Appendix A

2002
Point, Area, On-Road Mobile and Off-Road Mobile Emissions Inventory

(Missouri Counties)

2002 NEI Data

The 2002 Emissions Inventory used to develop this document was generated from EPA's 2002 National Emissions Inventory (2002 NEI) data. This information is publicly available on EPA's website: http://www.epa.gov/ttn/chief/net/2002inventory.html. The point source ammonia (NH3) emissions inventory was pulled from the 2005 NEI because point sources were not required to report ammonia emissions in 2002. The 2005 NEI is also publicly available on EPA's website: http://www.epa.gov/ttn/chief/net/2005inventory.html.

Tables A-1 through A-4 describe the 2002 annual emissions in tons per year for each county within the 1997 St. Louis $PM_{2.5}$ nonattainment area for the point, area, on-road mobile, and off-road mobile source categories, respectively.

Table A-1
2002 Annual Point Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	151.95	7,851.84	1,005.61	47,612.62	816.06
Jefferson County	81.41	9,202.06	979.12	39,281.20	789.55
St. Charles County	102.36	14,691.27	1,377.53	46,644.89	1,455.40
St. Louis County	535.50	10,438.98	634.94	16,689.37	4,725.12
St. Louis City	444.53	2,014.31	610.03	6,771.23	3,851.73
Totals	**1,315.75**	**44,198.44**	**4,607.24**	**156,999.31**	**11,637.86**

Table A-2
2002 Annual Area Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1,523.07	706.6	3,213.60	1,003.85	2,141.98
Jefferson County	184.13	662.15	5,024.16	789.34	4,629.17
St. Charles County	747.93	1,219.33	2,863.10	2,043.37	4,484.60
St. Louis County	1,452.35	5,340.02	3,120.76	9,957.84	23,601.38
St. Louis City	60.59	2,001.13	611.59	3,437.49	10,528.03
Totals	**3,968.07**	**9,929.24**	**14,833.22**	**17,231.88**	**45,385.16**

Table A-3
2002 Annual On-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area
(Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	143.30	3,991.40	77.85	108.51	2,145.69
Jefferson County	221.37	6,229.65	120.53	167.84	3,455.41
St. Charles County	306.04	8,869.06	167.11	232.31	5,049.09
St. Louis County	1,357.65	39,489.52	742.01	1,030.91	22,579.66
St. Louis City	354.94	10,319.70	194.18	269.49	6,023.21
Totals	**2,383.29**	**68,899.33**	**1,301.68**	**1,809.06**	**39,253.06**

Table A-4
2002 Annual Off-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area
(Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	0.58	2,223.75	116.15	168.33	987.67
Jefferson County	0.77	1,758.78	112.71	142.38	1,122.75
St. Charles County	1.88	3,399.91	250.51	292.34	2,659.31
St. Louis County	5.83	9,593.70	776	811.58	9,217.04
St. Louis City	0.79	10,461.01	331.29	660.68	1,521.14
Totals	**9.84**	**27,437.16**	**1,586.67**	**2,075.32**	**15,507.90**

Appendix B

2008
Point, Area, On-Road Mobile and Off-Road Mobile Emissions Inventory Summary

(Missouri Counties)

Appendix B-1	**2008 Point and Area Source Emissions**
Appendix B-2	**2008 On-Road Mobile Source Emissions Using Mobile 6.2 via NMIM**
Appendix B-3	**2008 On-Road Mobile Source Emissions Using MOVES 2010A**
Appendix B-4	**2008 Off-Road Mobile Source Emissions**
Appendix B-5	**MOVES I/M Input Table Development Protocol**

Appendix B-1 2008 Point and Area Source Emissions

The 2008 Emissions Inventory used to develop the 2008 point and area source emissions in this document was generated from the information that the Missouri Department of Natural Resources' Air Pollution Control Program submitted to EPA for use in the 2008 National Emissions Inventory (NEI) data. The 2008 NEI data is publicly available on EPA's website: http://www.epa.gov/ttn/chief/net/2008inventory.html. Table B-1 describes the 2008 annual emissions in tons per year for each county within the 1997 St. Louis $PM_{2.5}$ nonattainment area for the point source category. The full 2008 $PM_{2.5}$ annual emissions inventory for the Missouri side of the 1997 St. Louis $PM_{2.5}$ nonattainment area is included as Appendix E to this redesignation request and maintenance plan.

Table B-2 summarizes the area source emissions. This table includes refueling VOC emissions for on-road motor vehicles estimated by MOVES2010a and account for the stage II controls that were in place in the St. Louis nonattainment area in 2008. These 2008 refueling stage II VOC emissions are displayed by county in Table B-3. In addition, due to the methods that are used to calculate the emissions for the marine, and rail categories, these categories are included as area source emissions in the National Emissions Inventory (NEI) and aircraft takeoff and landing emissions are listed as point source emissions in the NEI, although all three categories really should be classified as off-road mobile source emissions. Therefore, the emissions for aircraft, rail, and marine are not included in the total point source and area source emissions listed in Tables B-1 and B-2. The source classification codes for the aircraft, rail, and marine categories are listed in Table B-4, and the emissions from these categories are listed in Table B-32, to be included as off-road mobile source emissions.

Table B-1 2008 Annual Point Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	2.82	9,178.19	1,448.96	57,944.69	685.48
Jefferson County	8.97	7,016.40	945.65	68,569.22	600.04
St. Charles County	8.04	7,649.32	316.21	48,595.24	936.97
St. Louis County	720.41	5,843.53	510.91	20,861.90	1,689.72
St. Louis City	568.40	1,415.83	271.66	5,729.67	1,155.67
Totals	**1,308.64**	**31,103.26**	**3,493.39**	**201,700.73**	**5,067.89**

Table B-2 2008 Annual Area Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1,300.09	283.00	2,315.04	991.12	1,604.16
Jefferson County	165.26	383.49	3,428.01	904.61	3,116.32
St. Charles County	883.43	463.05	2,331.71	895.42	5,744.68
St. Louis County	1,036.69	2,219.83	4,584.76	5,445.70	20,110.91
St. Louis City	129.50	1,033.57	1,374.12	3,273.63	7,639.28
Totals	**3,514.98**	**4,382.94**	**14,033.64**	**11,510.48**	**38,215.34**

Table B-3 2008 Annual Refueling Stage II VOC Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	Stage II VOC Emissions (tons/year)
Franklin County	18.34
Jefferson County	22.09
St. Charles County	32.9
St. Louis County	144.01
St. Louis City	41.88
Totals	**259.21**

Table B-4 SCC Codes and Descriptions Not Included in the Analysis for Point or Area Source Emissions

SCC	SCC Level One	SCC Level Two	SCC Level Three	SCC Level Four
2275001000	Mobile Sources	Aircraft	Military Aircraft	Total
2275020000	Mobile Sources	Aircraft	Commercial Aircraft	Total: All Types
2275050011	Mobile Sources	Aircraft	General Aviation	Piston
2275050012	Mobile Sources	Aircraft	General Aviation	Turbine
2275060011	Mobile Sources	Aircraft	Air Taxi	Piston
2275060012	Mobile Sources	Aircraft	Air Taxi	Turbine
2275085000	Mobile Sources	Aircraft	Unpaved Airstrips	Total
2275087000	Mobile Sources	Aircraft	In-flight (non-Landing-Takeoff cycle)	Total
2280002100	Mobile Sources	Marine Vessels, Commercial	Diesel	Port emissions
2280002200	Mobile Sources	Marine Vessels, Commercial	Diesel	Underway emissions
2280003100	Mobile Sources	Marine Vessels, Commercial	Residual	Port emissions
2280003200	Mobile Sources	Marine Vessels, Commercial	Residual	Underway emissions
2280004000	Mobile Sources	Marine Vessels, Commercial	Gasoline	Total, All Vessel Types
2285002006	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Class I Operations
2285002007	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Class II / III Operations
2285002008	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Passenger Trains (Amtrak)
2285002009	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Commuter Lines
2285002010	Mobile Sources	Railroad Equipment	Diesel	Yard Locomotives
28500201	Internal Combustion Engines	Railroad Equipment	Diesel	Yard Locomotives

Appendix B-2 2008 On-Road Mobile Source Emissions Using Mobile 6.2 via NMIM

The 2008 on-road mobile emissions shown in Section 4 of this redesignation request and maintenance plan were created using Mobile6.2 via the NMIM for the St. Louis nonattainment area for the purpose of submitting state wide emissions data for EPA's 2008 NEI. The NMIM NCD was updated with Missouri specific data. The fuel and meteorological data in the NCD for 2008 was used and all months for 2008 were selected to create an annual emissions profile. Table B-5 summarizes the emissions by county that were generated using NMIM.

Table B-5
2008 Annual On-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area Calculated using Mobile 6.2 and NMIM (Tons/Year)
(Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	166.80	2,730.77	51.07	27.09	1,448.33
Jefferson County	192.14	3,209.18	58.59	31.13	1,706.45
St. Charles County	278.22	4,726.01	84.48	44.93	2,566.36
St. Louis County	1,216.43	20,726.08	368.85	196.22	11,351.33
St. Louis City	351.94	6,004.28	106.90	56.78	3,350.19
Totals	**2,205.53**	**37,396.31**	**669.88**	**356.15**	**20,422.66**

The local VMT data was gathered from East-West Gateway at the county level. This data was used in conjunction with NMIM to estimate the emissions in Table B-5. The VMT data by county is listed below in Table B-6. This data was broken down to SCC using the default distribution in NMIM. A vehicle distribution was created from registration data from Missouri's Department of Revenue.

Table B-6 2008 Annual VMT Data by County
(Missouri Counties Only)

County	2008 Annual VMT
Franklin	1,636,760,381
Jefferson	1,884,745,023
St. Charles	2,728,058,895
St. Louis	11,924,864,323
St. Louis City	3,450,450,085
Total	**21,624,878,706**

The vehicle registration data used to in conjunction with NMIM to estimate the emissions in Table B-5 is listed below in Table B-7. The same registration distribution was used for all five counties in the nonattainment area.

Table B-7 St. Louis Nonattainment Area Registration Distribution (NMIM Inputs for 2008 On-Road Mobile Source Emissions)

Vehicle Class	Vehicle Model Year Population Percentage Per Vehicle Classification												
	2008	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**	**1999**	**1998**	**1997**	**1996**
LDV	0.0248	0.0564	0.0666	0.0649	0.0653	0.0632	0.0633	0.0679	0.0675	0.0652	0.0604	0.0501	0.0488
LDT1	0.0130	0.0345	0.0103	0.0666	0.0759	0.0255	0.0713	0.0780	0.0859	0.0487	0.0474	0.0398	0.0379
LDT2	0.0179	0.0593	0.0700	0.0750	0.0840	0.0759	0.0728	0.0808	0.0671	0.0640	0.0563	0.0522	0.0427
LDT3	0.0161	0.0734	0.0630	0.0760	0.0785	0.0842	0.0838	0.0728	0.0624	0.0539	0.0561	0.0365	0.0328
LDT4	0.0153	0.0843	0.1358	0.0771	0.0953	0.1119	0.0736	0.0461	0.0564	0.0549	0.0715	0.0395	0.0342
HDV2b	0.0078	0.0468	0.0483	0.0729	0.0660	0.0808	0.0871	0.0713	0.0773	0.0671	0.0642	0.0310	0.0519
HDV3	0.0066	0.0628	0.0602	0.0961	0.0876	0.0681	0.0715	0.0613	0.0774	0.0669	0.0734	0.0272	0.0331
HDV4	0.0040	0.0200	0.0638	0.0404	0.0338	0.0366	0.0385	0.0413	0.0653	0.0781	0.0821	0.0383	0.0630
HDV5	0.0187	0.1207	0.0664	0.0804	0.0535	0.0639	0.0560	0.0450	0.0578	0.0951	0.0899	0.0465	0.0572
HDV6	0.0311	0.0355	0.1005	0.0865	0.0529	0.0268	0.0212	0.0199	0.0840	0.0765	0.0685	0.0572	0.0591
HDV7	0.0182	0.0324	0.1250	0.1080	0.1033	0.0772	0.0847	0.0669	0.0285	0.0427	0.0285	0.0253	0.0281
HDV8a	0.0136	0.0110	0.0524	0.0497	0.0565	0.0513	0.0420	0.0301	0.0426	0.0791	0.0570	0.0386	0.0354
HDV8b	0.0189	0.0726	0.2263	0.0348	0.0639	0.0957	0.0899	0.0552	0.0522	0.1363	0.0697	0.0305	0.0203
HDBS	0.0343	0.0556	0.0925	0.0556	0.1004	0.0587	0.0623	0.0351	0.0489	0.0657	0.0669	0.0678	0.0426
HDBT	0.0060	0.0045	0.0132	0.0144	0.0138	0.0291	0.0378	0.0258	0.0249	0.0390	0.0351	0.0309	0.0351
MC	0.0190	0.0646	0.1035	0.1096	0.1172	0.0874	0.0922	0.0713	0.0610	0.0435	0.0360	0.0255	0.0208
	1995	**1994**	**1993**	**1992**	**1991**	**1990**	**1989**	**1988**	**1987**	**1986**	**1985**	**1984**	
LDV	0.0390	0.0420	0.0313	0.0274	0.0213	0.0184	0.0138	0.0121	0.0083	0.0065	0.0049	0.0106	
LDT1	0.0443	0.0211	0.0168	0.0210	0.0189	0.0193	0.0184	0.0363	0.0582	0.0433	0.0250	0.0426	
LDT2	0.0292	0.0287	0.0266	0.0215	0.0157	0.0149	0.0096	0.0096	0.0076	0.0054	0.0042	0.0090	
LDT3	0.0322	0.0423	0.0338	0.0207	0.0181	0.0106	0.0112	0.0104	0.0070	0.0067	0.0058	0.0117	
LDT4	0.0201	0.0158	0.0145	0.0101	0.0074	0.0055	0.0052	0.0063	0.0074	0.0045	0.0014	0.0059	
HDV2b	0.0350	0.0393	0.0244	0.0196	0.0151	0.0122	0.0124	0.0154	0.0097	0.0062	0.0102	0.0280	
HDV3	0.0266	0.0340	0.0223	0.0165	0.0122	0.0126	0.0134	0.0118	0.0126	0.0096	0.0098	0.0264	
HDV4	0.0504	0.0723	0.0647	0.0308	0.0247	0.0243	0.0238	0.0270	0.0198	0.0121	0.0128	0.0321	
HDV5	0.0517	0.0217	0.0147	0.0083	0.0067	0.0110	0.0113	0.0125	0.0080	0.0012	0.0000	0.0018	
HDV6	0.0557	0.0389	0.0134	0.0152	0.0093	0.0162	0.0292	0.0196	0.0184	0.0240	0.0062	0.0342	
HDV7	0.0253	0.0321	0.0174	0.0202	0.0158	0.0166	0.0139	0.0226	0.0162	0.0178	0.0103	0.0230	
HDV8a	0.0333	0.0786	0.0447	0.0381	0.0239	0.0228	0.0291	0.0360	0.0277	0.0261	0.0163	0.0641	
HDV8b	0.0087	0.0015	0.0015	0.0029	0.0044	0.0044	0.0029	0.0044	0.0000	0.0000	0.0015	0.0015	
HDBS	0.0489	0.0327	0.0185	0.0146	0.0106	0.0095	0.0114	0.0173	0.0024	0.0035	0.0032	0.0410	
HDBT	0.0830	0.0836	0.0492	0.0441	0.0267	0.0399	0.0609	0.0333	0.0558	0.0540	0.0351	0.1248	
MC	0.0189	0.0171	0.0122	0.0119	0.0073	0.0063	0.0063	0.0064	0.0054	0.0068	0.0097	0.0401	

The following I/M Program File was used in NMIM in order to generate the 2008 on-road mobile emissions listed in Table B-5.

```
> IM Programs for MO
* Added IM240 beginning 2000, OBD beginning 2005
* New programs include Evap GC

> Exhaust I/M program 1
* Original Idle program through 1999
I/M PROGRAM       : 1 1984 1999 1 TRC IDLE
I/M MODEL YEARS   : 1 1971 1995
I/M VEHICLES      : 1 22222 11111111 1
I/M STRINGENCY    : 1 20
I/M COMPLIANCE    : 1 96
I/M WAIVER RATES  : 1 3 3
NO I/M TTC CREDITS : 1

> Exhaust I/M program 2
* IM240
I/M PROGRAM       : 2 2000 2050 1 TRC IDLE
I/M MODEL YEARS   : 2 1971 1995
I/M VEHICLES      : 2 22222 11111111 1
I/M STRINGENCY    : 2 20
I/M COMPLIANCE    : 2 96
I/M WAIVER RATES  : 2 3 3
I/M CUTPOINTS     : 2 08152.CP1
NO I/M TTC CREDITS : 2

> Exhaust I/M program 3
* Cover OBD vehicles before 2005 OBD program
I/M PROGRAM       : 3 1996 2004 1 TRC IDLE
I/M MODEL YEARS   : 3 1996 2004
I/M VEHICLES      : 3 22222 11111111 1
I/M STRINGENCY    : 3 20
I/M COMPLIANCE    : 3 96
I/M WAIVER RATES  : 3 3 3
NO I/M TTC CREDITS : 3
```

Anti-tampering Program File:

```
* ATP data for 29071 from atp29071.txt
ANTI-TAMP PROG    :
84 71 50 22222 11111111 1 11 096. 22212222
```

Appendix B-3 2008 On-Road Mobile Source Emissions Using MOVES 2010A

EPA released the Mobile Vehicle Emission System (MOVES) in December of 2010, and MOVES is now the official model to use for mobile emissions modeling. The 2008 on-road mobile source emissions were initially created using Mobile6.2 via NMIM for the St. Louis nonattainment area for the purpose of submitting state wide emissions data for EPA's 2008 National Emissions Inventory (NEI). The NMIM NCD was updated with Missouri specific data. Local VMT data, vehicle registration distributions, and meteorology data from the updated NCD were converted to MOVES formatting using EPA provided conversion workbooks. The full 2008 base year $PM_{2.5}$ annual emissions inventory for the Missouri side of the 1997 St. Louis $PM_{2.5}$ nonattainment area is included as Appendix E to this redesignation request and maintenance plan. This inventory included the 2008 base year on-road mobile source emissions, which were calculated using EPA's MOVES 2010a, that were used in the redesignation request and maintenance plan to establish the base year (2008) transportation conformity budgets.

The 2008 VMT data was originally generated from the Missouri Department of Transportation for state-owned roads, and then East-West Gateway used their Traffic Demand Model to calculate the actual local VMT data for each of the five counties on the Missouri side of the St. Louis $PM_{2.5}$ nonattainment area. This data is listed in Table B-6 above. The road type distribution in the baseyearvmt table from the NCD was used to distribute the county level VMT to road type. EPA's VMT converter workbook was then used to produce MOVES input tables. A vehicle registration distribution was originally created for NMIM using registration data from Missouri's Department of Revenue. This registration distribution is listed above in Table B-7. The vehicle distribution was converted to MOVES age distribution table using EPA's VMT converter workbook. The registration data was also used to create the MOVES vehicle population input tables. Vehicle counts were converted from Mobile 6.2 vehicle classes to MOVES source types using the source type fractions from the Source Type Pop Fractions table in EPA's VMT converter workbook. The Air Program developed the I/M data input to accurately describe the Gateway Vehicle Inspection Program (GVIP), which is the I/M program in the St. Louis area. This protocol used to develop the I/M input in MOVES can be found in Appendix B-5. MOVES base data was used for all other inputs, after reviewing the data to ensure accuracy. The base fuel formulation and fuel supply tables in MOVES were used for the runs, as they already took into account the reformulated gasoline used in the St. Louis nonattainment area. A separate input database was created for each county, using county specific data where possible. All of the MOVES input tables, other than templates where EPA default data was used, which were used to create the 2008 on-road mobile emissions inventory for the early progress plan can be found in this Appendix.

Once MOVES input tables had been created, the MOVES model runs were set up selecting all available gasoline and diesel fuel vehicle type combinations, all months, days, hours, and all road types. A separate run was set-up for each pollutant and each county. All pollutant processes were selected in each run, but the VOC emissions from MOVES emission processes 18 and 19 (refueling displacement emissions, and refueling evaporative emissions) were removed during the post model analysis as these are refueling emissions, which are classified as area source emissions, and are not included in the mobile source emissions inventory. The emissions for all

pollutants and all counties were post aggregated to the month level and the emissions from all months in 2008 were totaled to develop the annual on-road mobile source emissions.

Table B-8 summarizes the 2008 annual on-road emissions by county as calculated using MOVES for the Missouri counties located in the St. Louis $PM_{2.5}$ nonattainment area. Tables B-9 through B-29 provide all of the MOVES inputs that were used to create the 2008 on-road mobile source emissions inventory that is summarized in Table B-8, and also referred to in Section 5 of the redesignation demonstration and maintenance plan, except for templates where MOVES default data was used. As stated above, the Fuel Formulation and Fuel Supply Tables that were used to create the on-road mobile source inventory were MOVES default tables, but they are still provided in this document for reference (Tables B-13 and B-14).

Table B-8
2008 Annual On-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area Calculated using MOVES
(Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	77.75	4,187.90	142.46	30.12	1,555.66
Jefferson County	90.68	5,313.80	183.94	36.32	2,522.89
St. Charles County	133.29	7,788.01	284.16	54.30	3,613.71
St. Louis County	585.26	32,363.41	1,215.47	237.05	12,865.54
St. Louis City	169.20	9,166.46	353.26	68.87	3,236.00
Totals	**1,056.17**	**58,819.58**	**2,179.28**	**426.65**	**23,793.80**

Table B-9 2008 Source Type Population (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

			Source Type Population by County				
YearID	**SourceTypeName**	**SourceTypeID**	**Franklin**	**Jefferson**	**St Charles**	**St Louis County**	**St Louis City**
2008	Motorcycle	11	6,067	13,018	11,151	19,243	3104
2008	Passenger Car	21	46,568	98,009	144,441	527,148	125,776
2008	Passenger Truck	31	45,890	82,509	110,386	303,296	59,406
2008	Light Commercial Truck	32	16,769	28,421	35,913	97,845	20,194
2008	Refuse Truck	41	8	41	36	94	70
2008	Single Unit Short-haul Truck	42	25	123	106	280	208
2008	Single Unit Long-haul Truck	43	302	541	549	2,709	661
2008	Motor Home	51	22	19	19	50	16
2008	School Bus	52	814	901	1,020	3,624	1,249
2008	Transit Bus	53	61	67	76	270	93
2008	Intercity Bus	54	44	71	82	379	143
2008	Combination Short-haul Truck	61	370	324	328	791	248
2008	Combination Long-haul Truck	62	307	257	258	545	160

Table B-10 2008 Annual VMT by HPMS Vehicle Type, County, and Year (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

			HPMSBaseYearVMT by County				
HPMSVtypeID	**HPMSVtypeName**	**YearID**	**Franklin**	**Jefferson**	**St. Charles**	**St. Louis**	**St. Louis City**
10	Motorcycles	2008	11,619,323	13,841,651	20,770,584	91,989,970	26,665,063
20	Passenger Cars	2008	707,169,172	811,173,607	1,171,243,667	5,115,865,231	1,477,495,621
30	Other 2 axle-4 tire vehicles	2008	799,130,600	924,394,839	1,342,595,411	5,875,722,138	1,702,465,533
40	Buses	2008	4,781,820	5,578,789	8,183,119	35,928,481	10,469,862
50	Single Unit Trucks	2008	29,351,955	33,386,793	47,634,481	207,228,073	59,856,119
60	Combination Trucks	2008	84,673,330	96,333,716	137,528,782	598,448,609	173,536,046

