Revised Air Quality Dispersion Modeling for the Proposed Suncoke Energy Middletown Coke Company Middletown, Ohio

July 2008

Prepared for:

SunCoke Energy
Parkside Plaza
11400 Parkside Drive
Knoxville, TN 37934

REVISED AIR QUALITY DISPERSION MODELING FOR THE PROPOSED SUNCOKE ENERGY MIDDLETOWN COKE COMPANY MIDDLETOWN, OHIO

Prepared for:

SunCoke Energy
Parkside Plaza
11400 Parkside Drive
Knoxville, TN 37934

Prepared by:

URS Corporation
1093 Commerce Park Drive, Suite 100
Oak Ridge, Tennessee 37830
0711211

July 2008

Summary

SunCoke Energy (SunCoke) is proposing to construct and operate a 100-oven heat recovery coke production facility in Middletown, Ohio. The facility will be constructed and operated as the Middletown Coke Company (MCC).

As part of the planned construction, MCC will install and operate equipment that releases regulated air pollutants to the atmosphere. Most of these emissions will be offset by changes at the AK Steel facility so that net emissions changes to the Middletown airshed will be less than major source air quality permitting thresholds.

The net emissions increase of nitrogen oxides (NO_X) (less than 40 tons/year) will exceed the Ohio Environmental Protection Agency (EPA) 25 tons/year threshold, requiring a dispersion modeling analysis. Further, hydrochloric acid (HCl) emissions will exceed the 1 ton/year Ohio EPA threshold for toxic air pollutants, which also requires a dispersion modeling assessment of potential ambient air impacts.

MCC provided the Ohio EPA with a dispersion modeling protocol for the project, and in an April 8, 2008 review, the Ohio EPA further requested modeling of mercury (Hg) emissions from MCC sources. MCC conducted the dispersion modeling requested by the Ohio EPA for the three regulated pollutants. The results suggested that ambient air quality is protected in the vicinity of the proposed MCC facility. The modeling was conducted following the submitted protocol:

- Modeling of different operational scenarios – typical facility operation during heat recovery steam generator (HRSG) maintenance and facility operation during maintenance and inspection of the spray dryer and baghouse,
- Modeling of NO_X emissions based on worst-case annual emissions, and
- Modeling of two toxic air pollutants (HCl and Hg) during typical HRSG maintenance and during maintenance and inspection of the spray dryer and baghouse.

The modeling was completed using AERMOD (version 07026) with representative meteorological data processed in AERMET using a receptor grid beginning at the MCC boundary and receptor heights determined using AERMAP. Short-term emissions during the maintenance period were modeled as if occurring each day of the year. The resulting concentrations were compared with the significant impact levels to determine whether additional National Ambient Air Quality Standards (NAAQS) modeling was required. HCl and Hg concentrations were compared to maximum acceptable ground-level concentrations (MAGLCs). The results show that NO_X impacts are insignificant and neither toxic air pollutant exceeds the MAGLC.

A report with the results of the NO_x, HCl, and Hg dispersion modeling was submitted to EPA on May 8, 2008. MCC will relocate the facility within the same property. This revised report updates the modeled concentrations of NO_x, HCl, and Hg with the current layout. This revised report also contains an assessment of impacts from carbon monoxide (CO), sulfur dioxide (SO_2), and particulate matter less than 10 microns (PM_{10}) as requested by EPA.

Updated Ohio EPA Required Modeling for MCC

A netting analysis was performed for emissions increases from MCC and emissions decreases from shutdown of the Sinter Plant and the addition of flame management projects at AK Steel. The net emissions increases of all pollutants will be below major source modification thresholds. However, NO_X emissions potentially exceed the Ohio EPA 25 tons/year threshold, which requires a modeling demonstration.

The modeling assessment began by identifying the MCC emissions inventory to determine whether MCC emission units would return a significant impact to ambient air. That is, the maximum annual modeled NO_2 concentration was compared with the significant impact level of 1 $\mu g/m^3$ to determine whether the MCC sources could cause or contribute to a violation of the NAAQS. Similarly, the impacts of HCl and Hg were compared to the respective MAGLCs.

MCC typically will operate with all flue gases from the coke ovens going through the spray dryer and baghouse and exhausted through the main stack. However, when maintenance is performed at the facility, other operating modes increase emissions of some pollutants. These were considered for the dispersion modeling and are described below as Cases 1 through 3.

- Case 1 – One of the five individual waste heat stacks may be open up to 10 days/year for maintenance of the HRSG. Case 1 emissions correspond with maximum production and HRSG maintenance.
- Case 2 – Typically, 50 of the 100 ovens are charged with coal each day. If equipment problems cause delays, fewer than 50 ovens may be charged one day and more than 50 ovens may be charged the next day. Case 2 emissions correspond with maximum production, HRSG maintenance, and charging 75 ovens per day.
- Case 3 – The spray dryer/baghouse system may need to be offline for maintenance up to 5 days/year. During these days, all five waste heat stacks are open. Case 3 corresponds with maximum production, spray dryer/baghouse maintenance, and charging 75 ovens per day.

NO_X was modeled on an annual basis assuming that both HRSG maintenance and spray dryer/baghouse maintenance occurred during the year. HCl and Hg were modeled in the HRSG maintenance mode with maximum production (Case 1) and the spray dryer/baghouse maintenance mode with the maximum charging situation (Case 3). The modeled MCC emissions inventory is tabulated in Table 1. The maximum short-term emission rates shown in Table 1 (Case 3) were based on the few days per year period when maintenance and inspection of the spray dryer/baghouse system require coke oven flue gases to be exhausted to the atmosphere through the waste heat stacks. Maintenance is conducted when needed and not on a routinely scheduled basis; therefore, it could occur at any time of the year. To simulate this type of activity and the unknown schedule, modeling for this short-term event was conducted as if it could happen each day of the year so that each 24-hour period is evaluated similarly and a worst-case short-term impact can be evaluated.

The NO_X modeled concentrations were converted to downwind NO_2 concentrations for comparison with the standards and significant impact levels using the Ambient Ratio Method (ARM) value of 0.75.

AERMOD Model Input Parameters and Results

The proposed location of MCC is shown in Figure 1. The receptor grid used is shown in Figure 2. Receptor heights were determined using AERMAP and available digital elevation model (DEM) data as obtained from the U.S. Geological Survey. The receptor grid spacing is nominally 25 m at the boundary and 100 m outward of that. Beyond the 100-m grid, receptors are spaced at 250 and 500 m out to 3 km.

The DEM model data used are depicted as shaded relief images with the grid overlaid as shown in Figure 3. Also shown in Figure 2 are the locations of MCC emission sources modeled and locations of the maxima overall impacts over the 5 years of meteorological data.

The 5 years of representative meteorological data as determined by the Ohio EPA were used and included the 5-year period (1987–1991) of surface data from the Cincinnati/Covington airport along with Dayton upper air. These data were processed in AERMET using the surface geophysical parameters as shown in Table 2. These parameters were determined to be appropriate for the airport measurement site. A wind rose is shown in Figure 4.

The maximum results of the cases modeled are shown in Table 3 and indicate that none of the impacts exceed threshold levels. Therefore, the impacts of these pollutants from the planned MCC should not adversely affect local air quality.

Updated Ohio EPA Requested Modeling for MCC

The net emissions changes to the local Middletown airshed from the combined MCC emission increase and AK Steel decrease will result in net changes that are below major source permitting threshold levels, and therefore, no modeling is required. However, the Ohio EPA has also requested that modeling be completed for the pollutants CO, SO_2, and PM_{10} to demonstrate that NAAQS will be protected in the vicinity of the project.

For these pollutants, the modeled MCC emission inventory was again based on the three operating cases as described above providing a very conservative assessment of potential impacts to the environment. The total PM_{10}, SO_2, and CO emissions for each operating case are shown in Table 4. The modeled emission inventory for the maximum case is provided in Table 5, and the results and comparison to significant impact levels are shown in Table 6.

Because of the finding of significant impacts for SO_2 and PM_{10}, the receptor grid was extended and an offsite inventory of sources obtained from the Ohio EPA was modeled. The offsite inventory included sources to nearly 100 km from Middletown. The location of the modeled inventory sources in comparison with MCC is shown in Figure 5.

The results of the modeling are shown in Table 7. The MCC plus inventory impacts return an aggregate modeled concentration together with ambient background values less than the respective NAAQS. The modeling analysis is very conservative because it did not include any of

the reductions from AK Steel and it assumed the spray dryer/baghouse maintenance occurs each day of the year (Case 3). Even so, compliance with NAAQS is demonstrated for SO_2.

However, for short-term PM_{10} concentrations, the modeled impacts potentially exceed NAAQS. The impacts of PM_{10} are primarily due to AK Steel sources and are located at receptors within the AK Steel boundary. A source does not need to quantify its impacts at receptors within its boundary; therefore, removing the AK Steel impacts from these receptors returns compliance to the NAAQS values. This was done by examining each 24-hour period for which impacts could exceed 100 $\mu g/m^3$ (which when added to the background of 47 $\mu g/m^3$ would be near the standard). These periods were compared with the MCC maximum facility impact to determine whether MCC could cause or contribute to a violation of NAAQS (i.e., have a significant impact at that receptor and 24-hour period). None were found to occur, and removing the AK Steel impacts from receptors within its boundary returned PM_{10} 24-hour values in compliance with the NAAQS.

Again, the PM_{10} modeling used the same assumptions as the SO_2 inventory assessment and therefore is quite conservative. Notwithstanding this conservatism, the addition of the MCC emission inventory would not compromise NAAQS in the vicinity of the proposed Middletown facility.

Electronic versions of model files and meteorological data are provided in Appendix A.

Table 1
MCC – Modeled Source Parameters for NO_x, HCl, and Hg

MCC Emission Source	Model ID	Location NAD 83		Modeled Exhaust Parameters				Case 1 Modeled Emission Rate (g/s)			Case 2 Modeled Emission Rate (g/s)			Case 3 Modeled Emission Rate (g/s)		
		X (m)	Y (m)	Height (m)	Temp (^oK)	Velocity (m/s)	Diam (m)	NO_X [A]	HCl	Hg	NO_X [A]	HCl	Hg	NO_X [A]	HCl	Hg
Main Stack	mainabc	723659	4372332	64.0	389	15.8	3.96	13.1	1.9	0.0022	13.1	1.9	0.0022	13.1	0.0	0.0000
Individual Waste Heat Stacks 1	waste11	723815	4372346	27.4	1311	21.0	2.74	0.1	7.5	0.0009	0.1	7.5	0.0009	0.1	7.5	0.0009
Individual Waste Heat Stacks 2	waste12	723736	4372396	27.4	1311	21.0	2.74	0.1	--	--	0.1	--	--	0.1	7.5	0.0009
Individual Waste Heat Stacks 3	waste13	723653	4372448	27.4	1311	21.0	2.74	0.1	--	--	0.1	--	--	0.1	7.5	0.0009
Individual Waste Heat Stacks 4	waste14	723542	4372527	27.4	1311	21.0	2.74	0.1	--	--	0.1	--	--	0.1	7.5	0.0009
Individual Waste Heat Stacks 5	waste15	723463	4372575	27.4	1311	21.0	2.74	0.1	--	--	0.1	--	--	0.1	7.5	0.0009
Pushing	pushabc	723653	4372427	6.1	478	21.2	1.52	0.2	--	--	0.2	--	--	0.2	--	
Charging (stack)	chargabc	723665	4372462	7.8	422	20.8	1.37	--	--	1.04E-8	--	--	1.56E-8	--	--	1.56E-08

[A] Annual Basis

Table 2
AERMET - Geophysical Parameters Used in Meteorological Data Processing

Sector Number and Orientation	Albedo	Bowen Ratio	Surface Roughness
Sector 1 0-180	0.208	1.625	0.100
Sector 2 180-230	0.215	0.875	0.250
Sector 3 230-280	0.290	0.925	0.025
Sector 4 280 –360	0.215	0.875	0.250

Note: 0 and 360 are degrees north. Parameters reflect measurement site.

Table 3
MCC – Maximum Modeled Pollutant Concentrations and Comparison with Thresholds for NO_2, HCl, and Hg

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Location of Maximum Modeled Concentration			Threshold Levels ($\mu g/m^3$)	Does MCC Impact Exceed Threshold?
			X (m)	Y (m)	Z m msl		
NO_2	Annual	0.58	724100	4372900	198	1	No
HCl	1-hour	94.4	724100	4372200	209	122.8	No
Hg	1-hour	0.0113	724100	4372200	209	0.595	No

Notes: NO_2 modeled concentration converted using 0.75 ARM (0.775 $\mu g/m^3$ NO_X * 0.75 ARM = 0.58 $\mu g/m^3$ NO_2).
HCl MAGLC calculated from TLV of 7.0 mg/m^3 (7.0 mg/m^3 = 7000 $\mu g/m^3$ * 0.737 * 4 / (24*7) = 122.8 $\mu g/m^3$).
Hg MAGLC calculated from TLV of 0.025 mg/m^3 (0.025 mg/m^3 = 25 $\mu g/m^3$ * 4 / (24*7) = 0.595 $\mu g/m^3$).

