OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

MEMORANDUM **February 7, 2018**

TO: PF Phillip Fielder, P.E., Permits and Engineering Group Manager

THROUGH: PM Phil Martin, P.E., Engineering Section

THROUGH: Amalia Talty, P.E., Existing Source Permits Section

FROM: DSS David Schutz, P.E., New Source Permits Section

SUBJECT: Evaluation of Permit Application No. **2007-213-C (M-5)(PSD)**
EJ Ardmore, Inc. (Formerly "East Jordan Iron Works")
Gray & Ductile Iron Foundry (FAC ID 4082)
Ardmore, Carter County, Oklahoma
Sec. 7 – T 3S – R 3E
From I-35, East on SH-53 to Ardmore Airpark, North ½ Mile
Latitude 34.306°N, Longitude 97.037°W

SECTION I. INTRODUCTION

This permitting action is an administrative amendment, changing the name of the facility to "EJ Ardmore, Inc." The latest standard conditions will be inserted. There are no changes other than the name.

EJ Ardmore has requested a modified construction permit for a gray and ductile iron foundry near Ardmore (SIC Code 3321). The facility was issued a modified PSD construction permit (Permit No. 2007-213-C (M-3)) on February 24, 2010. The facility is currently operating under Permit No. 2007-213-TVR (M-2) issued February 23, 2009.

The modified permit incorporates the changes as authorized under Permit No. 2007-213-C (M-3), and incorporates the following additional changes:

- CO emissions from the induction furnaces, pouring & mold cooling operations, and shake-out operations are being increased. Total facility CO increases from 509.91 TPY to 781.91 TPY. The original CO emission limits were based on published emission factors, but stack testing in October 2010 showed CO emissions (all uncontrolled) to be well above the original estimates. Relaxation of CO emissions limits re-opens previous PSD analyses of BACT, ambient impacts, etc.

- NOx emission limits for the "Pouring and Mold Cooling" and "Shake-out" operations are being relaxed. NOx emissions remain below PSD significant emission rates, but since one of the criteria of a "significant modification" is changing a limit established to avoid some otherwise applicable requirement (here, PSD), a modified construction permit will be issued to revise those NOx limits.

The changes authorized under Permit No. 2007-213-C (M-3) were:

- Allowable iron throughput will be increased from 560 tons per day and 137,143 tons per year to 736 tons per day and 180,000 tons per year.

- Some additional discharge fans will be added to the process area. This will necessitate revising point-by-point emissions limitations for the ventilation fans.

- The scrap crusher and dryer will be removed from the permit.

- A holding furnace, previously authorized, will be removed from the permit.

Emissions limits for PM, SO_2, and VOC are not affected.

The facility is subject to Title V permitting requirements by virtue of emissions of 58.34 TPY PM_{10}, 781.91 TPY CO, 223.27 TPY VOC, and 36.73 TPY of Title III hazardous air pollutants (HAPs). The facility is subject to PSD requirements and also subject to the requirements of 40 CFR Part 63, Subpart EEEEE.

SECTION II. PROCESS DESCRIPTION

The foundry includes charge handling, melting, inoculation, pouring, cooling, shake-out, mold and core making, sand handling and storing, finishing, and coating operations. Maximum melting rates are now anticipated at 32 tons per hour and 180,000 tons per year with a daily maximum of 736 tons. The facility anticipates handling 15 tons of sand per ton of iron poured, or a total circulation of 2.7 million tons of sand per year. A small portion of that sand is formed into cores. The foundry includes a "green sand" mold line and two core-making processes, one using shell sand and the other using a phenolic urethane cold box (PUCB) binder system.

The facility includes three electric induction furnaces for iron melting and facilities for mold making and casting processing. A detailed description of each area in the foundry follows.

A) Charge Handling/Melting/Inoculation

Scrap steel, scrap cast iron, foundry returns, and pig iron are loaded into storage bins from trucks and railroad cars. The charge composition can change with material price consideration and/or availability. The charge is weighed on scale feeders and is transferred to one of the melt furnaces.

Initial metal melting is done in three electric induction furnaces (EIF). The electric induction furnaces melt solid metals into a molten stage and alloys may be added. The composition of the charge depends upon the specific metal characteristics required. Addition of alloys is done to improve properties of the castings. Alloying generally consists of graphite, silicon carbide, ferrosilicon, and ferromanganese. Molten metal is tapped by tilting the furnace and pouring through a spout of the furnace to a transfer ladle. The transfer ladle is used to transport metal to an automatic pouring device. Slag removal is performed as part of normal operations on the melt furnaces.

When ductile iron is being made, the metal is tapped into a transfer ladle containing magnesium ferrosilicon. The introduction of magnesium into the iron improves its crystalline properties and facilitates the transition from gray to ductile iron. The metal is transferred to the automatic pouring device and ferrosilicon is added for further refining. Both the transfer and pouring ladles are heated by natural gas-fired heaters. The heaters (torches) are used to heat the ladles and are not used for direct heating of metal. These torches are additionally used to cure the refractory.