Table B-11 Age Distribution by Source Type (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	Source Type ID												
AgeID	**11**	**21**	**31**	**32**	**41**	**42**	**43**	**51**	**52**	**53**	**54**	**61**	**62**
0	0.019	0.0248	0.016038	0.015215	0.006	0.006	0.03372	0.019407	0.022549	0.022677	0.024421	0.018826	0.017834
1	0.0646	0.0564	0.059034	0.058508	0.0045	0.0045	0.054157	0.048521	0.039325	0.03937	0.032671	0.049995	0.052613
2	0.1035	0.0666	0.063189	0.062229	0.0132	0.0132	0.092687	0.158149	0.129508	0.130555	0.106219	0.16227	0.169835
3	0.1096	0.0649	0.073971	0.073529	0.0144	0.0144	0.057163	0.057986	0.082002	0.084645	0.091592	0.052692	0.04403
4	0.1172	0.0653	0.081725	0.079405	0.0138	0.0138	0.098055	0.068814	0.07432	0.076743	0.07138	0.066656	0.063479
5	0.0874	0.0632	0.072225	0.07206	0.0291	0.0291	0.05743	0.075516	0.060754	0.062113	0.04642	0.077218	0.080584
6	0.0922	0.0633	0.075227	0.075017	0.0378	0.0378	0.060728	0.071294	0.059753	0.061551	0.046468	0.072242	0.074392
7	0.0713	0.0679	0.075731	0.074101	0.0258	0.0258	0.034794	0.048222	0.045101	0.04668	0.038418	0.04791	0.047775
8	0.061	0.0675	0.069095	0.069315	0.0249	0.0249	0.049567	0.050551	0.053801	0.053336	0.05744	0.050259	0.049622
9	0.0435	0.0652	0.059343	0.060606	0.039	0.039	0.065329	0.101607	0.075238	0.074281	0.059218	0.106403	0.114631
10	0.036	0.0604	0.056546	0.058019	0.0351	0.0351	0.065952	0.060365	0.052757	0.052173	0.04901	0.061907	0.064481
11	0.0255	0.0501	0.045379	0.044021	0.0309	0.0309	0.066337	0.035034	0.038694	0.038608	0.041544	0.03448	0.033479
12	0.0208	0.0488	0.040069	0.041299	0.0351	0.0351	0.042714	0.030037	0.038252	0.038379	0.043733	0.028628	0.026173
13	0.0189	0.039	0.031719	0.032547	0.083	0.083	0.048635	0.022609	0.033622	0.033505	0.041779	0.020871	0.017769
14	0.0171	0.042	0.029341	0.030746	0.0836	0.0836	0.033323	0.026945	0.032499	0.031744	0.038573	0.026434	0.025331
15	0.0122	0.0313	0.025132	0.025766	0.0492	0.0492	0.018302	0.014853	0.01522	0.015277	0.015313	0.014766	0.014626
16	0.0119	0.0274	0.020261	0.020238	0.0441	0.0441	0.01489	0.014543	0.016624	0.016485	0.018482	0.014281	0.013778
17	0.0073	0.0213	0.01591	0.015912	0.0267	0.0267	0.010657	0.011093	0.012019	0.01218	0.012215	0.010861	0.010491
18	0.0063	0.0184	0.014002	0.013972	0.0399	0.0399	0.009968	0.011696	0.014667	0.014636	0.016859	0.011229	0.010394
19	0.0063	0.0138	0.011117	0.011398	0.0609	0.0609	0.012691	0.012448	0.018417	0.017168	0.026192	0.012123	0.011221
20	0.0064	0.0121	0.014109	0.014268	0.0333	0.0333	0.018084	0.014903	0.019136	0.018141	0.024946	0.014734	0.014172
21	0.0054	0.0083	0.015761	0.015219	0.0558	0.0558	0.00363	0.01022	0.014831	0.014247	0.019752	0.009773	0.008829
22	0.0068	0.0065	0.011686	0.011205	0.054	0.054	0.00501	0.010636	0.017272	0.016478	0.024234	0.009966	0.008574
23	0.0097	0.0049	0.00791	0.008124	0.0351	0.0351	0.003627	0.006385	0.007661	0.00744	0.00919	0.006293	0.006072
24	0.013837	0.003694	0.00582	0.006825	0.022815	0.022815	0.003017	0.003218	0.003631	0.003569	0.004095	0.003185	0.003108
25	0.019738	0.002785	0.004029	0.004856	0.01483	0.01483	0.002668	0.001864	0.001955	0.001889	0.002204	0.001885	0.001903
26	0.006525	0.002099	0.002201	0.002308	0.009639	0.009639	0.002379	0.001137	0.001109	0.001082	0.001162	0.001156	0.001183
27	0	0.001582	0.001069	0.001073	0.006266	0.006266	0.00214	0.00071	0.000645	0.000647	0.000595	0.000721	0.000739
28	0	0.00044	0.000253	0.000245	0.004073	0.004073	0.001953	0.000417	0.000378	0.000362	0.000398	0.000432	0.000454
29	0	0	0.000147	0.000139	0.002647	0.002647	0.001784	0.00024	0.000223	0.000197	0.000282	0.000256	0.000278
30	0	0	0.001957	0.001836	0.064531	0.064531	0.028609	0.010581	0.018036	0.013841	0.035194	0.011546	0.012147

Table B-12 Inspection and Maintenance Data for 2008 (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

Pol Process ID	State ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspect Freq.	Test Standards ID	Beg Model Year ID	End Model Year ID	Use IM Y/N	Compliance Factor
101	29	2008	21	1	1	1	11	1971	1995	N	93.12
101	29	2008	21	1	10	2	51	1996	2006	Y	97.94
101	29	2008	31	1	1	1	11	1971	1995	N	93.12
101	29	2008	31	1	10	2	51	1996	2006	Y	92.06
101	29	2008	32	1	1	1	11	1971	1995	N	93.12
101	29	2008	32	1	10	2	51	1996	2006	Y	86.18
102	29	2008	21	1	1	1	11	1971	1995	N	93.12
102	29	2008	21	1	10	2	51	1996	2006	Y	97.94
102	29	2008	31	1	1	1	11	1971	1995	N	93.12
102	29	2008	31	1	10	2	51	1996	2006	Y	92.06
102	29	2008	32	1	1	1	11	1971	1995	N	93.12
102	29	2008	32	1	10	2	51	1996	2006	Y	86.18
112	29	2008	21	1	7	1	41	1971	1995	N	93.12
112	29	2008	21	1	8	2	43	1996	2006	Y	97.94
112	29	2008	31	1	7	1	41	1971	1995	N	93.12
112	29	2008	31	1	8	2	43	1996	2006	Y	92.06
112	29	2008	32	1	7	1	41	1971	1995	N	93.12
112	29	2008	32	1	8	2	43	1996	2006	Y	86.18
113	29	2008	21	1	7	1	41	1971	1995	N	93.12
113	29	2008	21	1	8	2	43	1996	2006	Y	97.94
113	29	2008	31	1	7	1	41	1971	1995	N	93.12
113	29	2008	31	1	8	2	43	1996	2006	Y	92.06
113	29	2008	32	1	7	1	41	1971	1995	N	93.12
113	29	2008	32	1	8	2	43	1996	2006	Y	86.18
201	29	2008	21	1	1	1	11	1971	1995	N	93.12
201	29	2008	21	1	10	2	51	1996	2006	Y	97.94
201	29	2008	31	1	1	1	11	1971	1995	N	93.12
201	29	2008	31	1	10	2	51	1996	2006	Y	92.06

Pol Process ID	State ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspect Freq.	Test Standards ID	Beg Model Year ID	End Model Year ID	Use IM Y/N	Compliance Factor
201	29	2008	32	1	1	1	11	1971	1995	N	93.12
201	29	2008	32	1	10	2	51	1996	2006	Y	86.18
202	29	2008	21	1	1	1	11	1971	1995	N	93.12
202	29	2008	21	1	10	2	51	1996	2006	Y	97.94
202	29	2008	31	1	1	1	11	1971	1995	N	93.12
202	29	2008	31	1	10	2	51	1996	2006	Y	92.06
202	29	2008	32	1	1	1	11	1971	1995	N	93.12
202	29	2008	32	1	10	2	51	1996	2006	Y	86.18
301	29	2008	21	1	10	2	51	1996	2006	Y	97.94
301	29	2008	31	1	10	2	51	1996	2006	Y	92.06
301	29	2008	32	1	10	2	51	1996	2006	Y	86.18
302	29	2008	21	1	10	2	51	1996	2006	Y	97.94
302	29	2008	31	1	10	2	51	1996	2006	Y	92.06
302	29	2008	32	1	10	2	51	1996	2006	Y	86.18

Table B-13 Fuel Formulation for 2008 (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

Fuel FormulationID	Fuel SubtypeID	FuelSubtypeDesc	RVP	Sulfur Level	ETOH Volume	MTBE Volume	ETBE Volume	TAME Volume	Aromatic Content	Olefin Content
2302	12	Gasohol (E10)	11.2917	43.0622	10	0	0	0	20.2606	8.39154
2303	12	Gasohol (E10)	8.75115	46.6452	10	0	0	0	18.9623	8.14345
2304	12	Gasohol (E10)	6.84571	49.3325	10	0	0	0	17.9886	7.95739
2305	12	Gasohol (E10)	13.1972	40.375	10	0	0	0	21.2343	8.57759
20043	20	Conventional Diesel	0	43	0	0	0	0	0	0

Fuel FormulationID	Fuel SubtypeID	fuelSubtypeDesc	Benzene Content	e200	e300	biodiesel EsterVolume	cetaneIndex	PAHContent
2302	12	Gasohol (E10)	0.848747	56.4983	84.16	0	0	0
2303	12	Gasohol (E10)	0.763743	53.3414	85.1429	0	0	0
2304	12	Gasohol (E10)	0.69999	50.9738	85.88	0	0	0
2305	12	Gasohol (E10)	0.9125	58.8659	83.4229	0	0	0
20043	20	Conventional Diesel	0	0	0	0	0	0

Table B-14 2008 Fuel Supply (MOVES Inputs for 2008 On-Road Mobile Source Emissions)

FuelYearID	Month GroupID	Fuel FormulationID	Market Share	Market ShareCV
2008	1	2305	1	0.5
2008	1	20043	1	0.5
2008	2	20043	1	0.5
2008	2	2302	1	0.5
2008	3	2302	1	0.5
2008	3	20043	1	0.5
2008	4	20043	1	0.5
2008	4	2303	1	0.5
2008	5	2303	1	0.5
2008	5	20043	1	0.5
2008	6	20043	1	0.5
2008	6	2304	1	0.5
2008	7	2304	1	0.5
2008	7	20043	1	0.5
2008	8	20043	1	0.5
2008	8	2304	1	0.5
2008	9	2304	1	0.5
2008	9	20043	1	0.5
2008	10	20043	1	0.5
2008	10	2303	1	0.5
2008	11	2302	1	0.5
2008	11	20043	1	0.5
2008	12	20043	1	0.5
2008	12	2302	1	0.5

Table B-15 Franklin County Road Type Distribution (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0.090246
11	3	0.553444
11	4	0.087268
11	5	0.269042
21	1	0
21	2	0.084309
21	3	0.591423
21	4	0.079558
21	5	0.24471
31	1	0
31	2	0.08262
31	3	0.588941
31	4	0.083327
31	5	0.245112
32	1	0
32	2	0.082331
32	3	0.589795
32	4	0.082902
32	5	0.244973
41	1	0
41	2	0.091642
41	3	0.578893
41	4	0.092985
41	5	0.23648
42	1	0
42	2	0.091642
42	3	0.578893
42	4	0.092985
42	5	0.23648
43	1	0
43	2	0.090795
43	3	0.580059
43	4	0.092167
43	5	0.236979

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0.083482
51	3	0.602647
51	4	0.081432
51	5	0.232438
52	1	0
52	2	0.079374
52	3	0.604049
52	4	0.077497
52	5	0.23908
53	1	0
53	2	0.079998
53	3	0.603836
53	4	0.078094
53	5	0.238072
54	1	0
54	2	0.077187
54	3	0.604795
54	4	0.075403
54	5	0.242615
61	1	0
61	2	0.084046
61	3	0.602455
61	4	0.081972
61	5	0.231527
62	1	0
62	2	0.084887
62	3	0.602168
62	4	0.082778
62	5	0.230167

Table B-16 Jefferson County Road Type Distribution (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0.027299
11	3	0.327775
11	4	0.296743
11	5	0.348182
21	1	0
21	2	0.026499
21	3	0.363795
21	4	0.280746
21	5	0.32896
31	1	0
31	2	0.025738
31	3	0.359148
31	4	0.288448
31	5	0.326666
32	1	0
32	2	0.02567
32	3	0.359993
32	4	0.287549
32	5	0.326787
41	1	0
41	2	0.028299
41	3	0.349837
41	4	0.3093
41	5	0.312563
42	1	0
42	2	0.028299
42	3	0.349837
42	4	0.3093
42	5	0.312563
43	1	0
43	2	0.028073
43	3	0.351082
43	4	0.307413
43	5	0.313432

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0.026449
51	3	0.373764
51	4	0.284734
51	5	0.315052
52	1	0
52	2	0.025151
52	3	0.3747
52	4	0.27602
52	5	0.32413
53	1	0
53	2	0.025348
53	3	0.374558
53	4	0.277343
53	5	0.322751
54	1	0
54	2	0.02446
54	3	0.375196
54	4	0.271382
54	5	0.328963
61	1	0
61	2	0.026628
61	3	0.373636
61	4	0.28593
61	5	0.313806
62	1	0
62	2	0.026894
62	3	0.373444
62	4	0.287715
62	5	0.311948

Table B-17 St. Charles County Road Type Distribution (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0.008501
11	3	0.083985
11	4	0.423865
11	5	0.483649
21	1	0
21	2	0.011445
21	3	0.096868
21	4	0.416825
21	5	0.474863
31	1	0
31	2	0.010109
31	3	0.095047
31	4	0.426164
31	5	0.46868
32	1	0
32	2	0.010244
32	3	0.09535
32	4	0.425148
32	5	0.469258
41	1	0
41	2	0.011811
41	3	0.091364
41	4	0.453393
41	5	0.443432
42	1	0
42	2	0.011811
42	3	0.091364
42	4	0.453393
42	5	0.443432
43	1	0
43	2	0.009959
43	3	0.092097
43	4	0.451928
43	5	0.446017

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0.010872
51	3	0.100661
51	4	0.428451
51	5	0.460016
52	1	0
52	2	0.010809
52	3	0.100965
52	4	0.41471
52	5	0.473516
53	1	0
53	2	0.010819
53	3	0.100919
53	4	0.416797
53	5	0.471465
54	1	0
54	2	0.010769
54	3	0.101128
54	4	0.407389
54	5	0.480715
61	1	0
61	2	0.010881
61	3	0.10062
61	4	0.430335
61	5	0.458165
62	1	0
62	2	0.010893
62	3	0.100557
62	4	0.433146
62	5	0.455404

Table B-18 St. Louis County Road Type Distribution (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0.00113
11	3	0.011837
11	4	0.460448
11	5	0.526585
21	1	0
21	2	0.001544
21	3	0.015158
21	4	0.459076
21	5	0.524222
31	1	0
31	2	0.001361
31	3	0.01387
31	4	0.46841
31	5	0.516359
32	1	0
32	2	0.001379
32	3	0.014014
32	4	0.467447
32	5	0.51716
41	1	0
41	2	0.001583
41	3	0.015108
41	4	0.496442
41	5	0.486867
42	1	0
42	2	0.001583
42	3	0.015108
42	4	0.496442
42	5	0.486867
43	1	0
43	2	0.001336
43	3	0.013582
43	4	0.495108
43	5	0.489975

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0.001472
51	3	0.015096
51	4	0.473646
51	5	0.509786
52	1	0
52	2	0.001464
52	3	0.015054
52	4	0.458621
52	5	0.524861
53	1	0
53	2	0.001465
53	3	0.015061
53	4	0.460904
53	5	0.52257
54	1	0
54	2	0.001459
54	3	0.015026
54	4	0.450614
54	5	0.532901
61	1	0
61	2	0.001473
61	3	0.015102
61	4	0.475707
61	5	0.507719
62	1	0
62	2	0.001475
62	3	0.01511
62	4	0.47878
62	5	0.504636

Table B-19 St. Louis City Road Type Distribution (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0
11	3	0
11	4	0.408066
11	5	0.591934
21	1	0
21	2	0
21	3	0
21	4	0.408529
21	5	0.591471
31	1	0
31	2	0
31	3	0
31	4	0.419349
31	5	0.580651
32	1	0
32	2	0
32	3	0
32	4	0.41824
32	5	0.58176
41	1	0
41	2	0
41	3	0
41	4	0.455165
41	5	0.544835
42	1	0
42	2	0
42	3	0
42	4	0.455165
42	5	0.544835
43	1	0
43	2	0
43	3	0
43	4	0.452405
43	5	0.547595

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0
51	3	0
51	4	0.426701
51	5	0.573299
52	1	0
52	2	0
52	3	0
52	4	0.40783
52	5	0.59217
53	1	0
53	2	0
53	3	0
53	4	0.410705
53	5	0.589295
54	1	0
54	2	0
54	3	0
54	4	0.397721
54	5	0.602279
61	1	0
61	2	0
61	3	0
61	4	0.429279
61	5	0.570721
62	1	0
62	2	0
62	3	0
62	4	0.433119
62	5	0.566881

Table B-20 Average Monthly Temperatures by Hour of the Day for Franklin County in Fahrenheit (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	25.8	29	39.1	48.4	55.9	68.2	70.9	67.1	60.6	49	38.4	24.7
2	24.8	27.4	37	46.4	54.7	67.1	69.6	66.2	60.8	47.9	38.4	24.7
3	23.8	26.3	35.8	45	53.6	66	68.8	65.4	60	47.1	37.5	24
4	22.8	25.3	34.5	44.1	52.6	65	68.1	64.8	59.1	46.5	36.8	23.5
5	22	24.9	33.5	43.2	51.7	64.1	67.5	63.9	58.6	45.7	36	23
6	21.4	24.2	32.6	42.7	51.1	63.5	66.8	63.4	58.2	45.1	35.3	22.5
7	21.2	23.8	32.1	42.7	52.6	65.7	68.2	63.9	57.9	44.6	34.7	22.8
8	21	23.4	32.4	45.3	56.2	69.3	71.4	67.6	60	45.9	34.2	22.3
9	22.2	24.9	36.4	48.9	59.6	72.9	75.2	71.7	63.8	50.9	37.1	23.8
10	26.6	27.8	40.5	52.5	63.2	76.2	78.5	75.7	67.8	56	41.5	27.4
11	31.2	31.1	44.7	55.7	66.4	79	81.3	78.9	71.4	60.5	45.6	31.7
12	36	34.3	48.5	58.5	68.8	81.3	83.6	81.2	74.4	63.9	49.3	36.1
13	39.6	37.2	51.7	61.5	70.6	83	85.6	82.9	76.5	66.1	51.9	39.7
14	42.4	39.5	53.9	63.3	72.1	84.3	87	84.1	77.9	67.5	54	42.2
15	44	41	55.6	64.9	73.6	85.1	88	84.9	78.7	68.4	55.1	43.9
16	44.4	41.6	56.3	65.8	74.3	85.5	88.1	85.1	78.7	68.5	55.1	44.1
17	43.2	41.4	56.1	65.6	74.3	85.2	87.7	84.7	77.9	67.4	53.7	42.2
18	39.4	39.9	54.8	64.6	73.3	84.1	86.7	83.3	75.8	64.2	50.1	37.8
19	35.2	37	51.7	62.1	71.3	82.3	84.6	80.4	71.3	58.9	46.8	34.4
20	32.8	34.9	47.9	58.2	67.3	79	81	75.9	67	55.9	44.8	32
21	31	33.6	45.7	55.6	63.2	74.6	76.9	72.5	65.1	54.1	43.1	30.1
22	29.6	32.2	43.9	53.4	60.7	72.2	75	70.6	63.8	52.7	41.9	28.4
23	28.2	30.9	42.3	51.5	58.9	70.7	73.4	69.2	62.5	51.3	40.7	27.1
24	27.2	29.9	40.5	50	57.2	69.3	72.1	68.1	61.4	50.2	39.5	25.7

Table B-21 Average Monthly Percent Relative Humidity by Hour of the Day for Franklin County (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	68.3	76	71.8	70.6	77	78.3	83.9	86.1	88.2	77	68.9	69.9
2	69	77.2	72.8	72.9	77.2	80.2	84.4	86.9	88.5	78.7	70.3	71.8
3	70.1	78	73.9	74.5	78.2	81.6	85.3	87.5	89.2	79.8	71.7	72.9
4	70.9	78.3	75.3	75.3	79.3	82.4	86.1	88.1	90.1	80.4	72.8	73.8
5	71.8	78.3	76.8	76.1	80.5	83.8	86.4	89.3	90.4	81.6	73.9	75.1
6	72.3	78.9	77.6	77	81.1	84.4	87.3	89.6	90.4	82.5	75	75.7
7	72	78.8	78.2	77.6	80.3	83	85.8	89	90.4	83.4	75.9	76.1
8	72	78.8	78.3	74.5	76.2	77.9	81.4	84.9	89.5	83.2	76.5	76
9	71.2	77.6	74.8	69.8	71.5	72.4	74.9	77.5	84.7	76.8	74.3	75.2
10	66.9	74.3	69.7	64.8	65.8	66.9	69.3	70.2	77.2	67.7	68.4	72.4
11	62	70.4	63.5	61.1	61.1	62.1	64.5	64.2	70.5	59.4	62.1	68.4
12	56.8	67	58.7	58.2	58.1	58.2	60.9	60	64.6	53.3	56.5	64.8
13	53	63.8	54.8	55	56.3	55.4	57.9	57.2	60.9	49.9	52.7	62.1
14	50.2	61.5	52.6	53	55.1	53.7	55.8	55.4	58.3	47.7	49.4	60.2
15	48.4	60	51	51.1	53.1	52.2	54.6	54.2	56.8	46.3	47.6	58.7
16	47.3	59.4	50.7	49.7	52.5	51.5	54.4	54	56.6	46	47.1	58
17	47.9	59.8	50.7	49.1	51.7	51.5	55.1	54.9	58.1	47.2	48.4	59.2
18	51.2	61.6	52.5	49.9	52.1	52.8	56.7	57.6	62.8	52.3	52.9	62.9
19	55.5	65.4	56.2	52.8	54.6	55.5	61.1	63.5	72.5	61.5	57.2	65.6
20	58.3	68.2	61	57.5	60.3	61.6	68.4	72.7	80.5	66.9	60	67
21	60.6	70.1	63.9	60.8	66.3	68.8	75.3	78.4	83.9	69.6	62.5	67.6
22	62.8	72	66.3	63.9	70.3	72.8	78.3	81.9	85.3	71.9	64.4	68.3
23	64.5	73.7	68.2	66.4	73.1	75	80.7	83.8	86.4	73.7	65.9	68.7
24	66.1	75.1	70.3	68.3	75.4	77	82.3	85.2	87.6	75.6	67.6	69.1

Table B-22 Average Monthly Temperatures by Hour of the Day for Jefferson County in Fahrenheit (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	25.6	28.3	38.5	47.4	55	68.3	70.1	67	60.2	48.6	37.5	24.2
2	24.7	26.8	36.3	45.5	53.8	67.3	68.8	66.1	60.4	47.7	37.3	24.2
3	23.7	25.7	35.2	44.3	52.8	66.3	68.1	65.3	59.5	46.9	36.4	23.2
4	22.5	24.8	34.2	43.3	51.8	65.2	67.5	64.6	58.9	46.3	35.8	22.8
5	22	24.2	33.3	42.6	50.9	64.5	66.8	63.9	58.2	45.4	35	22.3
6	21.2	23.5	32.3	42.3	50.5	63.8	66.2	63.4	57.9	44.8	34.3	21.8
7	20.8	23.1	31.8	42.3	52.1	66	67.6	63.9	57.6	44.3	33.7	22.1
8	20.8	22.9	32	44.9	55.7	69.6	70.8	67.6	59.9	45.6	33.5	21.6
9	22	24.2	35.7	48.4	58.9	73	74.5	71.6	63.7	50.7	36.6	23.2
10	26.2	27	39.5	51.7	62.4	76.3	77.6	75.6	67.6	55.8	41	27
11	30.7	30	43.6	54.7	65.5	78.9	80.3	78.7	71.3	60.2	45	31
12	35	33.2	47.1	57.1	67.7	81.1	82.5	80.8	74.2	63.7	48.6	35.2
13	38.3	35.7	50.1	59.7	69.3	82.8	84.3	82.5	76.4	65.8	51.1	38.8
14	41.2	37.9	52.3	61.6	70.4	83.9	85.6	83.7	77.7	67.2	53.2	41.1
15	42.9	39.2	53.7	62.9	71.7	84.6	86.6	84.4	78.5	68.1	54.3	42.8
16	43.3	40	54.5	63.8	72.6	84.9	86.9	84.4	78.6	68.1	54.3	43
17	42.1	39.8	54.3	63.5	72.6	84.6	86.5	84.2	77.8	67.1	52.9	41.1
18	38.5	38.3	53	62.6	71.6	83.6	85.4	82.7	75.6	63.9	49.1	36.9
19	34.4	35.7	50	60.1	69.7	81.8	83.4	79.9	71	58.7	45.7	33.8
20	32	33.6	46.8	56.8	65.8	78.6	79.9	75.6	66.7	55.6	43.7	31.5
21	30.3	32.1	44.6	54.1	62	74.4	76.1	72.3	64.7	53.7	41.9	29.8
22	29.1	31.2	42.7	52.2	59.7	72.2	74.1	70.4	63.3	52.3	40.7	27.9
23	28	29.9	41.4	50.3	57.6	70.7	72.6	69	62.1	50.9	39.5	26.8
24	27	29.1	39.7	48.9	56.2	69.4	71.3	68.1	61.1	49.7	38.4	25.1

