217/782-2113

JOINT CONSTRUCTION AND OPERATING PERMIT
PREVENTION OF SIGNIFICANT DETERIORATION APPROVAL

PERMITTEE

Caterpillar Inc.
Attn: Jeff Haworth, staff engineer
8826 West Route 24
Mapleton, Illinois 61547

Application No.: 00120038
Applicant's Designation: 3500 Area
Subject: Metal Casting
Date Issued:

I.D. No.: 143805AAB
Date Received: December 18, 2000

Operating Permit
Expiration Date:

Location: 8826 West Route 24, Mapleton

Permit is hereby granted to the above-designated Permittee to CONSTRUCT and OPERATE emission source(s) and/or air pollution control equipment consisting of modifications to the 3500 Area including a modified pouring zone, the addition of a mold cooling zone, a casting removal/bucket dump, casting degating/decoring stations, waste sand and metallic return system, a replacement shakeout table for the Camshaft Area, and associated baghouse(s) as described in the above referenced application. This Permit is subject to standard conditions attached hereto and the following special condition(s):

In conjunction with this permit, approval is given with respect to the Prevention of Significant Deterioration of Air Quality Regulations (PSD) to construct and operate the above referenced project, in that the Illinois Environmental Protection Agency (Agency) finds that the application fulfills all applicable requirements of 40 CFR 52.21. This approval is issued pursuant to the Clean Air Act, as amended, 42 U.S.C. 7401 et. seq., the Federal regulations promulgated thereunder at 40 CFR 52.21 for Prevention of Significant Deterioration of Air Quality (PSD), and a Delegation of Authority agreement between the United States Environmental Protection Agency and the Illinois EPA for the administration of the PSD Program. This approval becomes effective in accordance with the provisions of 40 CFR 124.15 and may be appealed in accordance with the provisions of 40 CFR 124.19. This approval is also based upon and subject to the following findings and the conditions, which follow:

Findings

1.1. Caterpillar Inc. has requested a joint construction and operating permit for modifications to the 3500 area at its Mapleton cast iron foundry where large engine blocks are produced. The modification would allow for greater production in the 3500 Area. In conjunction with the changes to the 3500 Area, a shakeout table in the adjacent Camshaft Area will be replaced.

1.2. The source is located in Hollis Township in Peoria County. The area is designated attainment for all pollutants.

1.3a. The requested permit would allow a significant increase in PM/PM10 and Volatile Organic Material (VOM) emissions from the 3500 Area. The modified 3500 Area would therefore be subject to PSD as a major modification to an existing source for PM/PM10 and VOM emissions.

b. The emissions of other pollutants, if any, are not subject to PSD.

1.4. After reviewing the materials submitted by Caterpillar, Illinois EPA has determined that this project, as proposed, would (i) be in compliance with applicable Board emission standards and (ii) utilize Best Available Control Technology (BACT) on emissions of PM/PM10 and VOM.

1.5. The Illinois EPA has determined that this project, as proposed, would comply with all applicable Illinois Air Pollution Board Regulations and the federal Prevention of Significant Deterioration of Air Quality Regulations (PSD), 40 CFR 52.21.

1.6. A copy of the application and the Illinois EPA's formal review of the application and a draft of this permit were placed in a location in the vicinity of the project, and the public was given notice and an opportunity to examine this material and to submit comments and to request a public hearing on this matter.

The Illinois EPA is issuing this approval subject to the following conditions and consistent with the specifications and data included in the application. This Permit, as it applies to the modified 3500 Area, supersedes provisions in other permits that address the current configuration of the 3500 Area. Any departure from the conditions of this approval or terms expressed in the application would need to receive prior written authorization by Illinois EPA.

Conditions

2.1. Description

The 3500 area produces engine blocks for large heavy-duty engines that are used in a variety of applications. The changes to the 3500 area include: installation of a new pour station and conveyorized cooling area*, replacement of the existing shakeout with casting removal/bucket dump and casting degating/decoring stations*, replacement of the existing waste sand system with a new system*, installation of ancillary equipment including a new assembly gauge and gas-fired makeup air units for comfort heating.

The 3500 Area is a source of pollutants due to, the pouring and cooling of metal and from handling and processing the sand used to make molds (cores). PM/PM10 originates from the mold pouring, cooling and shakeout processes. VOM originates from the resin binders used to hold the sand together. The bulk of the VOM emissions occur in the core

making process which is not being physically changed. The remainder of the VOM emissions occur when cores are poured and castings are subsequently taken out of the molds.

