-Xylene	0.000097
Naphthalene <sup>[1]</sup>	0.000049
O-Xylene <sup>[1]</sup>	0.000049
Phenol <sup>[2]</sup>	0.000975
Toluene	0.000634
Total Aromatic Amines <sup>[1]</sup>	0.000049
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes	0.003070
Total HAPs <sup>[5]</sup>	0.016174

**Table 2. Phenolic Urethane Binder**

Pouring-Cooling-Shakeout

Binder System Phenolic Urethane Index: Resin	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.000083
Hydrogen Sulfide	0.000057
Nitrogen Oxides	0.000044
Sulfur Dioxide	0.000061
Total Hydrocarbons <sup>[4]</sup>	0.023377
Acrolein	0.000031
Benzene	0.005351
Formaldehyde <sup>[2]</sup>	0.000022
Hydrogen Cyanide	0.001053
M-Xylene	0.000439
Naphthalene <sup>[3]</sup>	0.000022
O-Xylene	0.000132
Phenol	0.003904
Toluene	0.000833
Total Aromatic Amines	0.000351
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes <sup>[1]</sup>	0.000219
Total HAPs <sup>[5]</sup>	0.012355

**Table 3. Phenolic Hotbox Binder**

Pouring-Cooling-Shakeout

Binder System Phenolic Hotbox Index: Resin	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.010931
Hydrogen Sulfide	0.000009
Nitrogen Oxides	0.000638
Sulfur Dioxide	0.000036
Total Hydrocarbons <sup>[4]</sup>	0.005165
Acrolein	0.000009
Benzene	0.001002
Formaldehyde	0.000006
Hydrogen Cyanide	0.001184
M-Xylene	0.000121
Naphthalene <sup>[1]</sup>	0.000030
O-Xylene <sup>[1]</sup>	0.000030
Phenol <sup>[2]</sup>	0.000203
Toluene	0.000182
Total Aromatic Amines	0.001275
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes	0.000273
Total HAPs <sup>[5]</sup>	0.004318

**Table 4. Green Sand Binder**

Pouring-Cooling-Shakeout

Binder System Green Sand Index: Seacoal	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.000065
Hydrogen Sulfide	0.000832
Nitrogen Oxides	0.000562
Sulfur Dioxide	0.000253
Total Hydrocarbons <sup>[4]</sup>	0.011941
Acrolein	0.000002
Benzene	0.000611
Formaldehyde	0.000004
Hydrogen Cyanide	0.000118
M-Xylene <sup>[1]</sup>	0.000021
Naphthalene <sup>[1]</sup>	0.000021
O-Xylene <sup>[1]</sup>	0.000021
Phenol	0.000131
Toluene	0.000063
Total Aromatic Amine	0.000021
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes	0.000063
Total HAPs <sup>[5]</sup>	0.001076

**Table 5. Core Oil Binder**  
Pouring-Cooling-Shakeout

Binder System Core Oil Index: Core Oil	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.000038
Hydrogen Sulfide	0.000057
Nitrogen Oxides	0.000081
Sulfur Dioxide	0.000115
Total Hydrocarbons <sup>[4]</sup>	0.028737
Acrolein	0.000077
Benzene	0.002344
Formaldehyde	0.000096
Hydrogen Cyanide	0.000086
M-Xylene	0.000239
Naphthalene <sup>[1]</sup>	0.000048
O-Xylene	0.000287
Phenol <sup>[2]</sup>	0.000057
Toluene	0.000478
Total Aromatic Amines	0.000096
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes <sup>[1]</sup>	0.000766
Total HAPs <sup>[5]</sup>	0.004574

**Table 6. Shell Binder**  
Pouring-Cooling-Shakeout

Binder System Shell Index: Resin <sup>[6]</sup>	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.003860
Hydrogen Sulfide	0.000094
Nitrogen Oxides	0.000994
Sulfur Dioxide	0.003509
Total Hydrocarbons <sup>[4]</sup>	0.022421
Acrolein	0.000047
Benzene	0.006667
Formaldehyde	0.000035
Hydrogen Cyanide <sup>[2]</sup>	0.010526
M-Xylene	0.000585
Naphthalene <sup>[3]</sup>	0.000058
O-Xylene <sup>[1]</sup>	0.000117
Phenol	0.002456
Toluene	0.002807
Total Aromatic Amines	0.002339
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes <sup>[1]</sup>	0.000585
Total HAPs <sup>[5]</sup>	0.026222