Table B-23 Average Monthly Percent Relative Humidity by Hour of the Day for Jefferson County (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	67.9	75.6	72.4	70.8	76.6	76.7	83	85.5	87.6	77.2	68.8	69.6
2	69	77.1	73	73.1	76.8	78.3	83.8	86.6	87.6	78.3	70.2	71.1
3	70.1	78	74.1	74.4	77.6	79.9	84.6	86.9	88.5	80.1	71.3	72.5
4	71.2	78.2	75.2	75.5	78.7	81.2	85.2	87.8	88.8	80.7	72.1	73.1
5	71.8	78.2	76.1	76.1	79.5	82.3	85.8	88.4	89.4	81.9	73.2	74.4
6	72.3	78.8	77.6	76.9	80.1	83.2	86.3	88.7	89.4	82.8	74.3	75
7	72.6	78.8	78.2	77.3	79.3	81.3	85.2	88.4	89.4	83.4	75.2	75.3
8	72.3	78.4	78.5	73.9	75	76	80.5	84	88.2	83.2	75.5	75.6
9	71.1	77.2	75.4	69	70.7	70.4	73.8	76.7	83.2	77.1	73.4	74.8
10	67.1	74.2	70.2	64.4	65	64.8	68.5	69.4	76.1	67.5	67.5	71.7
11	62.2	70.5	64.4	60.9	60.3	60.1	63.7	63.8	69.5	58.9	61.3	68
12	57.2	67.1	59.9	58.5	57.6	56.1	60	59.5	63.9	52.9	56.2	64.6
13	53.7	64.7	56.4	55.6	56.1	53	57.4	56.9	60	49.3	52.6	62
14	50.9	62.1	54.1	53.4	54.8	51.8	55	55.1	57.9	46.8	49.5	59.8
15	48.8	60.8	53	51.6	53.4	50.2	53.7	54.1	56.4	45.5	47.7	58.3
16	47.7	59.9	52.5	50.1	52.4	49.5	53.5	54.1	56	45.4	47	57.9
17	48.1	60.1	52.7	49.7	52	49.5	53.9	54.8	57.5	46.4	48.3	59
18	51.3	61.6	54.4	50.7	52.1	50.5	55.6	57.6	62.3	51.7	52.9	62.7
19	55.6	65.2	58.2	54	54.5	53.5	59.7	63.5	71.7	61	57.3	65.3
20	58.2	68.3	62.5	58.4	60.3	59.2	67.1	71.6	79.3	66.7	59.9	66.6
21	60.5	70.2	65.3	61.8	66.2	66.5	73.7	77.6	82.9	69.6	62.9	67.3
22	62.5	71.9	67.5	64.5	70	70.6	77.2	81	84.6	71.8	64.5	68.2
23	64.2	73.6	69.5	67.3	73.2	72.7	79.5	83.2	85.8	73.7	66.3	68.4
24	65.8	74.7	71.3	68.7	75.3	74.9	81.1	84.3	86.7	75.8	67.8	69.1

Table B-24 Average Monthly Temperatures by Hour of the Day for St. Charles County in Fahrenheit (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	24.3	26.9	37.9	47.5	54.9	68.8	70.2	67.6	60.6	49.2	37.6	23.3
2	23.3	25.3	36.1	45.7	53.7	67.8	69	66.8	60.7	48.1	37.5	23.5
3	22.2	24.1	34.9	44.4	52.6	66.7	68.3	65.9	59.9	47.6	36.6	22.8
4	21.2	23.2	33.8	43.5	51.5	65.7	67.9	65.1	59.2	46.8	35.9	22
5	20.7	22.9	32.8	42.7	50.8	64.8	67.2	64.5	58.6	46	35	21.5
6	20.3	22.4	31.7	42.4	50.2	64.3	66.7	63.9	58.1	45.4	34.2	21.3
7	20.1	21.8	31.2	42.4	51.9	66.4	68	64.5	58	44.8	33.8	21
8	20.1	21.5	31.5	45	55.3	69.8	71	68	60.1	46.1	33.5	20.5
9	21.4	23.1	35.2	48.4	58.2	73	74.4	71.9	63.7	50.8	36.5	22.3
10	25.8	25.6	38.9	51.4	61.8	75.9	77.5	75.7	67.6	55.4	40.5	26
11	30.3	28.6	42.7	54.3	64.7	78.4	79.9	78.7	71.3	59.7	44.2	30.3
12	34.4	31.7	46.2	56.7	66.7	80.8	82.2	80.7	74.1	63.1	47.9	34.8
13	38	34.1	48.9	59.3	68	82.3	84.1	82.2	76.2	65	50.5	38.3
14	40.7	36.2	51	61.1	69.4	83.3	85.4	83.5	77.6	66.4	52.6	40.3
15	42	37.6	52.4	62.5	70.8	84	86.4	84.1	78.3	67.3	53.8	41.8
16	42	38.1	52.9	63.4	71.7	84.4	86.5	84.3	78.4	67.4	53.8	42.1
17	41.1	37.8	52.7	63.3	71.8	84.3	86	84	77.8	66.3	52.5	40.6
18	37.5	36.4	51.6	62.4	71	83.3	85	82.7	75.7	63.3	48.9	36.3
19	33.3	33.6	48.8	60.1	69.1	81.8	83	79.8	71	58.4	45.8	33.3
20	30.9	31.9	45.4	56.5	65.3	78.6	79.7	75.8	66.8	55.4	43.9	31
21	29	30.5	43.5	54	61.5	74.6	76	72.5	65	53.9	42.5	29.3
22	27.8	29.5	41.9	52.3	59.1	72.5	74	70.7	63.4	52.6	41.4	27.3
23	26.5	28.2	40.8	50.5	57.4	71.1	72.7	69.4	62.4	51.4	40	25.8
24	25.4	27.7	39	49.1	56	69.8	71.3	68.5	61.2	50.3	38.8	24.3

Table B-25 Average Monthly Percent Relative Humidity by Hour of the Day for St. Charles County (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	67.5	75.8	71.7	70.5	76.6	77.3	83.3	85.5	87.9	76.1	68.8	69.8
2	68.2	77	72.1	72.8	76.5	78.9	84.1	86.4	88.2	77.8	70.2	71.3
3	69.6	77.5	73.5	74.4	77.9	80.5	84.9	86.9	88.8	78.9	71.6	72.5
4	70.7	78.1	74.9	75.3	79.3	82.1	85.2	88.1	89.4	79.5	72.4	73.4
5	71.6	78.1	76.4	75.8	79.8	82.9	86.4	88.4	90.1	81	73.8	74.9
6	71.9	78	77.5	76.3	81	84.1	86.7	89	90.4	81.9	75.3	75.6
7	71.6	78.7	78.2	77	79.9	81.9	85.2	88.1	90	83.1	76.2	76.5
8	71.6	78.3	78.2	73	75.5	76.3	80.2	84	88.8	82.6	76.4	76.2
9	70.5	76.7	74.7	67.9	71.4	70.6	73.8	76.5	83.8	76.8	73.9	75
10	66.2	73.8	69.8	63.9	64.7	65.5	68.2	69	76.3	67.9	68.3	72.2
11	61.3	70.1	63.8	60.2	59.8	60.5	63.5	62.9	69.2	59.8	62.4	68.5
12	56.4	66.7	58.8	57.5	57	55.9	59.5	58.5	63.9	53.4	56.9	65.4
13	52.5	64	55.1	54.7	55.9	53.1	56.6	55.9	59.8	49.9	53.2	62.7
14	49.9	61.3	53	52.7	54.3	51.7	54.4	54	57.3	47.6	49.8	61.2
15	48.1	59.5	51.6	50.9	52.7	50.1	53.1	52.9	56	46.3	47.8	59.6
16	47.1	58.9	51.4	49.5	51.7	49.2	52.9	53	55.6	46	47.1	59.2
17	47.3	59.5	51.8	49.1	50.8	49.2	53.8	53.9	57.1	47	48.6	60.2
18	50.9	61.1	53.5	50.3	50.7	50.3	55.5	56.4	61.6	52.2	53.3	64
19	55.7	65.2	57.5	53.3	53.1	53.2	60	62.4	71.9	61	57.6	66.6
20	58.6	68.1	62.3	58.2	59	59.3	66.8	71.2	80.5	66.9	60.4	67.7
21	61.1	70.6	64.9	61.5	65.4	66.9	74	77.6	83.5	69.3	62.2	67.8
22	62.6	72.3	67.1	63.7	70.2	71.1	77.4	81.3	85.6	71.1	63.9	68.1
23	64	73.7	68.6	66.6	72.9	73.5	79.2	83.3	86.1	72.9	65.5	68.5
24	65.6	74.9	70.7	68.2	75	76	81.1	84.7	87.6	74.7	67.3	69.3

Table B-26 Average Monthly Temperatures by Hour of the Day for St. Louis County in Fahrenheit (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	25.5	28.1	39	48.2	56.2	70.2	71.8	68.8	62.4	50.7	38.8	24.4
2	24.5	26.6	37.3	46.2	55	69.1	70.6	68.1	62.5	49.8	38.6	24.6
3	23.6	25.2	36.1	45.1	53.8	68	69.9	67.2	61.6	49.1	37.8	23.9
4	22.7	24.5	35.1	44.3	52.8	67	69.6	66.5	60.9	48.4	37	23.2
5	21.9	23.9	34.2	43.6	52.1	66.1	68.9	65.9	60.4	47.6	36.3	22.5
6	21.4	23.4	33.1	43.3	51.6	65.6	68.4	65.3	59.9	47.1	35.6	22.5
7	21.2	23.1	32.6	43.3	53.2	67.7	69.7	65.8	59.8	46.6	35	22.5
8	21.2	22.7	32.9	45.7	56.5	70.9	72.5	69.4	61.9	47.9	34.9	22
9	22.5	24.1	36.4	48.9	59.4	73.9	75.7	72.8	65.2	52.2	37.8	23.9
10	26.6	26.7	39.8	51.8	62.5	76.8	78.5	76.6	68.7	56.7	41.5	27.2
11	30.8	29.5	43.3	54.6	65.2	79.3	81	79.5	72.2	60.7	45.1	31.1
12	34.9	32.5	46.7	56.8	67.1	81.6	83.1	81.4	74.8	63.9	48.4	35.1
13	38.2	35	49.4	59.3	68.4	83.1	84.8	83	76.8	65.8	50.9	38.7
14	41	37.1	51.3	61	69.4	84	86.2	84.1	78.3	67.2	52.8	40.8
15	42.5	38.5	52.7	62.4	70.8	84.8	87.2	84.8	79	67.9	54	42
16	42.5	39	53	63.2	71.6	85	87.3	84.9	79	68.1	54.1	42.5
17	41.6	38.6	53	63.1	71.9	84.9	86.8	84.6	78.4	67	52.8	40.8
18	38.1	37.2	51.7	62.4	70.9	84	85.9	83.2	76.3	64.2	49.5	37
19	34.2	34.6	49.1	60.1	69.3	82.5	83.9	80.5	72.3	59.9	46.6	34.4
20	31.8	32.9	46.3	56.8	65.6	79.5	80.7	76.8	68.5	57.1	44.8	32.3
21	30.1	31.6	44.4	54.4	62.5	76	77.4	73.9	66.6	55.5	43.4	30.6
22	29.2	30.8	42.6	52.8	60.2	73.9	75.8	72.1	65.2	54.1	42.2	28.4
23	27.9	29.5	41.7	51	58.4	72.4	74.4	70.8	64.1	52.9	41.1	27
24	26.8	28.8	40	49.6	57.2	71.2	73	69.8	63.1	51.7	39.9	25.3

Table B-27 Average Monthly Percent Relative Humidity by Hour of the Day for St. Louis County (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	67.3	75.9	71.8	70	75.9	75.8	82.3	85	87.4	75.9	68.9	70.2
2	68.1	77.1	72.2	72.6	76	78.1	83.3	85.8	87.7	77.6	70.3	71.8
3	69.5	78.3	73.3	74.2	77.4	80	84.2	86.7	88.6	79.1	71.7	72.9
4	70.3	78.5	74.4	74.7	78.5	81.3	84.7	87	89.5	79.6	72.5	73.8
5	71.5	78.5	75.9	75.6	79.3	82.4	85.9	87.9	89.8	81.1	73.6	75.7
6	72	78.8	77.7	76.1	80.5	83.3	86.2	88.4	90.1	82	75.4	76.4
7	71.7	79.1	78	76.4	79.4	81.1	84.7	88.2	90.1	82.9	76.3	76.7
8	71.4	78.4	78.6	72.5	75	75.6	79.8	83.2	88.6	82.4	76.6	76.6
9	70.3	77.2	74.8	67.9	71	70	73.4	76.3	83.3	76.7	74.1	75.2
10	66	74.2	69.9	63.7	65	64.7	67.9	68.6	76.2	67.6	68.2	72.7
11	61.4	70.5	64.6	60.2	60	60	63.2	62.8	69.1	59.4	62.3	68.9
12	56.7	67.1	59.6	57.8	57.5	55.2	59.2	58.4	63.5	53.1	57.5	66
13	52.8	64.6	56	54.9	56.4	52.3	56.3	55.8	59.6	49.5	53.4	63.2
14	49.8	62	53.9	53.1	55.1	51.3	54.2	53.9	57	47.2	50.4	61.2
15	47.8	59.9	52.4	51.3	53.5	49.5	52.5	52.9	55.5	45.9	48.4	59.9
16	46.8	59	52.7	49.9	52.7	48.6	52.5	52.9	55.3	45.5	47.5	59.2
17	47.2	59.7	52.9	49.6	51.4	48.6	53.2	53.9	56.8	46.6	48.8	60.5
18	50.6	61.2	54.8	50.5	51.4	49.7	54.7	56.4	61.5	51.4	53.2	64.1
19	55.1	65.1	58.5	54	53.5	52.4	58.9	62	70.6	59.1	57.2	66.5
20	58.2	68.2	62.5	58.2	59	57.9	65.8	69.8	78.6	65.1	60	67.9
21	60.2	70.4	65.3	61.4	64.5	64.3	72.3	76.1	82.2	68.2	62.1	68.3
22	61.9	72.1	67.7	63.6	69.2	69	75.5	80	84.2	70.4	64	68.6
23	63.7	73.8	69.3	66.6	72.5	71.6	77.7	82.2	85.3	72.5	65.7	69
24	65.2	75	71.1	68.3	74.6	74.3	80.1	83.9	86.5	74.6	67.4	69.7

Table B-28 Average Monthly Temperatures by Hour of the Day for St. Louis City in Fahrenheit (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	25.9	28.9	40.2	48.1	56	70.1	72.4	69.2	62.7	51.5	39.4	25.9
2	25	27.5	38.4	46.2	54.9	69.1	71.2	68.5	62.9	50.7	39.2	25.9
3	24	26.3	37.4	45.3	53.8	68	70.6	67.7	62.2	49.9	38.3	25
4	22.9	25.4	36.3	44.3	52.9	67	70.1	67	61.5	49.4	37.8	24.6
5	22.4	24.9	35.6	43.7	52.2	66.2	69.6	66.3	61	48.6	37.1	23.9
6	21.7	24.4	34.5	43.4	51.8	65.6	69.1	65.9	60.6	47.9	36.4	23.9
7	21.5	23.8	33.9	43.7	53.6	67.9	70.6	66.5	60.5	47.5	35.8	23.9
8	21.3	23.5	34.2	46	57	71.2	73.5	70.2	62.6	48.8	35.8	23.2
9	22.8	24.9	37.7	49.2	59.8	74.4	76.5	73.7	66	53.3	38.7	25.2
10	27	27.5	41	52.1	62.9	77.4	79.2	77.5	69.5	57.8	42.5	28.4
11	31	30.3	44.3	54.8	65.6	79.9	81.6	80.3	72.9	61.8	45.9	32
12	35	33	47.4	57	67.7	82.1	83.6	82.3	75.4	64.8	49.3	35.9
13	38.1	35.5	50.1	59.3	68.7	83.8	85.2	83.7	77.3	66.8	51.7	39.3
14	41.1	37.4	51.8	61	69.7	84.5	86.7	84.9	78.7	68.1	53.5	41.5
15	42.7	38.8	53.3	62.4	71.1	85.3	87.6	85.5	79.4	68.8	54.6	42.9
16	42.5	39.3	53.6	63.2	71.7	85.4	87.8	85.5	79.5	68.8	54.6	42.9
17	41.6	39.1	53.4	62.9	72	85.4	87.5	85.3	78.7	67.9	53.3	41.5
18	38.1	37.7	52.2	62.1	71.2	84.4	86.4	83.8	76.8	65.1	50	37.7
19	34.3	35.1	49.5	60.1	69.4	82.9	84.5	81.2	72.5	60.7	47.2	35
20	32.1	33.4	47	56.7	65.8	79.8	81.4	77.2	68.5	57.8	45.2	33.4
21	30.4	32.2	45	54.5	62.5	76	77.9	74.3	66.8	56.2	43.8	31.6
22	29.5	31.3	43.5	52.8	60.2	73.6	76.2	72.3	65.5	54.9	42.7	29.8
23	28.3	30.1	42.6	51	58.3	72.2	74.8	71.2	64.3	53.6	41.6	28.4
24	27.2	29.6	41.1	49.5	57.1	71	73.6	70.3	63.4	52.4	40.6	26.8

Table B-29 Average Monthly Percent Relative Humidity by Hour of the Day for St. Louis City (MOVES Inputs for 2008, 2017, and 2025 On-Road Mobile Source Emissions)

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	68	76.6	72.6	71.4	77	76.6	83.4	85.9	87.7	76.9	69.3	69.8
2	69	78.1	73.2	73.8	76.9	78.7	84.2	86.5	87.7	78	71	71.3
3	69.8	79	74	74.8	78	80.8	85.4	87	88	79.7	72.1	72.7
4	70.9	79	75.2	75.9	79.1	81.9	85.6	87.6	88.9	80.3	72.3	73.6
5	72.1	78.9	76.3	76.5	79.9	82.7	86.5	88.5	89.5	81.5	73.4	75.2
6	72.4	79.2	78.4	77.4	80.5	83.9	86.8	88.5	89.8	82.7	75.2	75.8
7	72.7	79.5	79	77.1	79.4	81.7	85.1	88.2	89.5	83.3	76.3	76.2
8	72.3	79.1	79.4	73.4	75.1	75.9	80.1	83.3	88.3	83.1	76.3	76.4
9	70.9	77.9	75.6	68.3	71	70	74	76.4	83	77	73.6	75
10	66.7	74.9	70.6	64.2	64.8	64.5	68.4	68.9	75.7	67.4	68	72.5
11	61.9	71.5	65.5	60.7	60.1	59.6	63.7	63.1	68.9	59.1	62.4	69
12	57.4	68.3	60.7	58.5	57.1	55.3	59.7	58.7	63.6	52.8	57.2	66.1
13	53.7	65.5	57	55.7	56.4	52	57.1	56.3	59.7	48.9	53.8	63.1
14	50.6	63.3	55.1	53.7	55.1	51.2	54.6	54.2	57	46.4	50.7	61.1
15	48.4	61.4	53.4	51.7	53.7	49.5	53.1	53.5	55.5	45.5	48.5	59.5
16	47.8	60.3	53.4	50.4	52.9	48.9	52.7	53.5	55.1	45.3	47.8	59.1
17	48	60.7	53.8	50.2	51.8	48.9	53.4	54.2	56.8	46.4	48.9	60.1
18	51.2	62.1	55.8	51.4	51.4	49.9	55.2	57.1	61.6	51.3	53.3	63.6
19	55.9	66	59.7	54.8	53.9	52.4	59.2	62.6	71.1	59.4	57.3	66.2
20	58.7	69.2	63.6	59.6	59.7	58.2	66.3	71.1	79.7	65.7	60.6	67.5
21	60.8	71.1	66.4	62.1	65.5	65	73.6	77.5	83.4	68.8	62.6	68.4
22	62.5	73.1	68.7	64.8	70	70.2	76.8	81.4	84.8	71	64.5	68.7
23	64.3	74.8	70.2	67.7	73.6	72.8	79.1	83.1	86.2	73.1	66.3	68.9
24	66.1	75.7	71.8	69.4	75.7	75.3	81	84.8	87.1	75.5	67.8	69.6

Appendix B-4 2008 Off-Road Mobile Source Emissions

Off-road mobile source emissions were calculated for the Missouri counties in the St. Louis $PM_{2.5}$ nonattainment area using the NONROAD 2008a model. Fuel and meteorological data from the NCD was used to run the non-road model and create annual emissions for 2008. The modeling protocol, which was submitted by EPA Region 7 and is included in Appendix E-2 of the redesignation demonstration and maintenance plan, was followed except the Air Program used an oxygen weight percent of 3.5% and an ethanol market share of 100% instead of the values listed in the EPA protocol in Appendix E-2. The correct input data for the NONROAD 2008a model that was used in this latest modeling run is listed below in Table B-30.

Table B-30 NONROAD Model Temperature & Fuel Characteristic Input Values by County & Season

County	Season	Oxygen Weight %	RVP (psi)	Gasoline Sulfur %	Ethanol Volume %	Ethanol Market Share %	Diesel Sulfur	Marine Diesel Sulfur %	CNG/LPG Sulfur %	Temperatures		
										Min.	Max.	Avg.
Franklin	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	19.7	47	33.4
Franklin	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	33.5	76.9	55.2
Franklin	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	61.8	90	75.9
Franklin	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	34.3	80.9	57.6
Jefferson	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	18.6	45.6	32.1
Jefferson	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	32.4	75.8	54.1
Jefferson	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	61	88.6	74.8
Jefferson	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	33.6	79.8	56.7
St. Charles	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	18.7	43.9	31.3
St. Charles	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	32.3	75.8	54.1
St. Charles	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	62.2	89.2	75.7
St. Charles	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	34.8	80.3	57.6
St. Louis	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	19.8	44.2	32
St. Louis	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	34.5	76.1	55.3
St. Louis	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	64.1	89.5	76.8
St. Louis	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	35.5	80.2	57.9
St. Louis City	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	20.7	45.5	32.6
St. Louis City	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	35.7	76.4	56
St. Louis City	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	65.1	89.8	77.5
St. Louis City	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	36.6	80.4	58.5

The data generated by the NONROAD model for the 2008 off-road mobile source emissions for the Missouri counties in the St. Louis $PM_{2.5}$ nonattainment area are summarized in Table B-31. The full 2008 $PM_{2.5}$ annual emissions inventory for the Missouri side of the 1997 St. Louis $PM_{2.5}$ nonattainment area, which includes the 2008 off-road emissions inventory for the area, is included as Appendix E to this redesignation request and maintenance plan.

As stated in Appendix B-1, EPA generates emissions data for aircraft, marine, and rail sources using a method similar to the way emissions are generated for non-point sources. Therefore, 2008 NEI data for aircraft, marine, and rail emissions, which are listed as nonpoint emissions in the NEI data, need to be added to the off-road mobile source category. The 2008 emissions for

aircraft, marine, and rail sources are summarized by county in Table B-32. The total off-road mobile source emissions by county are listed in Table B-33.

Table B-31
2008 Annual Off-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area as Modeled by NONROAD 2008a (Excludes Aircraft, Marine, and Rail Emissions) (Missouri Counties Only)

County Name	NH_3 (tons/year)	NO_X (tons/year)	$PM_{2.5}$-Pri (tons/year)	SO_2 (tons/year)	VOC (tons/year)
Franklin County	1.20	1,873.72	100.89	24.15	974.70
Jefferson County	0.96	979.85	79.01	16.95	903.31
St. Charles County	2.33	2,512.83	186.81	47.30	1,902.51
St. Louis County	6.87	7,448.64	564.57	213.81	6,305.86
St. Louis City	1.53	2,460.82	102.45	55.38	1,074.08
Totals	**12.89**	**15,275.86**	**1,033.73**	**357.59**	**11,160.46**

Table B-32
2008 Annual Aircraft, Marine, and Rail Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3 (tons/year)	NO_X (tons/year)	$PM_{2.5}$-Pri (tons/year)	SO_2 (tons/year)	VOC (tons/year)
Franklin County	0.61	1,182.86	37.22	12.37	61.51
Jefferson County	0.12	219.44	6.81	2.34	11.45
St. Charles County	0.50	530.90	18.28	10.25	32.23
St. Louis County	0.88	1,895.82	53.63	116.11	207.31
St. Louis City	0.69	1,617.69	50.15	45.63	72.57
Totals	**2.79**	**5,446.71**	**166.09**	**186.71**	**385.07**

Table B-33
Total 2008 Annual Off-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3 (tons/year)	NO_X (tons/year)	$PM_{2.5}$-Pri (tons/year)	SO_2 (tons/year)	VOC (tons/year)
Franklin County	1.81	3,056.59	138.11	36.52	1,036.21
Jefferson County	1.08	1,199.29	85.82	19.29	914.76
St. Charles County	2.82	3,043.73	205.09	57.55	1,934.74
St. Louis County	7.75	9,344.46	618.20	329.93	6,513.17
St. Louis City	2.22	4,078.51	152.60	101.01	1,146.65
Totals	**15.68**	**20,722.57**	**1,199.82**	**544.30**	**11,545.53**

Appendix B-5 MOVES I/M Input Table Development Protocol

EPA has technical guidance on appropriate input assumptions and sources of data for the use of MOVES 2010 in State Implementation Plans (http://www.epa.gov/otaq/models/moves/420b10023.pdf). Section 1.3.10 of this guidance document explains the appropriate assumptions and methods to be used when developing the I/M input table for MOVES. This guidance has been followed in the development of the I/M input Table B-12 in Appendix B-3. This document outlines the approach used to develop each parameter of these I/M input tables in MOVES. The goal in developing these I/M input tables is to accurately reflect the actual I/M program being implemented in the St. Louis nonattainment area.

1 Pollutant Process ID

To begin development of the I/M input table, the default data for the I/M input table for St. Louis County was exported from the MOVES county database manager. The default data included four different I/M test types. However, the actual St. Louis area only had two different test types (On-board diagnostics) OBD tests for the exhaust and evaporative systems. In the default I/M input table, these were the only two types of tests that were "turned on" along with the appropriate pollutant process IDs that would be impacted by each test. Therefore, the pollutant process IDs that were included in the default table for the two OBD tests were the same pollutant process IDs used in the I/M input table for the St. Louis nonattainment area. The other two tests included in the default data along with their associated pollutant process IDs were still included in the I/M input table, but they were "turned off".