*These new units are controlled by a common filter (baghouse) control system that is also being installed.

2.2. List of New/Modified Emission Units and Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
Mold Pouring	Molten metal is poured into molds	None
Mold Cooling	Castings proceed on a conveyor to cool in mold	New Baghouse*
Casting Removal/Bucket Dump	Empties sand and castings from the transport bucket onto a conveyor	New Baghouse *
Casting Degating/Decoring	Sprue and sand are separated from mold	New Baghouse *
Waste Sand & Metallics Return System	Receives sand and metallics from the shakeout and separates them for reuse or disposal	New Baghouse *

* A single new baghouse will control emissions from previously uncontrolled sources.

2.3. Applicability Provisions and Applicable Regulations

a. “Affected foundry equipment” for the purpose of these unit-specific conditions, is the modified 3500 foundry area as described in Condition 2.1 with new emissions units as described in Condition: 2.2.

b. i. The affected foundry equipment is subject to 35 IAC 212.321(a), which provides that the emission of particulate matter into the atmosphere in any one hour period from any new process emission unit, either alone or in combination with the emission of particulate matter from all other similar process emission units for which construction or modification commenced on or after April 14, 1972, at a source or premises, exceeds the allowable emission rates specified in the following equation [35 IAC 212.321(a)].

$$E = A(P)^B$$

where:

P = process weight rate; and,
E = allowable emission rate; and,

1. For process weight rates up to 408 MG/hr (450 T/hr):

	Metric	English
P	Mg/hr	T/hr
E	kg/hr	lbs/hr
A	1.214	2.54
B	0.534	0.534

2. For process weight rates in excess of 408 MG/hr (450 T/hr):

	Metric	English
P	Mg/hr	T/hr
E	kg/hr	lbs/hr
A	11.42	24.8
B	0.16	0.16

ii. For purposes of this rule, as applies to this application, all the affected foundry equipment served by a single ventilation system, which may be controlled by one or more control devices, shall be considered similar emission units.

c. No person shall cause or allow the emission of sulfur dioxide into the atmosphere from any process emission unit to exceed 2000 ppm, [35 IAC 214.301].

d. The affected foundry equipment is subject to 35 IAC 215 Subpart K, Use of Organic Material, which provides that no person shall cause or allow the discharge of more than 3.6 kg/hr (8 lb/hr) of organic material into the atmosphere from any emission unit. Provided however that if no odor nuisance exists this limitation shall apply only to photochemically reactive material as defined in 35 IAC 211[35 IAC 215.301].

Note: Emissions of organic material in excess of those allowed above would be permittable if such emissions were controlled by flame, thermal or catalytic incineration so as either to reduce such emissions to 10 ppm equivalent methane (molecular weight 16) or less, or to convert 85 percent of the hydrocarbons to carbon dioxide and water [35 IAC 215.302(a)]; or if such emissions are controlled by any air pollution control equipment approved by the Agency capable of at least 85 percent reduction of VOM emissions.

2.4. Non-Applicability of Regulations of Concern

The Permittee has addressed the applicability and compliance of 40 CFR 52.21, PSD. The limits and other requirements of this permit ensure that the modifications addressed in this construction permit do not constitute a major modification for pollutants other than PM/PM10 and VOM, as explained in more detail in Attachment 1.

2.5 Operational and Production Limits and Work Practices

a. i. The phenolic urethane cold box process or other similar low-emitting process shall be used to minimize VOM emissions from the affected foundry equipment.

ii. Affected foundry equipment shall be operated in conformance with good air pollution work practice to minimize emissions of VOM.

b. i. The emissions of particulate matter shall be controlled by fabric filter.

ii. The emission of particulate matter from new and modified operations shall not exceed 0.005 gr/dscf, as determined at the outlet of the filter.