**Table 7. Low Nitrogen Furan Binder**  
Pouring-Cooling-Shakeout

Binder System Low Nitrogen Furan Index: Resin	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.000040
Hydrogen Sulfide	0.000405
Nitrogen Oxides	0.000012
Sulfur Dioxide	0.000607
Total Hydrocarbons <sup>[4]</sup>	0.007814
Acrolein	0.000028
Benzene	0.000648
Formaldehyde	0.000267
Hydrogen Cyanide	0.000368
M-Xylene	0.002227
Naphthalene <sup>[1]</sup>	0.000040
O-Xylene	0.000729
Phenol <sup>[2]</sup>	0.000024
Toluene	0.000121
Total Aromatic Amines	0.000081
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes	0.000243
Total HAPs <sup>[5]</sup>	0.004777

**Table 8. Medium Nitrogen Furan TSA Catalyst Binder**  
Pouring-Cooling-Shakeout

Binder System Medium Nitrogen Furan TSA Catalyst Index: Resin	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.000202
Hydrogen Sulfide	0.000486
Nitrogen Oxides	0.000312
Sulfur Dioxide	0.004858
Total Hydrocarbons <sup>[4]</sup>	0.017178
Acrolein	0.000016
Benzene	0.004534
Formaldehyde	0.000065
Hydrogen Cyanide	0.000607
M-Xylene	0.000243
Naphthalene	0.000040
O-Xylene	0.000040
Phenol <sup>[2]</sup>	0.000101
Toluene	0.008826
Total Aromatic Amines	0.000364
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes	0.017004
Total HAPs <sup>[5]</sup>	0.031842

**Table 9. Furan Hotbox Binder**

Pouring-Cooling-Shakeout

Binder System Furan Hotbox Index: Resin	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.019579
Hydrogen Sulfide	0.000060
Nitrogen Oxides	0.000411
Sulfur Dioxide	0.000088
Total Hydrocarbons <sup>[4]</sup>	0.006259
Acrolein	0.000013
Benzene	0.000537
Formaldehyde	0.000009
Hydrogen Cyanide <sup>[2]</sup>	0.003474
M-Xylene <sup>[1]</sup>	0.000032
Naphthalene <sup>[1]</sup>	0.000032
O-Xylene <sup>[1]</sup>	0.000032
Phenol	0.000016
Toluene <sup>[1]</sup>	0.000032
Total Aromatic Amines	0.003032
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes <sup>[1]</sup>	0.000158
Total HAPs <sup>[5]</sup>	0.007364

**Table 10. Alkyd Isocyanate Binder**

Pouring-Cooling-Shakeout

Binder System Alkyd Isocyanate Index: Resin + Isocyanate	Pounds of Chemical Released to Air per Pound of Index
Ammonia	0.000037
Hydrogen Sulfide	0.000007
Nitrogen Oxides	0.000355
Sulfur Dioxide	0.000040
Total Hydrocarbons <sup>[4]</sup>	0.035567
Acrolein	0.000088
Benzene	0.005336
Formaldehyde	0.000106
Hydrogen Cyanide	0.000175
M-Xylene	0.002522
Naphthalene	0.000037
O-Xylene	0.003838
Phenol <sup>[2]</sup>	0.000110
Toluene	0.001535
Total Aromatic Amines <sup>[1]</sup>	0.000037
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes	0.002156
Total HAPs <sup>[5]</sup>	0.015939

**Table 11. Sodium Silicate-Ester Binder**  
Pouring-Cooling-Shakeout

Binder System	Pounds of
Sodium Silicate - Ester	Chemical
Index: Sugar + Ester	Released to Air
	per Pound of Index
Ammonia	0.000038
Hydrogen Sulfide	0.000197
Nitrogen Oxides	0.000028
Sulfur Dioxide	0.000244
Total Hydrocarbons <sup>[4]</sup>	0.022782
Acrolein	0.000028
Benzene	0.001410
Formaldehyde	0.000169
Hydrogen Cyanide	0.000179
M-Xylene	0.000094
Naphthalene <sup>[3]</sup>	0.000005
O-Xylene <sup>[1]</sup>	0.000094
Phenol <sup>[2]</sup>	0.000273
Toluene	0.000282
Total Aromatic Amines	0.000094
Total C <sub>2</sub> to C <sub>5</sub> Aldehydes	0.001316
Total HAPs <sup>[5]</sup>	0.003943

**Attachment 2 - Badger Foundry Permit No. 16900012-003**

The following tables were taken from: "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.