A direct evacuation control (DEC) system vents emissions from the EIFs to a baghouse while scrap is being melted. Capture efficiency is 99%. When charging, the EIF roof is temporarily open until the charge feeder advances to engage the hood, allowing emissions from the furnace to escape. Particulate matter is primarily iron oxide (Fe_2O_3), a compound which is 69.9% by weight iron. The particulate also includes small amounts of manganese and metallic compounds, based on analyses of material collected from the baghouses. The collection efficiency for all control systems was based on experience with iron foundry ventilation system design. The stated efficiency for all baghouses associated with these operations is 0.0035 grains/DSCF.

B) Coremaking Operations

Cores are molded sand shapes used to make an opening or a cavity in a casting. The Core Room at the foundry uses two different coremaking processes: shell and phenolic urethane cold box (PUCB). Some of the cores are given a protective wash. This is accomplished by spraying or dipping the cores into a graphite refractory water-based slurry. A natural gas-fired oven will be used to dry and cure the cores. Core mud may be used to repair damaged portions of a core. Core wash prevents metal from penetrating the core. The cores from the two processes are transferred to molding lines for insertion into the mold.

The shell process utilizes sand coated with phenolic resin and hexamethylenetetramine. A release agent is used to allow separation of the core from the core box. The sand is fed into the shell machines and heat is applied to the core box from combustion of natural gas. The resin coating thermosets when the heat is applied, thus curing the core. The shell cores are then sent to the mold lines for placement into the molds.

The PUCB process utilizes a phenolic cold box binding system. With this system, sand is mixed with the three stages of organic binders. The first part is the phenolic resin, the second part is an isocyanate, and the third is the catalyst, dimethyl isopropanol amine (DMIPA), a non-HAP. The sand is mixed with the phenolic and isocyanate resins in a mixer. The mixed sand is then put into core boxes that are gassed with the catalyst, causing the resins to bind the sand and make the core. DMIPA emissions are controlled by an acid scrubber with a 98.5% control efficiency that uses sulfuric acid to neutralize the catalyst emissions. A release agent is applied to the core boxes to allow removal of the core from the core box after the core is made. Cores are sent to the mold lines for insertion into the mold. Particulate matter emissions from the sand heater is captured and vented to a fabric filter.

C) Green Sand Molding, Pouring, Cooling, and Shake-out

This process uses return sand from the shake-outs, new sand, bentonite clay, sea coal, and water to make molds used to shape the exterior of the casting. After mixing in the muller, the sand mixture is transferred to the molding machines and molded on the pattern. Patterns are coated with a heavy oil "release agent." The patterns are withdrawn to leave an impression of the shape on the casting. Cores are then set to produce the internal shape of the casting. A conveyor transports the mold to the pouring area where the mold is closed and molten metal is poured into the molds.

As the molten metal solidifies in the molds, the molds are routed through a set of cooling tunnels. The castings are separated from the sand via an initial shake-out process. The castings then pass through another set of cooling tunnels to the final shake-out process. The shake-out process emissions are included from the initial shake-out to the final shake-out processes. Sand separated by the shake-outs is processed through screens, cooled, and is recycled to the muller. Castings are routed to the finishing and cleaning area. Particulate matter emissions from the screens, sand mullers, pouring, cooling tunnels, and shake-out are controlled by baghouse dust collection systems. The baghouse manufacturers guarantee 0.0035 to 0.0045 gr/DSCF.

D) Finishing

The metal finishing process removes sand, prepares the casting surface, and includes quality inspection. Despruing, shotblasting, and grinding are all performed in this area. Despruing removes sprues, gates, and risers with casting handling manipulators. Particulate matter is controlled with a dry collection system that has a manufacturer's emission guarantee of 0.0045 grains/DSCF.

E) Coating

Finished castings are coated based on product requirements. Castings are sent to an asphaltic dip coating system. The asphaltic dip contains up to 0.6 pounds VOC per gallon.

SECTION III. PSD REVIEW

The facility is a major source under Prevention of Significant Deterioration (PSD) criteria. The recent construction permit section reopened PSD review. Permit No. 2007-213-TVR (M-3) authorized emissions of 58.41 TPY of PM_{10}, 29.83 TPY of NOx, 509.91 TPY of CO, 223.35 TPY of VOC, 2.18 TPY of SO_2, and 0.03 TPY of lead (Pb). NOx emissions of 34.22 TPY and CO emissions of 781.91 TPY will now be authorized.

The facility was subject to PSD because the potential emissions of carbon monoxide (CO) and volatile organic compounds (VOC) are greater than 100 tons per year for a facility classified as a PSD named source category. Full PSD review was required for those pollutants whose significance level is exceeded as shown in the following table. Full PSD review of emissions consists of the following: a determination of best available control technology (BACT); an evaluation of existing air quality and determination of monitoring requirements; an evaluation of PSD increment consumption; an analysis of compliance with National Ambient Air Quality Standards (NAAQS); an evaluation of source-related impacts on growth, soils, vegetation, visibility; and a Class I area impact evaluation.

