AIR EMISSION PERMIT NO. 16900012- 001

IS ISSUED TO

Badger Foundry Company

BADGER FOUNDRY COMPANY
1058 East Mark Street
Winona, Winona County, Minnesota 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 and additional submittals:

Permit Type	Application Date
Total Facility Operating Permit	June 15, 1995

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

Permit Type: Federal ; PSD/NSR

Issue Date: June 25, 1998

Expiration:

All Title I Conditions do not expire.

Michael J. Sandusky
Division Manager
Air Quality Division

for Peder A. Larson
Commissioner
Minnesota Pollution Control Agency

JKH:lao

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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	(612)296-6300
Outside Metro Area	1-800-657-3864
TTY	(612)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. Any requirements which have been determined not to apply are listed in Table A of this permit.

The permit shield, however does not apply to:

1. **Any national ambient air quality standards adopted under section 109 of the Clean Air Act or increment or visibility under Part C of Title I of the Clean Air Act,**
2. **Any state ambient air quality standard under Minn. R. ch. 7009, and**
3. **The state noise pollution control rules, Minn. R. ch. 7030.**

FACILITY DESCRIPTION:

Badger Foundry is a gray iron foundry. On the date of permit issuance, it operated one cupola with a capacity of 10 tons melted per hour. It has 3 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 100 percent VOC alcohol based core wash.

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.

Badger has made several modifications over the past years that should have been permitted, but weren't. This permit establishes limits for these modifications retroactively. The 150 Core line, the 250 Core line and the Omega-Kloster line have each been given a 39 ton per year VOC emission limit in order to avoid PSD requirements. The VOC emissions from the core dipping tanks have exceeded the 40 ton per year PSD major modification threshold and Badger is required to install Best Available Control Technology (BACT) on the tanks with this permit. BACT consists of Badger switching from the alcohol based core dipping solution to a water based dipping solution. For safety reasons, Badger must install one natural gas fired core drying oven to dry the water based dipping solution on the cores.

This permit authorizes Badger to install a 3.5 ton per hour induction furnace with an associated magnesium treating ladle so that Badger can make ductile iron as well as gray iron. Badger will use the existing pouring deck, shake out, mold making, core making and grinding and cleaning areas to support the ductile iron production. Badger is required to operate its pollution control equipment and is not allowed to melt more than 5000 tons of ductile iron per year in order to hold emissions from the ductile line modification to less than the PSD major modification thresholds.

This permit limits hazardous air pollutant emissions to less than the major source thresholds of 10 tons per year for a single Hazardous Air Pollutants (HAP) and 25 tons per year for combined HAPs.

Badger actually melted 15670 tons of gray iron in 1994. After the ductile line modification is complete, it is not likely that they will exceed 20000 tons melted per year.

TABLE A: LIMITS AND OTHER REQUIREMENTS

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Facility Name: Badger Foundry Company

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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: Upon presentation of credentials and other documents as may be required by law, allow the Agency, or its representative, to enter the Permittee's premises to have access to and copy any records required by this permit, to inspect at reasonable times (which include any time the source is operating) any facilities, equipment, practices or operations, and to sample or monitor any substances or parameters at any location.	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 Condtions 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

Total Facility Monthly HAP Emissions Record keeping: by the 30th day of each month calculate and record for the previous month the total facility: 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, EU 007 through EU 014, and EU 054 through EU 056, determined as specified below under "F. RECORDKEEPING" in this (Total Facility) Subject Item; 2) Total HAP emission rate, in tons per month, by summing all monthly Single HAP emission rates calculated in item 1 of this requirement. Record all emissions data at the time of calculation.	Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5
Total Facility 12-month Rolling Sum HAP Emissions Record keeping: by the 30th day of each month calculate and record for the total facility: 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; 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. Record all emissions data at the time of calculation.	Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5
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. 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.	Minn. R. 7007.0800, subp. 2
SV 001 and EU 056 Monthly HAP Emission Calculations: By the 30th day of each month: 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; 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. 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. Record all emission data, including the emission factor used, at the time of calculation.	Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5
EU 003 Pouring and Cooling Green Sand Mold HAP Emissions Calculations. By the 30th day of each month: 1) record Premix (seacoal) usage during the previous month (lb/mo) based on physical inventory; 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. 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.	Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5