The above requirements represent Best Available Control Technology (BACT) for emissions of VOM and PM, as required by the PSD rules.

c. i. The affected foundry equipment shall not exceed the following material throughput limits which become effective upon increasing the production of the 3500 Area:

Emission Units	Material	Throughput Limit (tons)	
		Monthly	Annually
Induction Furnace Operation (Metal Supplied to 3500 Area)	Metal Poured	5,556	50,000
Sand Distribution System	Raw Sand	10,369	93,320
Core Making	Resin	187	1,680
	Triethylamine(TEA)	17	154
Waste Sand and Metallics Return System	Sand Processed	14,147	127,325
Fuel Combustion Units*	Natural Gas Usage	18	158

Monthly limits are based on 1/9 the annual limits specified above.
*Core drying process, holding furnace torch, stress relief oven and makeup air units. Throughput expressed in million cubic feet.

ii. Compliance with these annual limits and other annual limits in this permit shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

2.6 Emission Limitations

a. The emissions from affected foundry equipment, as emission factors, shall not exceed the following limits. These factors are expressed in terms of lb/unit as listed in Condition 2.5.

Emission Unit	Basis	PM	PM10	SO_x	NO_x	VOM	CO	Pb
Induction Furnace	Ton Metal	0.69	0.62	0.01	0.23	0.32	0.94	0.03
Core Making	Ton Resin	-	-	-	-	87.2	-	-
TEA scrubber	Ton TEA	-	-	-	-	20	-	-
Mold Pouring	Ton Metal	0.04	0.02	0.02	0.01	0.14	0.12	-
Fuel Combustion Units[1]	MCF	6.2	6.2	0.6	100	5.8	20	-
Foundry Operations Controlled by baghouse	Lb/hr	11.36	-	-	-	-	-	-
Casting Removal/Bucket Dump/Degating/Decoring	Tons/Metal	-	-	-	-	0.14	0.06	-
Mold Cooling	Tons/Metal	-	-	-	-	0.52	2.33	-

[1] As pertains to emissions from natural gas combustion
[2] Values in shaded cells are controlled. All others are uncontrolled.

b. Annual emissions from the affected equipment shall not exceed the following emission limits (tons/year):

Emission Units	PM	PM10	SO_x	NO_x	VOM	CO	Pb
Induction Furnace	2.73	2.46	0.25	5.75	8.00	23.5	0.12
Core Making	-	-	-	-	73.24	-	-
Triethylamine Scrubber	-	-	-	-	1.39	-	-
Mold Pouring	1.04	0.45	0.5	0.25	3.5	2.91	-
Mold Cooling			-	-	13.0	58.25	-
Casting Removal/Bucket Dump/Degating/Decoring			-	-	7.0	2.92	-
Foundry Operations Controlled by baghouse	49.74	49.74					
Fuel Combustion	1.22	1.22	0.12	19.67	1.14	3.93	-
Total Annual Emissions	58.79	57.86	0.87	25.67	107.26[1]	91.71	0.12

Monthly limits are based on 1/9 annual limit.
[1] excludes Camshaft Shakeout

2.7. Testing Requirements

a. i. Within 60 days after achieving the maximum production rate at which the affected foundry equipment will be operated, following improvements, but not later than 180 days after initial startup the Permittee shall have emission tests conducted for particulate matter and opacity from the new baghouse as follows.

ii. The Permittee shall also have emission tests conducted at such times for particulate matter or such other pollutants as may be required by the Illinois EPA under Section 114 of the Act.

b. i. The following methods and procedures shall be used for testing of particulate matter emissions and opacity. Refer to 40 CFR 60, Appendix A for USEPA test methods.

A. Method 5 shall be used for negative-pressure fabric filters and other types of control devices and Methods 5D shall be used for positive-pressure fabric filters to determine the particulate matter concentration and volumetric flow rate of the effluent gas.

B. Method 9 and the procedures of 40 CFR 60.11 shall be used to determine opacity.

ii. The following methods and procedures shall be used for testing emissions of pollutants other than particulate matter.