2 Source Type ID

The St. Louis I/M program includes passenger cars and also trucks with a gross vehicle weight rating of 8,500 lbs. or less. Therefore, the three source type IDs included in the I/M input table for the St. Louis nonattainment area are passenger cars, passenger trucks, and light commercial trucks (IDs = 21, 31, and 32).

3 Fuel Type ID

The St. Louis I/M program is applicable to both gasoline and diesel vehicles; however, MOVES only calculates an I/M benefit for gasoline vehicles. Therefore, the fuel type ID for gasoline was the only fuel type ID used in the I/M input table for the St. Louis nonattainment area.

4 Inspection Frequency

The St. Louis I/M program requires that emission be tested every two years, so the inspection frequency ID that represents biennial tests (ID = 2) was used in the I/M input table for the OBD tests applicable to the St. Louis nonattainment area.

5 Test Standards

The GVIP is a decentralized program with OBD tests for exhaust and evaporative systems on the vehicles. Therefore, the test standard IDs for exhaust OBD check and the evaporative system OBD check (IDs = 43 and 51) were used in the I/M input table for the St. Louis nonattainment area.

6 I/M Program ID

This is an arbitrary number developed by the MOVES user to define a unique test given for vehicles within a range of model years. Therefore, I/M program IDs were arbitrarily assigned to the various unique tests within the St. Louis I/M program.

7 Beginning and Ending Model Years

The GVIP applies to gasoline vehicles with a model year of 1996 or later and it also applies to diesel vehicles with a model year of 1997 or later. Since the emissions inspection is required biennially, the ending model year would always be two years less than the emissions inventory year that is being developed. Therefore, for the tests for gasoline vehicles, the beginning model year is 1996 and the ending model year is two years earlier than the year for which MOVES is being run, in this case 2006 is the ending model year.

8 Compliance Factor

According to page 39 of the MOVES guidance document the compliance factor is calculated with the following equation:

> Compliance Factor = percent compliance rate x (100 – percent waiver rate) x regulatory class coverage adjustment.

Therefore, in order to calculate the compliance factor for each source type included in the I/M program, the compliance rate, waiver rate, and regulatory class coverage adjustment needed to be determined. These three values were determined by the processes described below and then the compliance factors for each source type were calculated with the equation written above.

9 Compliance Rate

The compliance rate was calculated with the following equation:

> Compliance Rate = Number of vehicles that were tested over a two year period (2008 – 2009) / Population of vehicles that is theoretically subject to I/M during the same period.

In order to determine the compliance rate, as it compares to the source type population by model year, the population of vehicles that is theoretically subject to I/M first needed to be determined.

In May 2009, the Missouri Department of Revenue (DOR) Vehicle Registration database was queried and a VIN decoder was used to separate the vehicle counts into Mobile 6.2 vehicle classes by model year. In the St. Louis nonattainment area, the Mobile 6.2 vehicle classes that are subject to I/M include 1996 and newer light duty gasoline vehicles, light duty gasoline trucks Class 1, light duty gasoline trucks Class 2, light duty gasoline trucks Class 3, light duty gasoline trucks Class 4, as well as 1997 and newer light duty diesel vehicles, light duty diesel trucks Class 1, light duty diesel trucks Class 2, light duty diesel trucks Class 3, and light duty diesel trucks Class 4. Table B-34 below shows the total combined population of these 10 vehicle classes within the appropriate model years by county in the St. Louis nonattainment area according to the May 2009 DOR data.

Table B-34 Vehicles Theoretically Subject to the I/M Program in the Missouri Portion of the St. Louis Nonattainment Area

County	Light Duty Gas (1996 and newer)	Light Duty Diesel (1997 and newer)
Franklin	73,300	328
Jefferson	150,998	484
St Charles	238,672	589
St Louis City	144,871	345
St Louis County	756,978	1,653
Total	**1,364,819**	**3,399**
Total Count	**1,368,218**	

The Air Program also queried the I/M report generator to determine the total number of vehicles, which had their emissions tested at least once from January 1, 2008 through December 31, 2009. The query also included the total number of vehicles that received waivers during the same time period. Table B-35 below, was generated with data from this query.

Table B-35 Initially Tested Vehicles that Received a Waiver in the St. Louis I/M Program from January 1, 2008 through December 31, 2009

Model Year	Passenger Car			Truck			Total Initially Tested		
	Test Count	Waivers	% Waivers	Test Count	Waivers	% Waivers	Test Count	Waivers	% Waivers
1996	48858	547	1.12 %	5605	61	1.09 %	54463	608	1.12 %
1997	56769	406	0.72 %	8834	50	0.57 %	65603	456	0.70 %
1998	73704	473	0.64 %	8391	63	0.75 %	82095	536	0.65 %
1999	83090	412	0.50 %	12182	46	0.38 %	95272	458	0.48 %
2000	102025	474	0.46 %	10267	44	0.43 %	112292	518	0.46 %
2001	99275	533	0.54 %	13552	57	0.42 %	112827	590	0.52 %
2002	118172	407	0.34 %	11417	18	0.16 %	129589	425	0.33 %
2003	105898	294	0.28 %	14664	24	0.16 %	120562	318	0.26 %
2004	116039	226	0.19 %	11951	16	0.13 %	127990	242	0.19 %
2005	122101	165	0.14 %	13992	20	0.14 %	136093	185	0.14 %
2006	117968	178	0.15 %	10795	21	0.19 %	128763	199	0.15 %
2007	119535	147	0.12 %	11898	18	0.15 %	131433	165	0.13 %
2008	36470	49	0.13 %	2396	3	0.13 %	38866	52	0.13 %
2009	8373	9	0.11 %	396	0	0.00 %	8769	9	0.10 %
2010	129	0	0.00 %	1	0	0.00 %	130	0	0.00 %
Total	1208406	4320	0.36 %	136341	441	0.32 %	1344747	4761	0.35 %

Using the data from Tables B-34 and B-35 above the compliance rate is calculated for the St. Louis I/M Program with the following equation:

Compliance Rate: (1,344,747 / 1,368,218) x 100% = 98.28%

10 Waiver Rate

The waiver rate is the percentage of vehicles that fail an initial I/M test and do not pass a retest, but do receive a certificate of compliance. The waiver rate was determined by dividing the number of vehicles that received waivers from January 1, 2008 through December 31, 2009 by the total number of vehicles that were tested at least once during the same time period. Therefore, the waiver rate was calculated for the St. Louis I/M Program with the following equation:

Waiver Rate: (4,761 / 1,344,747) X 100% = 0.35%

11 Regulatory Class Coverage Adjustment

The regulatory class coverage adjustment is an adjustment that accounts for the fraction of vehicles within a source type that are covered by the I/M program. Since the I/M program in St. Louis exempts vehicles with a gross vehicle weight rating above 8,500 lbs., the compliance factor needs to reflect the percentage of vehicles in the source types subject to I/M that are exempt because of their GVWR. Table A.3 in the Appendix of the MOVES Technical Guidance Document was used to develop adjustments to the compliance factor to account for this discrepancy. The adjustments are percentages of vehicle miles traveled by the various regulatory weight classes within a source type. The corresponding adjustment factors used for the three source categories are as follow:

Passenger cars: 100%
Passenger Trucks: 94%
Light Commercial Trucks: 88%

12 Calculating the Compliance Factor

Based on the calculations listed above the compliance factor for each source category impacted by the I/M program in St. Louis is listed below.

Passenger cars: 98.28% x (100% - 0.35%) x 100% = **97.94%**
Passenger Trucks: 98.28% x (100% - 0.35%) x 94% = **92.06%**
Light Commercial Trucks: 98.28% x (100% - 0.35%) x 88% = **86.18%**

Appendix C

2017 Interim Year
Point, Area, On-Road Mobile and Off-Road Mobile
Projected Emissions Inventory

(Missouri Counties)

Appendix C-1	**2017 Emissions Inventory Summary for the Missouri Portion of the Nonattainment Area**
Appendix C-2	**2017 Point Source Emissions**
Appendix C-3	**2017 Area Source Emissions**
Appendix C-4	**2017 On-Road Mobile Source Emissions**
Appendix C-5	**2017 Off-Road Mobile Source Emissions**

Appendix C-1 2017 Emissions Inventory Summary for the Missouri Portion of the Nonattainment Area

Table C-1 displays the projected 2017 emissions inventory summary for point, area, on-road mobile, and off-road mobile sources for the Missouri portion of the 1997 $PM_{2.5}$ St. Louis nonattainment area. Details regarding the developing the interim year (2017) inventory for the Missouri portion of the nonattainment area can be found in Appendices C-2 through C-5.

Table C-1 2017 Emissions Inventory Summary for the Missouri Portion of the Nonattainment Area

County Name	Source Category	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	Point Sources	2.82	9,524.34	1,466.57	61,089.08	809.12
Jefferson County		8.97	7,357.10	1,034.38	31,868.12	740.33
St. Charles County		8.04	7,457.61	321.69	5,435.85	1,192.95
St. Louis County		720.41	5,445.44	526.07	17,549.92	2,142.42
St. Louis City		568.4	1,536.21	344.04	5,796.10	1,478.31
Totals		**1,308.64**	**31,320.70**	**3,692.74**	**121,739.06**	**6,363.13**
Franklin County	Area Sources	1,300.09	290.24	2,333.01	992.85	1,927.56
Jefferson County		165.26	395.14	3,462.09	906.99	3,485.98
St. Charles County		883.43	468.07	2,341.40	895.02	6,665.26
St. Louis County		1,036.69	2,245.97	4,616.72	5,459.18	23,111.88
St. Louis City		129.5	1,047.55	1,412.56	3,280.78	8,866.50
Totals		**3,514.98**	**4,446.97**	**14,165.78**	**11,534.82**	**44,057.17**
Franklin County	On-Road Mobile Sources	53.16	1,608.66	57.54	13.45	716.14
Jefferson County		62.02	2,109.21	77.96	16.29	1,221.37
St. Charles County		91.17	3,087.41	121.49	24.37	1,704.14
St. Louis County		400.33	12,564.45	509.43	106.23	5,811.83
St. Louis City		115.79	3,535.26	146.74	30.79	1,413.93
Totals		**722.47**	**22,904.99**	**913.15**	**191.12**	**10,867.41**
Franklin County	Off-Road Mobile Sources	1.3	1,354.73	69.13	11.14	617.81
Jefferson County		1.14	657.44	55.23	3.38	580.81
St. Charles County		2.98	1,607.06	125.71	8.52	1,134.42
St. Louis County		8.79	5,156.67	456.82	155.23	4,426.28
St. Louis City		1.54	1,729.98	80.46	15.28	638.71
Totals		**15.75**	**10,505.88**	**787.35**	**193.55**	**7,398.02**
Grand Total		**5,561.84**	**69,178.54**	**19,559.02**	**133,658.55**	**68,685.73**

Appendix C-2 2017 Point Source Emissions

All of the details associated with developing the 2008 point and area source emissions inventories are described in Appendix B-1 of this document. To forecast point source emissions of NO_X, $PM_{2.5}$, SO_2, and VOC to the future year of 2017, growth factors were obtained from the Economic Growth and Analysis System (EGAS) version 5.0, published in January 2006. The model forecasts economic activity to generate growth factors used to develop emission inventories. For this project, growth factors were obtained for years 2009 through 2017 for the five counties of interest: Franklin (29071), Jefferson (29099), St. Charles (29183), St. Louis County (29189), and St. Louis City (29510). The default REMI 5.5 (Regional Economic Model, Inc) configuration was used, and it includes growth based on economy, population, employment, consumption, and value-added for 53 major sectors of the economy. Factors were created for both point and area categories, and are broken out by Source Classification Code (SCC), county, and year.

Point growth factors covered all point SCCs in use in Missouri for 2008. The county and SCC-specific growth factor was multiplied by the 2008 total annual emissions to get the 2017 forecast point source inventory. Adjustments were made to account for the October 2010 consent decree for Doe Run Herculaneum in Franklin County to account for the termination of the traditional lead smelting activities by 2013, eliminating SO_2 emissions by 2017. Point growth factors covered all point SCCs in use in Missouri for 2008. The county and SCC-specific growth factor was multiplied by the 2008 annual emissions to get the 2017 forecast point source inventory.

Point source emissions of ammonia were not grown using EGAS growth factors. Instead, total point source ammonia emissions in 2008 were compared to total point source ammonia emissions in 2011 to determine current trends in point source ammonia emissions. In total, point source ammonia emissions decreased from 1,308.64 tons in 2008 to 1,197.47 tons in 2011. Because these emissions are trending downwards, EGAS growth factors are not appropriate to use to project the future year emissions. In order to ensure conservative estimates are used to help protect air quality, the 2008 point source ammonia emissions were held level to project the point source ammonia emissions in 2017 even though, over recent years, there has been a downward trend in these emissions.

The annual SO_2 and NO_X emissions from the following three electric generating unit (EGU) facilities: Ameren's Labadie, Meramec, and Rush Island were grown as follows: the actual annual NO_X and SO_2 emissions from these Ameren units from 2008 - 2011 were obtained from the Clean Air Market Division database and averaged to obtain an annual average of NO_X and SO_2 emissions over these four years. These annual averages of NO_X and SO_2 emissions over these four years were used to project the NO_X and SO_2 emissions in 2017 for these three facilities. The average 2008 – 2011 annual NO_X and SO_2 emissions for these three Ameren EGU facilities are listed in Table C-2. These four year averages of annual NO_X and SO_2 emissions were determined to be representative of the projected NO_X and SO_2 emissions in 2017 because of EPA's Clean Air Interstate Rule (CAIR). In 2015, their allowances from CAIR drop significantly, but they will likely have some banked allowances allowing them to hold their annual NO_X and SO_2 emissions pretty steady for the first several years after the 2015 CAIR allocations take effect.

The annual SO_2 and NO_X emissions from Ameren's Sioux EGU facility were grown as follows: For NO_X emissions from this facility, the 2017 emissions were projected in the exact same manner as the NO_X emissions from the other three Ameren EGU facilities in the St. Louis nonattainment area. Using the average annual NO_X emissions from 2008 – 2011. However, for annual SO_2 emissions from the Sioux facility, the average heat input from 2008 – 2011 was multiplied by the annual SO_2 rate from 2011 in order to generate the 2017 annual SO_2 emissions. This is due to the fact that scrubbers were installed on the two units at this facility in late 2010 that reduced SO_2 emissions by approximately 90 percent. By using the average heat input from these three facilities over the last four years this accounts for variability in production, and by using the emission rate from 2011, this accurately projects the emissions reductions that will result from continued use the scrubbers at the facility. The average annual NO_X emissions from Sioux from 2008 – 2011 are listed in Table C-2 along with the emissions from the other three Ameren EGU facilities. Table C-3 summarizes the annual heat input at the Sioux facility from 2008 – 2011 and also provides the 2011 SO_2 emission rate and the projection for annual SO_2 emissions in 2017 for this facility.

Table C-2 2008 - 2011 Average Annual NO_X and SO_2 Emissions for Ameren EGUs in the Missouri Portion of the St. Louis Ozone Nonattainment Area

Boiler Name	Average Annual NO_X Emissions (tons) (Used for the 2017 Emissions Projection)	Average Annual SO_2 Emissions (tons) (Used for the 2017 Emissions Projection)
Labadie Unit 1	2,146	14,144
Labadie Unit 2	2,428	15,174
Labadie Unit 3	2,434	15,649
Labadie Unit 4	2,507	16,122
Labadie Total	**9,515**	**61,089**
Meramec Unit 1	584	2,789
Meramec Unit 2	532	2,727
Meramec Unit 3	1,526	4,942
Meramec Unit 4	2,244	7,052
Meramec Total	**4,886**	**17,510**
Rush Island Unit 1	1,884	14,370
Rush Island Unit 2	1,835	13,636
Rush Island Total	**3,719**	**28,006**
Sioux Unit 1	3,608	See Table C-3
Sioux Unit 2	3,527	See Table C-3
Sioux Total	**7,135**	**See Table C-3**

Table C-3 2008 - 2011 Average Annual Heat Input, 2011 SO_2 Rate, and Projected 2017 SO_2 Emissions for Ameren's Sioux Facility

Data Type	Value
2008 – 2011 Average Annual Heat Input (MMBTU)	54,202,161
2011 Annual SO_2 Rate (lb./MMBTU)	0.184
Projected 2017 Annual SO_2 Emissions (tons)	**4,987**

Annual emissions of $PM_{2.5}$, and VOC from all four of the Ameren EGU facilities that are located in the Missouri portion of the St. Louis $PM_{2.5}$ nonattainment area were grown from 2008 to 2017 using EGAS 5.0 growth factors. Table C-4 summarizes the total point source emissions projected for 2017 for the Missouri portion of the St. Louis $PM_{2.5}$ nonattainment area. This table includes the NO_X and SO_2 emissions from the four Ameren EGU facilities in the Missouri portion of the St. Louis $PM_{2.5}$ nonattainment area.

As stated in Appendix B, the 2008 National Emissions Inventory (NEI) data, which was used as the base year to project 2017 emissions, include point source emissions for aircraft takeoffs and landings. However, they really should be classified as off-road mobile source emissions. Therefore, the emissions for aircraft takeoffs and landings are not included in the total point source emissions listed in Table C-4. The SCC codes for the aircraft categories are listed in Table C-8, and the emissions from these categories are included in Table C-18, to be included as off-road mobile source emissions.

Table C-4
2017 Annual Point Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	2.82	9,524.34	1,466.57	61,089.08	809.12
Jefferson County	8.97	7,357.10	1,034.38	31,868.12	740.33
St. Charles County	8.04	7,457.61	321.69	5,435.85	1,192.95
St. Louis County	720.41	5,445.44	526.07	17,549.92	2,142.42
St. Louis City	568.4	1,536.21	344.04	5,796.10	1,478.31
Totals	**1,308.64**	**31,320.70**	**3,692.74**	**121,739.06**	**6,363.13**

Table C-5 includes all of the projected point source emissions for 2017 by facility. As mentioned above the EGAS growth factors were not used for the SO_2 or NO_X emissions for the Ameren EGU Facilities or the SO_2 emissions for the Doe Run Primary Lead Smelter in Herculaneum. Also as mentioned above EGAS growth factors were also not used to project the NH_3 emissions from any point source.

Table C-5 2017 Point Source Emissions in the Missouri Portion of the St. Louis $PM_{2.5}$ Nonattainment Area by Facility

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
5150011	Jefferson Smurfit Corp-Pacific	-	-	-	-	35.52
5150511	Bull Moose Tube Company-Bull Moose Tube Company	-	0.62	0.07	0.00	23.08
5151111	Sullivan Precision Metal Finishing Inc-Sullivan Precision Metal Finishing Inc	-	-	-	-	24.29
5151211	Sporlan Valve Company-Plant #2 - West Main	-	-	-	-	53.81
5151411	Aerofil Technology Inc-Aerofil Technology Inc	-	2.19	3.61	0.01	65.65
5151511	Magnet Llc-Washington	-	-	-	-	12.54
5151611	Marble Decor Inc-Marble Decor Inc	-	-	-	-	0.59
5151811	Plaze Incorporated-Plaze Incorporated	-	1.88	-	0.01	58.54
5152011	GDX Automotive - Danny Scott Drive-New Haven	-	0.00	-	-	28.84
5152111	Sporlan Valve Company-Plant #3 - Lange Drive	-	-	-	-	22.42
6032111	Amerenue-Labadie Plant	2.82	9,515.00	1,462.84	61,089.00	303.23
6032311	Canam Steel Corp-Canam Steel Corp	-	3.43	-	0.04	88.57
6032611	Steelweld Equipment Co-St Clair	-	0.23	-	0.00	21.05
7369411	Meramec Industries Inc-Ramsey St Plant	-	0.34	-	0.00	45.56
8243211	Integram - St Louis Seating-Pacific	-	0.65	0.05	0.00	25.43
Franklin County Totals		**2.82**	**9,524.34**	**1,466.57**	**61,089.08**	**809.12**
5258211	Doe Run Company-Herculaneum Smelter	0.38	15.85	15.11	-	2.33
5258511	Union Pacific Railroad Co-Desoto Car Shop	-	2.06	3.14	0.01	21.38
5258611	Trautman Quarry-Pevely	-	-	-	-	-
5258811	Amerenue-Rush Island Plant	1.51	3,719.00	670.19	28,006.00	161.81
5259811	Aero Metal Finishing-Aero Metal Finishing	-	3.32	-	0.47	4.32
7270711	Bussen Quarries Inc-Antire Quarry	-	-	0.10	-	-
7271811	Dow Chemical Company The-Riverside Plant	0.04	1.48	0.11	0.01	1.71
7271911	Carondelet Corporation-Carondelet Corporation	0.07	8.16	0.19	0.34	93.10
7272311	Rc Cement Company Inc-River Cement Co - Selma Plant	5.70	3,363.16	250.93	3,572.87	254.61
7272511	Metal Container Corporation-Arnold	-	12.66	3.53	0.08	146.66
7272611	Engineered Coil Company-D B A Marlo Coil	-	0.13	-	0.00	12.51
8112911	Saint-Gobain Containers Llc-Pevely	1.27	231.28	91.07	288.34	41.91
Jefferson County Totals		**8.97**	**7,357.10**	**1,034.38**	**31,868.12**	**740.33**
6783411	Amerenue-Sioux Plant	0.86	7,135.00	312.29	4,987.00	170.07
6783511	Fred Weber Inc-O'Fallon Asphalt Plant	0.04	2.50	0.14	0.23	0.47
6783611	Fred Weber Inc-O'Fallon Stone Plant	-	-	0.01	-	-
6783911	McDonnell Douglas Corp-Boeing Company	0.08	2.87	0.05	0.02	18.75
6784211	St Joseph Health Center-St Joseph Health Center	0.03	5.01	0.38	0.16	0.30
6797711	Superior Home Products Inc-Superior Home Products Inc	-	-	-	-	14.73
7273311	Memc Electronic Materials Inc-St Peters Plant	5.11	29.52	5.96	0.15	20.23
7284511	General Motors-Wentzville Center	0.34	276.11	1.63	448.24	746.34
7387111	Woodbridge Corporation-St Peters	-	-	-	-	66.09
7387311	True Manufacturing Co-O'Fallon	-	4.52	0.38	0.03	49.22
8100411	O Fallon Casting Llc-O Fallon	1.59	2.08	0.83	0.01	106.75
St. Charles County Totals		**8.04**	**7,457.61**	**321.69**	**5,435.85**	**1,192.95**

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
10735111	KV Pharmaceutical - Bridgeton	-	-	0.00	-	23.90
5113811	Nesco Container Corp-Fenton	0.04	2.66	0.02	0.02	114.08
5113911	McDonnell Douglas Corp /Boeing Company-Lindbergh Plant	0.77	25.21	0.74	0.40	92.19
5114011	St Louis Lithographing Company-Heege Avenue	-	-	-	-	21.27
5114511	Bussen Quarries Inc-Bussen Road	-	-	0.62	-	-
5114611	Ruprecht Quarry-Paule Rd	-	-	-	-	-
5114711	BFI Missouri Pass Landfill-Maryland Heights	-	9.17	0.71	2.92	6.29
5114811	Color Art Inc-Crestwood	0.04	1.35	0.03	0.01	28.53
5115911	Onyx Oak Ridge Landfill Inc-(West County)	-	2.39	1.19	0.84	4.99
5116011	Bridgeton Landfill Authority-Bridgeton	-	13.03	5.54	4.56	10.08
5116311	Pro-Tect Mfg Inc-Ferguson Ave	-	-	-	-	23.45
5116411	St Marys Health Center-Richmond Heights	0.05	8.53	0.16	0.16	0.50
5167511	St Joseph Hospital-Kirkwood	0.02	3.69	0.07	0.06	2.64
5181011	Pan-Glo St Louis-Trenton Avenue	-	-	-	-	6.30
5278111	Camie-Campbell Inc-Watson Industrial Park	-	-	-	-	6.56
5278311	Belt Service Corp-Earth City	0.02	0.63	0.01	0.00	53.78
5278411	Kv Pharmaceutical Company-Brentwood	-	-	0.15	-	79.31
5278611	Depaul Health Center-Bridgeton	0.04	7.46	0.57	0.04	0.41
5278811	Kv Pharmaceutical Company-Schuetz Rd	0.05	1.63	1.02	0.01	7.67
5278911	Veterans Admin Medical Center-Jefferson Barracks Drive	-	-	-	-	1.06
5279511	St Luke's Hospital-Woods Mill Road	0.04	6.59	0.14	0.68	0.35
5366411	Printpack Inc-Hazelwood Plant	0.13	4.62	0.09	0.03	279.92
5366611	Metropolitan St Louis Sewer District-Lemay Waste Water Treatment Plant	505.36	62.63	2.25	2.51	22.53
6816611	Amerenue-Meramec Plant	1.30	4,886.00	466.71	17,510.00	110.64
6822011	Whitmire Microgen Research Laboratory-Kirkwood	-	-	-	-	7.74
6822111	Metropolitan St Louis Sewer District-Mo River Wasterwater Treatment Plant	101.19	91.27	0.27	1.41	11.99
6822411	Metropolitan St Louis Sewer District-Coldwater Creek Sewage Treatment Plant	105.85	71.48	0.39	2.02	3.44
6822811	Simpson Construction Materials Llc-Valley Park	-	8.07	0.80	5.92	2.09
6824011	Fred Weber Inc-South Asphalt	-	5.16	0.02	0.37	0.69
6824111	Fred Weber Inc-North Asphalt H & B	-	11.15	0.62	1.17	2.18
6824211	Fred Weber Inc-North Asphalt B & G	-	3.12	-	0.57	1.02
6828611	Fred Weber Inc-North Stone	-	-	5.98	-	-
6828711	Fred Weber Inc-South Stone	-	-	0.02	-	-
6828811	Monsanto World Headquarters-Lindbergh Blvd	0.39	13.82	0.26	0.08	0.76
6828911	U S Silica Company-Pacific	0.13	4.70	3.57	0.03	0.26
6829311	Pharmacia-Chesterfield Village	0.44	16.99	0.30	0.40	26.94
6829611	Washington University-Millbrook Blvd	0.70	25.27	0.51	0.29	1.39
6829711	St Louis Post-Dispatch-Dunlap Ind Dr	0.00	0.20	0.00	0.00	24.69
6829911	Sunnen Products Company-Maplewood	0.04	1.36	0.03	0.01	7.02
7285311	Multiplex Display Fixture-Fenton	-	0.66	0.05	0.00	1.35
7286211	Reichhold Chemicals Inc-Valley Park	0.17	5.89	0.22	0.04	42.31
7387411	St Louis Airport Authority-Lambert International Blvd	0.32	16.52	0.31	3.37	14.14