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EU 003 Pouring and Cooling Purchased Core HAP Emissions Calculations. By the 30th day of each month for the previous month: 1) record the type and usage (lb/mo) of each purchased core type, based on purchase records; 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; 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. 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.	Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5
EU 003 Pouring and Cooling Phenolic Urethane Resins Core HAP Emissions Calculations. By the 30th day of each month: 1) record total resin usage for the previous month (lb/mo) based on physical inventory; 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. 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.	Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5
EU 007, 008, 054, and 055 Mixing Resin and Catalyst in Sand HAP Emissions Calculations. By the 30th day of each month: 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; 2) determine and record the weight percentage of each HAP (Naphthalene, Phenol and Formaldehyde) in the binder system used during the previous month, based on MSDS or manufacturer specification; 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: 1) monthly resin and catalyst usage; 2) weight % for each HAPs in each catalyst and resin; 3) assume 10% of formaldehyde and 50% of other HAPs present in the virgin sand materials are released during mixing. If binder system is changed, the Permittee shall use the appropriate table in Attachment 2 to determine the percent of each HAP released during mixing.	Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5
EU 009 through EU 014 Core Dip/Wash HAP Emissions Calculations. By the 30th day of each month: 1) record the identity and weight (lb/mo) of each type of core dip/wash used during the previous month based on physical inventory; 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 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.	Minn. R. 7007.0800, subp. 4; Minn. R. 7007.0800, subp. 5
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.	Minn. R. 7007. 0800, subp. 5(B)
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).	Minn. R. 7007.0800, subp. 5(C)
G. REPORTING	hdr

TABLE A: LIMITS AND OTHER REQUIREMENTS

Facility Name: Badger Foundry Company

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Computer Dipersion 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.	Minn. R. 7009.0020; Minn. R. 7007.0800, subp. 2; 40 CFR pt. 50
Shutdowns: Notify the Commissioner at least 24 hours in advance of a planned shutdown of any process or control equipment, or as soon as possible of an unplanned shutdown, if the shutdown would cause an increase in the emission of air contaminants. At the time of notification, notify the Commissioner of the cause of the shutdown and the estimated duration. Notify the Commissioner again when the shutdown is over.	Minn. R. 7019.1000, subp. 1
Breakdowns: Notify the Commissioner within 24 hours of a breakdown of more than one hour duration of any process or control equipment if the breakdown causes an increase in the emission of air contaminants. At the time of notification or as soon thereafter as possible, the permittee shall also notify the Commissioner of the cause of the breakdown and the estimated duration. Notify the Commissioner again when the breakdown is over.	Minn. R. 7019.1000, subp. 2
Oral Notification of Deviations Endangering Human Health or the Environment: Within 24 hours of discovery, orally notify the Commissioner of any deviation from permit conditions which could endanger human health or the environment.	Minn. R. 7007.0800, subp. 6(A)
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.	Minn. R. 7007.1150 through Minn. R. 7007.1500
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).	Minn. R. 7007.1400, subp. 1(H)
Emission Fees: due 60 days after receipt of an MPCA bill.	Minn. R. 7002.0005 through Minn. R. 7002.0095

TABLE A: LIMITS AND OTHER REQUIREMENTS

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Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: EU 009 Dip Tanks/Core Storage

EU 010 Dip Tanks/Core Storage

EU 011 Dip Tanks/Core Storage

EU 012 Dip Tanks/Core Storage

EU 013 Dip Tanks/Core Storage

EU 014 Dip Tanks/Core Storage

What to do	Why to do it
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

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Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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
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
GP 002 VOC Emissions Record Keeping. Upon issuance of this permit, record the initial VOC content of each resin used, and the weight percent resin in the resin/catalst receipe. 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.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
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.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
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.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
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.	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

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Facility Name: Badger Foundry Company

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

Associated Items: CE 004 Fabric Filter - Low Temperature, i.e., T<180 Degrees F

CE 005 Fabric Filter - Low Temperature, i.e., T<180 Degrees F

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

EU 025 Multiple Hand Grinding Stations

EU 044 Shot Blaster - 1 Wheel

EU 045 Shot Blaster - 2 Wheel

EU 046 Shot Blaster - 4 Wheel

EU 058 Shot Blaster - 3 wheel

SV 011

SV 012

SV 013

SV 019

What to do	Why to do it
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: 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. 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.	Minn. R. 7007.0800, subp. 11
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. 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.	Minn. R. 7007.0800, subp. 11
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.	NOTE:

TABLE A: LIMITS AND OTHER REQUIREMENTS

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Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: SV 002
SV 003
SV 004
SV 005
SV 006
SV 008
SV 009
SV 011
SV 012
SV 013
SV 016
SV 017
SV 018
SV 019

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 005 SV 016 - Roof Vent, No Control Equipment SV 017 - Roof Vent, No Control Equipment SV 018 - See monitoring requirements under CE 006 SV 019 - See monitoring requirements under CE 010	NOTE:

TABLE A: LIMITS AND OTHER REQUIREMENTS

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Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

Subject Item: **SV 001**

Associated Items: EU 001 Cupola

EU 049 Cupola Torches

What to do	Why to do it
Opacity: less than or equal to 20 percent opacity except that a maximum of 60 percent opacity shall be permissible for four minutes in any 60-minute period and that a maximum of 40 percent opacity shall be permissible for four additional minutes in any 60-minute period.	Minn. R. 7011.0610, subp. 1(A)(2)
Total Particulate Matter: less than or equal to 0.3 grains/dry standard cubic foot unless required to reduce emissions to less than or equal to either the amount allowed by Minn. R. 7011.0730 or the concentration allowed by Minn. R. 7011.0735.	Minn. R. 7011.0610, subp. 1(A)(1)
Record keeping: once each day, record the tons of metal melted in EU 001 during the previous day. By the 30th day of each month, calculate and record the tons of metal melted during the previous month.	Minn. R. 7007.0800, subp. 4 and 5
Initial Performance Test: due 180 days after 09/01/00 to measure emissions of PM10, Manganese (Mn), Lead (Pb), Carbon Monoxide (CO), Sulfur Dioxide (SO2) and Opacity. See the technical support document for a discussion of what constitutes worst case test conditions.	Minn. R. 7017.2020, subp. 1
Performance Test Pre-test Meeting: due 7 days before Initial Performance Test to measure PM10, Mn, Pb, CO, SO2 and opacity.	Minn. R. 7017.2030, subp. 4
Performance Test: due before end of each 36 months following Permit Issuance to measure PM. If the result of any PM emission test is greater than 90 percent of the PM limit, the next PM test shall be conducted within one year.	Minn. R. 7017.2020, subp. 1
Performance Test Pre-test Meeting: due 7 days before Performance Test to measure PM.	Minn. R. 7017.2030, subp. 4
If lead emissions equal or exceed 0.51 lbs/ton of melted metal during the Initial Performance Test, the Permittee shall conduct total facility computer dispersion modeling for lead emissions in the same time frame required for PM-10 computer dispersion modeling in the "Total Facility" section of this permit.	Minn. R. 7009.0020

TABLE A: LIMITS AND OTHER REQUIREMENTS

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Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: SV 008

What to do	Why to do it
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
EU 007 VOC Emissions Record Keeping. Upon issuance of this permit, 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. Once each day: 1) record the weight (lb/day) of sand used in EU 007 during the previous day; 2) record the VOC content of each resin and each catalyst; 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.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
EU 007 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 sand in EU 007 by summing daily usage of sand during the previous month; 2) calculate resin usage (lb/mo) and catalyst usage (lb/mo) based on weight percent of each in the catalyst/resin/sand 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 EU 007 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 emission calculations.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
EU 007 Pouring-and-Cooling Monthly VOC Emissions Record Keeping: 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. Record the emission factor used at the time of calculation.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
TOTAL EU 007 Monthly and 12-month Rolling Sum VOC Emissions Record Keeping: By the 30th day of each month calculate and record: 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; 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.	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

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: SV 009

What to do	Why to do it
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
EU 008 VOC Emissions Record Keeping. Upon issuance of this permit, 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. Once each day: 1) record the weight (lb/day) of sand used in EU 008 during the previous day; 2) record the VOC content of each resin and each catalyst; 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.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
EU 008 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 sand in EU 008 by summing daily usage of sand during the previous month; 2) calculate resin usage (lb/mo) and catalyst usage (lb/mo) based on the weight percentages of each in the catalyst/resin/sand recipe; 3) multiply the monthly usage of each resin and catalyst by the corresponding VOC weight percentage and sum all results; 4) multiply the sum by .50 (emission factor) and divide by 2000 to determine EU 008 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 emission calculations.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
EU 008 Pouring-and-Cooling Monthly VOC Emissions Record Keeping: 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. Record the emission factor used at the time of calculation.	Title I Condition: record keeping to avoid classification as a major modification under 40 CFR Section 52.21; Minn. R. 7007.0800, subp. 5
TOTAL EU 008 Monthly and 12-month Rolling Sum VOC Emissions Record Keeping: By the 30th day of each month calculate and record: 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; 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.	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

