



DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 012009-007 Project Number: 2008-02-024

Parent Company: Keokuk Prototype Foundry Company, Inc.

Parent Company Address: 809 East Maple, Kahoka, MO 63445

Installation Name: KPF Steel Foundry

Installation Address: 809 East Maple Street, Kahoka, MO 63445

Location Information: Clark County, S19, T65N, R7W

Application for Authority to Construct was made for:

The emission sources associated with the operation of a steel foundry that was constructed prior to obtaining a permit. Steel foundries produce steel castings by melting scrap, alloying, molding and finishing. Carbon steel, low alloy steel and high alloy steel are all produced at this operation. This review was conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.



Standard Conditions (on reverse) are applicable to this permit.



Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

JAN 21 2009

EFFECTIVE DATE


DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the departments' Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. Also, you must notify the Department of Natural Resources Regional office responsible for the area within which you are located within 15 days after the actual start up of this (these) air contaminant source(s).

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant source(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, Attention: Construction Permit Unit.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."

KPF Steel Foundry
Clark County, S19, T65N, R7W

1. Baghouse Operation
 - A. KPF Steel Foundry shall control emissions from the sand delivery (EP-01) and casting shakeout (EP-05) using baghouses as specified in the permit application. The baghouses shall be operated and maintained in accordance with the manufacturer's specifications. The baghouse shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that Department of Natural Resources' employees may easily observe them. Replacement filters for the baghouses and drum filters shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
 - B. KPF Steel Foundry shall monitor and record the operating pressure drop across the baghouses and drum filters at least once every 24 hours when the units are in operation. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
 - C. KPF Steel Foundry shall maintain an operating and maintenance log for the baghouses and drum filters which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
2. Control Measure – Capture Efficiency
 - A. The sand delivery (EP-01) and casting shakeout (EP-05) shall be enclosed by ductwork and shall be maintained under negative pressure and exhausted to baghouses.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- B. KPF Steel Foundry shall demonstrate negative pressure by using visual indicators such as streamers, talc puff test, negative pressure gauges, flags, etc. at openings that are not closed during normal operations. All openings must indicate the presence of negative pressure for compliance.
 - C. KPF Steel Foundry shall perform a visual indicator check for each emission point at least once in every 24-hour period while the sand delivery and sand shakeout are in operation.
 - D. KPF Steel Foundry shall maintain an operating and maintenance log for the sand delivery and sand shakeout handling equipment and process equipment which shall include the following:
 - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions.
 - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
 - 3) A record of regular inspection schedule, the date and results of all inspections, including any actions or maintenance activities that result from the inspections. Either paper copy or electronic formats are acceptable.
 - 4) Maintain a record of daily visual indicator checks, including date and result.
3. Solvent/Clean Up Cloths
- KPF Steel Foundry shall keep the solvents and cleaning solutions in sealed containers whenever the materials are not in use. KPF Steel Foundry shall provide and maintain suitable, easily read, permanent markings on all, solvent and cleaning solution containers used with this equipment.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW

Project Number: 2008-02-024

Installation ID Number:

Permit Number:

KPF Steel Foundry
809 East Maple Street
Kahoka, MO 63445

Complete: July 10, 2008

Parent Company:
Keokuk Prototype Foundry Company, Inc.
809 East Maple
Kahoka, MO 63445

Clark County, S19, T65N, R7W

REVIEW SUMMARY

- KPF Steel Foundry has applied for authority to construct a steel foundry. As a condition of remedial enforcement action KPF Steel Foundry is seeking a construction permit for a plant in operation since 1999.
- Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process are Phenol (cas # 108-95-2), Diphenylmethane 4, 4'-Dilsoncyanate (cas # 101-68-8), Napthalene (cas # 91-20-3) and Formaldehyde (cas # 50-00-0).
- None of the New Source Performance Standards (NSPS) apply to the proposed equipment. Subpart AAa, Standards of Performance of Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization (AOD) Vessels Constructed After August 7, 1983, does not apply as the application did not list this equipment or processes.
- The National Emission Standards for Hazardous Air Pollutants (NESHAPs), 40 CFR Part 63, Subpart EEEEE, National Emission Standards for Iron and Steel Foundries applies to the proposed equipment. Subpart YYYYY, National Emission Standards for Area Sources: Electric Arc Furnaces Steelmaking Facilities, does not apply as this installation is a major source for HAPs. Subpart FFFFF, National Emission Standards for Hazardous Air Pollutants for Integrated Iron and Steel Manufacturing Facilities does not apply as the application did not indicate that the applicant was operating a sinter plant, blast furnace, or a basic oxygen process furnace (BOPF). Subpart ZZZZZ, National Emission Standards for Hazardous Air Pollutants for Iron and Steel Foundries Area Sources does not apply as this is a major source for HAPs.