Pollutants added in minor quantities were evaluated for all pollutant-specific rules, regulations and guidelines.

The following table presents the facility emissions compared to PSD levels of significance. References used in determining the emission rates for each emission unit are also tabulated.

EMISSIONS INCREASES COMPARED TO PSD LEVELS OF SIGNIFICANCE

Pollutant	Current Permit Total Emissions TPY	This Permit Total Emissions TPY	Emissions Changes, TPY	PSD Levels of Significance, TPY	PSD Review Required?
PM_{10}	58.42	58.34	-0.08	15	No
CO	509.91	781.91	272.0	100	Yes
VOC	223.35	223.27	-0.08	40	No
NOx	29.83	34.22	4.39	40	No
SO_2	2.18	2.11	-0.07	40	No
Pb	0.03	0.03	0	0.6	No

EMISSION FACTOR REFERENCES

Emission Unit	Pollutant	Emission Factor Source
Charge Handling	PM_{10}	Manufacturer Guarantee, Ohio RACM Guide, Gutow article (Modern Castings, 1972)
EIF Melting	PM_{10}, SO_2, NO_x, Pb	FIRE: 6.25, SCC 3-04-003-03, CERP data and baghouse manufacturer guarantee
	CO, VOC	Stack testing at EJIW – Ardmore Foundry, Inc
EIF Melting HAPs	HAPs	"Foundry Process Emission Factors: Baseline Emissions from Automotive Foundries in Mexico" (CERP data)
Inoculation	PM_{10}, VOC	FIRE: 6.25, SCC 3-04-003-10 & 22
Ladle Heating Torches	All	AP-42 (9/98), Table 1.4-1 through 4
Pouring & Cooling Pouring HAPs	PM_{10}	Manufacturer guarantee, stack testing at foundry in Ohio
	SO_2	FIRE: 6.25, SCC 3-04-003-20
	VOC, CO	Stack testing at EJIW – Ardmore Foundry, Inc
	NOx	Stack testing in 2010
	Pb	CERP data
	HAPs	CERP data
Cooling HAPs	HAPs	CERP data

EMISSION FACTOR REFERENCES
Continued

Emission Unit	Pollutant	Emission Factor Source
Shake-out	PM_{10}	FIRE: 6.25, SCC 3-04-003-31 and baghouse manufacturer guarantee
	VOC, CO	Stack testing at EJIW – Ardmore Foundry, Inc
	Pb	CERP data
Shake-out HAPs	HAPs	CERP data and baghouse manufacturer guarantee
Grinding	PM_{10}	FIRE: 6.25, SCC 3-04-003-60 and baghouse manufacturer guarantee
Sand Handling and Storage	PM_{10}	FIRE: 6.25, SCC 3-04-003-50 and baghouse manufacturer guarantee
Mold Making	PM_{10}	Ohio RACM Guide
Shell Coremaking	PM_{10}	Ohio RACM Guide
	VOC, HAPs	Mass Balances
Shell Core NG Emissions	All, HAPs	AP-42 (9/98), Table 1.4-1 through 4
PUCB Coremaking	PM_{10}	Ohio RACM Guide
	VOC	Mass Balances
Pattern & Maintenance Shop	PM_{10}	"Inventory of Iron Foundry Emissions", Modern Castings, 1971, Gutow, Bernard S. and baghouse manufacturer guarantee
Mold and Core Chemicals	VOC	Mass Balances
Coating	VOC	Mass Balances
Building and Ducting Heaters	All	AP-42 (9/98), Table 1.4-1 through 4
Core Oven	All	AP-42 (9/98), Table 1.4-1 through 4
Road Dust	PM_{10}	AP-42 (10/97), Section 13.2.1
Emergency generators	All	AP-42 (10/96), Section 3.3
Coating Heater	All	AP-42 (9/98), Table 1.4-1 through 4
Waste Handling Baghouse	PM_{10}	19,340 ACFM and baghouse manufacturer guarantee

SECTION IV. EQUIPMENT

EUG "MS"

EU ID#	Point ID#	EU Name/Model	Construction Date
CH-1	MS01, MS02	Charge handling	2001
CH-1	CH1, CH2, CH3, CH4	Charge handling fugitives	2001
EIF-1	MS01, MS02, R13, R14	Electric induction melt furnace	2001
EIF-2		Electric induction melt furnace	2001
EIF-3		Electric induction melt furnace	2001
EIF-1 EIF-2 EIF-3	EF-16B, R13, R14, EF-22, EF-23, EF-24	Electric induction furnace fugitives	2001
I-1	EF-16B, R13, R14, EF-22, EF-23, EF-24	Inoculation ladle	2001
I-1	MS01, MS02	Ladle repair	2001

EUG "NG"

EU ID#	Point ID#	EU Name/Model	Construction Date
T-1	R13, R14, EF-16B, EF-22, EF-23, EF-24	Preheater torches for inoculation and transfer ladles – 10 MMBTUH	2001
SHELLHE	SHELLHE, R1, R2	Core machines – two 0.5 MMBTUH units	2001
CO-1	SHELLHE, R1, R2	2.5 MMBTUH oven	2001
MUA	MUA1	Building air & miscellaneous units (45 MMBTUH total)	2001
	MUA2	Building air & miscellaneous units	2001
	MUA3	Building air & miscellaneous units	2001
	MUA4	Building air & miscellaneous units	2001
	MUA5	Building air & miscellaneous units	2001
	MUA6	Building air & miscellaneous units	2001
	MUA7	Building air & miscellaneous units	2001
	MUA8	Building air & miscellaneous units	2001
	MUA9	Building air & miscellaneous units	2001
	MUA10	Building air & miscellaneous units	2001
	DIP-2	Coating Post-Heater	2003

EUG "P"			
EU ID#	**Point ID#**	**EU Name/Model**	**Construction Date**
PM-2	MS01, MS02, SS01	Pouring & mold cooling	2001
PM-2	R1, R2, R3, R4, R5, R6, R7	Pouring & mold cooling fugitives	2001
SO-1	SS01, SS03, R1, R2, R3, R4, R5, R6, R7	Shake-out – punchout	2001
SO-2		Shake-out – mold dump conveyor	2001
SO-3		Shake-out – primary shake-out	2001
SO-4		Shake-out – cooling conveyor	2001
SO-5		Shake-out – secondary shake-out	2001
SO-1 – SO-5	R1, R2, R3, R4, R5, R6, R7	Shake-out fugitives	2001

EUG "F"			
EU ID#	**Point ID#**	**EU Name/Model**	**Construction Date**
CC-1	SS01, SS03	Casting Cooling	2001
SB-1	GS01	Shotblasting – continuous shotblast cabinet	2001
SB-1	R8, R9, R10, R11, R12, EF-13	Shotblasting fugitives	2001
GR-1	GS01	Grinding – autogrinder 1	2001
GR-2		Grinding – autogrinder 2	2001
GR-3		Grinding – manual grinder 1	2001
GR-4		Grinding – manual grinder 2	2001
GR-5		Grinding – manual grinder 3	2001
GR-6		Grinding – manual grinder 4	2001
GR-7		Grinding – manual grinder 5	2001
GR-8		Grinding – manual grinder 6	2001
GR-9		Grinding – manual grinder 7	2001
GR-10		Grinding – manual grinder 8	2001
GR-1 to GR-6	R4, R5, R6, R7	Grinding fugitives	2001
WHBH	R9, R10	Waste handling	2005

EUG "C"

EU ID#	Point ID#	EU Name/Model	Construction Date
SHELL1	R1, R2	Shell core machine #1	2001
SHELL2	R1, R2	Shell core machine #2	2001
PUCB1	COREBH, R1, R2	PUCB core machine #1	2001
PUCB2	COREBH, R1, R2	PUCB core machine #2	2001

EUG "SS"

EU ID#	Point ID#	EU Name/Model	Construction Date
MOLD1	SS01, SS02, SS03, SS04, MS01, MS02	HWS mold making machine - 300 ton/hr sand	2001
SAND1		Sand handling & storage – return sand conveyor	2001
SAND2		Sand handling & storage – overbelt magnet	2001
SAND3		Sand handling & storage – metallics conveyor	2001
SAND4		Sand handling & storage – crusher sand conveyor	2001
SAND5		Sand handling & storage – return sand conveyor	2001
SAND6		Sand handling & storage – return sand belt	2001
SAND7		Sand handling & storage –transfer conveyor	2001
SAND8		Sand handling & storage – screen inlet belt	2001
SAND9		Sand handling & storage – screen	2001
SAND10		Sand handling & storage – 275 ton surge bin	2001
SAND11		Sand handling & storage – cooler inlet conveyor	2001
SAND12		Sand handling & storage – 150 ton new sand bin	2001
SAND13		Sand handling & storage – cooler	2001
SAND14		Sand handling & storage – bucket elevator	2001
SAND15		Sand handling & storage – plow belt	2001
SAND16		Sand handling & storage – 300 ton sand bin #1	2001
SAND17		Sand handling & storage – 300 ton sand bin #2	2001
SAND18		Sand handling & storage – Mullor weight feeder #1	2001
SAND19		Sand handling & storage - Mullor weight feeder #1	2001
SAND20		Sand handling & storage – Mullor #1	2001
SAND21		Sand handling & storage – Mullor #2	2001
SAND22		Sand handling & storage – mold machine hopper	2001
SAND23		Sand handling & storage – bad batch surge hopper	2001
--	R1, R2, R3, R4, R5, R6, R7, R16	Sand handling & molding fugitives	2001

EUG "MCRC"

EU ID#	Point ID#	EU Name/Model	Construction Date
CHEM1	R1, R2	Mold and core room chemicals	2001

EUG "D"

EU ID#	Point ID#	EU Name/Model	Construction Date
DIP1	EF-34	Asphaltic dip coating	2001

EUG "HR"

EU ID#	Point ID#	EU Name/Model	Construction Date
ROAD1	fugitive	Haul roads	2001

EUG "S"

EU ID#	Point ID#	EU Name/Model	Construction Date
SHOP1	R1, R2 EF-21	Pattern & Maintenance shops	2001

EUG "EG"

EU ID#	Point ID#	EU Name/Model	Construction Date
EG-1	EG-1	250 kW (350 HP) emergency generator	2001
EG-2	EG-2	400 kW (550 HP) emergency generator	2001

EUG "Facility"

EU ID#	Point ID#	EU Name/Model	Construction Date
None	None	Facility	2001

SECTION V. EMISSIONS

EUG "MS"

Point ID	Emission Unit	PM_{10}		SO_2		NO_x		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
MS01 MS02	Charge handling	0.420	1.183	--	--	--	--	--	--	--	--
CH1 CH2 CH3 CH4	Charge handling fugitives	0.931	2.619	--	--	--	--	--	--	--	--
MS01 MS02 R13 R14	EIF melting	1.176	3.313	--	--	--	--	0.950	2.673	10.432	29.340
EF-16B R13 R14 EF-22 EF-23 EF-24	EIF melting fugitives	0.138	0.387	--	--	--	--	0.010	0.027	0.105	0.296
EF-16B R13 R14 EF-22 EF-23 EF-24	Inoculation (all fugitive)	0.960	2.700	--	--	--	--	0.160	0.450	--	--
MS01 MS02	Ladle repair	0.180	0.507	--	--	--	--	--	--	--	--
	TOTALS	**3.805**	**10.709**	**0**	**0**	**0**	**0**	**1.12**	**3.15**	**10.537**	**29.636**

EUG "NG"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
R13 R14 EF-16B EF-22 EF-23 EF-24	I & T Ladle torches – 10 MMBTUH	0.080	0.210	0.006	0.017	1.000	2.820	0.060	0.150	0.840	2.370
SHELLHE R1, R2	two shell core machines – 0.5 MMBTUH apiece	0.010	0.021	0.001	0.002	0.100	0.282	0.010	0.016	0.080	0.237
SHELLHE R1, R2	core oven – 2.5 MMBTUH	0.020	0.083	0.002	0.007	0.250	1.095	0.010	0.060	0.210	0.920
MUA1-MUA10	miscellaneous heaters – total 45 MMBTUH	0.342	1.498	0.027	0.118	4.500	19.710	0.248	1.084	3.780	16.556
DIP-2	Coating Post Heater – 3.5 MMBTUH	0.030	0.116	0.002	0.009	0.350	1.533	0.020	0.084	0.290	1.288
	TOTALS	**0.482**	**1.928**	**0.038**	**0.153**	**6.200**	**25.440**	**0.348**	**1.394**	**5.200**	**21.371**

EUG "P"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
MS01 MS02 SS01	Pouring & mold cooling	2.434	6.859	0.622	1.750	2.129	5.989	38.838	109.233	203.008	570.960
R1 R2 R3 R4 R5 R6 R7	Pouring & mold cooling fugitives	0.184	0.517	0.018	0.050	0.061	0.173	0.874	2.457	5.741	16.145
SS01 SS03	Shake-out	1.856	5.228	--	--	0.063	0.178	16.727	47.045	50.432	141.840
R1 R2 R3 R4 R5 R6 R7	Shake-out fugitives	0.358	1.008	--	--	0.001	0.002	0.169	0.475	0.509	1.433
	TOTALS	**4.832**	**13.612**	**0.640**	**1.800**	**2.254**	**6.342**	**56.608**	**159.21**	**259.69**	**730.378**

EUG "F"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
SS01 SS03	Casting cooling	1.251	3.526	--	--	--	--	--	--	--	--
GS01	Shotblasting	1.234	3.478	--	--	--	--	--	--	--	--
R8 R9 R10 R11 R12 EF-13	Shotblasting fugitives	0.027	0.077	--	--	--	--	--	--	--	--
GS01	Grinding	2.816	7.933	--	--	--	--	--	--	--	--
R4 R5 R6 R7	Grinding fugitives	0.004	0.010	--	--	--	--	--	--	--	--
R9 R10	Waste handling	0.373	1.051	--	--	--	--	--	--	--	--
	TOTALS	**5.705**	**16.075**	--	--	--	--	--	--	--	--

EUG "SS"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
SS01 SS02 SS03 SS04 MS01 MS02	Sand handling & molding	5.169	14.562	--	--	--	--	--	--	--	--
R1 R2 R3 R4 R5 R6 R7 R16A	Sand handling & molding fugitives	0.130	0.364	--	--	--	--	--	--	--	--
	TOTALS	**5.299**	**14.926**	--	--	--	--	--	--	--	--

EUG "C"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
R1 R2	Shell core machine #1 Shell core machine #2	0.084	0.131	--	--	--	--	1.82	2.85	--	--
COREBH	PUCB core machine #1 PUCB core machine #2	0.164	0.064	--	--	--	--	8.68	3.40	--	--
R1 R2	PUCB core machine fugitives	0.042	0.016	--	--	--	--	--	--	--	--
	TOTALS	**0.290**	**0.211**	--	--	--	--	**10.500**	**6.25**	--	--

EUG "MCRC"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
R1 R2	Mold and core room chemicals	--	--	--	--	--	--	11.61	32.71	--	--

EUG "D"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
EF-34	Asphaltic dip coating	--	--	--	--	--	--	10.34	20.36	--	--

EUG "S"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
R1, R2 EF-21	Pattern & maintenance shop + fugitives	0.130	0.367	--	--	--	--	--	--	--	--

EUG "HR"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
fugitive	Haul roads	0.002	0.008	--	--	--	--	--	--	--	--

EUG "EG"

Point ID	Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
EG-1	350 HP generator	0.265	0.066	0.247	0.062	3.763	0.941	0.307	0.077	0.811	0.203
EG-2	550 HP generator	0.423	0.106	0.396	0.099	6.021	1.505	0.491	0.123	1.297	0.324
	TOTALS	**1.980**	**0.247**	**1.846**	**0.231**	**27.900**	**3.487**	**2.224**	**0.278**	**6.012**	**0.751**

HAZARDOUS AIR POLLUTANTS

HAP	C A S	lb/hr	TPY
Antimony	7440360	0.00011	0.00043
Arsenic	7440382	0.00004	0.00015
Cadmium	7440439	0.00019	0.00076
Chromium (III)	7440473	0.00398	0.01593
Cobalt	7440484	0.01734	0.06937
Lead	7439921	0.00804	0.03215
Manganese	7439965b	0.01593	0.06370
Mercury	7439976	0.00002	0.00007
Nickel	7440020	0.00367	0.01050
Selenium	7782492	0.00006	0.00016
2-Methylnaphthalene	91576	0.00000	0.00001
3-Methylchloranthrene	56495	0.00000	0.00000
Acetaldehyde	75070	1.40666	5.62662
Acetophenone	98862	0.03560	0.14238
Benz(a)anthracene	56553	0.00000	0.00000
Benzene	71422	1.70068	6.80325
Cumene	98828	0.01322	0.05286
Dichlorobenzene	25321226	0.00008	0.00031
Dibenzofurans	132649	0.00873	0.03491
Ethyl benzene	100414	0.12123	0.48492
Formaldehyde	50000	0.72397	2.89652
Hexane	110543	0.11447	0.45787
Napthalene	91203	0.28646	1.14588
o-Cresol	95487	0.34912	1.39649
Phenol	108952	1.13475	4.53900
POM	--	0.71190	2.84760
Styrene	100425	0.12867	0.51469
Toluene	108883	1.08067	4.32289
Xylenes	1330207	1.14705	4.58836
TOTALS		**9.16773**	**36.67092**

SUMMARY OF CRITERIA EMISSIONS BY UNIT

Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Charge handling	0.420	1.183	--	--	--	--	--	--	--	--
Charge handling fugitives	0.931	2.619	--	--	--	--	--	--	--	--
EIF melting	1.176	3.313	--	--	--	--	0.950	2.673	10.432	29.340
EIF melting fugitives	0.138	0.387	--	--	--	--	0.010	0.027	0.105	0.296
Inoculation (all fugitive)	0.960	2.700	--	--	--	--	0.160	0.450	--	--
I & T Ladle torches – 10 MMBTUH	0.080	0.210	0.006	0.017	1.000	2.820	0.060	0.150	0.840	2.370
Ladle repair	0.180	0.507	--	--	--	--	--	--	--	--
Two shell core machine – 0.5 MMBTUH apiece	0.010	0.021	0.001	0.002	0.100	0.282	0.010	0.0160	0.080	0.237
Core oven – 2.5 MMBTUH	0.020	0.083	0.002	0.007	0.250	1.095	0.010	0.060	0.210	0.920
Miscellaneous heaters – total 45 MMBTUH	0.342	1.498	0.027	0.118	4.500	19.71	0.248	1.084	3.780	16.556
Pouring & mold cooling	2.434	6.859	0.622	1.750	2.129	5.989	38.838	109.233	203.008	570.960
Pouring & mold cooling fugitives	0.184	0.517	0.018	0.050	0.061	0.173	0.874	2.457	5.741	16.145
Shake-out	1.856	5.228	--	--	0.063	0.178	16.727	47.045	50.432	141.840
Shake-out fugitives	0.358	1.008	--	--	0.001	0.002	0.169	0.475	0.509	1.433
Casting cooling	1.251	3.526	--	--	--	--	--	--	--	--
Shotblasting	1.234	3.478	--	--	--	--	--	--	--	--
Shotblasting fugitives	0.027	0.077	--	--	--	--	--	--	--	--

SUMMARY OF CRITERIA EMISSIONS BY UNIT - Continued

Emission Unit	PM_{10}		SO_2		NOx		VOC		CO	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Grinding	2.816	7.933	--	--	--	--	--	--	--	--
Grinding fugitives	0.004	0.010	--	--	--	--	--	--	--	--
Sand handling & molding	5.169	14.562	--	--	--	--	--	--	--	--
Sand handling & molding fugitives	0.130	0.364	--	--	--	--	--	--	--	--
Shell core machine #1 Shell core machine #2	0.084	0.131	--	--	--	--	1.82	2.85	--	--
PUCB core machine #1 PUCB core machine #2	0.164	0.064	--	--	--	--	8.68	3.40	--	--
PUCB core machine fugitives	0.042	0.016	--	--	--	--	--	--	--	--
Mold and core room chemicals	--	--	--	--	--	--	11.61	32.71	--	--
Asphaltic dip coating	--	--	--	--	--	--	10.34	20.36	--	--
Pattern & maintenance shop + fugitives	0.130	0.367	--	--	--	--	--	--	--	--
Haul roads	0.002	0.008	--	--	--	--	--	--	--	--
350 HP generator	0.265	0.066	0.247	0.062	3.763	0.941	0.307	0.077	0.811	0.203
550 HP generator	0.423	0.106	0.396	0.099	6.021	1.505	0.491	0.123	1.297	0.324
Coating Heater – 3.5 MMBTUH	0.027	0.117	0.002	0.009	0.350	1.533	0.019	0.084	0.294	1.288
Waste sand dust handling	0.373	1.051	--	--	--	--	--	--	--	--
TOTALS	**20.48**	**58.34**	**1.32**	**2.11**	**18.24**	**34.22**	**91.32**	**223.27**	**277.54**	**781.91**
PREVIOUS PERMIT	**21.77**	**58.42**	**2.53**	**2.18**	**34.42**	**29.83**	**92.75**	**223.35**	**184.51**	**509.91**
NET CHANGES	**-1.29**	**-0.08**	**-1.21**	**-0.07**	**-16.18**	**4.39**	**-1.43**	**-0.08**	**93.03**	**272.00**

SUMMARY OF EMISSIONS BY DISCHARGE POINT

Discharge Point	PM_{10}		SO_2		NOx		VOC		CO	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
SSO1	2.994	8.803	0.207	0.583	0.710	1.996	20.238	56.920	48.000	135.000
SSO2	2.366	6.955	--	--	--	--	--	--	--	--
SSO3	2.004	5.893	--	--	0.063	0.178	5.687	15.995	7.232	20.340
SSO4	1.314	3.864	--	--	--	--	--	--	--	--
MSO1	1.699	4.955	0.207	0.583	0.710	1.996	15.295	43.017	104.320	293.400
MSO2	1.699	4.955	0.207	0.583	0.710	1.996	15.295	43.017	104.320	293.400
GSO1	3.881	11.411	--	--	--	--	--	--	--	--
R1	0.204	0.512	0.004	0.011	0.184	0.713	11.217	19.936	1.040	3.089
R2	0.204	0.512	0.004	0.011	0.184	0.713	11.217	19.936	1.040	3.089
R3	0.090	0.263	0.003	0.007	0.009	0.025	0.149	0.419	0.893	2.511
R4	0.091	0.266	0.003	0.007	0.009	0.025	0.149	0.419	0.893	2.511
R5	0.091	0.266	0.003	0.007	0.009	0.025	0.149	0.419	0.893	2.511
R6	0.091	0.266	0.003	0.007	0.009	0.025	0.149	0.419	0.893	2.511
R7	0.091	0.266	0.003	0.007	0.009	0.025	0.149	0.419	0.893	2.511
R8	0.004	0.013	--	--	--	--	--	--	--	--
R9	0.183	0.538	--	--	--	--	--	--	--	--
R10	0.183	0.538	--	--	--	--	--	--	--	--
R11	0.004	0.013	--	--	--	--	--	--	--	--
R12	0.004	0.013	--	--	--	--	--	--	--	--
EF-13	0.004	0.013	--	--	--	--	--	--	--	--
R13	0.187	0.550	0.001	0.003	0.167	0.470	0.037	0.105	0.158	0.444
R14	0.187	0.550	0.001	0.003	0.167	0.470	0.037	0.105	0.158	0.444
EF-16B	0.187	0.550	0.001	0.003	0.167	0.470	0.037	0.105	0.158	0.444
R16	0.016	0.046	--	--	--	--	--	--	--	--
EF-21	0.042	0.122	--	--	--	--	--	--	--	--
EF-22	0.187	0.550	0.001	0.003	0.167	0.470	0.037	0.105	0.158	0.444
EF-23	0.187	0.550	0.001	0.003	0.167	0.470	0.037	0.105	0.158	0.444
EF-24	0.187	0.550	0.001	0.003	0.167	0.470	0.037	0.105	0.158	0.444
COREBH	0.158	0.064	--	--	--	--	--	--	--	--
MUA1 – 10	0.328	1.498	0.027	0.118	4.500	19.710	0.248	1.084	3.780	16.556
CH1	0.201	0.589	--	--	--	--	--	--	--	--
CH2	0.201	0.589	--	--	--	--	--	--	--	--
CH3	0.201	0.589	--	--	--	--	--	--	--	--
CH4	0.201	0.589	--	--	--	--	--	--	--	--
CHF	0.089	0.262	--	--	--	--	--	--	--	--
ROAD	0.002	0.008	--	--	--	--	--	--	--	--
COATING	--	--	--	--	--	--	10.339	20.355	--	--
EG-1	0.265	0.066	0.247	0.062	3.763	0.941	0.307	0.077	0.811	0.203
EG-2	0.423	0.106	0.396	0.099	6.021	1.505	0.491	0.123	1.297	0.324
DIP-2	0.025	0.117	0.002	0.009	0.350	1.533	0.019	0.084	0.294	1.288
TOTAL	**20.475**	**58.34**	**1.322**	**2.112**	**18.242**	**34.226**	**91.320**	**223.269**	**277.547**	**781.908**