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

Subject Item: **EU 056 Electric Induction Melting Furnace**

Associated Items: CE 006 Fabric Filter - Medium Temperature i.e., 180 F<T<250 F

SV 018

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

TABLE A: LIMITS AND OTHER REQUIREMENTS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

Subject Item: **CE 001 Venturi Scrubber**

Associated Items: EU 001 Cupola

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

TABLE A: LIMITS AND OTHER REQUIREMENTS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: EU 001 Cupola

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

TABLE A: LIMITS AND OTHER REQUIREMENTS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: EU 015 Mold-Making Machines

EU 016 Mold-Making Machines

EU 017 Mold-Making Machines

EU 018 Mold-Making Machines

EU 019 Mold-Making Machines

EU 020 Mold-Making Machines

EU 023 Sand Handling System

EU 024 Mold Sand Mullor

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

TABLE A: LIMITS AND OTHER REQUIREMENTS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: EU 044 Shot Blaster - 1 Wheel

EU 045 Shot Blaster - 2 Wheel

GP 004 Grinding and Cleaning Operations

What to do	Why to do it
Operate and maintain the fabric filter to achieve a control efficiency (100% collection efficiency X control equipment removal 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% collection efficiency X control equipment removal 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 in 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

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

Subject Item: **CE 005 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% collection efficiency X control equipment removal 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% collection efficiency X control equipment removal 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 in 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 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

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: EU 056 Electric Induction Melting Furnace

EU 057 Refining Operations

GP 004 Grinding and Cleaning Operations

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

TABLE A: LIMITS AND OTHER REQUIREMENTS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: EU 024 Mold Sand Mullor

What to do	Why to do it
Rotoclone Supply Water flow rate: greater than or equal to 21 gallons/minute	Title I Condition: Monitoring of control equipment used to avoid classification as a major modification under 40 CFR Section 52.21
Record the number of strokes per minute (as measured by counting the number of strokes during one minute of pump operation) once every 24 hours when in operation. 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% collection efficiency X control equipment removal 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% collection efficiency X control equipment removal efficiency) for Particulate Matter < 10 micron: greater than or equal to 98 percent control efficiency	Title I Condition: Limit to avoid classification as a major modification under 40 CFR Section 52.21

TABLE A: LIMITS AND OTHER REQUIREMENTS

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: EU 005 Casting Shakeout/Dump

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

TABLE A: LIMITS AND OTHER REQUIREMENTS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

Associated Items: EU 058 Shot Blaster - 3 wheel

What to do	Why to do it
Operate and maintain the fabric filter to achieve a control efficiency (100% collection efficiency X control equipment removal 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% collection efficiency X control equipment removal 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 in 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 B: SUBMITTALS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

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

TABLE B: ONE TIME SUBMITTALS OR NOTIFICATIONS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

What to send	When to send	Portion of Facility Affected
Application for Permit Reissuance	due 180 days before expiration of Existing Permit	Total Facility
Computer Dispersion Modeling Protocol	due before 12/31/00 for emissions of PM-10 and lead. If the facility has conducted the Initial Performance Test on SV 001 prior to the due date for this Computer Dispersion Modeling Protocol and the test shows that lead emissions are less than 0.51 pounds/ton of metal melted, the Protocol does not need to include a protocol for modeling lead emissions.	Total Facility
Computer Dispersion Modeling Results	due 180 days after Notification that the Computer Dispersion Modeling Protocol has been approved by the MPCA for emissions of PM-10 and lead. The facility is not required to conduct Computer Dispersion Modeling for lead if the Initial Performance Test on SV 001 shows lead emissions less than 0.51 pounds/ton of metal melted.	Total Facility
Performance Test Notification (written)	due 30 days before Initial Performance Test to measure PM10, Mn, Pb, CO, SO2 and opacity.	SV001
Performance Test Notification (written)	due 30 days before Performance Test to measure PM.	SV001
Performance Test Plan	due 30 days before Initial Performance Test to measure PM10, Mn, Pb, CO, SO2 and opacity.	SV001
Performance Test Plan	due 30 days before Performance Test to measure PM.	SV001
Performance Test Report - Microfiche Copy	due 105 days after Initial Performance Test to measure PM10, Mn, Pb, CO, SO2 and opacity.	SV001
Performance Test Report - Microfiche Copy	due 105 days after Performance Test to measure PM.	SV001
Performance Test Report	due 45 days after Initial Performance Test to measure PM10, Mn, Pb, CO, SO2 and opacity.	SV001
Performance Test Report	due 45 days after Performance Test to measure PM.	SV001
Report	due 2 days after Discovery of Deviation (Discovery of Deviations Endangering Human Health or the Environment Report (written)). Submit a written description of any deviations endangering human health or the environment to the Commissioner. Include the following information in this written description: cause of the deviation; exact dates of the period of the deviation; if the deviation has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the deviation.	Total Facility