The information found for different types of binder systems can be used to calculate the amount of individual HAP's and total VOC's that are emitted when sand is mixed with binder, but before the mold or core is exposed to molten metal. In order to do this, the HAP content and VOC contents of each part of the binder system must be known (either from the material safety data sheet (MSDS), or the manufacturer).

**Binder: Alkyd Oil**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining Mold/Core</b>
<b>Resin</b>			
Lead (7439-92-1)	0	0	100
Cobalt (7440-48-4)	0	0	100

**Coreactant**

Methylene Phenylene Isocyanate (101-68-8) <sup>(1)</sup>	99.99	<0.01	0.01
Polymeric diphenylmethane Diisocyanate (9016-87-9)	99.99	<0.01	0.01

<sup>(1)</sup> Listed as CAS #101-68-8, MBI, Methylenebis (phenyl, isocyanate) on 313 chemical list

**Binder: Acrylic/Epoxy/SO<sub>2</sub>**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Part I</b>			
Cumene Hydroperoxide (80-15-9)	97	0	3
Cumene (98-82-8)	0	1.5	98.5

**Binder: Furan Hotbox**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Resin</b>			
Formaldehyde (50-00-0)	95	5	0

**Binder: Furan Nobake**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Resin</b>			
Phenol (108-95-2)	98+	0	2
Formaldehyde (50-00-0)	98	2	0
Methyl Alcohol (67-56-1)	0	50	50
<b>Catalyst</b>			
Methyl Alcohol (67-56-1)	0	50	50
Sulfuric Acid (8774-93-9)	100	0	0

**Binder: Furan/SO<sub>2</sub>**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Resin</b>			
Formaldehyde (50-00-0)	98	2	0
Methyl Alcohol (65-56-1)	0	50	50
<b>Oxidizer</b>			
Dimethyl Phthalate (131-11-3)	0	50	50
Methyl Ethyl Ketone (78-93-3)	0	50	50

**Binder: Furan Warmbox**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Resin</b>			
Formaldehyde (50-00-0)	95	5	0
<b>Catalyst</b>			
Methyl Alcohol (67-56-1)	0	100	0

**Binder: Phenolic Baking**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Part I</b>			
Phenol (108-95-2)	95	0	5
Formaldehyde (50-00-0)	95	5	0

**Binder: Phenolic Ester Nobake**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Resin</b>			
Formaldehyde (50-00-0)	98	2	0
Phenol (108-95-2)	98	0	2

**Binder: Phenolic Ester Coldbox**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Resin</b>			
Formaldehyde (50-00-0)	98	2	0
Phenol (108-95-2)	98	0	2
Glycol Ethers (1)	0	50	50

**Catalyst**

Methanol (67-56-1)	0	50	50
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(1) Listed as Certain Glycol Ethers under (c) Chemical categories on the SARA 313 chemical list.

**Binder: Phenolic Hotbox**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Resin</b>			
Formaldehyde (50-00-0)	95	5	0
Phenol (108-95-2)	95	0	5

**Binder: Phenolic Nobake - Acid Catalyzed**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Resin</b>			
Phenol (108-95-2)	98	0	2
Formaldehyde (50-00-0)	98	2	0
Methyl Alcohol (67-56-1)	0	50	50
<b>Acid</b>			
Methyl Alcohol (67-56-1)	0	50	50
Sulfuric Acid (7664-93-9)	100	0	0

**Binder: Phenolic Novolac Flake - Coating Operations**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Part I</b>			
Phenol (108-95-2)	95	0	5

**Part II**

Ammonia <sup>(1)</sup> (7664-41-7)	0	100	0
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<sup>(1)</sup> Ammonia is generated as a breakdown product from the hexamethylenetetramine (hexa). As the hexa breaks down 40% is converted to ammonia. The percentages listed here are for the ammonia generated from the hexa.

**Binder: Phenolic Novolac Liquid - Coating Operations**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Part I</b>			
Phenol (108-95-2)	95	0	5
Formaldehyde (50-00-0)	95	5	0
Methanol (67-56-1)	0	100	0

**Binder: Phenolic Urethane Nobake**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Part I</b>			
Phenol (108-95-2)	98	0	2
Formaldehyde (50-00-0)	98	2	0
Naphthalene (91-20-3)	0	5.85	94.15
1,2,4 Trimethyl Benzene (95-63-6)	0	5.85	94.15
Cumene (98-82-8)	0	5.85	94.15
Xylene (1330-20-7)	0	5.85	94.15
<b>Part II</b>			
Methylene Phenylene Isocyanate <sup>(1)</sup> (101-68-8)	99.99	0	0.01
Polymeric diphenylmethane Diisocyanate (9016-87-9)	99.99	0	0.01
Naphthalene (91-20-3)	0	5.85	94.15
1,2,4 Trimethylbenzene (95-63-6)	0	5.85	94.15
Cumene (98-82-8)	0	5.85	94.15
Xylene (1330-20-7)	0	5.85	94.15

<sup>(1)</sup> Listed as CAS #101-68-8, Methylenebis (phenylisocyanate)(MDI) under (c) Chemical categories on the SARA 313 chemical list.

**Binder: Phenolic Urethane Coldbox**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Part I</b>			
Formaldehyde (50-00-0)	98	2	0
Phenol (108-95-2)	98	0	2
Xylene (1330-20-7)	0	3.25	96.75
Cumene (98-82-8)	0	3.25	96.75
Naphthalene (91-20-3)	0	3.25	96.75
1,2,4 Trimethylbenzene (95-63-6)	0	3.25	96.75

**Part II**

Methylene Phenylene Isocyanate (101-68-8) <sup>(1)</sup>	99.99	0	0.01
Polymeric diphenylmethane Diisocyanate (9016-87-9)	99.99	0	0.01
Naphthalene (91-20-3)	0	3.25	96.75
Xylene (1330-20-7)	0	3.25	96.75
Biphenyl (95-52-4)	0	3.25	96.75

(1) Listed as CAS #101-68-8, Methylenebis (phenylisocyanate)(MDI) under (c) Chemical categories on the SARA 313 chemical list.

**Binder: Urea Formaldehyde**

	<b>% Reacted</b>	<b>% Evaporated</b>	<b>% Remaining in Mold/Core</b>
<b>Part I</b>			
Formaldehyde (50-00-0)	98	2	0

**TECHNICAL SUPPORT DOCUMENT**  
**For**  
**AIR EMISSION PERMIT NO. 16900012-003**

This Technical Support Document (TSD) is intended for all parties interested in the permit and to meet the requirements that have been set forth by the federal and state regulations (40 CFR § 70.7(a)(5) and Minn. R. 7007.0850, subp.1). The purpose of this document is to provide the legal and factual justification for each applicable requirement or policy decision considered in the preliminary determination to issue the permit.

**1. General Information**

**1.1. Applicant and Stationary Source Location:**

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

**1.2. Description of the Permit Action**

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**

The project involves the installation of a fabric filter (CE 012) to control particulate matter / PM<sub>10</sub> emissions from certain sources at the facility. Emissions from the fabric filter will be vented to stack/vent SV 023. The project also involves the removal of several stacks / vents and the alteration of other stacks / vents at the facility to increase dispersion of emissions. Diagrams representing the changes are included as Attachment A. The project is necessary to demonstrate modeled compliance with the state and national ambient air quality standards for PM<sub>10</sub>. The pre-project equipment configuration is shown below (only PM/PM<sub>10</sub> emission sources are shown):