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
7387811	Fred Weber Inc Sanitary Landfill-St Louis County	-	6.94	3.38	2.43	9.76
7388011	Chrysler Assembly Plant 1-Fenton	0.83	29.07	4.46	0.18	272.88
7400611	Flex-O-Lite Inc-Fenton	-	-	-	-	29.64
7578011	Gkn Aerospace Services Inc-Berkeley	0.44	9.01	17.83	0.23	66.69
7579111	F & S Real Eastate Inc-St Louis	-	-	-	-	73.46
7688111	Simpson Construction Materials Llc-West Lake Quarry & Material Co	-	6.29	0.11	4.61	0.43
7703011	Energy Petroleum Company-Kienlen	-	-	-	-	8.28
8029111	Chrysler Corp-North Plant	1.69	68.30	6.62	0.51	633.64
8100511	Dana Corporation-Perfect Circle Division	0.01	1.08	0.02	0.01	2.34
8100611	Rockwood Pigments Na Inc-E Hoffmeister	0.37	13.52	0.27	4.06	0.79
St. Louis County Totals		**720.41**	**5,445.44**	**526.07**	**17,549.92**	**2,142.42**
10738111	Washington University – Hilltop Campus	0.01	1.31	0.10	0.01	0.07
5129911	U S Ringbinder Corp-Loose Leaf Metals	-	-	-	-	4.07
5131011	St Louis Post Dispatch-St Louis Post Dispatch	0.00	0.55	0.01	0.00	2.34
5131711	National Geospatial-Intelligence Agency-National Geospatial-Intelligence Agency	0.05	2.32	0.15	0.04	0.14
5132111	Southern Metal Processing-Southern Metal Processing	-	7.76	0.50	9.47	1.51
5132411	Allied Health Care Products-Allied Health Care Products	-	-	-	-	4.94
5132511	Energy Center (The)-St Louis Univ Health Sciences Center	-	12.38	0.43	1.09	0.76
5146111	Connector Castings-Connector Castings	0.01	0.18	0.84	0.02	1.31
5146411	J S Alberici Construction-J S Alberici Construction	-	-	-	-	31.02
5341711	Chemisphere Corporation-Chemisphere	-	-	-	-	3.79
5341811	PQ Corporation (The)-St Louis	0.53	148.14	86.51	0.20	6.75
5342111	Interstate Brands Corp-Interstate Brands Corp	0.05	2.40	0.13	0.01	48.10
5342911	Goodwin Printing Co -St Louis	-	-	-	-	10.51
5343111	Mid-West Industrial Chemical-Mid-West Industrial Chemical	-	-	-	-	7.97
5343211	Brenntag Mid-South Inc-Brenntag Mid-South Inc	-	0.00	-	-	0.27
6009311	ADM Gromark River Systems-St Louis	-	0.00	1.09	-	-
6009611	Trigen-St Louis Energy Corp-Ashley Street Station	2.13	43.25	6.55	1.38	3.88
6009711	Washington Univ Medical School-Boiler Plant	0.18	39.70	2.98	1.83	2.09
6009811	Fred Weber Inc-Asphalt Plant	0.00	2.21	-	0.15	0.29
6009911	Metropolitan St Louis Sewer District-Bissel Plant	534.96	107.93	4.38	13.22	52.25
6010311	Dial Corp-Dial Corp	-	11.04	31.67	0.07	2.44
6110211	Astaris Llc-Carondelet Plant	0.55	9.40	1.47	0.36	1.48
6123811	Alumax Foils Inc-Alcoa Foil Products/Alumax Foils Inc	0.01	26.30	66.39	0.89	693.90
6124211	ADM/TPC Milling Co-Pillsbury Company	-	-	18.03	-	8.99
6124311	Marquette Tool & Die-Marquette Tool & Die	-	-	-	-	10.08
6124811	Italgrani Elevator-Italgrani Elevator	0.12	3.97	1.08	0.02	0.78
6125211	St Alexius Hospital-St Louis	-	1.38	-	0.01	0.03
6125311	Bjc Health System-Pavillion	-	9.65	-	0.50	0.52
6125511	Sensient Colors Inc-Baldwin Plant	0.09	3.26	0.25	0.11	0.23
6126211	Hermann Oak Leather Co-Hermann Oak Leather Co	-	-	-	-	8.17
6126311	Lange-Stegmann Co-Lange-Stegmann Co	-	0.00	-	-	0.00

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
7287111	Poly One Corporation-St Louis	-	-	-	-	4.47
7287211	St Louis Metallizing-St Louis	-	0.37	-	0.00	5.96
7301011	Elementis Specialties Inc-Elementis Specialties Inc	0.26	9.06	0.42	0.05	66.89
7304011	Precoat Metals-Precoat Metals	-	6.83	-	0.04	40.55
7765811	Anheuser-Busch Inc-St Louis	24.25	676.50	26.27	5,490.07	265.90
7766311	Sigma - Aldrich Co-Sigma Chemical Company	-	6.59	-	0.04	12.50
7766411	Procter & Gamble-Procter & Gamble	0.38	13.38	61.79	0.80	0.73
7766811	Ashland Distribution Company-St Louis Plant	-	-	-	-	10.01
7767411	P D George Co (The)-P D George Co (The)	0.30	5.28	1.77	0.03	49.72
7767511	U S Paint Div Of Grow Group-U S Paint Div Of Grow Group	-	-	-	-	41.60
7768911	Sigma - Aldrich Co-Sigma - Aldrich Co	-	3.27	-	0.03	5.37
7769011	Permacel St Louis Inc-Permacel St Louis Inc	0.03	2.11	0.09	0.01	0.99
7833711	Superior Solvent & Chemical-St Louis	-	-	-	-	3.49
7833811	Laclede Tower Associates Llc-Laclede Gas Building	0.00	233.21	0.98	0.06	3.04
7834011	New World Pasta- Marceau Facility-New World Pasta	0.17	6.14	1.12	0.04	0.34
7834611	Southwestern Bell Telephone Company-Southwestern Bell Telephone Company	0.11	15.59	0.57	0.78	0.66
7835511	St Louis University-Facilities Svcs	0.06	11.96	0.91	0.07	0.66
8398811	Mallinckrodt Inc -Mallinckrodt Inc	4.13	112.82	27.56	274.68	56.74
St. Louis City Totals		**568.40**	**1,536.21**	**344.04**	**5,796.10**	**1,478.31**
Grand Total		**1,308.64**	**31,320.70**	**3,692.74**	**121,739.06**	**6,363.13**

Appendix C-3 2017 Area Source Emissions

Similarly to the 2017 point source emission projections, the 2017 area source emission projections for all categories of NO_X and SO_2, as well as the majority of categories for $PM_{2.5}$ and VOC, were calculated using the 2008 area source emissions inventory and applying growth factors to project the emissions in 2017. The growth factor file included SCCs with non-numeric characters. These were identified and determined not to be placeholder SCCs that would be used to match to Missouri SCCs, and so they were removed. When the Missouri area SCCs were initially matched to the growth factors generated by EGAS 5.0, there were several categories that did not have a growth factor. Area SCCs added since 2006 would not be included in EGAS, so a similar growth factor had to be found. The area residential wood category has seen new SCCs added to account for EPA-certified stoves, hydronic heaters, and wax firelogs. EGAS provides a single growth factor for all other residential wood combustion, and so this single factor is used for the new SCCs. New SCCs for portable fuel containers are assigned the most similar growth factor for gasoline product storage. SCCs for bulk plant evaporation of gasoline are assigned the growth factor for bulk terminal evaporation of gasoline.

Once all area SCCs had an assigned growth factor, the annual 2008 emissions were multiplied by the growth factor specific to that county and SCC to get the 2017 forecast emissions. The county totals are summarized below in Table C-6. This table includes refueling emissions for on-road motor vehicles estimated by MOVES2010b. The stage II controls in MOVES2010b were "turned off" by setting the stage II control efficiencies in the countyyear input table to zero (0) for all counties in the Missouri portion of the St. Louis nonattainment area. This was done, because the Air Program is currently developing a SIP revision to remove stage II control requirements in the St. Louis area due to the widespread use of on-board vapor recovery systems. These 2017 refueling stage II VOC emissions are displayed by county in Table C-7.

EGAS 5.0 growth factors were not used to project future year ammonia emissions from any area source categories, nor were these growth factors used to project the $PM_{2.5}$ emissions from the following five fugitive dust categories: paved roads, unpaved roads, residential construction, commercial/industrial/institutional construction, road construction, and agricultural tilling.

In order to project the future year ammonia emissions from area source categories, total area source ammonia emissions in 2008 were compared to total area source ammonia emissions in 2011 to determine current trends in area source ammonia emissions. In total, area source ammonia emissions decreased from 3,514.98 tons in 2008 to 3,207.16 tons in 2011. Because these emissions are trending downwards, EGAS growth factors are not appropriate to use to project the future year emissions. In order to ensure conservative estimates are used to help protect air quality, the 2008 area source ammonia emissions were held level to project the area source ammonia emissions in 2017 even though, over recent years, there has been a downward trend in these emissions.

Fugitive dust emissions from paved roads, unpaved roads, residential construction, commercial/industrial/institutional construction, road construction, and agricultural tilling were also held at 2008 levels when projecting 2017 emissions from these categories as opposed to using EGAS growth factors. These emissions result from dust disturbed during the above

mentioned activities. These types of emissions, in aggregate, comprise a significant total amount of direct $PM_{2.5}$ emissions; however these emissions have negligible impact on urban-wide or region-wide $PM_{2.5}$ concentrations because they settle out of the air quickly and disburse. These types of emissions can impact the immediate local area surrounding the emissions release point; however, $PM_{2.5}$ concentrations quickly return to normal background levels within a few hundred yards of the source. In addition, these types of emissions are difficult, if not impossible, to control. The Air Program reviewed the 2008 and 2011 emissions from these categories. In 2008, direct $PM_{2.5}$ emissions from these five categories totaled 10,964.19 tons/year in the Missouri portion of the nonattainment area and in 2011the emissions totaled 10,092.17 tons/year in the Missouri portion of the nonattainment area, which is a reduction of 872.02 tons/year. In order to ensure conservative estimates are used to help protect air quality, the 2008 direct $PM_{2.5}$ emissions from these five categories were held level to project the emissions in 2017 even though, over recent years, there has been a downward trend in these emissions.

As stated in Appendix B, the 2008 NEI data, which was used as the base year to project 2017 emissions, includes nonpoint emissions. These emissions were used to generate the area source emissions listed in Table C-6. However, due to the methods that are used to calculate the emissions for the marine and rail categories, these categories are included as area source emissions in the National Emissions Inventory (NEI), although they really should be classified as off-road mobile source emissions. Therefore, the emissions for rail and marine are not included in the total area source emissions listed in Table C-6. The SCC codes for the rail and marine categories are listed in Table C-8, and the emissions from these categories are included in Table C-18, to be included as off-road mobile source emissions.

Table C-6
2017 Annual Area Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1,300.09	290.24	2,333.01	992.85	1,927.56
Jefferson County	165.26	395.14	3,462.09	906.99	3,485.98
St. Charles County	883.43	468.07	2,341.40	895.02	6,665.26
St. Louis County	1,036.69	2,245.97	4,616.72	5,459.18	23,111.88
St. Louis City	129.5	1,047.55	1,412.56	3,280.78	8,866.50
Totals	**3,514.98**	**4,446.97**	**14,165.78**	**11,534.82**	**44,057.17**

Table C-7
2017 Annual Refueling Stage II
VOC Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (MO Counties Only)

County Name	Stage II VOC Emissions (tons/year)
Franklin County	54.40
Jefferson County	65.28
St. Charles County	95.98
St. Louis County	420.85
St. Louis City	122.41
Totals	**758.92**

Table C-8
SCC Codes and Descriptions Not Included in the Analysis for Point or Area Source Emissions

SCC	SCC Level One	SCC Level Two	SCC Level Three	SCC Level Four
2275001000	Mobile Sources	Aircraft	Military Aircraft	Total
2275020000	Mobile Sources	Aircraft	Commercial Aircraft	Total: All Types
2275050011	Mobile Sources	Aircraft	General Aviation	Piston
2275050012	Mobile Sources	Aircraft	General Aviation	Turbine
2275060011	Mobile Sources	Aircraft	Air Taxi	Piston
2275060012	Mobile Sources	Aircraft	Air Taxi	Turbine
2275085000	Mobile Sources	Aircraft	Unpaved Airstrips	Total
2275087000	Mobile Sources	Aircraft	In-flight (non-Landing-Takeoff cycle)	Total
2280002100	Mobile Sources	Marine Vessels, Commercial	Diesel	Port emissions
2280002200	Mobile Sources	Marine Vessels, Commercial	Diesel	Underway emissions
2280003100	Mobile Sources	Marine Vessels, Commercial	Residual	Port emissions
2280003200	Mobile Sources	Marine Vessels, Commercial	Residual	Underway emissions
2280004000	Mobile Sources	Marine Vessels, Commercial	Gasoline	Total, All Vessel Types
2285002006	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Class I Operations
2285002007	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Class II / III Operations
2285002008	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Passenger Trains (Amtrak)
2285002009	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Commuter Lines
2285002010	Mobile Sources	Railroad Equipment	Diesel	Yard Locomotives
28500201	Internal Combustion Engines	Railroad Equipment	Diesel	Yard Locomotives

Table C-9 includes all of the area source emissions for 2017 by SCC for each county in the nonattainment area along with the associated growth factors for each SCC. As mentioned above, area source ammonia emissions from all categories were held level from 2008 levels based on current emissions inventory trends for these emissions. Therefore, any growth factor for a category listed below in Table C-9, which includes NH_3 emissions along with other pollutants was not applied to the ammonia emissions when projecting the 2017 area source inventory.

Table C-9 Projected 2017 Area Source Emissions and Growth Factors in the Missouri Portion of the St. Louis $PM_{2.5}$ Nonattainment Area

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2102001000	1.002504468	-	-	-	-	-
Franklin	2102002000	1.002504468	0.38	138.05	-	906.10	0.63
Franklin	2102004000	1.089928269	0.04	1.20	-	2.55	0.01
Franklin	2102005000	0.988051414	0.01	0.94	-	6.06	0.00
Franklin	2102006000	1.12421298	0.02	0.84	-	0.01	0.05
Franklin	2102007000	1.121167541	-	-	-	-	-
Franklin	2102008000	1.225912094	4.66	14.59	-	1.66	1.13
Franklin	2102011000	1.023750782	-	-	-	-	-
Franklin	2103001000	0.998075187	-	-	-	-	-
Franklin	2103002000	0.998075187	0.01	5.46	-	34.89	0.02
Franklin	2103004000	1.179753184	0.00	0.08	-	0.18	0.00
Franklin	2103005000	1.011710644	0.00	0.06	-	0.35	0.00
Franklin	2103006000	1.035624146	0.07	13.81	-	0.08	0.76
Franklin	2103007000	1.011783481	0.00	0.59	-	0.00	0.03
Franklin	2103008000	1.000000000	0.38	0.98	-	0.11	0.08
Franklin	2103011000	1.031448126	-	0.03	-	0.08	-
Franklin	2104001000	0.940908968	-	-	-	-	-
Franklin	2104002000	0.940908968	-	-	-	-	-
Franklin	2104004000	0.900171578	0.58	9.34	1.11	22.11	0.36
Franklin	2104006000	1.005829215	2.97	14.04	0.06	0.09	0.82
Franklin	2104007000	1.008683324	0.10	29.36	0.09	0.12	1.14
Franklin	2104008100	0.993908882	1.52	2.18	19.76	0.33	15.82
Franklin	2104008210	0.993908882	1.39	2.27	24.79	0.32	42.94
Franklin	2104008220	0.993908882	0.24	0.59	5.10	0.10	3.12
Franklin	2104008230	0.993908882	0.08	0.17	1.77	0.03	1.30
Franklin	2104008310	0.993908882	1.25	2.05	22.45	0.29	38.88
Franklin	2104008320	0.993908882	0.21	0.54	4.60	0.09	2.82
Franklin	2104008330	0.993908882	0.07	0.16	1.59	0.03	1.17
Franklin	2104008400	0.993908882	0.07	0.88	0.71	0.07	0.01
Franklin	2104008510	0.993908882	0.79	0.81	12.07	0.89	5.16
Franklin	2104008610	0.993908882	0.80	0.82	28.35	0.90	29.85
Franklin	2104009000	0.993908882	-	0.86	3.17	-	4.41
Franklin	2104011000	1.113933325	0.24	4.91	0.58	11.61	0.19
Franklin	2294000000	1.000000000	-	-	240.75	-	-
Franklin	2296000000	1.000000000	-	-	1,555.69	-	-
Franklin	2302002100	1.071232915	-	-	2.69	-	0.65
Franklin	2302002200	1.071232915	-	-	19.06	-	2.24
Franklin	2302003000	1.071232915	-	-	-	-	0.68
Franklin	2302003100	1.071232915	-	-	5.57	-	0.32
Franklin	2302003200	1.071232915	-	-	0.38	-	0.01
Franklin	2311010000	1.000000000	-	-	2.37	-	-
Franklin	2311020000	1.000000000	-	-	26.14	-	-
Franklin	2311030000	1.000000000	-	-	13.00	-	-
Franklin	2325000000	1.206140399	-	-	11.54	-	-
Franklin	2401001000	1.193573117	-	-	-	-	181.85
Franklin	2401005000	1.231237292	-	-	-	-	32.38
Franklin	2401008000	0.998033822	-	-	-	-	16.81
Franklin	2401015000	1.228024364	-	-	-	-	1.35
Franklin	2401020000	1.362539172	-	-	-	-	35.25
Franklin	2401025000	1.362539172	-	-	-	-	36.08
Franklin	2401030000	1.242753625	-	-	-	-	-
Franklin	2401040000	1.306329131	-	-	-	-	-
Franklin	2401050000	1.348751545	-	-	-	-	87.57
Franklin	2401055000	1.821049213	-	-	-	-	82.10
Franklin	2401060000	1.420174122	-	-	-	-	-

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2401065000	1.172098875	-	-	-	-	5.77
Franklin	2401070000	1.355618477	-	-	-	-	24.26
Franklin	2401075000	1.27256608	-	-	-	-	2.45
Franklin	2401080000	1.177083373	-	-	-	-	16.82
Franklin	2401085000	1.386554599	-	-	-	-	-
Franklin	2401090000	1.362517118	-	-	-	-	55.13
Franklin	2401100000	1.218145132	-	-	-	-	67.60
Franklin	2401200000	1.277777791	-	-	-	-	0.45
Franklin	2415000000	1.362539172	-	-	-	-	126.48
Franklin	2420000000	1.152129769	-	-	-	-	1.68
Franklin	2425000000	1.20169425	-	-	-	-	90.64
Franklin	2460100000	1.090155363	-	-	-	-	104.49
Franklin	2460200000	1.090155363	-	-	-	-	98.99
Franklin	2460400000	1.090155363	-	-	-	-	74.80
Franklin	2460500000	1.090155363	-	-	-	-	52.25
Franklin	2460600000	1.090155363	-	-	-	-	31.35
Franklin	2460800000	1.090155363	-	-	-	-	97.89
Franklin	2460900000	1.090155363	-	-	-	-	3.85
Franklin	2461021000	1.23496294	-	-	-	-	45.68
Franklin	2461022000	1.23496294	-	-	-	-	23.88
Franklin	2461850000	1.21449995	-	-	-	-	76.43
Franklin	2501011011	1.152557731	-	-	-	-	17.54
Franklin	2501011012	1.152557731	-	-	-	-	34.25
Franklin	2501011013	1.152557731	-	-	-	-	3.99
Franklin	2501011014	1.152557731	-	-	-	-	1.31
Franklin	2501011015	1.152557731	-	-	-	-	0.11
Franklin	2501012011	1.152557731	-	-	-	-	0.56
Franklin	2501012012	1.152557731	-	-	-	-	1.09
Franklin	2501012013	1.152557731	-	-	-	-	5.44
Franklin	2501012014	1.152557731	-	-	-	-	2.52
Franklin	2501012015	1.152557731	-	-	-	-	0.21
Franklin	2501050120	0.998033822	-	-	-	-	7.01
Franklin	2501055120	1.152557731	-	-	-	-	6.30
Franklin	2501060053	0.998033822	-	-	-	-	20.31
Franklin	2501060201	0.998033822	-	-	-	-	28.73
Franklin	2501080050	1.305269957	-	-	-	-	15.03
Franklin	2501080100	1.305269957	-	-	-	-	0.78
Franklin	2505030120	0.998033822	-	-	-	-	1.88
Franklin	2505040120	1.150793672	-	-	-	-	6.87
Franklin	2610000100	1.090155363	-	0.90	2.46	0.11	4.06
Franklin	2610000400	1.090155363	-	0.73	2.21	0.24	2.76
Franklin	2610000500	1.090155363	-	22.40	58.72	-	51.97
Franklin	2610030000	1.090155363	-	19.45	112.79	3.24	27.74
Franklin	2630020000	1.209375024	0.38	-	-	-	2.31
Franklin	2801000003	1.000000000	-	-	151.11	-	-
Franklin	2801500000	1.21449995	-	0.73	2.31	0.10	1.46
Franklin	2801700001	1.000000000	81.45	-	-	-	-
Franklin	2801700002	1.21449995	-	-	-	-	-
Franklin	2801700003	1.000000000	0.03	-	-	-	-
Franklin	2801700004	1.000000000	400.32	-	-	-	-
Franklin	2801700005	1.000000000	27.01	-	-	-	-
Franklin	2801700006	1.000000000	2.63	-	-	-	-
Franklin	2801700007	1.21449995	-	-	-	-	-
Franklin	2801700010	1.000000000	5.02	-	-	-	-
Franklin	2801700011	1.21449995	-	-	-	-	-
Franklin	2801700012	1.21449995	-	-	-	-	-
Franklin	2801700013	1.000000000	41.32	-	-	-	-

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2801700014	1.21449995	-	-	-	-	-
Franklin	2801700015	1.21449995	-	-	-	-	-
Franklin	2801700099	1.000000000	0.08	-	-	-	-
Franklin	2805001100	1.000000000	17.29	-	-	-	-
Franklin	2805001200	1.000000000	0.01	-	-	-	-
Franklin	2805001300	1.000000000	13.17	-	-	-	-
Franklin	2805002000	1.000000000	116.29	-	-	-	-
Franklin	2805003100	1.000000000	113.26	-	-	-	-
Franklin	2805007100	1.000000000	1.49	-	-	-	-
Franklin	2805007300	1.000000000	0.03	-	-	-	-
Franklin	2805008100	1.21449995	-	-	-	-	-
Franklin	2805008200	1.21449995	-	-	-	-	-
Franklin	2805008300	1.21449995	-	-	-	-	-
Franklin	2805009100	1.000000000	0.05	-	-	-	-
Franklin	2805009200	1.000000000	0.01	-	-	-	-
Franklin	2805009300	1.000000000	0.04	-	-	-	-
Franklin	2805010100	1.000000000	0.02	-	-	-	-
Franklin	2805010200	1.000000000	0.00	-	-	-	-
Franklin	2805010300	1.000000000	0.01	-	-	-	-
Franklin	2805018000	1.000000000	22.18	-	-	-	-
Franklin	2805019100	1.000000000	0.53	-	-	-	-
Franklin	2805019200	1.000000000	1.49	-	-	-	-
Franklin	2805019300	1.000000000	0.15	-	-	-	-
Franklin	2805021100	1.000000000	14.12	-	-	-	-
Franklin	2805021200	1.000000000	19.14	-	-	-	-
Franklin	2805021300	1.000000000	23.76	-	-	-	-
Franklin	2805022100	1.000000000	2.07	-	-	-	-
Franklin	2805022200	1.000000000	0.10	-	-	-	-
Franklin	2805022300	1.000000000	1.20	-	-	-	-
Franklin	2805023100	1.000000000	9.42	-	-	-	-
Franklin	2805023200	1.000000000	0.17	-	-	-	-
Franklin	2805023300	1.000000000	12.57	-	-	-	-
Franklin	2805025000	1.21449995	-	-	-	-	-
Franklin	2805030000	1.000000000	0.14	-	-	-	-
Franklin	2805030007	1.000000000	0.21	-	-	-	-
Franklin	2805030008	1.000000000	0.16	-	-	-	-
Franklin	2805035000	1.000000000	38.28	-	-	-	-
Franklin	2805039100	1.000000000	93.85	-	-	-	-
Franklin	2805039200	1.000000000	171.60	-	-	-	-
Franklin	2805039300	1.000000000	14.78	-	-	-	-
Franklin	2805040000	1.000000000	4.20	-	-	-	-
Franklin	2805045000	1.000000000	3.75	-	-	-	-
Franklin	2805047100	1.000000000	20.99	-	-	-	-
Franklin	2805047300	1.000000000	8.95	-	-	-	-
Franklin	2805053100	1.000000000	0.45	-	-	-	-
Franklin	2810060100	1.250728846	-	0.43	0.03	0.07	0.00
Franklin County Total			**1,300.09**	**290.24**	**2,534.61**	**992.85**	**1,873.16**
Jefferson	2102001000	1.002504468	-	-	-	-	-
Jefferson	2102002000	1.002504468	0.36	131.92	-	865.86	0.60
Jefferson	2102004000	1.089928269	0.04	1.14	-	2.44	0.01
Jefferson	2102005000	0.988051414	0.01	0.90	-	5.79	0.00
Jefferson	2102006000	1.12421298	0.02	0.81	-	0.00	0.04
Jefferson	2102007000	1.121167541	-	-	-	-	-
Jefferson	2102008000	1.225912094	4.46	13.95	-	1.58	1.08
Jefferson	2102011000	1.023750782	-	-	-	-	-
Jefferson	2103001000	0.998075187	-	-	-	-	-
Jefferson	2103002000	0.998075187	0.00	1.09	-	6.96	0.00