TABLE B: RECURRENT SUBMITTALS

06/25/98

Facility Name: Badger Foundry Company

Permit Number: 16900012 - 001

What to send	When to send	Portion of Facility Affected
Progress Report	due 15 days after end of each calendar quarter following Permit Issuance until BACT is installed and in operation. All progress reports shall describe the actions the Permittee has taken during the previous quarter, and the activities scheduled to be taken during the upcoming quarter to replace the IPA/Velvacoat core dipping mixture with a 5% VOC or less mixture. All progress reports shall be sent by certified mail, return receipt requested and addressed to the MPCA Project Leader (Rhonda Land.)	GP001
Semiannual Deviations Report	due 30 days after end of each calendar half-year following Permit Issuance 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. The types of deviations these reports should list include but are not limited to exceeding the allowed amount of metal melted, the operation of pollution control equipment outside of the manufacturer's recommended specifications or instances when daily/montly records and/or calculations are not done. (Deviations that endanger human health and the environment must be reported soner - see below.) If no deviations occur during the half year, a Semiannual Deviations Report must be submitted stating this.	Total Facility
Compliance Certification	due 30 days after end of each calendar year following Permit Issuance (for the previous calendar year). To be submitted on a form approved by the Commissioner. The report covers all deviations experienced during the calendar year.	Total Facility
Emissions Inventory Report	due 91 days after end of each calendar year following Permit Issuance (April 1). To be submitted on a form approved by the Commissioner.	Total Facility

TECHNICAL SUPPORT DOCUMENT
For
AIR EMISSION PERMIT NO. 16900012-001

This Technical Support Document (TSD) is for all the interested parties of the permit. The purpose of this document is to set forth the legal and factual basis for the permit conditions, including references to the applicable statutory or regulatory provisions.

1. General Information

1.1. Applicant and Stationary Source Location:

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

1.2. Description of the facility

Badger Foundry is a gray iron foundry with a scrubber and afterburner controlled cupola. They currently melt about 15000 tons per year which represents about 20 percent of their maximum possible capacity. Badger proposes to install an induction furnace and magnesium treatment area with this 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 any changes allowed with this permit issuance

This permit will allow the facility to install an induction furnace and magnesium treating area and allows them to melt 5000 tons of ductile iron per year. The production limit in combination with the use of PM pollution control equipment holds the allowable emissions from the ductile line modification to less than the major modification thresholds found in 40 CFR § 52.21, Prevention of Significant Deterioration (PSD). The permit requires that the facility install Best Available Control Technology (BACT) on the core dipping tanks by December 1, 1998. BACT consists of switching from a high VOC dipping solution to a low VOC dipping solution. The use of the slower drying low VOC dipping solution will require Badger to install a 1.2 MMBtu/hr natural gas drying oven.

The original BACT analysis stated that six infrared core drying ovens would be used for drying the cores dipped in the new dipping solution. However, upon further review, the infrared ovens were proven to be inadequate for drying the cores produced at this facility. Due to the insignificant change in emission from the infrared ovens to the one natural gas oven, no additional requirements were placed into the final permit. Additional changes required to accomodate the new dipping solution include, but are not limited to, installation of bridge cranes for core mobility, a steel dip tank and a conveyor system, room expansion, restructuring of building columns and a building addition. The permit requires that the facility keep VOC emissions to less than 40 tons per year (PSD major modification threshold) from each the Omega-Kloster line, the 150 line and the 250 line so that the facility can avoid having to install BACT on each of those lines. Finally, the permit requires the facility to keep Hazardous Air Pollutant (HAP) emissions to less than the major source thresholds found in 40 CFR pt. 63.