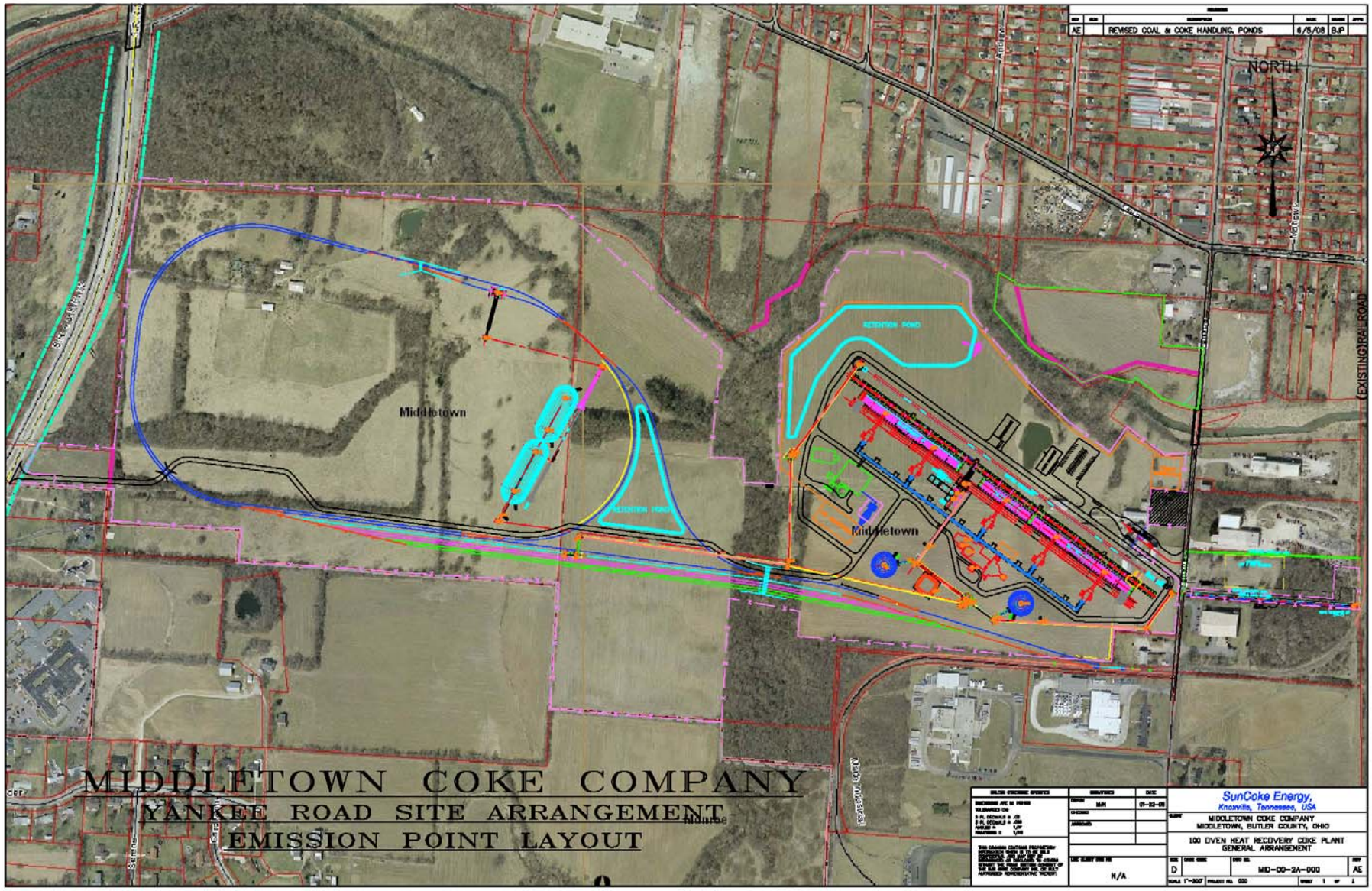

Figure 1. Revised Location of Proposed MCC

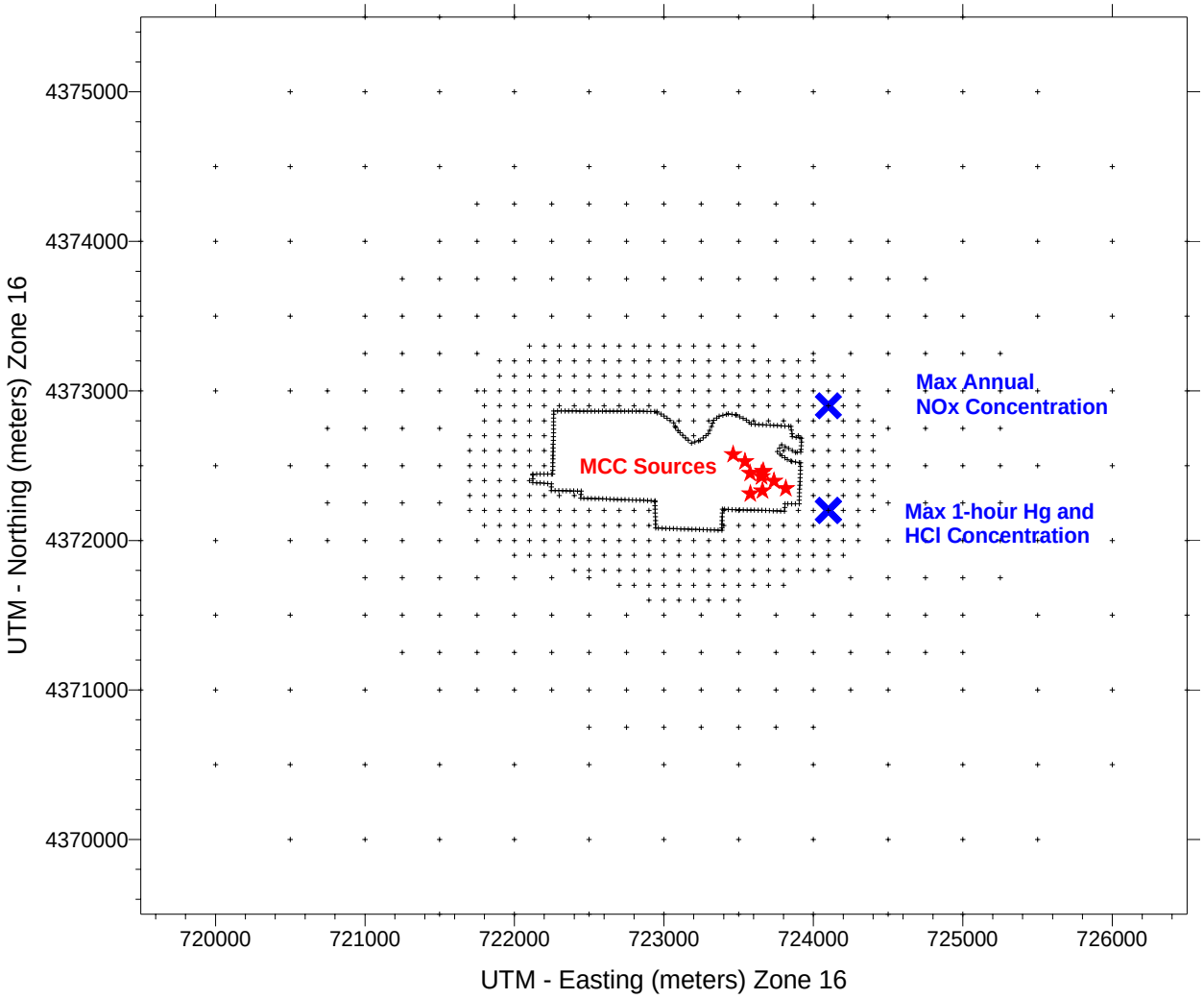

Figure 2. MCC Receptor Grid and Source Locations

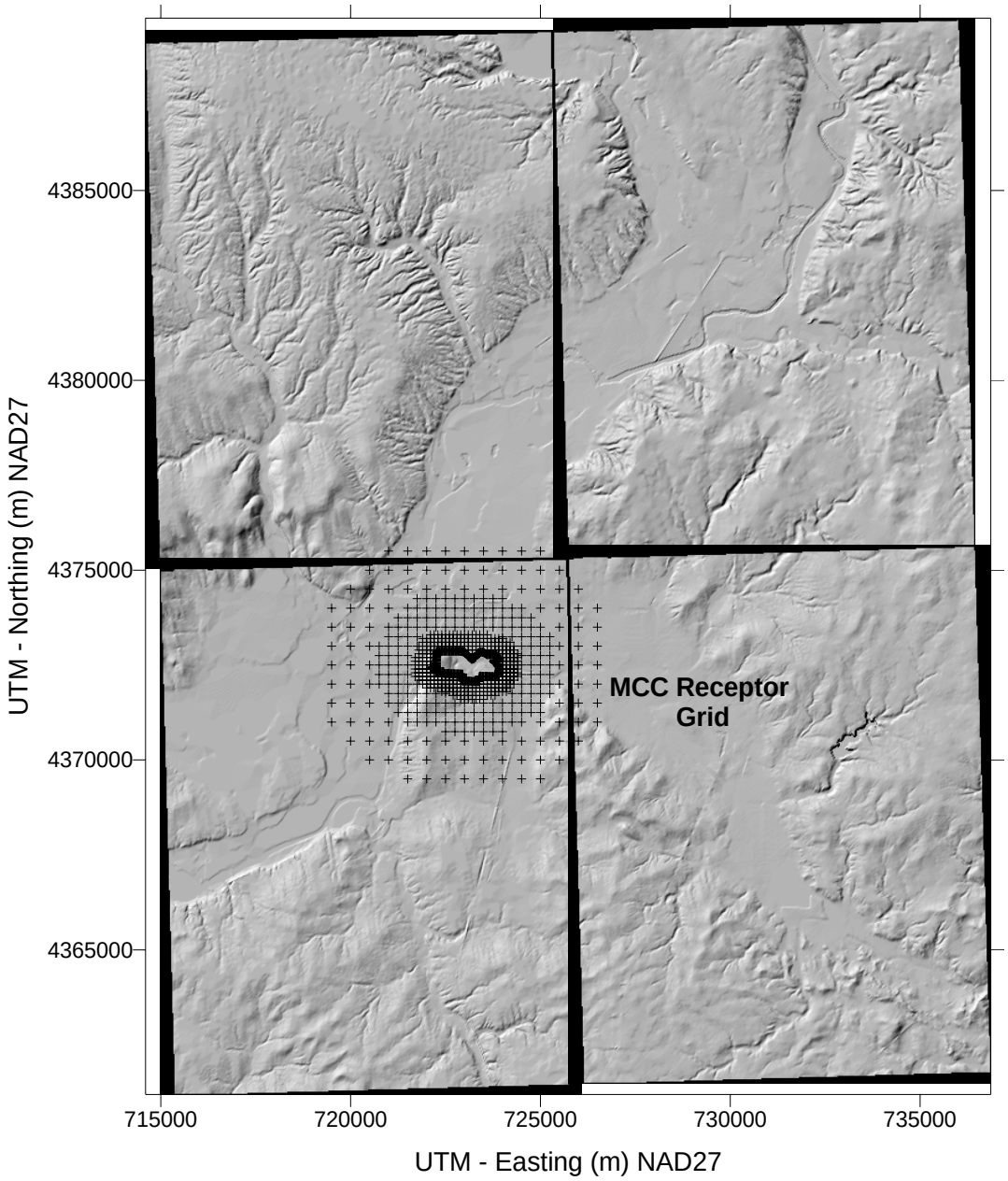

Figure 3. MCC Receptor Grid and Shaded Relief of Surrounding Terrain

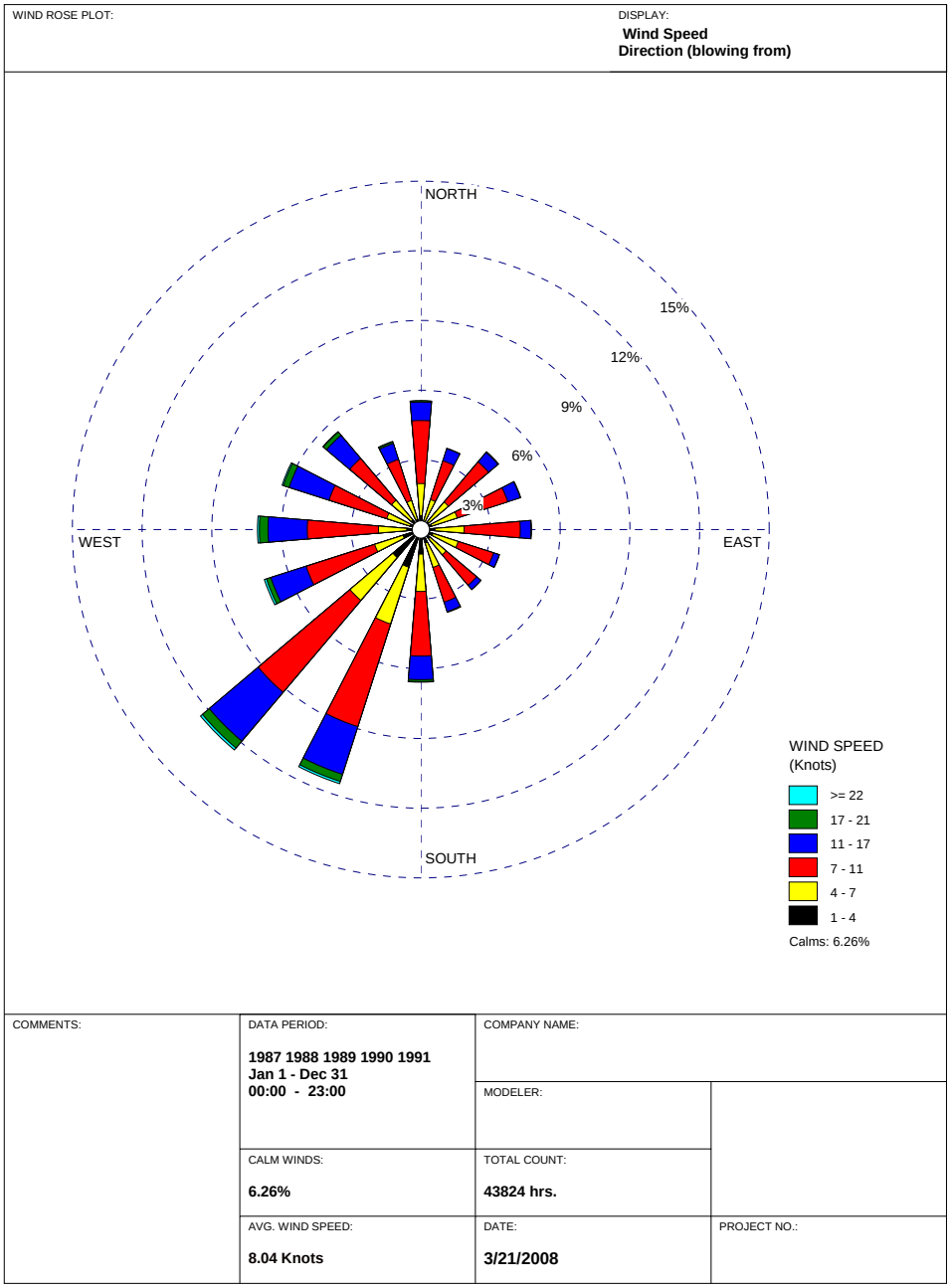

Figure 4. Wind Rose of Surface Data (1987–1991) from Cincinnati/Covington

Table 4
MCC – Total PM_{10}, SO_2, and CO Emission Rates for All Units

Case	PM_{10} 24-hour	SO_2 3-hour	SO_2 24-hour	CO 1-hour
	(g/sec)	(g/sec)	(g/sec)	(g/sec)
Case 1	10.6	145.7	95.5	4.2
Case 2	11.5	146.4	96.1	4.6
Case 3	25.7	315.9	315.9	4.0

Table 5
MCC Modeled Emission Parameters – CO, SO_2, and PM_{10} Emission Units

MCC Emission Source	Model ID	Location		Modeled Exhaust Parameters				Modeled Emission Rates (g/s)		
		X (m)	Y (m)	Ht (m)	T (^oK)	V (m/s)	D (m)	CO	SO_2	PM_{10}
Main Stack	mainabc	723659	4372332	64	389	15.8	3.96	2.7	0	0
Individual Waste Heat Stacks 1	waste11	723815	4372346	27.4	1311	21	2.74	0.5	62.8	4.5