STACK PARAMETERS

Stack ID	Process	Height, Feet	Diameter, Inches	Flowrate, ACFM	Temperature, °F
CH1	charge handling	75	96	80,000	70
CH2	charge handling	75	96	80,000	70
CH3	charge handling	75	96	80,000	70
CH4	charge handling	75	96	80,000	70
COREBH	PUCB coremaking	65	11	2,000	70
GS01	shotblasting grinding	135	74	105,000	77
MS01	charge handling EIF melting pouring & mold cooling sand handling & molding ladle repair	130	58	59,306	100
MS02	charge handling EIF melting pouring & mold cooling sand handling & molding ladle repair	130	58	59,306	95
SS01	pouring & mold cooling shake-out casting cooling sand handling & molding	135	68	80,701	110
SS02	sand handling & molding	135	58	64,224	92
SS03	shake-out casting cooling sand handling & molding	135	58	61,439	110
SS04	sand handling & molding	135	46	40,000	110
R1	pouring & mold cooling fugitives shake-out fugitives sand handling & molding fugitives shell coremaking core oven fugitives PUCB coremaking fugitives mold & core room chemicals pattern & maintenance shop fugitives	60	32	10,000	80

STACK PARAMETERS - Continued

Stack ID	Process	Height, Feet	Diameter, Inches	Flowrate, ACFM	Temperature, °F
R2	pouring & mold cooling fugitives shake-out fugitives sand handling & molding fugitives shell coremaking core oven fugitivesPUCB coremaking fugitives mold & core room chemicals pattern & maintenance shop fugitives	60	32	10,000	80
R3	pouring & mold cooling fugitives shake-out fugitives sand handling & molding fugitives	60	32	10,000	80
R4	pouring & mold cooling fugitives shake-out fugitives sand handling & molding fugitives grinding fugitives	60	32	10,000	80
R5	pouring & mold cooling fugitives shake-out fugitives sand handling & molding fugitives grinding fugitives	60	32	10,000	80
R6	pouring & mold cooling fugitives shake-out fugitives sand handling & molding fugitives grinding fugitives dip coating	60	32	10,000	80
R7	pouring & mold cooling fugitives shake-out fugitives sand handling & molding fugitives grinding fugitives	60	32	10,000	80
R8	shotblast fugitives	57	62	45,000	150
R9	shotblast fugitives waste handling	57	62	45,000	150
R10	shotblast fugitives waste handling	57	62	45,000	150
R11	shotblast fugitives	57	62	45,000	150
R12	shotblast fugitives	57	62	45,000	150
R13	shotblast fugitives	74	32	10,000	80

STACK PARAMETERS - Continued

Stack ID	Process	Height, Feet	Diameter, Inches	Flowrate, ACFM	Temperature, °F
SHELLHE	shell coremaking core oven	54.5	15	3,000	170
EF-15	EIF melting inoculation I & T ladle torches	74	32	9,917	81
EF-16A	EIF melting inoculation I & T ladle torches sand handling & molding fugitives	74	32	9,917	81
EF-16B	EIF melting inoculation I & T ladle torches	74	32	9,917	81
EF-21	pattern & maintenance shops	20	45	13,000	80
EF-34	dip coating	29	57	20,000	80
MUA-1 through MUA-10	heaters	32 – 104'	3	—	171
EF-22	EIF melting inoculation I & T ladle torches	68	50	25,200	80
EF-23	EIF melting inoculation I & T ladle torches	68	50	25,200	80
EF-24	EIF melting inoculation I & T ladle torches	54	50	25,200	80

SECTION VI. INSIGNIFICANT ACTIVITIES

Insignificant activities are listed in OAC 252:100-8, Appendix I. Insignificant activities identified and justified in the application are listed below.

- * Stationary reciprocating engines burning natural gas, gasoline, aircraft fuels, or diesel fuel which are either used exclusively for emergency power generation or for peaking power service not exceeding 500 hours/year. The facility includes two diesel-engine powered emergency generators rated at 400 kW and a 250 kW, respectively. Upon the compliance date of changes to NESHAP Subpart ZZZZ, these engines will cease to be "insignificant activities."

- Space heaters, boilers, process heaters and emergency flares less than or equal to 5 MMBTU/hr heat input (commercial natural gas). The facility includes numerous gas-fired heaters which are smaller than 5 MMBTUH.