1.4 Description of all amendments issued since the issuance of the last total facility permit and to be included in the Part 70 Permit.

Permit Number and Issuance Date	**Action Authorized**
64-81-OT-2 March 11, 1981	Last Total Facility permit. Allowed operation of the foundry
	No amendments issued since 1981. Several amendments were applied for, and have been included in this permit action.

1.5. Facility Emissions:

Table 1. Total Facility Potential to Emit Summary (emissions allowed after permit issuance):

EU #	SV#	Emission Unit Description	PM tpy	PM_{10} tpy	SO_2 tpy	NO_x tpy	CO tpy	VOC tpy	Pb tpy	Single HAP tpy	All HAPs tpy
001	001	Cupola	27.6	24.8	21	4.3	64	0.5	3.4	4.4 Manganese	See ↓
002	002	Scrap & Charge Handling	8.8	5.3	0.02	2.3	0.8	0.06	-	-	-
003	003	Pouring & Cooling	194	96	0.8	1.1	-	67	-	9.5 Benzene Phenol	See ↓
004, 005	004 005 006	Shakeout	148	132	-	-	-	-	-	-	-
007, 008, 015 to 020, 023, 024, 054, 055	003 008 009 017	Sand Handling	70	11	-	-	-	0.2	-	9.5 Naphthalene	See ↓
009 to 014	010	Core Dip Tanks	-	-	-	-	-	53	-	-	-
025, 058, 044 to 046	011 012 013 019	Grinding and Cleaning	7.9	0.8	-	-	-	-	-	-	-
056	018	Induction Furnace	0.5	0.5	-	-	-	-	0.05	0.01 Manganese	0.01
057	018	Inoculation	0.2	0.2	-	-	-	-	-	-	-

	PM tpy	PM_{10} tpy	SO_2 tpy	NO_x tpy	CO tpy	VOC tpy	Pb tpy	Single HAP tpy	All HAPs tpy
Total Facility Limited Potential Emissions	458	242	22	8	64	121	3.4	9.5 Manganese, Benzene, Naphthalene, Phenol	24.5
Total Facility Actual Emissions	103	54	2	2	12	70	0.66	7.1	10

Table 2. Facility(TF) and Permit Classification

Classification	Major/Affected Source	*Synthetic Minor	*Minor
PSD	PM, PM_{10}, VOC	NA	NA
NAAR (list pollutant)	NA	NA	NA
Part 70 Permit Program (list pollutant)	PM, PM_{10}, VOC	NA	NA

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

2. Regulatory and/or Statutory Basis

Regulatory Overview of Facility

EU, GRP, or SV #	Applicable Regulations	Comments: (Note: all limits expressed as "tons/year" are on a 12-month rolling sum basis)
EU009 - 014	40 CFR § 52.21	Prevention of Significant Deterioration. BACT limits set for VOC. Core dipping solution VOC content not to exceed 5% by volume.
007	40 CFR § 52.21	Prevention of Significant Deterioration. 39 ton per year VOC limit accepted to avoid PSD requirements. (This limit applies to an existing EU, however actual emissions have never exceeded 40 tons per year)
008	40 CFR § 52.21	Prevention of Significant Deterioration. 39 ton per year VOC limit accepted to avoid PSD requirements. (This limit applies to an existing EU, however actual emissions have never exceeded 40 tons per year)
054, 055	40 CFR § 52.21	Prevention of Significant Deterioration. 39 ton per year VOC limit accepted to avoid PSD requirements. (This limit applies to an existing EU, however actual emissions have never exceeded 40 tons per year)

056, 057	40 CFR § 52.21	Prevention of Significant Deterioration. 5000 tons melted per year production limit accepted to limit PM emissions below 25 tons/year and PM_{10} emissions to below 15 tons per year in order to avoid PSD requirements when Ductile line is installed.
Total Facility	40 CFR pt. 63	National Emission Standards for Hazardous Air Pollutants. Single HAP emissions limited to less than 9.5 tons per year to avoid requirements that may be promulgated in the future. Naphthalene from EU 007, 008, 054 and 055, Benzene and Phenol from EU 003 and Manganese from EU 001 are the most significant HAPs emitted.
Total Facility	40 CFR pt. 63	National Emission Standards for Hazardous Air Pollutants. Total HAP emissions limited to less than 24.5 tons per year to avoid requirements that may be promulgated in the future.

