

4.0 EMISSIONS ANALYSIS

This section contains a summary of air pollutant emissions from MCC. Facility-wide emissions are summarized in Table 1-1. Plant operation will be continuous (8,760 hours/year). Annual emissions are based on the maximum design production rate of 912,000 tons/year of coal. Many of the processes are batch operations and do not operate continuously. Production and emissions are limited by the nature of the operation. The cycle time is 48 hours. Half the ovens are charged each day with each oven charged every other day.

Table 4-1 presents the annual stack and fugitive criteria pollutant (plus sulfuric acid) emissions by emissions unit. The majority of HAP emissions are from HCl. Total emissions of other HAPs are less than 5 tons/year. Table 4-2 summarizes the HAP emissions.

Table 4-1
Maximum MCC Emissions

Emissions Unit	Designation	Associated Control Device^a	TSP (tons/year)	PM₁₀ (tons/year)	SO₂ (tons/year)	NO_x (tons/year)	CO (tons/year)	VOCs (tons/year)	Lead (tons/year)	Sulfuric Acid (tons/year)
Fugitive emissions	Coal unloading, storage, handling and processing	WS, E	12.39	6.04	—	—	—	—	—	—
Thaw shed	Thaw shed	Heat with natural gas	0.07	0.07	0.01	0.98	0.82	0.05	—	—
Coal charging	Charge	Traveling hood with baghouse	7.95	7.09	0.14	—	1.28	0.91	0.00005	—
Heat recovery coking	Coking (main stack)	Baghouse, common tunnel afterburner, and lime spray dryer	131.40	131.40	1091.35	456.25	95.54	20.47	0.10	11.13
Heat recovery coking	Coking (individual waste heat stacks)	Common tunnel afterburner	32.01	32.01	448.50	18.75	3.93	0.84	0.09	22.88
Coke pushing	Pushing	Flat push and traveling hood with multicyclone	26.18	26.18	44.71	8.67	28.74	9.13	0.007	2.28
Coke quenching	Quench	Baffles, with TDS control water	54.75	20.08	—	—	—	—	0.04	—
Coke screening	Processing	Baghouse, E	15.02	15.02	—	—	—	—	—	—
Fugitive emissions	Coke handling, storage, and loadout	WS, E	6.39	3.04	—	—	—	—	—	—
Fugitive emissions	Industrial roads	Paving, W, GH	15.48	3.02	—	—	—	—	—	—
Other fugitive emissions	FGD dust and lime silo	Bin vent	0.14	0.14	—	—	—	—	—	—
Total Emissions			301.79	244.08	1584.71	484.65	130.31	31.41	0.24	36.29

^a W = watering as needed, E = enclosure, GH = good housekeeping, WS = wet suppression or wet material