Individual Waste Heat Stacks 2	waste12	723736	4372396	27.4	1311	21	2.74	0	62.8	4.5
Individual Waste Heat Stacks 3	waste13	723653	4372448	27.4	1311	21	2.74	0	62.8	4.5
Individual Waste Heat Stacks 4	waste14	723542	4372527	27.4	1311	21	2.74	0	62.8	4.5
Individual Waste Heat Stacks 5	waste15	723463	4372575	27.4	1311	21	2.74	0	62.8	4.5
Pushing	pushabc	723653	4372427	6.1	478	21.2	1.52	1.2	1.93	1.1
Charging (stack)	chargabc	723665	4372462	7.8	422	20.8	1.37	0.06	0.006	0.3
Coke Screening	cokecrsh	723603	4372292	8.5	-6	18.3	1.28	--	--	0.4
Quench Tower	qunchabc	723577	4372448	18.29	366.6	3.18	11.9	--	--	0.9
Coal Unloading	fug1	722857	4372730	0	0	0.1	0.5	--	--	4.72E-03
To Unloader Conveyor	fug2	722857	4372730	0	0	0.1	0.5	--	--	7.87E-04
Coal Transfer #1	fug3	722840	4372661	5	0	0.1	0.5	--	--	7.87E-04
Coal Transfer #2	fug4	723023	4372622	15	0	0.1	0.5	--	--	7.87E-04
Transfer to Stacker Conveyor	fug5	723023	4372622	2	0	0.1	0.5	--	--	1.57E-02
Transfer to Stacker	fug6	722993	4372559	15	0	0.1	0.5	--	--	1.57E-02
Coal Storage Pile #1 In	fug7	722956	4372544	15	0	0.1	0.5	--	--	7.87E-03
Coal Storage Pile #1 (Dead Pile)	fug8	722956	4372544	7.5	0	0.1	0.5	--	--	1.59E-02
Coal Storage Pile#2 Out	fug9	722956	4372544	2	0	0.1	0.5	--	--	7.87E-03
Coal Transfer from Storage Pile #1 to Storage Pile #2	fug10	722935	4372502	2	0	0.1	0.5	--	--	7.87E-03
Coal Storage Pile In	fug11	722914	4372454	15	0	0.1	0.5	--	--	7.87E-03
Coal Storage Pile #2 (Live Pile)	fug12	722914	4372454	7.5	0	0.1	0.5	--	--	1.72E-02
Coal Storage Pile Out	fug13	722914	4372454	0	0	0.1	0.5	--	--	7.87E-04
Stacker (Front End Loadout)	fug14	722900	4372397	2	0	0.1	0.5	--	--	3.15E-03
Transfer to Stacker Reclaim Hopper	fug15	722879	4372384	2	0	0.1	0.5	--	--	3.15E-03
Coal Transfer #3	fug16	722873	4372374	15	0	0.1	0.5	--	--	7.87E-04
Coal Transfer #4	fug17	723327	4372337	15	0	0.1	0.5	--	--	7.87E-04
Transfer to Coal Crushing Tower	fug18	723322	4372503	15	0	0.1	0.5	--	--	7.87E-04
Coal Crushing	fug19	723322	4372503	9	0	0.1	0.5	--	--	1.58E-02
Transfer to Silo Feed Conveyor	fug20	723322	4372503	4	0	0.1	0.5	--	--	7.87E-04
Transfer to Silo	fug21	723420	4372648	40	0	0.1	0.5	--	--	7.87E-04