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2103004000	1.179753184	0.00	0.02	-	0.04	0.00
Jefferson	2103005000	1.011710644	0.00	0.01	-	0.07	0.00
Jefferson	2103006000	1.035624146	0.01	2.75	-	0.02	0.15
Jefferson	2103007000	1.011783481	0.00	0.12	-	0.00	0.01
Jefferson	2103008000	1.000000000	0.08	0.19	-	0.02	0.02
Jefferson	2103011000	1.031448126	-	0.01	-	0.02	-
Jefferson	2104001000	0.940908968	-	-	-	-	-
Jefferson	2104002000	0.940908968	-	-	-	-	-
Jefferson	2104004000	0.900171578	0.27	4.43	0.52	10.49	0.17
Jefferson	2104006000	1.005829215	16.58	78.39	0.36	0.50	4.59
Jefferson	2104007000	1.008683324	0.14	40.36	0.12	0.17	1.57
Jefferson	2104008100	0.993908882	3.21	4.62	41.90	0.71	33.55
Jefferson	2104008210	0.993908882	2.94	4.82	52.63	0.69	91.16
Jefferson	2104008220	0.993908882	0.50	1.26	10.83	0.22	6.63
Jefferson	2104008230	0.993908882	0.17	0.37	3.76	0.07	2.77
Jefferson	2104008310	0.993908882	2.66	4.36	47.62	0.62	82.48
Jefferson	2104008320	0.993908882	0.45	1.14	9.78	0.20	5.99
Jefferson	2104008330	0.993908882	0.15	0.33	3.38	0.07	2.49
Jefferson	2104008400	0.993908882	0.15	1.84	1.49	0.16	0.02
Jefferson	2104009000	0.993908882	-	1.79	6.63	-	9.23
Jefferson	2104011000	1.113933325	0.12	2.33	0.28	5.51	0.09
Jefferson	2294000000	1.000000000	-	-	229.48	-	-
Jefferson	2296000000	1.000000000	-	-	2,484.70	-	-
Jefferson	2302002100	1.071232915	-	-	5.81	-	1.41
Jefferson	2302002200	1.071232915	-	-	41.13	-	4.84
Jefferson	2302003000	1.071232915	-	-	-	-	1.47
Jefferson	2302003100	1.071232915	-	-	12.01	-	0.69
Jefferson	2302003200	1.071232915	-	-	0.82	-	0.03
Jefferson	2311010000	1.000000000	-	-	6.82	-	-
Jefferson	2311020000	1.000000000	-	-	56.75	-	-
Jefferson	2311030000	1.000000000	-	-	43.02	-	-
Jefferson	2325000000	1.206140399	-	-	23.08	-	-
Jefferson	2401001000	1.193573117	-	-	-	-	392.32
Jefferson	2401005000	1.231237292	-	-	-	-	37.20
Jefferson	2401008000	0.998033822	-	-	-	-	16.68
Jefferson	2401015000	1.228024364	-	-	-	-	0.21
Jefferson	2401020000	1.362539172	-	-	-	-	14.04
Jefferson	2401025000	1.362539172	-	-	-	-	1.70
Jefferson	2401030000	1.242753625	-	-	-	-	22.64
Jefferson	2401040000	1.306329131	-	-	-	-	-
Jefferson	2401050000	1.348751545	-	-	-	-	23.70
Jefferson	2401055000	1.821049213	-	-	-	-	20.35
Jefferson	2401060000	1.420174122	-	-	-	-	1.32
Jefferson	2401065000	1.172098875	-	-	-	-	-
Jefferson	2401070000	1.355618477	-	-	-	-	1.97
Jefferson	2401075000	1.27256608	-	-	-	-	2.45
Jefferson	2401080000	1.177083373	-	-	-	-	0.96
Jefferson	2401085000	1.386554599	-	-	-	-	-
Jefferson	2401090000	1.362517118	-	-	-	-	16.68
Jefferson	2401100000	1.218145132	-	-	-	-	145.84
Jefferson	2401200000	1.277777791	-	-	-	-	0.97
Jefferson	2415000000	1.362539172	-	-	-	-	69.04
Jefferson	2420000000	1.152129769	-	-	-	-	12.11
Jefferson	2425000000	1.20169425	-	-	-	-	88.28
Jefferson	2460100000	1.090155363	-	-	-	-	225.44
Jefferson	2460200000	1.090155363	-	-	-	-	213.57
Jefferson	2460400000	1.090155363	-	-	-	-	161.37

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2460500000	1.090155363	-	-	-	-	112.72
Jefferson	2460600000	1.090155363	-	-	-	-	67.63
Jefferson	2460800000	1.090155363	-	-	-	-	211.20
Jefferson	2460900000	1.090155363	-	-	-	-	8.31
Jefferson	2461021000	1.23496294	-	-	-	-	82.80
Jefferson	2461022000	1.23496294	-	-	-	-	43.29
Jefferson	2461850000	1.21449995	-	-	-	-	16.27
Jefferson	2501011011	1.152557731	-	-	-	-	38.27
Jefferson	2501011012	1.152557731	-	-	-	-	74.72
Jefferson	2501011013	1.152557731	-	-	-	-	8.70
Jefferson	2501011014	1.152557731	-	-	-	-	2.86
Jefferson	2501011015	1.152557731	-	-	-	-	0.24
Jefferson	2501012011	1.152557731	-	-	-	-	1.22
Jefferson	2501012012	1.152557731	-	-	-	-	2.39
Jefferson	2501012013	1.152557731	-	-	-	-	11.87
Jefferson	2501012014	1.152557731	-	-	-	-	5.50
Jefferson	2501012015	1.152557731	-	-	-	-	0.47
Jefferson	2501050120	0.998033822	-	-	-	-	79.52
Jefferson	2501055120	1.152557731	-	-	-	-	71.46
Jefferson	2501060052	0.998033822	-	-	-	-	519.72
Jefferson	2501060201	0.998033822	-	-	-	-	50.70
Jefferson	2501080050	1.305269957	-	-	-	-	2.05
Jefferson	2501080100	1.305269957	-	-	-	-	0.11
Jefferson	2505030120	0.998033822	-	-	-	-	3.32
Jefferson	2505040120	1.150793672	-	-	-	-	77.90
Jefferson	2610000100	1.090155363	-	1.16	3.17	0.14	5.23
Jefferson	2610000400	1.090155363	-	0.93	2.84	0.31	3.55
Jefferson	2610000500	1.090155363	-	68.12	178.55	-	158.05
Jefferson	2610030000	1.090155363	-	25.04	145.23	4.17	35.72
Jefferson	2630020000	1.209375024	0.82	-	-	-	4.99
Jefferson	2801000003	1.000000000	-	-	49.33	-	-
Jefferson	2801700001	1.21449995	-	-	-	-	-
Jefferson	2801700002	1.21449995	-	-	-	-	-
Jefferson	2801700003	1.21449995	-	-	-	-	-
Jefferson	2801700004	1.000000000	15.47	-	-	-	-
Jefferson	2801700005	1.21449995	-	-	-	-	-
Jefferson	2801700006	1.000000000	0.01	-	-	-	-
Jefferson	2801700007	1.21449995	-	-	-	-	-
Jefferson	2801700010	1.000000000	6.04	-	-	-	-
Jefferson	2801700011	1.21449995	-	-	-	-	-
Jefferson	2801700012	1.21449995	-	-	-	-	-
Jefferson	2801700013	1.000000000	2.18	-	-	-	-
Jefferson	2801700014	1.21449995	-	-	-	-	-
Jefferson	2801700015	1.21449995	-	-	-	-	-
Jefferson	2801700099	1.000000000	0.05	-	-	-	-
Jefferson	2805001100	1.000000000	1.91	-	-	-	-
Jefferson	2805001200	1.000000000	0.00	-	-	-	-
Jefferson	2805001300	1.000000000	1.45	-	-	-	-
Jefferson	2805002000	1.000000000	16.10	-	-	-	-
Jefferson	2805003100	1.000000000	20.20	-	-	-	-
Jefferson	2805007100	1.000000000	0.94	-	-	-	-
Jefferson	2805007300	1.000000000	0.02	-	-	-	-
Jefferson	2805008100	1.21449995	-	-	-	-	-
Jefferson	2805008200	1.21449995	-	-	-	-	-
Jefferson	2805008300	1.21449995	-	-	-	-	-
Jefferson	2805009100	1.000000000	0.02	-	-	-	-
Jefferson	2805009200	1.000000000	0.00	-	-	-	-

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2805009300	1.000000000	0.02	-	-	-	-
Jefferson	2805010100	1.000000000	0.02	-	-	-	-
Jefferson	2805010200	1.000000000	0.00	-	-	-	-
Jefferson	2805010300	1.000000000	0.01	-	-	-	-
Jefferson	2805018000	1.000000000	6.19	-	-	-	-
Jefferson	2805019100	1.000000000	0.16	-	-	-	-
Jefferson	2805019200	1.000000000	0.45	-	-	-	-
Jefferson	2805019300	1.000000000	0.04	-	-	-	-
Jefferson	2805021100	1.000000000	4.63	-	-	-	-
Jefferson	2805021200	1.000000000	6.27	-	-	-	-
Jefferson	2805021300	1.000000000	7.79	-	-	-	-
Jefferson	2805022100	1.000000000	0.67	-	-	-	-
Jefferson	2805022200	1.000000000	0.03	-	-	-	-
Jefferson	2805022300	1.000000000	0.39	-	-	-	-
Jefferson	2805023100	1.000000000	3.08	-	-	-	-
Jefferson	2805023200	1.000000000	0.06	-	-	-	-
Jefferson	2805023300	1.000000000	4.11	-	-	-	-
Jefferson	2805025000	1.21449995	-	-	-	-	-
Jefferson	2805030000	1.000000000	0.20	-	-	-	-
Jefferson	2805030007	1.000000000	0.20	-	-	-	-
Jefferson	2805030008	1.000000000	0.18	-	-	-	-
Jefferson	2805035000	1.000000000	22.70	-	-	-	-
Jefferson	2805039100	1.000000000	1.04	-	-	-	-
Jefferson	2805039200	1.000000000	2.02	-	-	-	-
Jefferson	2805039300	1.000000000	0.17	-	-	-	-
Jefferson	2805040000	1.000000000	1.91	-	-	-	-
Jefferson	2805045000	1.000000000	5.03	-	-	-	-
Jefferson	2805047100	1.000000000	0.23	-	-	-	-
Jefferson	2805047300	1.000000000	0.10	-	-	-	-
Jefferson	2805053100	1.000000000	0.00	-	-	-	-
Jefferson	2810060100	1.25072885	-	0.94	0.06	0.14	0.00
Jefferson County Total			**165.26**	**395.14**	**3,735.94**	**906.99**	**3,420.70**
St. Charles	2102001000	1.002504468	-	-	-	-	-
St. Charles	2102002000	1.002504468	0.33	122.04	-	801.05	0.55
St. Charles	2102004000	1.089928269	0.04	1.06	-	2.25	0.01
St. Charles	2102005000	0.988051414	0.01	0.83	-	5.36	0.00
St. Charles	2102006000	1.12421298	0.02	0.75	-	0.00	0.04
St. Charles	2102007000	1.121167541	-	-	-	-	-
St. Charles	2102008000	1.225912094	4.12	12.90	-	1.47	1.00
St. Charles	2102011000	1.023750782	-	-	-	-	-
St. Charles	2103001000	0.998075187	-	-	-	-	-
St. Charles	2103002000	0.998075187	0.01	4.55	-	29.09	0.02
St. Charles	2103004000	1.179753184	0.00	0.07	-	0.15	0.00
St. Charles	2103005000	1.011710644	0.00	0.05	-	0.29	0.00
St. Charles	2103006000	1.035624146	0.05	11.51	-	0.07	0.63
St. Charles	2103007000	1.011783481	0.00	0.49	-	0.00	0.03
St. Charles	2103008000	1.000000000	0.32	0.81	-	0.09	0.06
St. Charles	2103011000	1.031448126	-	0.03	-	0.06	-
St. Charles	2104001000	0.940908968	-	-	-	-	-
St. Charles	2104002000	0.940908968	0.82	3.49	1.47	40.32	3.84
St. Charles	2104004000	0.900171578	0.14	2.30	0.27	5.45	0.09
St. Charles	2104006000	1.005829215	52.03	245.96	1.13	1.57	14.39
St. Charles	2104007000	1.008683324	0.08	23.94	0.07	0.10	0.93
St. Charles	2104008100	0.993908882	5.06	7.26	65.88	1.12	52.76
St. Charles	2104008210	0.993908882	4.63	7.58	82.79	1.08	143.40
St. Charles	2104008220	0.993908882	0.79	1.98	17.01	0.35	10.41
St. Charles	2104008230	0.993908882	0.26	0.58	5.91	0.12	4.35

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2104008310	0.993908882	4.19	6.86	74.92	0.98	129.76
St. Charles	2104008320	0.993908882	0.71	1.79	15.38	0.31	9.42
St. Charles	2104008330	0.993908882	0.24	0.52	5.33	0.10	3.92
St. Charles	2104008400	0.993908882	0.23	2.95	2.38	0.25	0.03
St. Charles	2104009000	0.993908882	-	2.86	10.58	-	14.73
St. Charles	2104011000	1.113933325	0.06	1.21	0.14	2.86	0.05
St. Charles	2294000000	1.000000000	-	-	260.13	-	-
St. Charles	2296000000	1.000000000	-	-	964.31	-	-
St. Charles	2302002100	1.071232915	-	-	9.32	-	2.26
St. Charles	2302002200	1.071232915	-	-	66.01	-	7.76
St. Charles	2302003000	1.071232915	-	-	-	-	2.36
St. Charles	2302003100	1.071232915	-	-	19.28	-	1.11
St. Charles	2302003200	1.071232915	-	-	1.31	-	0.04
St. Charles	2311010000	1.000000000	-	-	14.67	-	-
St. Charles	2311020000	1.000000000	-	-	92.66	-	-
St. Charles	2311030000	1.000000000	-	-	77.73	-	-
St. Charles	2325000000	1.206140399	-	-	22.76	-	-
St. Charles	2401001000	1.193573117	-	-	-	-	629.74
St. Charles	2401005000	1.231237292	-	-	-	-	87.50
St. Charles	2401008000	0.998033822	-	-	-	-	18.74
St. Charles	2401015000	1.228024364	-	-	-	-	2.90
St. Charles	2401020000	1.362539172	-	-	-	-	15.31
St. Charles	2401025000	1.362539172	-	-	-	-	-
St. Charles	2401030000	1.242753625	-	-	-	-	-
St. Charles	2401040000	1.306329131	-	-	-	-	-
St. Charles	2401050000	1.348751545	-	-	-	-	119.88
St. Charles	2401055000	1.821049213	-	-	-	-	251.25
St. Charles	2401060000	1.420174122	-	-	-	-	1.32
St. Charles	2401065000	1.172098875	-	-	-	-	-
St. Charles	2401070000	1.355618477	-	-	-	-	131.51
St. Charles	2401075000	1.27256608	-	-	-	-	-
St. Charles	2401080000	1.177083373	-	-	-	-	0.96
St. Charles	2401085000	1.386554599	-	-	-	-	8.20
St. Charles	2401090000	1.362517118	-	-	-	-	82.65
St. Charles	2401100000	1.218145132	-	-	-	-	234.10
St. Charles	2401200000	1.277777791	-	-	-	-	1.56
St. Charles	2415000000	1.362539172	-	-	-	-	251.68
St. Charles	2420000000	1.152129769	-	-	-	-	129.67
St. Charles	2425000000	1.20169425	-	-	-	-	999.34
St. Charles	2460100000	1.090155363	-	-	-	-	361.86
St. Charles	2460200000	1.090155363	-	-	-	-	342.82
St. Charles	2460400000	1.090155363	-	-	-	-	259.02
St. Charles	2460500000	1.090155363	-	-	-	-	180.93
St. Charles	2460600000	1.090155363	-	-	-	-	108.56
St. Charles	2460800000	1.090155363	-	-	-	-	339.01
St. Charles	2460900000	1.090155363	-	-	-	-	13.33
St. Charles	2461021000	1.23496294	-	-	-	-	92.06
St. Charles	2461022000	1.23496294	-	-	-	-	48.13
St. Charles	2461850000	1.21449995	-	-	-	-	116.65
St. Charles	2501011011	1.152557731	-	-	-	-	76.88
St. Charles	2501011012	1.152557731	-	-	-	-	150.11
St. Charles	2501011013	1.152557731	-	-	-	-	17.47
St. Charles	2501011014	1.152557731	-	-	-	-	5.74
St. Charles	2501011015	1.152557731	-	-	-	-	0.49
St. Charles	2501012011	1.152557731	-	-	-	-	2.46
St. Charles	2501012012	1.152557731	-	-	-	-	4.79
St. Charles	2501012013	1.152557731	-	-	-	-	23.84

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2501012014	1.152557731	-	-	-	-	11.06
St. Charles	2501012015	1.152557731	-	-	-	-	0.93
St. Charles	2501050120	0.998033822	-	-	-	-	40.86
St. Charles	2501055120	1.152557731	-	-	-	-	36.68
St. Charles	2501060052	0.998033822	-	-	-	-	793.61
St. Charles	2501060201	0.998033822	-	-	-	-	77.42
St. Charles	2501080050	1.305269957	-	-	-	-	34.98
St. Charles	2501080100	1.305269957	-	-	-	-	1.82
St. Charles	2505030120	0.998033822	-	-	-	-	5.06
St. Charles	2505040120	1.150793672	-	-	-	-	40.03
St. Charles	2610000100	1.090155363	-	-	-	-	-
St. Charles	2610000400	1.090155363	-	-	-	-	-
St. Charles	2610000500	1.090155363	-	-	-	-	-
St. Charles	2610030000	1.090155363	-	-	-	-	-
St. Charles	2630020000	1.209375024	1.32	-	-	-	8.02
St. Charles	2801000003	1.000000000	-	-	522.93	-	-
St. Charles	2801500000	1.21449995	-	2.19	6.92	0.29	4.37
St. Charles	2801700001	1.000000000	51.93	-	-	-	-
St. Charles	2801700002	1.21449995	-	-	-	-	-
St. Charles	2801700003	1.000000000	375.03	-	-	-	-
St. Charles	2801700004	1.000000000	102.23	-	-	-	-
St. Charles	2801700005	1.000000000	0.01	-	-	-	-
St. Charles	2801700006	1.000000000	0.83	-	-	-	-
St. Charles	2801700007	1.000000000	0.17	-	-	-	-
St. Charles	2801700010	1.000000000	30.78	-	-	-	-
St. Charles	2801700011	1.21449995	-	-	-	-	-
St. Charles	2801700012	1.21449995	-	-	-	-	-
St. Charles	2801700013	1.000000000	14.66	-	-	-	-
St. Charles	2801700014	1.000000000	6.03	-	-	-	-
St. Charles	2801700015	1.000000000	2.90	-	-	-	-
St. Charles	2801700099	1.000000000	0.04	-	-	-	-
St. Charles	2805001100	1.000000000	8.40	-	-	-	-
St. Charles	2805001200	1.000000000	0.00	-	-	-	-
St. Charles	2805001300	1.000000000	6.38	-	-	-	-
St. Charles	2805002000	1.000000000	17.42	-	-	-	-
St. Charles	2805003100	1.000000000	25.21	-	-	-	-
St. Charles	2805007100	1.000000000	0.63	-	-	-	-
St. Charles	2805007300	1.000000000	0.01	-	-	-	-
St. Charles	2805008100	1.21449995	-	-	-	-	-
St. Charles	2805008200	1.21449995	-	-	-	-	-
St. Charles	2805008300	1.21449995	-	-	-	-	-
St. Charles	2805009100	1.21449995	-	-	-	-	-
St. Charles	2805009200	1.21449995	-	-	-	-	-
St. Charles	2805009300	1.21449995	-	-	-	-	-
St. Charles	2805010100	1.21449995	-	-	-	-	-
St. Charles	2805010200	1.21449995	-	-	-	-	-
St. Charles	2805010300	1.21449995	-	-	-	-	-
St. Charles	2805018000	1.000000000	3.79	-	-	-	-
St. Charles	2805019100	1.000000000	0.18	-	-	-	-
St. Charles	2805019200	1.000000000	0.52	-	-	-	-
St. Charles	2805019300	1.000000000	0.05	-	-	-	-
St. Charles	2805021100	1.000000000	4.42	-	-	-	-
St. Charles	2805021200	1.000000000	5.99	-	-	-	-
St. Charles	2805021300	1.000000000	7.44	-	-	-	-
St. Charles	2805022100	1.000000000	0.67	-	-	-	-
St. Charles	2805022200	1.000000000	0.03	-	-	-	-
St. Charles	2805022300	1.000000000	0.39	-	-	-	-

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2805023100	1.000000000	2.96	-	-	-	-
St. Charles	2805023200	1.000000000	0.05	-	-	-	-
St. Charles	2805023300	1.000000000	3.95	-	-	-	-
St. Charles	2805025000	1.21449995	-	-	-	-	-
St. Charles	2805030000	1.000000000	0.14	-	-	-	-
St. Charles	2805030007	1.000000000	0.02	-	-	-	-
St. Charles	2805030008	1.000000000	0.02	-	-	-	-
St. Charles	2805035000	1.000000000	10.40	-	-	-	-
St. Charles	2805039100	1.000000000	35.38	-	-	-	-
St. Charles	2805039200	1.000000000	70.75	-	-	-	-
St. Charles	2805039300	1.000000000	5.82	-	-	-	-
St. Charles	2805040000	1.000000000	0.68	-	-	-	-
St. Charles	2805045000	1.000000000	0.15	-	-	-	-
St. Charles	2805047100	1.000000000	7.95	-	-	-	-
St. Charles	2805047300	1.000000000	3.39	-	-	-	-
St. Charles	2805053100	1.000000000	0.17	-	-	-	-
St. Charles	2810060100	1.250728846	-	1.51	0.10	0.23	0.01
St. Charles County Total			**883.43**	**468.07**	**2,596.20**	**895.02**	**6,569.28**
St. Louis	2102001000	1.002504468	-	-	-	-	-
St. Louis	2102002000	1.002504468	2.20	807.37	-	5,299.30	3.67
St. Louis	2102004000	1.089928269	0.26	7.00	-	14.92	0.07
St. Louis	2102005000	0.988051414	0.08	5.52	-	35.45	0.03
St. Louis	2102006000	1.12421298	0.14	4.94	-	0.03	0.27
St. Louis	2102007000	1.121167541	-	-	-	-	-
St. Louis	2102008000	1.225912094	27.28	85.35	-	9.70	6.60
St. Louis	2102011000	1.023750782	-	-	-	-	-
St. Louis	2103001000	0.998075187	-	-	-	-	-
St. Louis	2103002000	0.998075187	0.01	5.20	-	33.24	0.02
St. Louis	2103004000	1.179753184	0.00	0.08	-	0.17	0.00
St. Louis	2103005000	1.011710644	0.00	0.05	-	0.34	0.00
St. Louis	2103006000	1.035624146	0.06	13.16	-	0.08	0.72
St. Louis	2103007000	1.011783481	0.00	0.56	-	0.00	0.03
St. Louis	2103008000	1.000000000	0.36	0.93	-	0.11	0.07
St. Louis	2103011000	1.031448126	-	0.03	-	0.07	-
St. Louis	2104001000	0.940908968	-	-	-	-	-
St. Louis	2104002000	0.940908968	0.61	2.62	1.10	30.24	2.88
St. Louis	2104004000	0.900171578	0.24	3.85	0.46	9.11	0.15
St. Louis	2104006000	1.005829215	250.92	1,186.19	5.43	7.57	69.40
St. Louis	2104007000	1.008683324	0.06	16.35	0.05	0.07	0.64
St. Louis	2104008100	0.993908882	15.64	22.46	203.87	3.46	163.27
St. Louis	2104008210	0.993908882	14.32	23.44	256.14	3.35	443.65
St. Louis	2104008220	0.993908882	2.43	6.12	52.62	1.07	32.22
St. Louis	2104008230	0.993908882	0.81	1.79	18.27	0.36	13.43
St. Louis	2104008310	0.993908882	12.95	21.21	231.76	3.03	401.42
St. Louis	2104008320	0.993908882	2.20	5.54	47.60	0.97	29.14
St. Louis	2104008330	0.993908882	0.73	1.62	16.51	0.32	12.14
St. Louis	2104008400	0.993908882	0.74	9.28	7.47	0.78	0.10
St. Louis	2104009000	0.993908882	-	9.01	33.29	-	46.37
St. Louis	2104011000	1.113933325	0.10	2.02	0.24	4.79	0.08
St. Louis	2294000000	1.000000000	-	-	1,041.13	-	-
St. Louis	2296000000	1.000000000	-	-	563.24	-	-
St. Louis	2302002100	1.071232915	-	-	26.45	-	6.40
St. Louis	2302002200	1.071232915	-	-	187.38	-	22.04
St. Louis	2302003000	1.071232915	-	-	-	-	6.70
St. Louis	2302003100	1.071232915	-	-	54.74	-	3.16
St. Louis	2302003200	1.071232915	-	-	3.71	-	0.12
St. Louis	2311010000	1.000000000	-	-	7.11	-	-