- Baghouses are being used to control the PM₁₀ pollutant emissions from the sand delivery (EP-01) and casting shakeout (EP-05) equipment in this permit.
- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of HAPs and VOCs are above de minimis levels.
- This installation is located in Clark County, an attainment area for all criteria air pollutants.
- This installation is on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2, Item 19] as a Secondary Metal Production Plant.
- Ambient air quality modeling was not performed to determine the ambient impact of Phenol (cas # 108-95-2), Diphenylmethane 4, 4'-Dilsoncyanate (cas # 101-68-8), Napthalene (cas # 91-20-3) and Formaldehyde (cas # 50-00-0) because of the applicability of 40 CFR Part 63, Subpart EEEEE, National Emission Standards for Iron and Steel Foundries, which set standards for PM₁₀, VOC and HAP emissions. No model currently exists that can determine the impact of VOCs.
- Emissions testing is required to show compliance with National Emission Standards for Hazardous Air Pollutants (NESHAPs) for the equipment in this permit.
- A Part 70 Operating Permit application is required for this installation within 60 days of the issuance of this permit.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

This is a major source for HAPs. It will be a Part 70 installation for operating permits. They are located in Clark County in Kahoka, Missouri. The application did not contain general information concerning this installation. The information listed was found on their web site. In 1997, Keokuk Prototype Foundry moved from their facility in Keokuk, Iowa, to a new building constructed in nearby Kahoka, Missouri. Ground was broken on the new site on July 24, 1998, at Vine and Maple Streets. In February of 1999 the first "heat" was poured and full production began that spring. With the new location came a name change and all three divisions; the foundry, pattern shop, and Keokuk Machining became incorporated under the name KPF Steel Foundry.

In September of 2000, KPF Steel Foundry became International Organization for Standardization (ISO) Certified. The following year a 12,000 sq. ft. addition was made to increase pattern storage and machining expansion. In 2002, new equipment was

added that increased the casting cleaning department capabilities. In 2007, KPF Steel Foundry made another addition to accommodate more core making equipment as well as six more Computer Numerical Control (CNC) machines that had been added to further increase capacity.

KPF Steel Foundry pours parts for a variety of different companies to ASTM specifications. The materials they currently pour are listed in Table 1.

Table 1: Material Produced at KPF Steel Foundry

Low Alloy	High Alloy-Heat Resistant	High Alloy	Carbon Steel
4318	310	C5	B50E54A
8625		CF3M	LCB
8625/8630		CF8C	LCC
8630		CF8M	WCB
4100			WCC
			1045

Scrap metal of similar composition is melted in one of the two induction furnaces (one 2,400 pound and two 1,200 pound induction furnaces). An induction furnace is an electrical furnace in which the heat is applied by induction heating of a conductive medium (usually a metal) in a crucible around which water-cooled magnetic coils are wound. The advantage of the induction furnace is a clean, energy-efficient and well-controllable melting process compared to most other means of metal melting. A chemical analysis of the molten bath is taken from a slug test. Any corrections are calculated and made prior to the final casting. A final test specimen is collected and made prior to the final casting. A final test specimen is collected from the pour and verified. All parts are poured using ASTM material requested. They can pour castings up to 2,000 pounds. No permits have been issued to KPF Steel Foundry from the Air Pollution Control Program.

PROJECT DESCRIPTION

The application describes eight proposed sources. Table 2 contains the type of equipment installed. Baghouses and total enclosure are the two types of control devices mentioned in the application. Sand unloading (EP01) and casting shakeout (EP05) have baghouses attached. These baghouses were given 100 percent capture and 98 percent control for PM₁₀. The media blaster is described as fully enclosed in the application. However, media blasters are typically enclosed and this is taken into account in the development of the emission factor for media blasters. Therefore, this is not considered a control device for the media blaster as described in the application.

Table 2: List of Emission Points and Control Devices.

Emission Point	Description and Source Classification Code	Maximum Hourly Design Rate	Capture Efficiency Percent	Control Efficiency Percent
EP-01	Sand delivery 30400350	0.8627 tons per hour	100	98
EP-02	Induction Furnace (process emissions) 30400705	0.9706 tons per hour	None	None
EP-03	Mold Preparation 30400706	0.8627 tons per hour	None	None
EP-05	Cooling 30400713	0.9706 tons per hour	None	None
EP-06	Welding 30905254	0.00165	None	None
EP-07	Media Blast 30900208	0.000355 1000lbs/hour	None	None
EP-08	Natural Gas Usage	0.00881 MMCF	N/A	N/A

This site identified resin binders that it uses to mix with sand. These resin binders contain HAPs. The potential to emit calculation was based on the actual consumption of the product from June 2007 to May 2008. The installation indicated that a typical work week was 8 hours per day, 5 days per week for 51 weeks of the year. This amount of time equals 2,040 hours. The consumption rate of the HAP containing material from June 2007 to May 2008, determined the individual HAP containing material Maximum Hourly design rate. The tons per year rate for each HAP was calculated at 8,760 hours. No control devices were indicated in the application to control the HAP emissions. All HAPs in the HAP containing materials were assumed to be emitted. Table 3 lists the materials used and the HAPs listed for those materials. Table 4 is a comparison of the amount of HAP material used over a specific period of time compared to the Potential to Emit calculated values.