MCC Emission Source	Model ID	Location		Modeled Exhaust Parameters				Modeled Emission Rates (g/s)		
		X (m)	Y (m)	Ht (m)	T (^oK)	V (m/s)	D (m)	CO	SO_2	PM_{10}
Transfer to Batch Bin	fug22	723420	4372648	20	0	0.1	0.5	--	--	7.87E-04
Transfer to tripper conveyor	fug23	723420	4372648	2	0	0.1	0.5	--	--	1.57E-02
Tripper point 1	fug24	723653	4372496	7	0	0.1	0.5	--	--	1.57E-02
Tripper point 2	fug25	723653	4372496	7	0	0.1	0.5	--	--	1.57E-02
Tripper point 3	fug26	723653	4372496	7	0	0.1	0.5	--	--	1.57E-02
Coke from Hot Car to Quench Car	fug27	723577	4372448	2	0	0.1	0.5	--	--	3.39E-03
Coke from Quench Car to Wharf	fug28	723577	4372448	0	0	0.1	0.5	--	--	1.13E-02
Transfer to Wharf conveyor	fug29	723577	4372448	0	0	0.1	0.5	--	--	1.13E-02
Coke Transfer #1	fug30	723524	4372346	2	0	0.1	0.5	--	--	3.39E-03
Coke Transfer (Stacking Conveyor)	fug31	723524	4372346	2	0	0.1	0.5	--	--	1.13E-02
Coke emergency storage pile in	fug32	723474	4372337	14	0	0.1	0.5	--	--	1.13E-02
Coke emergency storage pile wind	fug33	723474	4372337	7	0	0.1	0.5	--	--	8.63E-03
Coke emergency storage pile out	fug34	723474	4372337	2	0	0.1	0.5	--	--	1.13E-02
Unloading to Coke Reclaim Hopper	fug35	723540	4372370	2	0	0.1	0.5	--	--	1.13E-02
Coke Transfer (Plant Feed Conveyor)	fug36	723524	4372346	20	0	0.1	0.5	--	--	4.06E-03
Transfer to Screening Station	fug37	723603	4372292	25	0	0.1	0.5	--	--	4.06E-03
Transfer to Recirculating Conveyor	fug38	723603	4372292	12	0	0.1	0.5	--	--	6.77E-04
Recirculating Transfer to Plant Feed Conveyor	fug39	723524	4372346	12	0	0.1	0.5	--	--	6.77E-04
Transfer Breeze to Bunker	fug40	723603	4372292	5	0	0.1	0.5	--	--	2.10E-04
Breeze loadout at bunker	fug41	723603	4372292	5	0	0.1	0.5	--	--	2.10E-04
Emergency Breeze Pile In	fug42	723541	4372311	2	0	0.1	0.5	--	--	7.00E-04
Emergency Breeze Pile	fug43	723541	4372311	2	0	0.1	0.5	--	--	5.64E-03
Emergency Breeze Pile Out	fug44	723541	4372311	2	0	0.1	0.5	--	--	7.00E-04
Transfer to coke product conveyor	fug45	723603	4372292	12	0	0.1	0.5	--	--	3.39E-03
Coke Transfer #2	fug46	723647	4372264	12	0	0.1	0.5	--	--	3.39E-03
Transfer to screened coke stacker conveyor	fug47	723647	4372264	12	0	0.1	0.5	--	--	1.13E-02
Emergency Screened coke storage pile in	fug48	723689	4372290	12	0	0.1	0.5	--	--	1.06E-02
Emergency Screened coke storage pile	fug49	723689	4372290	6	0	0.1	0.5	--	--	1.73E-03

MCC Emission Source	Model ID	Location		Modeled Exhaust Parameters				Modeled Emission Rates (g/s)		
		X (m)	Y (m)	Ht (m)	T (^oK)	V (m/s)	D (m)	CO	SO_2	PM_{10}
Emergency Screened coke storage pile out	fug50	723689	4372290	2	0	0.1	0.5	--	--	1.06E-02
Unloading to Screened Coke Reclaim Hopper	fug51	723719	4372267	2	0	0.1	0.5	--	--	1.13E-02
Coke Transfer #3	fug52	723884	4372263	9	0	0.1	0.5	--	--	3.39E-03
Coke Transfer #4	fug53	723921	4372319	9	0	0.1	0.5	--	--	3.39E-03
Coke Transfer #5	fug54	724203	4372313	9	0	0.1	0.5	--	--	3.39E-03
Coke Rail Loadout Transfer #1	fug55	723597	4372285	9	0	0.1	0.5	--	--	3.39E-03
Coke Rail Loadout Transfer #2	fug56	723326	4372329	9	0	0.1	0.5	--	--	3.39E-03
Coke Rail Loadout Transfer #3	fug57	723000	4372356	9	0	0.1	0.5	--	--	3.39E-03
Coke Rail Loadout Transfer #4	fug58	722999	4372328	9	0	0.1	0.5	--	--	3.39E-03
Transfer to coke loadout conveyor	fug59	723000	4372356	9	0	0.1	0.5	--	--	3.39E-03
Coke Rail Loadout	fug60	722981	4372330	9	0	0.1	0.5	--	--	3.39E-03
Charging fugitive	fug61	723665	4372462	9	0	0.1	0.5	--	--	1.60E-02
Lime Silo	fug62	723593	4372375	22	0	0.1	0.5	--	--	3.88E-03
FGD Silo	fug63	723609	4372340	37	0	0.1	0.5	--	--	2.68E-04
Vehicles	fug64	723606	4372423	0.5	225.7			--	--	7.57E-07