CO = Carbon Monoxide

FGD = Flue Gas Desulfurization

MCC = Middletown Coke Company

NO_x = Nitrogen Oxides

PM₁₀ = Particulate matter less than 10 micrometers in diameter

SO₂ = Sulfur Dioxide

TDS = Total Dissolved Solids

TSP = Total Suspended Particulates

VOC = Volatile Organic Compound

Table 4-2
Summary of Maximum Annual HAP Emissions from MCC

Compound	Coking - Main and Waste Heat Stacks (tons/year)	Charging (tons/year)	Pushing (tons/year)	Quenching (tons/year)	Total Maximum Annual Emissions (tons/year)
Anthracene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
Benzene	2.28E-01	1.64E-02	NM	ND	2.44E-01
Benzo (a) pyrene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
Benzo (b,k) fluoranthene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
Bromoform	5.70E-04	ND/NR	NM	ND	5.70E-04
Bromomethane	2.66E-01	ND/NR	NM	ND	2.66E-01
Benzene Soluble Organics	ND/NR	ND/NR	9.58E-02	ND	9.58E-02
2-Butanone	2.99E-02	ND/NR	NM	ND	2.99E-02
Carbon disulfide	7.60E-03	9.58E-04	NM	ND	8.56E-03
Chlorobenzene	5.70E-04	ND/NR	NM	ND	5.70E-04
Chloroform	5.23E-03	ND/NR	NM	ND	5.23E-03
Chloromethane	3.61E-01	9.13E-04	NM	ND	3.62E-01
Chrysene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
Cumene	6.65E-04	ND/NR	NM	ND	6.65E-04
Ethylbenzene	1.52E-03	3.33E-04	NM	ND	1.85E-03
Fluoranthene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
Fluorene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
Hydrogen chloride	118.04	NM	NM	NM	118.04
Iodomethane	2.99E-03	ND/NR	NM	ND	2.99E-03
Isooctane	7.60E-03	ND/NR	NM	ND	7.60E-03
Methylene chloride	3.14E-01	ND/NR	NM	ND	3.14E-01
2-Methylnaphthalene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
4-Methyl-2-Pentanone	4.23E-03	ND/NR	NM	ND	4.23E-03
2-Methylphenol	ND/NR	ND/NR	NM	4.75E-03	4.75E-03
4-Methylphenol/3-Methylphenol	ND/NR	ND/NR	NM	1.53E-02	1.53E-02
Naphthalene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
n-Hexane	7.13E-03	ND/NR	NM	ND	7.13E-03
Phenanthrene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
Phenol	3.37E-02	ND/NR	NM	1.11E-02	4.49E-02
Pyrene	Part of total PAHs	Part of total PAHs	NM	Part of total PAHs	Part of total PAHs
Styrene	3.28E-03	ND/NR	NM	ND	3.28E-03
Tert-butyl methyl ether	2.23E-05	ND/NR	NM	ND	2.23E-05
Tetrachloroethane	1.95E-04	ND/NR	NM	ND	1.95E-04
1,1,2,2-Tetrachloroethane	9.50E-04	ND/NR	NM	ND	9.50E-04

Table 4-2
(Continued)

Compound	Coking - Main and Waste Heat Stacks (tons/year)	Charging (tons/year)	Pushing (tons/year)	Quenching (tons/year)	Total Maximum Annual Emissions (tons/year)
Toluene	2.42E-01	7.76E-03	NM	ND	2.50E-01
Total PAHs	1.29E-01	2.01E-02	NM	3.57E-03	1.52E-01
1,1,1-Trichloroethane	1.19E-03	ND/NR	NM	ND	1.19E-03
1,1,2-Trichloroethane	2.76E-04	ND/NR	NM	ND	2.76E-04
Trichloroethene	4.12E-03	ND/NR	NM	ND	4.13E-03
Vinyl acetate	3.28E-03	ND/NR	NM	ND	3.28E-03
Xylenes	7.70E-03	3.06E-03	NM	ND	1.08E-02
Antimony ^a	5.40E-03	ND/NR	ND	3.71E-03	9.12E-03
Arsenic	5.40E-02	1.10E-04	5.48E-03	7.36E-02	1.33E-01
Beryllium	8.31E-04	3.97E-06	ND	2.44E-04	1.08E-03
Cadmium	7.48E-03	ND/NR	ND	ND	7.48E-03
Chromium	2.62E-02	4.56E-05	ND	1.28E-03	2.75E-02
Cobalt	ND/NR	3.24E-05	ND	7.85E-04	8.18E-04
Lead	1.90E-01	4.56E-05	6.98E-03	3.96E-02	2.36E-01
Manganese	1.25E-02	2.10E-04	9.58E-04	1.48E-02	2.84E-02
Mercury ^b	8.15E-02	3.60E-07	ND	ND	8.15E-02
Nickel	2.41E-02	6.48E-05	ND	1.86E-03	2.60E-02
Phosphorus	5.82E-01	ND/NR	ND	3.53E-02	6.17E-01
Selenium	1.33E-02	ND/NR	ND	6.03E-03	1.93E-02
Total HAPs (tons/year)	120.70	0.05	0.11	0.21	121.07
Total HAPs without HCl (tons/year)	2.66	0.05	0.11	0.21	3.03

^aEstimated 95% removal in spray dryer/baghouse for all metals except mercury.

^bEstimated 50% mercury removal in spray dryer/baghouse with carbon injection.

HAP = Hazardous Air Pollutant
HCl = Hydrogen Chloride
MCC = Middletown Coke Company
ND = Not detected
NM = Not measured
NR = Not reported
PAH = Polynuclear Aromatic Hydrocarbon