**Table 1. Pre-Project Equipment Configuration**

<b>Emission Unit ID</b>	<b>Emission Unit Description</b>	<b>Control Equipment ID*</b>	<b>Stack / Vent Number</b>
EU 001	Cupola / Cupola Torches	CE 001, CE 002	SV 001
EU 002	Charge Handling		SV 002, SV 016
EU 003	Pouring / Cooling		SV 003
EU 004	Mold Dump		SV 004, SV 005
EU 005	Casting Shakeout / Dump	CE 008	SV 006
EU 007	Core Making		SV 008
EU 008	Core Making		SV 009
EU 015	Mold-Making Machines	CE 003	SV 003
EU 016	Mold-Making Machines	CE 003	SV 003
EU 017	Mold-Making Machines	CE 003	SV 003
EU 018	Mold-Making Machines	CE 003	SV 003
EU 019	Mold-Making Machines	CE 003	SV 003
EU 020	Mold-Making Machines	CE 003	SV 003
EU 023	Sand Handling System	CE 003	SV 003
EU 024	Mold Sand Mullor	CE 003, CE 007	SV 006
EU 025	Multiple Hand Grinding Stations		SV 011
EU 044	Shot Blaster – 1 Wheel	CE 004	SV 012
EU 045	Shot Blaster – 2 Wheel	CE 004	SV012
EU 046	Shot Blaster – 4Wheel	CE 010	SV 013
EU 049	Cupola Torches		SV 001
EU 054	Omega Line Sand Mixer / Mold Production		SV 017
EU 055	Kloster Line Sand Mixer / Core Production		SV 017
EU 056	Electric Induction Melting Furnace	CE 006	SV 018
EU 057	Refining Operations	CE 006	SV 018
EU 058	Shot Blaster – 3 Wheel	CE 011	SV 020
EU 061	Nobake Vibra Mill Sand Reclaimer	CE 011	SV 020
EU 062	Nobake Sand Handling System	CE 011	SV 020

\* Control equipment is described in Table 3.

The post-project equipment configuration is shown below:

**Table 2. Post-Project Equipment Configuration**

<b>Emission Unit ID</b>	<b>Emission Unit Description</b>	<b>Control Equipment ID*</b>	<b>Stack / Vent Number</b>
EU 001	Cupola	CE 001, CE 002	SV 001
EU 002	Charge Handling		SV 002
EU 003	Pouring / Cooling	CE 012	SV 023
EU 004	Mold Dump	CE 012	SV 023
EU 005	Casting Shakeout / Dump	CE 004 CE 012	SV 012 SV 023
EU 007	Core Making		**
EU 008	Core Making		**
EU 015	Mold-Making Machines	CE 003	**
EU 016	Mold-Making Machines	CE 003	**
EU 017	Mold-Making Machines	CE 003	**
EU 018	Mold-Making Machines	CE 003	**
EU 019	Mold-Making Machines	CE 003	**
EU 020	Mold-Making Machines	CE 003	**
EU 023	Sand Handling System	CE 003, CE 012	SV 023
EU 024	Mold Sand Mullor	CE 003, CE 004, CE 012	SV 012, SV 023
EU 025	Multiple Hand Grinding Stations	CE 004, CE 011	SV 012, SV 020
EU 044	Shot Blaster – 1 Wheel	CE 004	SV 012
EU 045	Shot Blaster – 2 Wheel	CE 004	SV012
EU 046	Shot Blaster – 4Wheel	CE 010	SV 013
EU 049	Cupola Start Up Torches	CE 001, CE 002	SV 001
EU 054	Omega Line Sand Mixer / Mold Production		**
EU 055	Kloster Line Sand Mixer / Core Production		**
EU 056	Electric Induction Melting Furnace	CE 012	SV 023
EU 057	Ductile Treatment Operations	CE 011	SV 020***
EU 058	Shot Blaster – 3 Wheel	CE 011	SV 020***
EU 061	Nobake Vibra Mill Sand Reclaimer	CE 011	SV 020***
EU 062	Nobake Sand Handling System	CE 011	SV 020***
EU 065	Scrap pre-heating for Ductile Line	CE 011	SV 020***

\* Control equipment is described in Table 3.

\*\* Emissions from EU 007 and EU 008 will be vented to a particulate matter control device and will be vented inside of the building 100 percent of the time. Emissions from EU 015-020 are controlled by the moisture content of the sand and will be vented into the building 100 percent of the time. Emissions for EU 054 and EU 055 are vented inside the building 100 percent of the time.

\*\*\* Shown in the dispersion modeling as SV 019.

**Table 3. Control Equipment Description**

<b>Control Equipment ID</b>	<b>Description</b>	<b>Comment</b>
CE 001	Venturi Scrubber	
CE 002	Direct Flame Afterburner	
CE 003	2-3% Moisture Content	
CE 004	Fabric Filter	
CE 005	Fabric Filter	Removed. CE 005 was formerly the control equipment for EU 046; however, CE 005 was removed and replaced by CE 010.
CE 006	Fabric Filter	Removed with the project. Emission units currently controlled by CE 006 will be controlled by CE 011 and CE 012.
CE 007	Wet Cyclone	Removed with the project. Emission units currently controlled by CE 007 will be controlled by CE 004 and CE 012.
CE 008	Wet Cyclone	Removed with the project. Emission units currently controlled by CE 008 will be controlled by CE 004 and CE 012.
CE 010	Fabric Filter	
CE 011	Fabric Filter	
CE 012	Fabric Filter	New fabric filter.