Location of Sample Points	USEPA Method 1
Sulfur Dioxide	USEPA Method 6
Nitrogen Oxides	USEPA Method 7
Carbon Monoxide	USEPA Method 10
Volatile Organic Material	USEPA Method 18, 25 or 25A, as appropriate

c. At least 60 days prior to the actual date of testing, a written test plan shall be submitted to the Illinois EPA for review and approval. This plan shall describe the specific procedures for testing including as a minimum:

i. The person(s) who will be performing sampling and analysis and their experience with similar tests.

ii. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of the maximum emissions, the levels of operating parameters at or within which compliance is intended to be shown, if parameters for the process and any control equipment will be determined.

iii. The specific determination of emissions and operations which are intended to be made, including sampling and monitoring locations.

iv. The test methods which will be used, with the specific analysis method.

v. Any minor changes in standard methodology proposed to accommodate the specific circumstances of testing, with justification.

vi. A statement that the testing will be performed by a qualified independent testing service.

d. i. Prior to carrying out these test, the Illinois EPA shall be notified a minimum of thirty (30) days prior to the scheduled date of these tests with the exact date, time and place of these tests, to enable the Illinois EPA to witness these tests.

ii. If the scheduled date for the test is changed the Permittee shall inform the Illinois EPA within five (5) working days of the scheduled test date and must specify the date of the rescheduled test.

e. A copy of the Final Reports for these tests shall be submitted to the Illinois EPA within fourteen days after the test results are compiled and finalized.

2.8. Monitoring Requirements

a. The Permittee shall install and maintain a continuous pressure drop monitoring device on the baghouse.

b. The Permittee shall follow written procedures for inspection and maintenance of the baghouse and other air pollution control systems.

2.9. Recordkeeping Requirements

a. The Permittee shall keep the following records related to VOM emissions associated with core making:

i. Material safety data sheets or other manufacturer data for the resin used in producing cores.

ii. Calculations for the VOM emissions associated with use of such resin, with supporting calculations.

b. The Permittee shall maintain records of the throughput of the following items for the affected foundry equipment for a period of at least 5 years from the date of creation:

i. Throughputs of material as limited by condition 2.5(b) in Tons/month and Tons/year

ii. Facility-wide natural gas consumption as a surrogate for consumption at the new combustion sources (since these sources are not being limited in operation).

c. The Permittee shall keep records of the emissions of: PM, PM_{10}, NO_x, SO_x, VOM, CO, HAP, and Pb in Tons/month and Tons/year, with supporting calculations.

d. The Permittee shall keep the following records related to air pollution control systems:

i. Operational and maintenance records of each air pollution control system.

ii. Baghouse pressure drop (inches/wc)

2.10. Reporting Requirements

The Permittee shall promptly notify the Illinois EPA, Compliance Section of noncompliance of affected foundry equipment with the permit requirements. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken:

2.11. Operational Flexibility/Anticipated Operating Scenarios

The Permittee is authorized to switch from the phenolic urethane cold set process to other similar low-emitting processes if:

a. The Permittee demonstrates that such process will result in similar or lower levels of emissions from the phenolic urethane cold box process, expressed in terms of lb VOM emitted/ton of resin

b. Use of a similar process is authorized to the extent it does not qualify as a “modification” according to 35 IAC 201.102

2.12. Compliance Procedures

To determine compliance with Condition 2.6(b) emissions from the affected foundry equipment shall be calculated based on the emission factors in Condition 2.6(a), if the process is operating normally and control system(s) are being properly operated.

Please Note, the Illinois EPA may simplify the compliance procedures for affected foundry equipment in the CAAPP permit based on the results of the emission testing as required by this permit.

3.0. This permit is issued based on negligible increases in the emissions of the 3600 Area in which camshafts are produced as a result of this project. This is because a limited number of emission units are being relocated and replaced mainly to accommodate modifications to the adjacent 3500 area.

If you have any questions on this, please call Kevin Smith at 217/782-2113.

Donald E. Sutton, P.E.
Manager, Permit Section
Division of Air Pollution Control

DES:KLS:psj

cc: Region 2

Attachment 1

PSD Applicability

Table I – Past Actual Emissions
(Tons/Year)

CO	SO_2	VOM	NO_x	PM	PM10	Pb
27.47	0.29	30.32	13.56	17.06	15.82	0.04

Table II – Future Potential Emissions (Tons/Year)

CO	SO_2	VOM	NO_x	PM	PM10	Pb
91.71	0.87	108.08	25.67	58.79	57.86	0.12

Table IV – Net Emissions Change From This Project (Tons/Year)

	CO	SO_2	VOM	NO_x	PM	PM10	Pb
Table I	27.47	0.29	30.32	13.56	17.06	15.82	0.04
Table II	91.71	0.87	108.08	25.67	58.79	57.86	0.12
Totals	64.24	0.58	77.76	12.11	41.73	42.04	0.08

KLS:psj