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2311020000	1.000000000	-	-	1,634.59	-	-
St. Louis	2311030000	1.000000000	-	-	37.90	-	-
St. Louis	2325000000	1.206140399	-	-	112.18	-	-
St. Louis	2401001000	1.193573117	-	-	-	-	1,787.57
St. Louis	2401005000	1.231237292	-	-	-	-	455.96
St. Louis	2401008000	0.998033822	-	-	-	-	52.12
St. Louis	2401015000	1.228024364	-	-	-	-	5.25
St. Louis	2401020000	1.362539172	-	-	-	-	134.79
St. Louis	2401025000	1.362539172	-	-	-	-	118.27
St. Louis	2401030000	1.242753625	-	-	-	-	26.96
St. Louis	2401040000	1.306329131	-	-	-	-	1.31
St. Louis	2401050000	1.348751545	-	-	-	-	100.48
St. Louis	2401055000	1.821049213	-	-	-	-	379.32
St. Louis	2401060000	1.420174122	-	-	-	-	-
St. Louis	2401065000	1.172098875	-	-	-	-	0.32
St. Louis	2401070000	1.355618477	-	-	-	-	562.32
St. Louis	2401075000	1.27256608	-	-	-	-	-
St. Louis	2401080000	1.177083373	-	-	-	-	9.99
St. Louis	2401085000	1.386554599	-	-	-	-	-
St. Louis	2401090000	1.362517118	-	-	-	-	257.57
St. Louis	2401100000	1.218145132	-	-	-	-	664.50
St. Louis	2401200000	1.277777791	-	-	-	-	4.44
St. Louis	2415000000	1.362539172	-	-	-	-	767.72
St. Louis	2420000000	1.152129769	-	-	-	-	465.68
St. Louis	2425000000	1.20169425	-	-	-	-	4,134.82
St. Louis	2460100000	1.090155363	-	-	-	-	1,027.19
St. Louis	2460200000	1.090155363	-	-	-	-	973.12
St. Louis	2460400000	1.090155363	-	-	-	-	735.25
St. Louis	2460500000	1.090155363	-	-	-	-	513.59
St. Louis	2460600000	1.090155363	-	-	-	-	308.16
St. Louis	2460800000	1.090155363	-	-	-	-	962.31
St. Louis	2460900000	1.090155363	-	-	-	-	37.84
St. Louis	2461021000	1.23496294	-	-	-	-	393.07
St. Louis	2461022000	1.23496294	-	-	-	-	205.51
St. Louis	2461850000	1.21449995	-	-	-	-	23.16
St. Louis	2501011011	1.152557731	-	-	-	-	440.63
St. Louis	2501011012	1.152557731	-	-	-	-	860.31
St. Louis	2501011013	1.152557731	-	-	-	-	100.15
St. Louis	2501011014	1.152557731	-	-	-	-	32.89
St. Louis	2501011015	1.152557731	-	-	-	-	2.78
St. Louis	2501012011	1.152557731	-	-	-	-	14.07
St. Louis	2501012012	1.152557731	-	-	-	-	27.48
St. Louis	2501012013	1.152557731	-	-	-	-	136.62
St. Louis	2501012014	1.152557731	-	-	-	-	63.38
St. Louis	2501012015	1.152557731	-	-	-	-	5.35
St. Louis	2501050120	0.998033822	-	-	-	-	203.77
St. Louis	2501055120	1.152557731	-	-	-	-	189.56
St. Louis	2501060052	0.998033822	-	-	-	-	3,564.89
St. Louis	2501060201	0.998033822	-	-	-	-	347.75
St. Louis	2501080050	1.305269957	-	-	-	-	72.10
St. Louis	2501080100	1.305269957	-	-	-	-	3.74
St. Louis	2505030120	0.998033822	-	-	-	-	22.74
St. Louis	2505040120	1.150793672	-	-	-	-	206.65
St. Louis	2610000100	1.090155363	-	-	-	-	-
St. Louis	2610000400	1.090155363	-	-	-	-	-
St. Louis	2610000500	1.090155363	-	-	-	-	-
St. Louis	2610030000	1.090155363	-	-	-	-	-

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2630020000	1.209375024	3.74	-	-	-	22.76
St. Louis	2801000003	1.000000000	-	-	73.19	-	-
St. Louis	2801700001	1.000000000	0.08	-	-	-	-
St. Louis	2801700002	1.21449995	-	-	-	-	-
St. Louis	2801700003	1.21449995	-	-	-	-	-
St. Louis	2801700004	1.000000000	532.02	-	-	-	-
St. Louis	2801700005	1.000000000	12.04	-	-	-	-
St. Louis	2801700006	1.000000000	1.23	-	-	-	-
St. Louis	2801700007	1.21449995	-	-	-	-	-
St. Louis	2801700010	1.000000000	59.69	-	-	-	-
St. Louis	2801700011	1.21449995	-	-	-	-	-
St. Louis	2801700012	1.21449995	-	-	-	-	-
St. Louis	2801700013	1.000000000	2.84	-	-	-	-
St. Louis	2801700014	1.000000000	0.08	-	-	-	-
St. Louis	2801700015	1.000000000	0.16	-	-	-	-
St. Louis	2801700099	1.000000000	2.22	-	-	-	-
St. Louis	2805001100	1.000000000	3.06	-	-	-	-
St. Louis	2805001200	1.000000000	0.00	-	-	-	-
St. Louis	2805001300	1.000000000	2.32	-	-	-	-
St. Louis	2805002000	1.000000000	2.06	-	-	-	-
St. Louis	2805003100	1.21449995	-	-	-	-	-
St. Louis	2805007100	1.000000000	0.05	-	-	-	-
St. Louis	2805007300	1.000000000	0.00	-	-	-	-
St. Louis	2805008100	1.21449995	-	-	-	-	-
St. Louis	2805008200	1.21449995	-	-	-	-	-
St. Louis	2805008300	1.21449995	-	-	-	-	-
St. Louis	2805009100	1.21449995	-	-	-	-	-
St. Louis	2805009200	1.21449995	-	-	-	-	-
St. Louis	2805009300	1.21449995	-	-	-	-	-
St. Louis	2805010100	1.000000000	0.00	-	-	-	-
St. Louis	2805010200	1.000000000	0.00	-	-	-	-
St. Louis	2805010300	1.000000000	0.00	-	-	-	-
St. Louis	2805018000	1.21449995	-	-	-	-	-
St. Louis	2805019100	1.21449995	-	-	-	-	-
St. Louis	2805019200	1.21449995	-	-	-	-	-
St. Louis	2805019300	1.21449995	-	-	-	-	-
St. Louis	2805021100	1.21449995	-	-	-	-	-
St. Louis	2805021200	1.21449995	-	-	-	-	-
St. Louis	2805021300	1.21449995	-	-	-	-	-
St. Louis	2805022100	1.21449995	-	-	-	-	-
St. Louis	2805022200	1.21449995	-	-	-	-	-
St. Louis	2805022300	1.21449995	-	-	-	-	-
St. Louis	2805023100	1.21449995	-	-	-	-	-
St. Louis	2805023200	1.21449995	-	-	-	-	-
St. Louis	2805023300	1.21449995	-	-	-	-	-
St. Louis	2805025000	1.21449995	-	-	-	-	-
St. Louis	2805030000	1.21449995	-	-	-	-	-
St. Louis	2805030007	1.21449995	-	-	-	-	-
St. Louis	2805030008	1.000000000	0.03	-	-	-	-
St. Louis	2805035000	1.000000000	10.35	-	-	-	-
St. Louis	2805039100	1.000000000	21.78	-	-	-	-
St. Louis	2805039200	1.000000000	40.00	-	-	-	-
St. Louis	2805039300	1.000000000	3.54	-	-	-	-
St. Louis	2805040000	1.21449995	-	-	-	-	-
St. Louis	2805045000	1.000000000	0.16	-	-	-	-
St. Louis	2805047100	1.000000000	4.90	-	-	-	-
St. Louis	2805047300	1.000000000	2.09	-	-	-	-

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2805053100	1.000000000	0.10	-	-	-	-
St. Louis	2810060100	1.250728846	-	4.28	0.28	0.66	0.01
St. Louis County Total			**1,036.69**	**2,245.97**	**5,069.66**	**5,459.18**	**22,691.03**
St. Louis City	2102001000	1.002504468	-	-	-	-	-
St. Louis City	2102002000	1.002504468	1.31	482.39	-	3,166.23	2.19
St. Louis City	2102004000	1.089928269	0.15	4.18	-	8.91	0.04
St. Louis City	2102005000	0.988051414	0.05	3.30	-	21.18	0.02
St. Louis City	2102006000	1.12421298	0.08	2.95	-	0.02	0.16
St. Louis City	2102007000	1.121167541	-	-	-	-	-
St. Louis City	2102008000	1.225912094	16.30	51.00	-	5.80	3.94
St. Louis City	2102011000	1.023750782	-	-	-	-	-
St. Louis City	2103001000	0.998075187	-	-	-	-	-
St. Louis City	2103002000	0.998075187	0.01	4.54	-	28.99	0.02
St. Louis City	2103004000	1.179753184	0.00	0.07	-	0.15	0.00
St. Louis City	2103005000	1.011710644	0.00	0.05	-	0.29	0.00
St. Louis City	2103006000	1.035624146	0.05	11.47	-	0.07	0.63
St. Louis City	2103007000	1.011783481	0.00	0.49	-	0.00	0.03
St. Louis City	2103008000	1.000000000	0.32	0.81	-	0.09	0.06
St. Louis City	2103011000	1.031448126	-	0.03	-	0.06	-
St. Louis City	2104001000	0.940908968	-	-	-	-	-
St. Louis City	2104002000	0.940908968	0.61	2.62	1.10	30.24	2.88
St. Louis City	2104004000	0.900171578	0.19	3.08	0.36	7.29	0.12
St. Louis City	2104006000	1.005829215	91.88	434.38	1.99	2.77	25.42
St. Louis City	2104007000	1.008683324	0.03	8.27	0.03	0.04	0.32
St. Louis City	2104008100	0.993908882	5.36	7.69	69.84	1.18	55.93
St. Louis City	2104008210	0.993908882	4.91	8.03	87.76	1.15	152.00
St. Louis City	2104008220	0.993908882	0.83	2.10	18.02	0.37	11.03
St. Louis City	2104008230	0.993908882	0.28	0.61	6.24	0.12	4.59
St. Louis City	2104008310	0.993908882	4.44	7.27	79.40	1.04	137.53
St. Louis City	2104008320	0.993908882	0.75	1.90	16.30	0.33	9.98
St. Louis City	2104008330	0.993908882	0.25	0.55	5.64	0.11	4.15
St. Louis City	2104008400	0.993908882	0.27	3.37	2.71	0.28	0.04
St. Louis City	2104009000	0.993908882	-	3.27	12.07	-	16.82
St. Louis City	2104011000	1.113933325	0.08	1.62	0.19	3.83	0.06
St. Louis City	2294000000	1.000000000	-	-	321.54	-	-
St. Louis City	2296000000	1.000000000	-	-	-	-	-
St. Louis City	2302002100	1.071232915	-	-	9.45	-	2.29
St. Louis City	2302002200	1.071232915	-	-	66.95	-	7.87
St. Louis City	2302003000	1.071232915	-	-	-	-	2.39
St. Louis City	2302003100	1.071232915	-	-	19.56	-	1.13
St. Louis City	2302003200	1.071232915	-	-	1.33	-	0.04
St. Louis City	2311010000	1.000000000	-	-	2.90	-	-
St. Louis City	2311020000	1.000000000	-	-	477.56	-	-
St. Louis City	2311030000	1.000000000	-	-	13.44	-	-
St. Louis City	2325000000	1.206140399	-	-	198.09	-	-
St. Louis City	2401001000	1.193573117	-	-	-	-	638.66
St. Louis City	2401005000	1.231237292	-	-	-	-	77.86
St. Louis City	2401008000	0.998033822	-	-	-	-	12.54
St. Louis City	2401015000	1.228024364	-	-	-	-	3.75
St. Louis City	2401020000	1.362539172	-	-	-	-	151.04
St. Louis City	2401025000	1.362539172	-	-	-	-	257.25
St. Louis City	2401030000	1.242753625	-	-	-	-	17.29
St. Louis City	2401040000	1.306329131	-	-	-	-	83.35
St. Louis City	2401050000	1.348751545	-	-	-	-	243.96
St. Louis City	2401055000	1.821049213	-	-	-	-	53.74
St. Louis City	2401060000	1.420174122	-	-	-	-	-
St. Louis City	2401065000	1.172098875	-	-	-	-	2.54

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis City	2401070000	1.355618477	-	-	-	-	51.53
St. Louis City	2401075000	1.27256608	-	-	-	-	-
St. Louis City	2401080000	1.177083373	-	-	-	-	1.67
St. Louis City	2401085000	1.386554599	-	-	-	-	-
St. Louis City	2401090000	1.362517118	-	-	-	-	59.67
St. Louis City	2401100000	1.218145132	-	-	-	-	237.41
St. Louis City	2401200000	1.277777791	-	-	-	-	1.58
St. Louis City	2415000000	1.362539172	-	-	-	-	366.64
St. Louis City	2420000000	1.152129769	-	-	-	-	254.50
St. Louis City	2425000000	1.20169425	-	-	-	-	2,037.41
St. Louis City	2460100000	1.090155363	-	-	-	-	366.99
St. Louis City	2460200000	1.090155363	-	-	-	-	347.68
St. Louis City	2460400000	1.090155363	-	-	-	-	262.69
St. Louis City	2460500000	1.090155363	-	-	-	-	183.50
St. Louis City	2460600000	1.090155363	-	-	-	-	110.10
St. Louis City	2460800000	1.090155363	-	-	-	-	343.81
St. Louis City	2460900000	1.090155363	-	-	-	-	13.52
St. Louis City	2461021000	1.23496294	-	-	-	-	142.35
St. Louis City	2461022000	1.23496294	-	-	-	-	74.43
St. Louis City	2461850000	1.21449995	-	-	-	-	-
St. Louis City	2501011011	1.152557731	-	-	-	-	68.24
St. Louis City	2501011012	1.152557731	-	-	-	-	133.24
St. Louis City	2501011013	1.152557731	-	-	-	-	15.51
St. Louis City	2501011014	1.152557731	-	-	-	-	5.09
St. Louis City	2501011015	1.152557731	-	-	-	-	0.43
St. Louis City	2501012011	1.152557731	-	-	-	-	2.18
St. Louis City	2501012012	1.152557731	-	-	-	-	4.26
St. Louis City	2501012013	1.152557731	-	-	-	-	21.16
St. Louis City	2501012014	1.152557731	-	-	-	-	9.82
St. Louis City	2501012015	1.152557731	-	-	-	-	0.83
St. Louis City	2501050120	0.998033822	-	-	-	-	218.64
St. Louis City	2501055120	1.152557731	-	-	-	-	196.27
St. Louis City	2501060052	0.998033822	-	-	-	-	911.21
St. Louis City	2501060201	0.998033822	-	-	-	-	88.89
St. Louis City	2501080050	1.305269957	-	-	-	-	0.95
St. Louis City	2501080100	1.305269957	-	-	-	-	0.05
St. Louis City	2505030120	0.998033822	-	-	-	-	5.81
St. Louis City	2505040120	1.150793672	-	-	-	-	214.23
St. Louis City	2610000100	1.090155363	-	-	-	-	-
St. Louis City	2610000400	1.090155363	-	-	-	-	-
St. Louis City	2610000500	1.090155363	-	-	-	-	-
St. Louis City	2610030000	1.090155363	-	-	-	-	-
St. Louis City	2630020000	1.209375024	1.34	-	-	-	8.13
St. Louis City	2801000003	1.000000000	-	-	-	-	-
St. Louis City	2801700001	1.21449995	-	-	-	-	-
St. Louis City	2801700002	1.21449995	-	-	-	-	-
St. Louis City	2801700003	1.21449995	-	-	-	-	-
St. Louis City	2801700004	1.21449995	-	-	-	-	-
St. Louis City	2801700005	1.21449995	-	-	-	-	-
St. Louis City	2801700006	1.21449995	-	-	-	-	-
St. Louis City	2801700007	1.21449995	-	-	-	-	-
St. Louis City	2801700010	1.21449995	-	-	-	-	-
St. Louis City	2801700011	1.21449995	-	-	-	-	-
St. Louis City	2801700012	1.21449995	-	-	-	-	-
St. Louis City	2801700013	1.21449995	-	-	-	-	-
St. Louis City	2801700014	1.21449995	-	-	-	-	-
St. Louis City	2801700015	1.21449995	-	-	-	-	-

County Name	SCC	2017 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis City	2801700099	1.21449995	-	-	-	-	-
St. Louis City	2805001100	1.21449995	-	-	-	-	-
St. Louis City	2805001200	1.21449995	-	-	-	-	-
St. Louis City	2805001300	1.21449995	-	-	-	-	-
St. Louis City	2805002000	1.21449995	-	-	-	-	-
St. Louis City	2805003100	1.21449995	-	-	-	-	-
St. Louis City	2805007100	1.21449995	-	-	-	-	-
St. Louis City	2805007300	1.21449995	-	-	-	-	-
St. Louis City	2805008100	1.21449995	-	-	-	-	-
St. Louis City	2805008200	1.21449995	-	-	-	-	-
St. Louis City	2805008300	1.21449995	-	-	-	-	-
St. Louis City	2805009100	1.21449995	-	-	-	-	-
St. Louis City	2805009200	1.21449995	-	-	-	-	-
St. Louis City	2805009300	1.21449995	-	-	-	-	-
St. Louis City	2805010100	1.21449995	-	-	-	-	-
St. Louis City	2805010200	1.21449995	-	-	-	-	-
St. Louis City	2805010300	1.21449995	-	-	-	-	-
St. Louis City	2805018000	1.21449995	-	-	-	-	-
St. Louis City	2805019100	1.21449995	-	-	-	-	-
St. Louis City	2805019200	1.21449995	-	-	-	-	-
St. Louis City	2805019300	1.21449995	-	-	-	-	-
St. Louis City	2805021100	1.21449995	-	-	-	-	-
St. Louis City	2805021200	1.21449995	-	-	-	-	-
St. Louis City	2805021300	1.21449995	-	-	-	-	-
St. Louis City	2805022100	1.21449995	-	-	-	-	-
St. Louis City	2805022200	1.21449995	-	-	-	-	-
St. Louis City	2805022300	1.21449995	-	-	-	-	-
St. Louis City	2805023100	1.21449995	-	-	-	-	-
St. Louis City	2805023200	1.21449995	-	-	-	-	-
St. Louis City	2805023300	1.21449995	-	-	-	-	-
St. Louis City	2805025000	1.21449995	-	-	-	-	-
St. Louis City	2805030000	1.21449995	-	-	-	-	-
St. Louis City	2805030007	1.21449995	-	-	-	-	-
St. Louis City	2805030008	1.21449995	-	-	-	-	-
St. Louis City	2805035000	1.21449995	-	-	-	-	-
St. Louis City	2805039100	1.21449995	-	-	-	-	-
St. Louis City	2805039200	1.21449995	-	-	-	-	-
St. Louis City	2805039300	1.21449995	-	-	-	-	-
St. Louis City	2805040000	1.21449995	-	-	-	-	-
St. Louis City	2805045000	1.21449995	-	-	-	-	-
St. Louis City	2805047100	1.21449995	-	-	-	-	-
St. Louis City	2805047300	1.21449995	-	-	-	-	-
St. Louis City	2805053100	1.21449995	-	-	-	-	-
St. Louis City	2810060100	1.250728846	-	1.53	0.10	0.24	0.01
St. Louis City Total			**129.50**	**1,047.55**	**1,527.59**	**3,280.78**	**8,744.09**
St. Louis Nonattainment Area Total			**3,514.98**	**4,446.97**	**14,165.78**	**11,534.82**	**43,298.25**

* This table does not include VOC refueling emissions (Stage II) for on-road motor vehicles

Appendix C-4 2017 On-Road Mobile Source Emissions

The 2017 on-road mobile source emissions, which were used to compare to the 2008 base year on-road mobile source emissions, were calculated using MOVES. MOVES 2010a was used to calculate 2017 emissions for ammonia (NH_3), and SO_2. MOVES 2010b was used to calculate the 2017 emissions for CO, NO_X, PM_{10}, $PM_{2.5}$, and VOC. Please see the redesignation demonstration and maintenance plan for details about the use of the two different versions of MOVES in projecting 2017 emissions.

Both vehicle miles traveled (VMT) data and source type population data for 2017, were grown annually by 1.5% from the 2008 data. This 1.5% growth factor was discussed and agreed to by the Transportation Conformity Interagency Council. The emissions for 2008 were calculated using 2008 VMT data provided by the East West Gateway Council of Governments. The 2008 VMT data was originally generated from the Missouri Department of Transportation for state-owned roads, and then East-West Gateway used their Traffic Demand Model to calculate the actual local VMT data for each of the five counties on the Missouri side of the St. Louis Ozone nonattainment area.

The road type distribution input used in 2008 was developed from the National County Database (NCD) to distribute the county level VMT to road type. EPA's VMT converter workbook was then used to produce MOVES input tables. The same road type distribution data that was used for 2008 was also used for 2017. A vehicle registration distribution for 2008 was originally created for the National Mobile Inventory Model (NMIM) using registration data from Missouri's Department of Revenue. The vehicle distribution was converted to a MOVES age distribution table using EPA's VMT converter workbook. The same age distribution table was used for 2017. The registration data was also used to create the MOVES vehicle population input tables for 2008. Vehicle counts were converted from Mobile 6.2 vehicle classes to MOVES source types using the source type fractions from the Source Type Pop Fractions table in EPA's VMT converter workbook. As mentioned above these 2008 vehicle populations were grown annually by 1.5% to generate the vehicle populations used for the projected emissions in 2017. The meteorology data used for 2008 was developed by EPA from National Weather Service data. The 2008 meteorology data was also used for the projected emissions in 2017. Inspection and Maintenance (I/M) input tables were developed to characterize the Gateway Vehicle Inspection Program (the I/M program in place in the St. Louis Ozone nonattainment area). Additional details regarding the development of the I/M program input can be found in the I/M input table development protocol (Appendix B-5).

The stage II controls in MOVES were "turned off" when running the model to calculate the VOC emissions in 2017 by setting the stage II control efficiencies in the countyyear input table to zero (0) for all counties in the Missouri portion of the St. Louis nonattainment area. This was done, because the Air Program is currently developing a SIP revision to remove stage II control requirements in the St. Louis area due to the widespread use of on-board vapor recovery systems.

MOVES base data was used for all other inputs to calculate the 2008 and 2017 mobile source emissions, after reviewing the data to ensure accuracy. The base fuel supply tables in MOVES were used for the runs, as they already took into account the reformulated gasoline used in the St.

Louis nonattainment area. A separate input database was created for each county, using county specific data where possible.

To summarize, when projecting the 2017 on-road mobile source emissions, the vehicle age distributions, road type distributions, and the meteorological data was identical to the 2008 data that was used for each county in the nonattainment area. To reduce the size of this document, these files are not repeated again in this Appendix. The files that were used for both 2008 and 2017 include the following tables in Appendix B-3 of the redesignation demonstration and maintenance plan: Table B-11 and Tables B-15 through B-29. The following input files were updated for the 2017 MOVES runs to reflect projections of data in 2017: VMT data, source type population, fuel supply, fuel formulation, and I/M data. The data for these input files are included below in Tables C-11 through C-15.

The MOVES model runs were set up selecting all available gasoline and diesel fuel vehicle type combinations, all months, days, hours, and all road types. A separate run was set-up for each pollutant. The emissions were post aggregated to the month level and the emissions from all months in 2017 were totaled to develop the annual on-road mobile source emissions. Table C-10 summarizes the 2017 annual on-road emissions by county as calculated using MOVES for the Missouri counties located in the St. Louis $PM_{2.5}$ nonattainment area.