**1.4. Facility Emissions:**

**Table 4. Total Facility Potential to Emit Summary**

	PM tpy	PM <sub>10</sub> tpy	SO <sub>2</sub> tpy	NO <sub>x</sub> tpy	CO tpy	VOC tpy	Pb tpy	Single HAP tpy	All HAPs tpy
Total Facility Limited Potential Emissions (Before Installation of New Fabric Filter)	468	244	22	8	64	160	3.4	9.5	24.5
Total Facility Limited Potential Emissions (After Installation of New Fabric Filter)	139	55.5	22	8	64	160	3.4	9.5	24.5
Change in Potential Emissions from Installation of the Fabric Filter	-329	-188.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Table 5. Facility Classification**

<b>Classification</b>	<b>Major/Affected Source</b>	<b>Synthetic Minor</b>	<b>Minor</b>
PSD	PM, VOC		PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO
Part 70 Permit Program	VOC		PM <sub>10</sub> , SO <sub>2</sub> , NO <sub>x</sub> , CO
Part 63 NESHAP		HAPs	

**2. Regulatory and/or Statutory Basis**

**Table 6. Regulatory Overview of Units Affected by the Modification/Permit Amendment**

<b>EU, GP, or SV</b>	<b>Applicable Regulations</b>	<b>Comments:</b>
EU 003, EU 004, EU 005, EU 023, EU 024	Minn. R. 7011.0715	Standards of Performance for Post-1969 Industrial Process Equipment  Compliance with Minn. R. 7011.0715 is addressed in Section 3.1.
EU 003, EU 004, EU 005, EU 023, EU 024	Minn. R. 7009.0020	Prohibited Emissions  A requirement to install and operate a new fabric filter to control emissions from the listed emission units and certain stack height requirements are added to the permit to ensure that emissions do not cause a violation of the ambient air quality standards for PM <sub>10</sub> . The permit requires the changes to be completed by August 7, 2006. This date differs slightly from the date proposed in the permit application (see Attachment A). This date was changed to coincide with a scheduled shutdown at the facility.
FS 001, FS 002	Minn. R. 7009.0020	Prohibited Emissions  The permit requires construction of structures to completely enclose the coke storage pile (FS 001) and the limestone storage pile (FS 002) to ensure that emissions do not cause or contribute to a violation of the ambient air quality standards for PM <sub>10</sub> . The permit requires completion of the structures by June 25, 2007.

### 3. Technical Information

#### 3.1 Calculations

The project will result in enhanced control of several PM/PM10 emission sources. Emissions from the sources affected by the project are calculated below:

##### Emissions due to EU 003:

Pouring / Cooling Emission Factors:

Pouring: PM = 2.8 lb/ton metal melted, PM-10 = 1.38 lb/ton melted

Cooling: PM = 1.4 lb/ton melted, PM-10 = 0.69 lb/ton melted

The Induction Furnace (EU 056) has a maximum capacity of 3.5 ton/hour of metal melted and the Cupola (EU 001) has a maximum capacity of 10.0 ton/hour of metal melted, for a plant-wide capacity of 13.5 ton/hour metal melted.

PM (EU 003), stack = 13.5 ton/hour metal melted (4.2 lb/ton metal melted)(80% capture)(1-0.99) = 0.45 lb/hr

PM (EU 003), emitted in building = 13.5 ton/hr(4.2 lb/ton melted)(1-0.80)(1-0.78)\* = 2.50 lb/hr

Total PM (EU 003, lb/hr) = 0.45 lb/hr + 2.50 lb/hr = 2.95 lb/hr

Total PM (EU 003, ton/year) = 2.95 lb/hr(8760 hr/yr)(1 ton/2000 lb) = 12.92 tpy

\* It is assumed that 78% of the PM emitted inside of the building settles out before escaping the room.

PM-10 (EU 003), stack = 13.5 ton/hour metal melted (2.07 lb/ton metal melted)(80% capture)(1-0.99) = 0.23 lb/hr

PM-10 (EU 003), emitted in building = 10 ton/hr(2.07 lb/ton melted)(1-80%)(1-78%)\* = 1.23 lb/hr

Total PM-10 (EU 003) = 0.17 lb/hr + 0.91 lb/hr = 1.46 lb/hr

Total PM-10 (EU 003, ton/year) = 1.46 lb/hr(8760 hr/yr)(1 ton/2000 lb) = 6.40 tpy

\* It is assumed that 78% of the PM emitted inside of the building settles out before escaping the room.