Table Note: All sources modeled as point sources, except vehicle emissions, which were characterized as an area source with emission rate expressed as $g/s/m^2$.

Table 6
MCC – Maximum Modeled Pollutant Concentrations and Comparison with Thresholds for CO, SO_2, and PM_{10}

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Location of Maximum Modeled Concentration			Threshold Levels ($\mu g/m^3$)	Does MCC Impact Exceed Threshold?
			X (m)	Y (m)	Z (m msl)		
CO	1-hour	143.3	723856	4372527	195	2000	No
	8-hour	55.3	723856	4372527	195	500	No
SO_2	3-hour	513.4	724300	4372100	200	25	Yes
	24-hour	249.5	724300	4372100	200	5	Yes
	Annual	19.1	723900	4372900	198	1	Yes
PM_{10}	24-hour	79.9	723856	4372527	195	5	Yes
	Annual	11.5	723759	4372594	193	1	Yes

Table 7
Maximum Modeled MCC and Off-site Inventory Impacts for SO_2 and PM_{10}

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Location of Maximum Modeled Concentration		Ambient Background Concentration ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
			X (m)	Y (m)			
SO_2 – All	3-hour	636.2	733000	4384000	151.96	788.2	1300
	24-hour	271.9	711000	4363000	49.78	321.7	365
	Annual	49.3	711000	4363000	10.7	60	80
PM_{10} – All	24-hour	248.1	725500	4373000	47	295.1	150
PM_{10} - AKS	24-hour	247.6	725500	4373000	47	294.6	150

Notes: AKS is the 24-hour concentration due to AK Steel sources only. Short-term values are highest-second-highest concentrations.

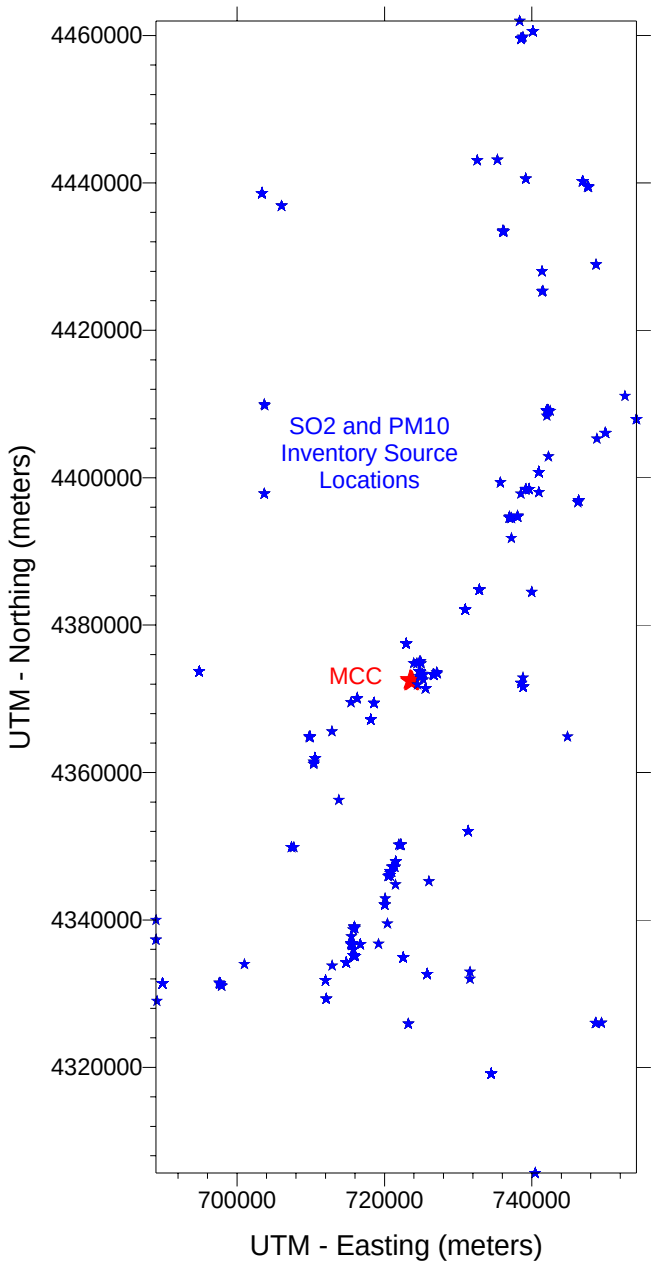

Figure 5. MCC – Location of Off-site Inventory Modeled Sources

Appendix A

MODELING AND METEOROLOGICAL DATA