3. Technical Information

SV 001, Cupola (EU 001), Scrubber (CE 001) and Afterburner (CE 002)

- Worst-case Cupola Emissions/Standard Operating Methods: excluding startup and shutdown, the cupola operation is comprised of two distinct operating methods: 1) steady operation with combustion blower on is worst-case for PM and SO_2 emissions; 2) interrupted operation when the blower is shutoff usually for approximately 30 minutes is worst case for opacity and condensable VOC emissions.

- CO and opacity testing for SV 001: After permit issuance, Badger will conduct simultaneous CO and opacity performance tests. During testing, the combustion blower will be shut off for at least 15 minutes during each one hour test run while the cupola is holding a charge of coke and iron. The CO/opacity testing shall be conducted separately from the PM testing, because worst-case for PM emissions is different than worst-case for CO/opacity emissions.

- The MPCA performance testing staff will evaluate whether PM_{10} should be tested at the same time as CO. It is unclear whether maximum production of the cupola (continuous operation of the combustion blower) would be worst case for PM_{10} emissions or whether periodic blower shut down would be worst case for PM_{10} emissions.

- Manganese, Lead, SO_2 and PM will be tested simultaneously at maximum production (continuous operation of the combustion blower) and any production limits (in tons of melt per hour) that are set based on testing conditions will be set based on this test. (Shutting down the combustion blower during the CO/opacity test will artificially lower the tons per hour melted.)
- Badger is required to test SV 001 for PM every three years based on current AQD stack test frequency policy.

- Badger is required to test once for PM_{10} to determine the actual PM_{10} emission rate for use in PM_{10} emissions modeling, and to verify the emission factor used in the Title V permit application.

- The facility is required to test once for Pb from SV 001 to verify the emission factor used in the Title V application. If the emission factor for Pb is higher than (0.51 tons Pb/ton melt) the value used in their calculations, then they are required to conduct Pb modeling. MPCA staff ran the EPA SCREEN 3 model for Pb for Badger using 0.51 lb Pb/ton of melt. The model predicted that ambient lead concentrations would be right at the ambient standard. However, since SCREEN 3 is a very conservative model, the MPCA is not concerned that there would be actual ambient Pb violations unless the actual emission rate exceeds 0.51 lb Pb/ton of melt.

- The facility is required to do an initial performance test to measure Manganese emissions from SV 001 to verify that emissions are below 9.5 tons per year for a single HAP.

- There is no SO_2 limit on SV 001 (the cupola stack/vent) because the total facility heat input is less than 250 tph (it is about 60 MMBTU/hr) and the facility is located outside of the Minneapolis-St. Paul Air Quality Control Region. Minn. R. 7011.0610, subp. 2(B). (Badger's consultant indicated the cupola burns 310 lbs. coke per ton of melt. Assuming coke hasa heat content of 15,000 BTUs per lb, at 10 tons melt per hour the heat input is 46.5 MMBTU/hr. The total of all remaining sources at the facility equals about 11 - 15 MMBTU/hr.)

- Badger is not required to record the flow rate of water to the scrubber as was proposed in the Title V permit application. Badger is required to record water supply pressure instead because the scrubber was modified since the application was filed. The company that designed the modification recommended that water supply pressure be monitored instead.
- Badger is required to install a Dual recorder on EU 001 and CE 002 to simultaneously record operating status of the combustion blower and the temperature of the afterburner(CE 002).
- The afterburner temperature is measured with an array of thermocouples located in the upper stack just below the take-off elbow.

Other Emission Units

- The Permittee requested a 35 ton per year synthetic minor VOC limit on each EU 007 and EU 008 in the application. However, the permit provides a 39 tpy VOC limit for future flexibility.
- The permit requires Badger to calculate HAP emissions from EU 009 - EU 014 (core dip/wash). However, there were no HAPs contained in the core dip/wash at the time of permit issuance.
- GP 001 - The 5 percent by weight VOC content limit and the 2,132,000 lb. dipping mixture per year limit were committed to by the Permittee in the BACT analysis they submitted. These limits correspond to potential VOC emissions of 53.3 tons per year.