##### Emissions due to EU 004/005:

Shakeout Emission Factors:

PM = 3.2 lb/ton metal melted

PM-10 = 2.24 lb/ton metal melted

PM (EU 004/005), stack = 13.5 ton/hour metal melted (3.2 lb/ton metal melted)(80% capture)(1-0.99) = 0.35 lb/hr

PM (EU 004/005), emitted in building = 13.5 ton/hr(3.2 lb/ton melted)(1-80%)(1-78%)\* = 1.90 lb/hr

Total PM (EU 004/005, lb/hr) = 0.35 lb/hr + 1.90 lb/hr = 2.25 lb/hr

Total PM (EU 004/005, tpy) = 2.25 lb/hr(8760 hr/yr)(1 ton/2000 lb) = 9.86 tpy

\* It is assumed that 78% of the PM emitted inside of the building settles out before escaping the room.

PM-10 (EU 004/005), stack = 13.5 ton/hour melted (2.24 lb/ton metal melted)(80% capture)(1-0.99) = 0.24 lb/hr

PM-10 (EU 003), emitted in building = 13.5 ton/hr(2.24 lb/ton melted)(1-80%)(1-78%)\* = 1.34 lb/hr

Total PM-10 (EU 003, lb/hr) = 0.24 lb/hr + 1.34 lb/hr = 1.58 lb/hr

Total PM-10 (EU 003, ton/year) = 1.58 lb/hr(8760 hr/yr)(1 ton/2000 lb) = 6.92 tpy

\* It is assumed that 78% of the PM emitted inside of the building settles out before escaping the room.

Emissions due to EU 023, EU 024:

Sand Handling Emission Factors:

PM = 3.6 lb/ton sand handled

PM-10 = 0.54 lb/ton sand handled

PM, stack = 94.5 ton/hour\*(3.6 lb/ton sand handled)(1-0.90)\*\*(80% capture)(1-0.99) = 0.27 lb/hr

PM, emitted in building = 94.5 ton/hour(3.6 lb/ton)(1-0.90)(20% not captured)(1-0.78)\*\*\* = 1.50 lb/hr

Total PM (lb/hr) = 0.27 lb/hr + 1.50 lb/hr = 1.77 lb/hr

Total PM (ton/year) = 1.77 lb/hr(8760 hr/yr)(1 ton/2000 lb) = 7.75 tpy

\* 7 tons of sand is used per ton of metal melted, so at 13.5 tph of metal melted, 94.5 tph of sand is used.

\*\* Since the moisture content of the sand is required to be greater than 2%, a control efficiency of 90% is used.

\*\*\* It is assumed that 78% of the PM emitted inside of the building settles out before escaping the room.

PM-10, stack = 94.5 ton/hour\*(0.54 lb/ton sand handled)(1-0.90)\*\*(80% capture)(1-0.99) = 0.04 lb/hr

PM-10, emitted in building = 94.5 ton/hour(0.54 lb/ton)(1-0.90)(20% not captured)(1-0.78)\*\*\* = 0.22 lb/hr

Total PM-10 (lb/hr) = 0.04 lb/hr + 0.22 lb/hr = 0.26 lb/hr

Total PM-10 (ton/year) = 0.26 lb/hr(8760 hr/yr)(1 ton/2000 lb) = 1.14 tpy

\* 7 tons of sand is used per ton of metal melted, so at 13.5 tph of metal melted, 94.5 tph of sand is used.

\*\* Since the moisture content of the sand is required to be greater than 2%, a control efficiency of 90% is used.

\*\*\* It is assumed that 78% of the PM emitted inside of the building settles out before escaping the room.