Table 3: HAP Containing Materials and MHDR

HAP Containing Resin Material	HAPs	MHDR (Pounds/Hour)
SIGMA CURE 703 UCB Pt1	Formaldehyde, Phenol,	1.41
SIGMA CURE 303 UCB Pt2	Diphenylmethane 4,4" Diisocyanate (MDI),	1.18
TECHNISET F6000	Formaldehyde, Phenol, Naphtalene	35.29
TECHNISET F6400	Diphenylmethane 4,4" Diisocyanate (MDI), Naphtalene	28.24

Table 4: Actual HAP compared to PTE HAP.

Cas #	HAP Name	Actual HAP Tons June 07 to May 08 (12 Months)	PTE HAP Tons (12 Months)
101-68-8	Diphenylmethane 4,4" Diisocyanate (MDI)	9.49	39.98
91-20-3	Naphtalene	3.2	13.96
108-95-2	Phenol	3.67	15.87
50-00-0	Formaldehyde	0.0375	0.0157
	Total HAP	16.40	69.83

Determining the Potential to Emit based on the HAP consumption rate for a time period allows for a wide range of materials to be cast at the mold preparation rate. The HAP PTE was based on the physical limitation of the MHDR of mold preparation. This was provided in the application as a rate of 0.8627 tons of sand per hour. The amount and type of resin demand is determined by the type of product made and the corresponding type of finishing required. The PTE of the HAPs was based on a fixed amount consumed over defined period of time. However, the amount consumed depends on the type of product made as that determines the amount of HAP containing material used.

The application did not list any painting activities as occurring at this site. The application did not provide any haul road information as no fugitive emission sources were included with this application.

EMISSIONS/CONTROLS EVALUATION

The emission factors and control efficiencies used in this analysis were obtained from the Environmental Protection Agency (EPA) document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, 12.13 Steel Foundries (1/95). Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8,760 hours per year.) Potential emissions of the HAPs were determined based on HAP containing materials used over a fixed period of time. The following table provides an emissions summary for this project.

Table 5: Emissions Summary (tons per year).

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions*	Potential Emissions of the Application	New Installation Conditioned Potential
PM ₁₀	15.0	N/D	N/D	10.71	N/A
SO _x	40.0	N/D	N/D	0.002	N/A
NO _x	40.0	N/D	N/D	0.60	N/A
VOC	40.0	N/D	N/D	61.12	N/A
CO	100.0	N/D	N/D	0.32	N/A
HAPs	10.0/25.0	N/D	N/D	69.96	N/A
Phenol	10	N/D	N/D	15.87	N/A
Diphenylmethane 4, 4- Diloncyanate	10	N/D	N/D	39.98	N/A
Naphthalene	10	N/D	N/D	13.96	N/A
Formaldehyde	10	N/D	N/D	0.1572	N/A

N/A = Not Applicable; N/D = Not Determined *no emission information was located for this installation.

VOC emissions are calculated based on the maximum hourly design rate of the casting shake out multiplied by a VOC emission factor which yields 5.12 tons per year. This amount is added to the amount of HAPs (56 tons per year) that are also VOCs. Fifty-six (56) tons of VOC were added to the VOC total from casting shake out. The HAPs that are also know to be VOCs are Phenol, Diphenylmethane 4, 4- Diloncyanate and Formaldehyde.

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of HAPs and VOCs are above de minimis levels.

APPLICABLE REQUIREMENTS

KPF Steel Foundry shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information, 10 CSR 10-6.110*
The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required June 1 for the previous year's emissions.
- *Operating Permits, 10 CSR 10-6.065*
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin, 10 CSR 10-6.170*
- *Restriction of Emission of Visible Air Contaminants, 10 CSR 10-6.220*
- *Restriction of Emission of Odors, 10 CSR 10-3.090*

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes, 10 CSR 10-6.400*
- *Emission Standards for Hazardous Air Pollutants, 10 CSR 10-6.080 – National Emission Standards for Hazardous Air Pollutants (NESHAPs) for Iron and Steel Foundries, 40 CFR Part 63, Subpart EEEEE*
- *Restriction of Emission of Sulfur Compounds, 10 CSR 10-6.260*
- *Maximum Allowable Emissions of Particulate Matter From Fuel Burning Equipment Used for Indirect Heating, 10 CSR 10-3.060*

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (6), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

Timothy Paul Hines
Environmental Engineer

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated February 1, 2008, received February 6, 2008, designating Keokuk Prototype Foundry Company, Inc. as the owner and operator of the installation.
- MSDS sheets received April 18, 2008 and June 16, 2008.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- Northeast Regional Office Site Survey, dated February 14, 2008.

Mr. Kevin Bender
Quality Manager
KPF Steel Foundry
809 East Maple Street
Kahoka, MO 63445

RE: New Source Review Permit - Project Number: 2008-02-024

Dear Mr. Bender:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files.

Operation in accordance with these conditions, your new source review permit application and with your amended operating permit is necessary for continued compliance.

The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact Timothy Paul Hines, at the departments' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102, or by telephone at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Kendall B. Hale
New Source Review Unit Chief

KBH:thk

Enclosures

c: Northeast Regional Office
PAMS File: 2008-02-024

Permit Number: