

1.0 INTRODUCTION/OVERVIEW

Middletown Coke Company (MCC) plans to construct a heat recovery coke making facility adjacent to AK Steel Corporation's (AK's) Middletown Works in Middletown, Ohio. This application package contains information required by the Ohio Environmental Protection Agency (EPA) to evaluate the project and issue an air pollution control permit-to-install (PTI) for the project.

The proposed operation will consist of 100 heat recovery coke ovens in three batteries. Operations at the facility will include coal handling, charging, heat recovery coking, pushing, quenching, coke handling, and coke storage. Heat recovery steam generators (HRSGs) will recover waste heat from the ovens to produce steam and electricity. At design capacity, the facility will coke 910,000 tons /year of coal and produce up to 614,000 tons/year of furnace coke. A nominal 52 megawatts of electricity will be produced from the waste heat. All the power produced will go to AK through the grid under a bilateral trade agreement.

A netting analysis was performed for emissions increases from the heat recovery coke plant and emissions decreases from shutdown of the AK Sinter Plant. In addition, AK will install a flame management system at the No. 2 Boiler House that will reduce the amount of gas required by the pilot burners. Reduced natural gas usage will reduce emissions from natural gas combustion.

The initial MCC application, submitted February 12, 2008, used particulate matter smaller than 10 microns (PM_{10}) as a surrogate for particulate matter smaller than 2.5 microns ($PM_{2.5}$). EPA subsequently published "Implementation of the New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers ($PM_{2.5}$)" on May 16, 2008. This rule amends how a state's NSR program is to regulate sources of $PM_{2.5}$ when all regulations are promulgated and in effect. Based on information in this rule, Ohio EPA requested that particulate matter for MCC and the AK Sinter Plant be presented using the best information available for the following categories: filterable particulate matter (PM filterable), filterable PM_{10} (PM_{10} filterable), PM_{10} total (sum of PM_{10} filterable and condensable particulate matter), and filterable $PM_{2.5}$ ($PM_{2.5}$ filterable).

Table 1-1 lists the emission increases from the heat recovery coke plant and the emission decreases from shutting down the Sinter Plant and installing the flame management system. Note that MCC emissions represent “potential to emit” and include different operating modes that will not occur simultaneously. This results in a conservative over estimation of some emissions. Table 1-2 demonstrates that the heat recovery coke plant project should be treated as a minor modification because there will not be a significant net emissions increase [Ohio Administrative Code 3745-31-01 (TTT)].

Section 2.0 includes a more detailed discussion of the heat recovery coke plant. Section 3.0 discusses the coke plant air pollution controls. Section 4.0 presents the air pollutant emission analysis. Regulatory requirements for the new facility are discussed in Section 5.0. Ohio EPA permit application forms are included in Appendix A. Appendix B contains supporting calculations for the coke plant emissions. Appendix C contains a Compliance Assurance Monitoring (CAM) Plan. Appendix D contains supporting information related to AK’s emission reductions.

Table 1-1
Heat Recovery Coke Plant and Related Projects at AK Steel

	Filterable PM	Filterable PM ₁₀	Total PM ₁₀	Filterable PM _{2.5}	SO ₂	NO _x	CO	VOC	Lead	H ₂ SO ₄ ^a
Emissions Increases										
Heat Recovery Coke Plant	195.0	131.7	217.5	114.2	1584.7	483.7	129.5	31.4	0.28	36.3
Emissions Reductions from Sinter Plant Shutdown										
Raw Materials Unloading	104.6	52.3	52.3	18.5						
Windbox	125.2	120.2	155.3	111.4	1615.4	394.6	14536	167.6	2.6	48.5
Breaker End	155.2	49.7	49.7	17.1						
Cold Sinter Screening	68.7	10.3	10.3	3.4						
Subtotal	453.6	232.4	267.6	150.5	1615.4	394.6	14536	167.6	2.6	48.5
Other Emissions Reductions Project										
No. 2 Boiler Burner Management Project						49.5				
Increases minus Reductions	-258.6	-100.7	-50.1	-36.3	-30.7	39.6	-14406.5	-136.2	-2.3	-12.2
CAA Significant Emissions Rates	25	15	15	10	40	40	100	40	0.6	7
Significant Impact ?	No	No	No	No	No	No	No	No	No	No

^a Estimated as 3% of SO₂.

CAA = Clean Air Act
CO = Carbon Monoxide
H₂SO₄ = Sulfuric Acid Mist
NO_x = Nitrogen Oxides
PM = Particulate Matter
PM_{2.5} = Particulate matter less than 2.5 micrometers in diameter
PM₁₀ = Particulate matter less than 10 micrometers in diameter
SO₂ = Sulfur Dioxide
VOC = Volatile Organic Compound

Table 1-2**Comparison of Net Air Emissions Change with Significant Emission Rates**

Pollutant	Net Emissions Change (tons/year)	Significant Threshold (tons/year)	Significant? (Yes/No)
PM (filterable)	-258.6	25	No
PM ₁₀ (filterable)	-100.7	15	No
PM ₁₀ (total)	-50.1	15	No
PM _{2.5} (filterable)	-36.3	10	No
SO ₂	-30.7	40	No
NO _x ^a	39.6	40	No
CO	-14,406.5	100	No
VOCs	-136.2	40	No
Lead	-2.3	0.6	No
H ₂ SO ₄	-12.2	7	No

^a Actual net emissions increase of NOx will be ≤ 20.9 tons/year. Table shows combined emissions of units that cannot operate simultaneously.

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H₂SO₄ = Sulfuric Acid Mist

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