Compliance with Minn. R. 7011.0715:

Minn. R. 7011.0715 establishes allowable PM emission limits based upon the following equations:

$$E = 3.59P^{0.62} \text{ for } P \leq 30 \text{ tons/hour}$$

$$E = 17.31P^{0.16} \text{ for } P > 30 \text{ tons/hour}$$

Where:

E = emissions in pounds per hour

P = process weight rate in tons per hour

$$\text{Allowable PM from EU 003, lb/hr} = 3.59(13.5 \text{ ton/hour metal melted})^{0.62} = \underline{18.03 \text{ lb/hr}}$$

$$\text{Allowable PM from EU 004/005, lb/hr} = 3.59(13.5 \text{ ton/hour metal melted})^{0.62} = \underline{18.03 \text{ lb/hr}}$$

$$\text{Allowable PM from 023/024, lb/hr} = 17.31(94.5 \text{ tph sand})^{0.16} = \underline{35.84 \text{ lb/hr}}$$

Expected emissions from EU 003, EU 004/005 and EU 023/024 are 2.95 lb/hr, 1.77 lb/hr and 0.26 lb/hr, respectively. These emissions rates are below the allowable emission rates calculated above.

Minn. R. 7011.0715 also establishes a PM limit of 0.30 gr/scf of exhaust gas. Given that all sources are controlled by fabric filters, PM emissions are expected to be well below the concentration limit.

### **3.2 Compliance Assurance Monitoring (CAM)**

40 CFR Part 64 requires submittal of a CAM plan proposing monitoring sufficient to provide a reasonable assurance of compliance with the particulate matter emission limits applicable to emissions from SV 023 (the stack for the new fabric filter CE 012). The monitoring design criteria are outlined in 40 CFR Section 64.3 and the submittal requirements are established in 40 CFR 64.4.

Badger has yet to submit a CAM proposal for emissions from CE 012. EPA's guidance on the development of CAM plans allows for the use of operating history for the development of appropriate parameter ranges. To allow for completion of stack testing and for establishment of appropriate indicators of emission control performance for CE 012, the permit requires submittal of the CAM plan within 180 days of startup of CE 012. The permit requires an initial performance test to measure particulate matter and opacity emissions within 90 days of startup of CE 012.

### **3.2 Changes Made to the Permit**

Below is a description of the changes made to the permit with this permit action:

- 1) A condition is added under the Total Facility section of the permit which references the parameters used in the dispersion modeling. The parameters are added as Appendix II to the permit.
- 2) The permit requires stack / vent SV 012 to be altered so the stack is vented vertically with a stack height of 13 feet. The permit also requires that the roof over SV 012 be removed. The permit requires these actions to be completed by October 31, 2004.
- 3) The permit requires that a new fabric filter (CE 012) be installed to control emissions from EUs 003, 004, 005, 023 and 024. CE 012 must be installed and operational by August 7, 2006.
- 4) Upon installation of the new fabric filter CE 012, the permit requires emissions from EU 003 to be vented to CE 012 and requires that SV 003 be removed.
- 5) Upon installation of the new fabric filter CE 012, the permit requires emissions from EU 004 to be vented to CE 012 and requires that SV 004 and SV 005 be removed.
- 6) Upon installation of the new fabric filter CE 012, the permit requires emissions from EU 005 to be vented to CE 012 and requires that SV 006 be removed.
- 7) The permit requires that, by October 31, 2005, the Permittee install an air cleaning system to control emissions from EU 007 and vent emissions from EU 007 inside of the building 100 percent of the time. Upon venting emissions inside of the building, the stack for EU 007 (SV 008) is required to be removed.

- 8) The permit requires that, by October 31, 2005, the Permittee install an air cleaning system to control emissions from EU 008 and vent emissions from EU 008 inside of the building 100 percent of the time. Upon venting emissions inside of the building, the stack for EU 008 (SV 009) is required to be removed.
- 9) The permit requires that, by June 25, 2007, the Permittee complete construction of a structure to completely enclose the coke storage pile.
- 10) The permit requires that, by June 25, 2007, the Permittee complete construction of a structure to completely enclose the limestone storage pile.
- 11) The permit requires that, by August 7, 2006, all stacks and vents at the facility be vented vertically with no rain caps or other air flow obstructions installed.

#### **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. 16900012-003, and this TSD, will not cause or contribute to a violation of applicable federal regulations and Minnesota Rules.

##### Staff Members on Permit Team:

Craig Thorstenson (engineer / permit writer)  
Greg Berger (enforcement)  
Dennis Becker (dispersion modeling)  
John Chikkala (peer reviewer)

##### Attachments:

- A Compliance Schedule Submitted with the Permit Application
- B Dispersion Modeling Results Submitted by Pinnacle Engineering
- C MPCA's Administrative Completeness Review of the Dispersion Modeling