OECA – Air Enforcement Division
INSPECTION REPORT

Inspection Date(s):	05/09/2022	
Media Program:	Air	
Regulatory Program(s)	Title V	
Company Name:	**Amsted Rail**	
Facility Name:	**Amsted Rail Kansas City**	
Facility Physical Location:	7111 GRIFFIN RD	
(city, state, zip code)	KANSAS CITY, KS 66111	
Mailing address:	7111 GRIFFIN RD	
(city, state, zip code)	KANSAS CITY, KS 66111	
County/Parish:	Wyandotte County	
Facility Phone Number	913-299-2223 ext. 10209	
Facility Contact:	Joel Coast	Environmental Engineer
	jcoast@amstedrail.com	
FRS Number:	110000445518	
Identification/Permit Number:	2090009/ O-12592	
Media Identifier Number:	KS0000002020900009	
NAICS:	331513	
SIC:	3325	
Personnel participating in inspection:		
Nicholas Bobbs	EPA/OECA	CAA Inspector
Luke Rodriguez	EPA/Region 7	CAA Inspector
Ryan Bowles	Wyandotte County	CAA Inspector
Joel Coast	Amsted Rail	Environmental Engineer
Paul Sheppard	Amsted Rail	Environmental Manager
Denise Dare	Amsted Rail	HR Manager
John Powell	Amsted Rail	Plant Manager
Eric Young	Amsted Rail	Operations Manager
EPA Lead Inspector Signature/Date	NICHOLAS BOBBS Digitally signed by NICHOLAS BOBBS Date: 2023.05.01 18:16:33 -05'00'	5/1/23
	{Inspector name}	Date
Supervisor Signature/Date	GREGORY FRIED Digitally signed by GREGORY FRIED Date: 2023.05.11 10:22:07 -04'00'	
	{Supervisor name}	Date

Section I – INTRODUCTION

PURPOSE OF THE INSPECTION

EPA inspectors Nicholas Bobbs and Luke Rodriguez and Wyandotte County inspector Ryan Bowles arrived at the Amsted Rail Kansas City at 8:30 AM on 05/09/2022 for an unannounced inspection. We met with Joel Coast, Environmental Engineer, John Powell, Plant Manager, and Denise Dare, HR Manager. I presented my credentials to Mr. Coast and informed him that this was an EPA inspection to determine compliance with the facility's Title V Air Permit and the Clean Air Act. The scope of the inspection is a partial compliance evaluation (PCE).

FACILITY DESCRIPTION

Amsted Rail operates a steel foundry in Kansas City, KS which manufacturers railcar wheels. The facility has approximately 170 employees and operates approximately 6,000 hours per year. The facility operates 24 hours per day for approximately 5 days per week.

Section II – OBSERVATIONS

Facility Tour

We toured the facility while accompanied by Mr. Coast and Mrs. Dare.

Melting Area

The facility operates two 20-ton electric arc furnaces ("EAF"). Steel scrap is moved by crane into either of the EAFs. Mr. Coast told me that the melting process consists of multiple steps; charging (adding scrap to the EAF), melting, (which includes the addition of oxygen and lime) and tapping (removing molten steel from the EAF). A ladle transfers the molten steel from the furnace to the molding area. Slag is removed from the EAFs and the ladle.

During the inspection we observed the tapping and charging of EAF #2. I observed significant uncaptured PM emissions from the EAF #2 within the melting building during charging and tapping. The EAFs both have a capture system connected to the lid of the EAF which pulls negative pressure and sends to the baghouse. This capture system is known as a side draft hood. During the charging and tapping of an EAF, the lid is raised, and the capture system disconnects and no longer captures the particulate matter ("PM") emissions from the EAF. (AOC 1) The EAFs also use a push-pull capture system which consists of a positive pressure duct which pushes air away from the door to the melt shop, and a negative pressure duct near the EAFs which pulls in air and sends it to the EAF baghouse. I observed that the negative pressure ducts were situated below the top of the EAFs and did not appear to be capturing PM emissions from the top of the EAFs during charging and tapping. (Photos 6 and 7)

Molding Area

Mr. Coast explained the molding process: The ladle containing molten steel is covered and pressurized, and the steel is forced up into the graphite mold. The graphite mold consists of two parts: the cope, the top part of the mold, and the drag, the bottom part of the mold. The mold is sprayed with fused silica (fine sand and water) before the molten steel is added. The cope section of the mold also contains columns called "risers" which allow the steel to overfill up the riser, then settle back down leaving a stub on the wheel which is cut off. Sand mixed with resin is baked into the risers to form "cores", which decreases the diameter of the risers and the resulting stubs.

We toured the different process elements of the molding and finishing areas, including the mold filling, cope and drag separation, riser knockout, hot wheel grinder, hub cutter, wheel peening, apex grinder, and cope and drag spray booths. We observed the baghouses and baghouse pressure monitors for the hot wheel grinder and hub cutter. We also observed the baghouse and baghouse pressure monitor for the apex grinder, wheel cleaner, wheel peener, and chamfer grinder.

Mold Machining Shop

The facility makes 26 in., 33 in., and 36 in. wheels. The molds for each of these three sizes of wheels are made and maintained in the mold machining shop. The mold machining shop contains 2 "King" mills and 1 "Amera-Seiki" mill. The Amera-Seiki is a computerized mill and the King mills are traditional mills. PM emissions from the mills are controlled via a capture system that leads to a baghouse. The King mills share a baghouse, while the Amera-Seiki mill vents to its own baghouse.

Method 9 Observation

Mr. Rodriguez performed a Method 9 opacity observation of emissions from the melt shop roof exhaust. See Appendix 2 for the Method 9 report.

Records Review

Mr. Rodriguez reviewed the facility's records required by the facility's Title V permit Compliance Assurance Monitoring ("CAM") plans for 2020 through 2022. The facility has CAM plans in their Title V permit for the Electric Arc Furnaces, Hot Wheel Grinders, Hub Cutters, Apex Grinder, Wheel Cleaner, Wheel Peener, Chamfer Grinder, and Graphite Mold Machining. Mr. Rodriguez did not identify any deviations from the CAM plans at the time of the inspection.

I reviewed the facility's wheel production records for 2020 and 2021 and confirmed that the facility was below it's annual permit limit of 520,125 wheels.

Electrical Arc Furnace Fugitive PM Emissions

The facility's two EAFs are subject to the NESHAP ZZZZZ total PM emission limit of 0.8 lbs of PM per ton of metal charged or 0.06 lbs of total metal HAP per ton of metal charged. These limits are located at 40 CFR 63.10895(c)(1) and incorporated into the facility's Title V operating permit in permit section L(2)(b).

The total PM emission limit includes both emissions from the EAF baghouse and fugitive emissions from the EAF which are not captured and sent to the baghouse.

I reviewed the facility's emission calculations for the fugitive PM emissions from the facility's EAFs. The facility uses a control efficiency of 98.6% for the EAF baghouse, which was determined during the facility's most recent stack test of the EAF baghouse. The facility determines the uncontrolled PM emission rate going to the baghouse based off the control efficiency and emission factors from their most recent stack test. The fugitive PM EAF emissions are the PM emissions not captured by the EAF side draft hood capture system or the push-pull capture system, and therefore not sent to the EAF baghouse. The percentage of PM captured by these capture systems is the "EAF capture efficiency". The facility then calculates the total PM generated by the EAFs by dividing the uncontrolled PM emissions by the EAF capture efficiency. Finally, the total PM generated by the EAFs is multiplied by one minus the EAF capture efficiency to determine the fugitive PM emissions from the EAFs.

The EAF capture efficiency used by the facility is 97%. I asked Mr. Coast how this capture efficiency was determined. Mr. Coast said that the capture efficiency comes from the 1981 EPA document "Summary of Factors Affecting Compliance by Ferrous Foundries, Volume 1-Text Final Report". Table 5-1 of the 1981 document gives a range of emission capture efficiency from 90-100%, with a typical maximum of 99%. The facility did not have a specific explanation for why 97% was chosen from that range.

The EAF capture efficiency, which is pivotal to calculating the EAF fugitive PM emissions, does not appear to be based on any test data. Furthermore, the use of the 90-100% range is inappropriate for calculating the total fugitive PM emissions, as the side draft hood does not capture any significant PM emissions during charging or tapping. It is also unknown what capture efficiency the push-pull system has during charging and tapping but given the position of the push-pull system vents below the lid of the EAF, it is likely that their capture efficiency is low or insignificant. (AOC 1)

Phenol Emissions

I reviewed the facility's emissions inventory for 2020 and 2021 and reviewed how the facility calculates their phenol emissions. The 2020 and 2021 emissions inventories attribute most of the phenol emissions to the sand mixer (EU-27), and the rest of the phenol emissions to the core baking (EU-19). The facility also has a sand heater, but the sand heater is prior to where the resin is added to the sand. Mr. Coast told me emission factors for phenol emissions from the core baking and sand mixer come from the facility's 2006 PSD Air Permit. For the sand mixer phenol emissions, the facility reported 4.68 tons in 2020 and 4.85 tons in 2021. For the core baking phenol emissions, the facility reported 0.53 tons in 2020 and 0.58 tons in 2021.

The facility also calculates their monthly phenol emissions for compliance with section I of their Title V permit. Section I.1.a of the permit requires that the facility limit their HAP (Phenol) emissions to less than 7.4 tons during each consecutive twelve-month period from the sand mixer unit (EU-27). The permit does not have a specific phenol limit for the core baking unit.

For compliance with section I of their Title V permit, the facility tracks the amount of batches of resin-coated sand they make to create the cores for the molds on a monthly basis. Each batch of sand contains 20 lbs of resin. The resin used is Plastiflake 1118, a phenolic plastic resin, which contains 7% phenol by weight. (Photos 3 to 5) The facility provided me the SDS for Plastiflake 1118 (Appendix 3). The facility multiplies the number of batches of sand by the amount of resin used and phenol composition of the resin to determine the amount of phenol by weight entering the process. The facility then calculates the phenol emissions by multiplying by 50% to estimate the amount of the phenol that volatilizes into the atmosphere.

We reviewed the rolling 12-month phenol emissions calculated by the facility for the last 2 years and they were below the 7.4 ton limit. Using this method to determine phenol emissions from the sand mixer, they calculated 4.16 tons for 2020 and 4.54 tons for 2021. These numbers are slightly different than the sand mixer phenol emissions reported to the emissions inventories of 2020 and 2021. The facility personnel could not determine the reason for this difference during the inspection.

I asked Mr. Coast the basis for using a 50% volatilization rate in their phenol emission calculations, which is also referenced in section I of their permit. He provided a letter from the resin manufacturer from 1996 that said that about 50% of the phenol in the resin volatilizes. (Appendix 4) The facility and the vendor has never done testing of the resin coated sand in the facility's process to confirm that this 50% volatilization rate is accurate. (AOC 2)

I asked Mr. Coast about what happens to the phenol which does not volatilize during the sand mixing process. He said that the phenol either remains in the sand which falls out of the molds after the core baking station, or it remains in the mold as the sand core which is destroyed when it comes in contact with the molten steel. When we were in core baking station during the facility tour, I observed that sand falls from the cores in the cope molds and is collected using a conveyor belt below the molds. After the cores are baked into the mold, there is a device which flips the mold over, shaking loose any remaining baked or unbaked sand. Mr. Coast said that this device also removes the "button" which is heated to 650 – 700° F to bake the sand core during the core baking process.

During the facility tour, I detected a strong chemical odor near the core baking section of the plant. The odor was most intense when we were on a raised walkway directly above the cope molds after core baking station. I also observed that the cope molds do not immediately enter the steel pouring section after the sand core is baked. Rather, the molds enter a waiting section where there is a supply of molds ready to accept steel once the ladle is in place.

Section III – AREAS OF CONCERN

EPA inspectors Nicholas Bobbs and Luke Rodriguez and Wyandotte County inspector Ryan Bowles conducted a closing conference at Amsted Rail Kansas City at 4:15 pm on 5/9/22 for the inspection. During the closing conference, Inspector Bobbs reviewed the observations noted and documents collected during the inspection. Additionally, Areas of Concern (AOC) 1-2 were determined after the conclusion of the inspection and were not included in the closing conference.

AOC 1 – Improper capture efficiency used for calculating fugitive PM emissions from EAFs

As the side draft hoods for the EAFs does not capture PM emissions during charging and tapping of the furnaces, the 90-100% capture efficiency from table 5-1 of the 1981 EPA document "Summary of Factors Affecting Compliance by Ferrous Foundries, Volume 1-Text Final Report" is inappropriate to use for calculation of fugitive PM emissions from all EAF operations, including charging and tapping. This incorrect capture efficiency could mean that fugitive PM emissions from the EAFs are being underestimated and that the facility may not be in compliance the PM limit in NESHAP ZZZZZ and its Title V permit.

AOC 2 – Lack of test data for volatilization rate used for calculating phenol emissions from sand mixer and core baking

The 1996 letter from the resin manufacturer is not a proper basis for estimating the phenol volatilization rate from the resin-coated sand during the sand mixing, core baking, and post core-baking cope lines. Test data is needed to establish an accurate volatilization rate and properly calculate the phenol emissions from the facility.

Section IV – FOLLOW UP

No additional information was received by EPA after exiting the Facility on 5/9/22.

Section V – LIST OF APPENDICES

Appendix 1 – Photo Log – 7 photos taken 5/9/21
Appendix 2 – Method 9 Opacity Observation Report – performed 5/9/21
Appendix 3 – SDS for Plastiflake 1118 – current as of 11/14/2005
Appendix 4 – Letter from resin vendor – sent to facility on 11/3/1995
Appendix 5 – EPA Document Summary of Factors Affecting Compliance by Ferrous Foundries, Volume 1-Text Final Report – EPA-340/1-80-020, published January 1981