- The Ductile Line modification emissions are limited to less than 15 tons per year PM_{10} and 25 tons per year PM to avoid classification as a major modification under 40 CFR § 52.21. This limit will be federally enforceable by limiting the amount the induction furnace (EU 056) can melt in a year. The only new pieces of equipment that will be added for the Ductile line will be the induction furnace and the refining operation (EU 057). Once the ductile iron is melted and refined, it will be processed through the already existing equipment that currently processes gray iron. All of the emission factors for the processes at a foundry are expressed in lbs. emissions per ton of metal melted. Therefore, limiting the tons of melt will limit emissions from the rest of the emission units down stream.
- There is no explicit emission limit on SV 010 because it is a VOC source. The limit will be based on material balance and will be placed on the EU level.
- AP-42 gives one emission factor for all grinding and cleaning at a foundry. The shot and tumble blasters are the most significant sources of PM from "grinding and cleaning". The hand grinding stations at Badger have uncertified hoods collecting and routing emissions to a baghouse. Since the hoods are uncertified, by policy Badger shouldn't get any credit for pollution control equipment. However, it is difficult to know what small percentage of the emissions from "grinding and cleaning" come from the hand grinding stations MPCA staff has made the assumption that 100 percent of the emissions are collected and routed to a baghouse for ease of emission calculations.
- The operational flexibility granted Group 004 "Grinding and Cleaning" is there so that Badger can move, change, add and subtract grinding and cleaning equipment without having to apply for amendments each time. Grinding and cleaning equipment at foundries is subject to frequent replacement because of wear. The MPCA believes (and AP-42 supports this) that the amount of grinding and cleaning emissions is directly proportional to the amount of metal melted. In other words, emissions will remain the same whether there are 10 shot blasters operating 1 hour a day each to clean 10 tons of castings or if there is one shot blaster operating 10 hours a day to clean 10 tons of castings.
- Elemental lead emissions have not been included in the Single HAP or Total HAP emission calculations. The HAP list says "lead compounds" not elemental lead.
- The VOC emissions due to the ductile line modification do not need tracking because with the 5000 ton per year melt limit on the ductile line, the VOC PTE only reaches 22 tons per year which is well under the 40 ton per year VOC de minimus threshold found in 40 CFR § 52.21 (PSD).
- The PM and PM_{10} emission from the 150 line (EU 007) and the 250 line (EU 008) do not need to be tracked (as the VOC emissions are) because the PM and PM_{10} emission factors for core sand mixing and pouring and cooling are based ontons of metal melted. Therefore, there was no PM or PM_{10} emissions increase due to the addition of the 150 line and 250 line.
- The 150 line (EU 007), the 250 line (EU 008) and the Omega-Kloster line (GP 002) were added to the facility at different times. Badger requested limits on each of these modifications to hold the emissions from each to less than 40 tons per year. Therefore, Badger is required to calculate VOC emissions from each of the three areas. Badger uses the same binder resin in each of these lines making it impossible to measure binder usage to determine how much VOC evaporates from each line during sand mixing. The most accurate way to determine evaporative VOC emissions from EU 007 and EU 008 is to measure how much sand is metered to each and calculate the binder and catalyst used based on the binder/catalyst/sand recipe which stays constant.

The most accurate way to determine evaporative VOC emissions from GP 002 is to measure how much catalyst is used in each of the two emission units and calculate how much binder was used in GP 002 based on the binder/catalyst/sand recipe which stays constant. (GP 002 uses the same binder as EU 007 and EU 008 but a different catalyst is used in each of the two EU's that comprise GP002.)

Total Facility

- An internal MPCA policy memo on modeling states that any facility with allowed emissions of over 100 tons per year of PM_{10} must model PM_{10} emissions within three years of Title V permit issuance. Badger's allowed PM_{10} emissions are 442 tons per year.

4. Conclusion

Based on the information provided by Badger Foundry Company, the MPCA has reasonable assurance that the proposed operation of the emission facility, as described in the Air Emission Permit No. 16900012-001, and this TSD, will not cause or contribute to a violation of applicable federal regulations and Minnesota Rules.

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Attachment: BACT Analysis
Emission Calculations Spreadsheet
Facility Flow Diagram