Table C-10
2017 Annual On-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area
(Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	53.16	1,608.66	57.54	13.45	716.14
Jefferson County	62.02	2,109.21	77.96	16.29	1,221.37
St. Charles County	91.17	3,087.41	121.49	24.37	1,704.14
St. Louis County	400.33	12,564.45	509.43	106.23	5,811.83
St. Louis City	115.79	3,535.26	146.74	30.79	1,413.93
Totals	**722.47**	**22,904.99**	**913.15**	**191.12**	**10,867.41**

Table C-11 2017 Source Type Population (MOVES Inputs for 2017 On-Road Mobile Source Emissions)

			Source Type Population by County				
YearID	**SourceTypeName**	**SourceTypeID**	**Franklin**	**Jefferson**	**St Charles**	**St Louis County**	**St Louis City**
2017	Motorcycle	11	6,937	14,885	12,750	22,002	3,549
2017	Passenger Car	21	53,245	112,063	165,152	602,736	143,811
2017	Passenger Truck	31	52,470	94,340	126,214	346,785	67,924
2017	Light Commercial Truck	32	19,173	32,496	41,063	111,875	23,090
2017	Refuse Truck	41	9	47	41	107	79
2017	Single Unit Short-haul Truck	42	28	141	122	321	238
2017	Single Unit Long-haul Truck	43	345	619	628	3,098	756
2017	Motor Home	51	25	22	22	57	19
2017	School Bus	52	931	1,030	1,166	4,143	1,428
2017	Transit Bus	53	70	77	87	309	106
2017	Intercity Bus	54	51	81	94	433	164
2017	Combination Short-haul Truck	61	423	371	375	905	283
2017	Combination Long-haul Truck	62	351	294	295	623	183

Table C-12 2017 Annual VMT by HPMS Vehicle Type, County, and Year (MOVES Inputs for 2017 On-Road Mobile Source Emissions)

			HPMSBaseYearVMT by County				
HPMSVtypeID	**HPMSVtypeName**	**YearID**	**Franklin**	**Jefferson**	**St. Charles**	**St. Louis**	**St. Louis City**
10	Motorcycles	2017	13,285,417	15,826,405	23,748,877	105,180,410	30,488,566
20	Passenger Cars	2017	808,570,142	927,487,770	1,339,188,268	5,849,429,021	1,689,353,682
30	Other 2 axle-4 tire vehicles	2017	913,717,917	1,056,943,792	1,535,110,134	6,718,241,791	1,946,582,024
40	Buses	2017	5,467,485	6,378,731	9,356,496	41,080,266	11,971,135
50	Single Unit Trucks	2017	33,560,731	38,174,124	54,464,788	236,942,502	68,438,886
60	Combination Trucks	2017	96,814,637	110,147,005	157,249,031	684,260,141	198,419,375

Table C-13 Inspection and Maintenance Data for 2017 (MOVES Inputs for 2017 On-Road Mobile Source Emissions)

Pol Process ID	State ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspect Freq.	Test Standards ID	Beg Model Year ID	End Model Year ID	Use IM Y/N	Compliance Factor
101	29	2017	21	1	1	1	11	1971	1995	N	93.12
101	29	2017	21	1	10	2	51	1996	2015	Y	97.94
101	29	2017	31	1	1	1	11	1971	1995	N	93.12
101	29	2017	31	1	10	2	51	1996	2015	Y	92.06
101	29	2017	32	1	1	1	11	1971	1995	N	93.12
101	29	2017	32	1	10	2	51	1996	2015	Y	86.18
102	29	2017	21	1	1	1	11	1971	1995	N	93.12
102	29	2017	21	1	10	2	51	1996	2015	Y	97.94
102	29	2017	31	1	1	1	11	1971	1995	N	93.12
102	29	2017	31	1	10	2	51	1996	2015	Y	92.06
102	29	2017	32	1	1	1	11	1971	1995	N	93.12
102	29	2017	32	1	10	2	51	1996	2015	Y	86.18
112	29	2017	21	1	7	1	41	1971	1995	N	93.12
112	29	2017	21	1	8	2	43	1996	2015	Y	97.94
112	29	2017	31	1	7	1	41	1971	1995	N	93.12
112	29	2017	31	1	8	2	43	1996	2015	Y	92.06
112	29	2017	32	1	7	1	41	1971	1995	N	93.12
112	29	2017	32	1	8	2	43	1996	2015	Y	86.18
113	29	2017	21	1	7	1	41	1971	1995	N	93.12
113	29	2017	21	1	8	2	43	1996	2015	Y	97.94
113	29	2017	31	1	7	1	41	1971	1995	N	93.12
113	29	2017	31	1	8	2	43	1996	2015	Y	92.06
113	29	2017	32	1	7	1	41	1971	1995	N	93.12
113	29	2017	32	1	8	2	43	1996	2015	Y	86.18
201	29	2017	21	1	1	1	11	1971	1995	N	93.12
201	29	2017	21	1	10	2	51	1996	2015	Y	97.94
201	29	2017	31	1	1	1	11	1971	1995	N	93.12
201	29	2017	31	1	10	2	51	1996	2015	Y	92.06
201	29	2017	32	1	1	1	11	1971	1995	N	93.12
201	29	2017	32	1	10	2	51	1996	2015	Y	86.18

Pol Process ID	State ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspect Freq.	Test Standards ID	Beg Model Year ID	End Model Year ID	Use IM Y/N	Compliance Factor
202	29	2017	21	1	1	1	11	1971	1995	N	93.12
202	29	2017	21	1	10	2	51	1996	2015	Y	97.94
202	29	2017	31	1	1	1	11	1971	1995	N	93.12
202	29	2017	31	1	10	2	51	1996	2015	Y	92.06
202	29	2017	32	1	1	1	11	1971	1995	N	93.12
202	29	2017	32	1	10	2	51	1996	2015	Y	86.18
301	29	2017	21	1	10	2	51	1996	2015	Y	97.94
301	29	2017	31	1	10	2	51	1996	2015	Y	92.06
301	29	2017	32	1	10	2	51	1996	2015	Y	86.18
302	29	2017	21	1	10	2	51	1996	2015	Y	97.94
302	29	2017	31	1	10	2	51	1996	2015	Y	92.06
302	29	2017	32	1	10	2	51	1996	2015	Y	86.18

Table C-14 Fuel Formulation for 2017 (MOVES Inputs for 2017 On-Road Mobile Source Emissions)

Fuel FormulationID	Fuel SubtypeID	FuelSubtypeDesc	RVP	Sulfur Level	ETOH Volume	MTBE Volume	ETBE Volume	TAME Volume	Aromatic Content	Olefin Content
3820	12	Gasohol (E10)	11.1487	23.4846	10	0	0	0	20	10.7096
3821	12	Gasohol (E10)	8.77801	22.8285	10	0	0	0	20	9.32538
3822	12	Gasohol (E10)	7	22.3364	10	0	0	0	20	8.28724
3823	12	Gasohol (E10)	12.9267	23.9767	10	0	0	0	20	11.7477
20011	20	Conventional Diesel	0	11	0	0	0	0	0	0

Fuel FormulationID	Fuel SubtypeID	fuelSubtypeDesc	Benzene Content	e200	e300	biodiesel EsterVolume	cetaneIndex	PAHContent
3820	12	Gasohol (E10)	0.6	61.1946	84.2534	0	0	0
3821	12	Gasohol (E10)	0.6	56.2713	84.2534	0	0	0
3822	12	Gasohol (E10)	0.6	52.5789	84.2534	0	0	0
3823	12	Gasohol (E10)	0.6	64.887	84.2534	0	0	0
20011	20	Conventional Diesel	0	0	0	0	0	0

Table C-15 2017 Fuel Supply (MOVES Inputs for 2017 On-Road Mobile Source Emissions)

FuelYearID	Month GroupID	Fuel FormulationID	Market Share	Market ShareCV
2017	1	3823	1	0.5
2017	1	20011	1	0.5
2017	2	20011	1	0.5
2017	2	3820	1	0.5
2017	3	3820	1	0.5
2017	3	20011	1	0.5
2017	4	20011	1	0.5
2017	4	3821	1	0.5
2017	5	3821	1	0.5
2017	5	20011	1	0.5
2017	6	20011	1	0.5
2017	6	3822	1	0.5
2017	7	3822	1	0.5
2017	7	20011	1	0.5
2017	8	20011	1	0.5
2017	8	3822	1	0.5
2017	9	3822	1	0.5
2017	9	20011	1	0.5
2017	10	20011	1	0.5
2017	10	3821	1	0.5
2017	11	3820	1	0.5
2017	11	20011	1	0.5
2017	12	20011	1	0.5
2017	12	3820	1	0.5

Appendix C-4 2017 Off-Road Mobile Source Emissions

Off-road mobile source emissions were calculated for the Missouri counties in the St. Louis $PM_{2.5}$ nonattainment area using the NONROAD 2008a model. Fuel and meteorological data from the NCD was used to run the non-road model and create annual emissions for 2017. The modeling protocol, which was submitted by EPA Region 7 and is included in Appendix E-2 of the redesignation demonstration and maintenance plan, was followed except the Air Program used an oxygen weight percent of 3.5%, an ethanol market share of 100%, a gasoline sulfur percent of 0.0011%, and a diesel sulfur percent of 0.0011% instead of the values listed in the EPA protocol in Appendix E-2. The correct input data for the NONROAD 2008a model that was used in this latest modeling run is listed below in Table C-16.

Table C-16 NONROAD Model Temperature & Fuel Characteristic Input Values by County & Season

County	Season	Oxygen Weight %	RVP (psi)	Gasoline Sulfur %	Ethanol Volume %	Ethanol Market Share %	Diesel Sulfur %	Marine Diesel Sulfur %	CNG/LPG Sulfur %	Temperatures		
										Min.	Max.	Avg.
Franklin	Winter	3.5	11.5	0.0011	10	100	0.0011	0.0402	0.003	19.7	47	33.4
Franklin	Spring	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	33.5	76.9	55.2
Franklin	Summer	3.5	7	0.0011	10	100	0.0011	0.0402	0.003	61.8	90	75.9
Franklin	Autumn	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	34.3	80.9	57.6
Jefferson	Winter	3.5	11.5	0.0011	10	100	0.0011	0.0402	0.003	18.6	45.6	32.1
Jefferson	Spring	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	32.4	75.8	54.1
Jefferson	Summer	3.5	7	0.0011	10	100	0.0011	0.0402	0.003	61	88.6	74.8
Jefferson	Autumn	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	33.6	79.8	56.7
St. Charles	Winter	3.5	11.5	0.0011	10	100	0.0011	0.0402	0.003	18.7	43.9	31.3
St. Charles	Spring	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	32.3	75.8	54.1
St. Charles	Summer	3.5	7	0.0011	10	100	0.0011	0.0402	0.003	62.2	89.2	75.7
St. Charles	Autumn	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	34.8	80.3	57.6
St. Louis	Winter	3.5	11.5	0.0011	10	100	0.0011	0.0402	0.003	19.8	44.2	32
St. Louis	Spring	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	34.5	76.1	55.3
St. Louis	Summer	3.5	7	0.0011	10	100	0.0011	0.0402	0.003	64.1	89.5	76.8
St. Louis	Autumn	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	35.5	80.2	57.9
St. Louis City	Winter	3.5	11.5	0.0011	10	100	0.0011	0.0402	0.003	20.7	45.5	32.6
St. Louis City	Spring	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	35.7	76.4	56
St. Louis City	Summer	3.5	7	0.0011	10	100	0.0011	0.0402	0.003	65.1	89.8	77.5
St. Louis City	Autumn	3.5	9	0.0011	10	100	0.0011	0.0402	0.003	36.6	80.4	58.5

The data generated by the NONROAD model for the 2017 off-road mobile source emissions for the Missouri counties in the St. Louis $PM_{2.5}$ nonattainment area are summarized in C-17. As stated in Appendices C-2 and C-3, EPA classifies emissions data for aircraft as point sources and they classify marine and rail sources on nonpoint sources in the NEI. Therefore, 2008 NEI data for aircraft and rail emissions were grown using EGAS 5.0 growth factors in order to estimate the emissions from these sources in 2017. For marine emissions, the 2011 NEI data was grown to 2017 using EGAS 5.0 growth factors. This is due to the fact that EPA changed the way that marine emissions are calculated in 2011, and although EPA created an NEI version 3 for 2008, which used the new method, some counties were not assigned any commercial marine emissions in 2008 even though some amount of emissions from this category were expected for each

county in the nonattainment area. The 2011 NEI data used the new method of calculating commercial marine emissions and included emissions values for each of the Missouri counties in the nonattainment area, which is why the 2011 NEI data for marine emissions were used to be grown to 2017. The 2017 emissions for aircraft, marine, and rail sources are summarized by county in Table C-18. The total off-road mobile source emissions for 2017 by county are listed in Table C-19.

Table C-17
2017 Annual Off-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area as Modeled by NONROAD 2008a (Excludes Aircraft, Marine, and Rail Emissions) (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	0.78	384.30	38.51	0.91	566.58
Jefferson County	1.01	439.97	48.42	0.98	570.30
St. Charles County	2.43	1,147.43	109.80	2.47	1,104.27
St. Louis County	7.85	3,131.88	400.98	8.30	4,179.64
St. Louis City	0.99	418.16	41.03	1.57	578.74
Totals	**13.06**	**5,521.75**	**638.73**	**14.22**	**6,999.53**

Table C-18
2017 Annual Aircraft, Marine, and Rail Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	0.52	970.43	30.62	10.23	51.22
Jefferson County	0.13	217.47	6.81	2.41	10.51
St. Charles County	0.56	459.63	15.91	6.05	30.16
St. Louis County	0.94	2,024.79	55.84	146.93	246.63
St. Louis City	0.55	1,311.82	39.43	13.71	59.97
Totals	**2.70**	**4,984.13**	**148.62**	**179.32**	**398.49**

Table C-19
Total 2017 Annual Off-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1.30	1,354.73	69.13	11.14	617.81
Jefferson County	1.14	657.44	55.23	3.38	580.81
St. Charles County	2.98	1,607.06	125.71	8.52	1,134.42
St. Louis County	8.79	5,156.67	456.82	155.23	4,426.28
St. Louis City	1.54	1,729.98	80.46	15.28	638.71
Totals	**15.75**	**10,505.88**	**787.35**	**193.55**	**7,398.02**

Appendix D

2025
Point, Area, On-Road Mobile and Off-Road Mobile Projected Emissions Inventory

(Missouri Counties)

Appendix D-1	**2025 Emissions Inventory Summary for the Missouri Portion of the Nonattainment Area**
Appendix D-2	**2025 Point Source Emissions**
Appendix D-3	**2025 Area Source Emissions**
Appendix D-4	**2025 On-Road Mobile Source Emissions**
Appendix D-5	**2025 Off-Road Mobile Source Emissions**

Appendix D-1 2025 Emissions Inventory Summary for the Missouri Portion of the Nonattainment Area

Table D-1 displays the projected 2025 emissions inventory summary for point, area, on-road mobile, and off-road mobile sources for the Missouri portion of the 1997 $PM_{2.5}$ St. Louis nonattainment area. Details regarding the developing the future year (2025) inventory for the Missouri portion of the nonattainment area can be found in Appendices D-2 through D-5.

Table D-1 2025 Emissions Inventory Summary for the Missouri Portion of the Nonattainment Area

County Name	Source Category	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	Point Sources	2.82	9,525.96	1,740.28	61,089.10	987.78
Jefferson County		8.97	8,112.04	1,237.83	32,683.62	900.13
St. Charles County		8.04	7,468.55	382.19	5,439.00	1,478.72
St. Louis County		720.41	5,497.33	623.59	17,555.29	2,603.27
St. Louis City		568.4	1,659.59	419.39	5,876.12	1,839.10
Totals		**1,308.64**	**32,263.48**	**4,403.28**	**122,643.13**	**7,809.01**
Franklin County	Area Sources	1,300.09	297.72	2,353.02	997.57	2,195.82
Jefferson County		165.26	408.4	3,500.36	912.72	3,810.63
St. Charles County		883.43	475.47	2,353.20	898.51	7,524.56
St. Louis County		1,036.69	2,283.66	4,655.28	5,496.07	25,869.18
St. Louis City		129.5	1,065.77	1,453.01	3,302.01	10,058.43
Totals		**3,514.98**	**4,531.02**	**14,314.86**	**11,606.89**	**49,458.63**
Franklin County	On-Road Mobile Sources	51.73	1,084.47	47.5	13.46	492.77
Jefferson County		60.38	1,406.72	64.74	16.29	841.91
St. Charles County		88.79	2,076.87	101.37	24.37	1,169.72
St. Louis County		389.76	8,489.89	425.15	106.27	4,037.03
St. Louis City		112.75	2,386.74	121.34	30.8	993.36
Totals		**691.88**	**16,568.44**	**533.34**	**189.22**	**8,035.80**
Franklin County	Off-Road Mobile Sources	1.35	1,103.17	50.46	9.89	481.76
Jefferson County		1.28	505.78	40.03	3.27	513.4
St. Charles County		3.34	1,218.25	89.09	8.46	986.11
St. Louis County		10.01	4,460.02	386.44	183.23	4,554.07
St. Louis City		1.65	1,608.59	74.66	15.05	642.95
Totals		**17.63**	**8,895.81**	**640.68**	**219.9**	**7,178.29**
Grand Total		**5,533.13**	**62,258.75**	**19,892.16**	**134,659.14**	**72,481.73**

Appendix D-2 2025 Point Source Emissions

All of the details associated with developing the 2008 point and area source emissions inventories are described in Appendix E of this document. To forecast point source emissions of NO_X, $PM_{2.5}$, SO_2, and VOC to the future year of 2025, growth factors were obtained from the Economic Growth and Analysis System (EGAS) version 5.0, published in January 2006. The model forecasts economic activity to generate growth factors used to develop emission inventories. For this project, growth factors were obtained for years 2009 through 2025 for the five counties of interest: Franklin (29071), Jefferson (29099), St. Charles (29183), St. Louis County (29189), and St. Louis City (29510). The default REMI 5.5 (Regional Economic Model, Inc) configuration was used, and it includes growth based on economy, population, employment, consumption, and value-added for 53 major sectors of the economy. Factors were created for both point and area categories, and are broken out by source classification code (SCC), county, and year.

Point growth factors covered all point SCCs in use in Missouri for 2008. The county and SCC-specific growth factor was multiplied by the 2008 total annual emissions to get the 2025 forecast point source inventory. Adjustments were made to account for the October 2010 consent decree for Doe Run Herculaneum in Franklin County to account for the termination of the traditional lead smelting activities by 2013, eliminating SO_2 emissions by 2025.

Point source emissions of ammonia were not grown using EGAS growth factors. Instead, total point source ammonia emissions in 2008 were compared to total point source ammonia emissions in 2011 to determine current trends in point source ammonia emissions. In total, point source ammonia emissions decreased from 1,308.64 tons in 2008 to 1,197.47 tons in 2011. Because these emissions are trending downwards, EGAS growth factors are not appropriate to use to project the future year emissions. In order to ensure conservative estimates are used to help protect air quality, the 2008 point source ammonia emissions were held level to project the point source ammonia emissions in 2025 even though over recent years we have seen a downward trend in these emissions.

The annual SO_2 and NO_X emissions from the following three electric generating unit (EGU) facilities: Ameren's Labadie, Meramec, and Rush Island, were grown as follows: the actual annual NO_X and SO_2 emissions from these Ameren units from 2008 - 2011 were obtained from the Clean Air Market Division database and averaged to obtain an annual average of NO_X and SO_2 emissions over these four years. These annual averages of NO_X and SO_2 emissions over these four years were used to project the NO_X and SO_2 emissions in 2025 for these three facilities. The average 2008 – 2011 annual NO_X and SO_2 emissions for these three Ameren EGU facilities are listed in Table D-2. These four year averages of annual NO_X and SO_2 emissions were determined to be representative of the projected NO_X and SO_2 emissions in 2017 because of EPA's Clean Air Interstate Rule (CAIR). In 2015, their allowances from CAIR drop significantly, but they will likely have some banked allowances allowing them to hold their annual NO_X and SO_2 emissions pretty steady for the first several years after the 2015 CAIR allocations take effect.

The annual SO_2 and NO_X emissions from Ameren's Sioux EGU facility were grown as follows: for NO_X emissions from this facility, the 2025 emissions were projected in the exact same manner as the NO_X emissions from the other three Ameren EGU facilities in the St. Louis nonattainment area, using the average annual NO_X emissions from 2008 – 2011 based on CAIR. However, for annual SO_2 emissions from the Sioux facility, the average heat input from 2008 – 2011 was multiplied by the annual SO_2 rate from 2011 in order to generate the 2025 annual SO_2 emissions. This is due to the fact that scrubbers were installed on the two units at this facility in late 2010 that reduced SO_2 emissions by approximately 90 percent. By using the average heat input from these three facilities over the last four years this accounts for variability in electricity production, and by using the emission rate from 2011, this accurately projects the emissions reductions that will result from continued use of the scrubbers at the facility. The average annual NO_X emissions from Sioux from 2008 – 2011 are listed in Table D-2 along with the emissions from the other three Ameren EGU facilities. Table D-3 summarizes the annual heat input at the Sioux facility from 2008 – 2011 and also provides the 2011 SO_2 emission rate and the projection for annual SO_2 emissions in 2025 for this facility.

Table D-2
2008 - 2011 Average Annual NO_X and SO_2 Emissions for Ameren EGUs in the Missouri Portion of the St. Louis Ozone Nonattainment Area

Boiler Name	Average Annual NO_X Emissions (tons) (Used for the 2025 Emissions Projection)	Average Annual SO_2 Emissions (tons) (Used for the 2025 Emissions Projection)
Labadie Unit 1	2,146	14,144
Labadie Unit 2	2,428	15,174
Labadie Unit 3	2,434	15,649
Labadie Unit 4	2,507	16,122
Labadie Total	**9,515**	**61,089**
Meramec Unit 1	584	2,789
Meramec Unit 2	532	2,727
Meramec Unit 3	1,526	4,942
Meramec Unit 4	2,244	7,052
Meramec Total	**4,886**	**17,510**
Rush Island Unit 1	1,884	14,370
Rush Island Unit 2	1,835	13,636
Rush Island Total	**3,719**	**28,006**
Sioux Unit 1	3,608	See Table D-2
Sioux Unit 2	3,527	See Table D-2
Sioux Total	**7,135**	**See Table D-2**

Table D-3
2008 - 2011 Average Annual Heat Input, 2011 SO_2 Rate, and Projected 2025 SO_2 Emissions for Ameren's Sioux Facility

Data Type	Value
2008 – 2011 Average Annual Heat Input (MMBTU)	54,202,161
2011 Annual SO_2 Rate (lb./MMBTU)	0.184
Projected 2025 Annual SO_2 Emissions (tons)	**4,987**

Annual emissions of $PM_{2.5}$, and VOC from all four of the Ameren EGU facilities that are located in the Missouri portion of the St. Louis $PM_{2.5}$ nonattainment area were grown from 2008 to 2025 using EGAS 5.0 growth factors just like most of the point sources in the nonattainment area. Table D-4 summarizes the total point source emissions projected for 2025 for the Missouri portion of the St. Louis $PM_{2.5}$ nonattainment area. This table includes the NO_X and SO_2 emissions from the four Ameren EGU facilities in the Missouri portion of the St. Louis $PM_{2.5}$ nonattainment area.

As stated in Appendix B, the 2008 National Emissions Inventory (NEI) data, which was used as the base year to project 2025 emissions, include point source emissions for aircraft takeoffs and landings. However, they really should be classified as off-road mobile source emissions. Therefore, the emissions for aircraft takeoffs and landings are not included in the total point source emissions listed in Table D-4. The SCC codes for the aircraft categories are included in Table D-8, and the emissions from these categories are listed in Table D-18, to be included as off-road mobile source emissions.

Table D-4
2025 Annual Point Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	2.82	9,525.96	1,740.28	61,089.10	987.78
Jefferson County	8.97	8,112.04	1,237.83	32,683.62	900.13
St. Charles County	8.04	7,468.55	382.19	5,439.00	1,478.72
St. Louis County	720.41	5,497.33	623.59	17,555.29	2,603.27
St. Louis City	568.4	1,659.59	419.39	5,876.12	1,839.10
Totals	**1,308.64**	**32,263.48**	**4,403.28**	**122,643.13**	**7,809.01**

Table D-5 includes all of the 2025 point source emissions projections by facility for the Missouri counties in the St. Louis nonattainment area. As mentioned above the EGAS growth factors were not used for the SO_2 or NO_X emissions for the Ameren EGU Facilities or the SO_2 emissions for the Doe Run Primary Lead Smelter in Herculaneum. Also as mentioned above EGAS growth factors were also not used to project the NH_3 emissions from any point source.

Table D-5 2025 Point Source Emissions in the Missouri Portion of the St. Louis $PM_{2.5}$ Nonattainment Area by Facility.

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
5150011	Jefferson Smurfit Corp-Pacific	-	-	-	-	42.19
5150511	Bull Moose Tube Company-Bull Moose Tube Company	-	0.68	0.08	0.01	27.59
5151111	Sullivan Precision Metal Finishing Inc-Sullivan Precision Metal Finishing Inc	-	-	-	-	30.42
5151211	Sporlan Valve Company-Plant #2 - West Main	-	-	-	-	64.54
5151411	Aerofil Technology Inc-Aerofil Technology Inc	-	2.48	4.34	0.01	79.86
5151511	Magnet Llc-Washington	-	-	-	-	15.57
5151611	Marble Decor Inc-Marble Decor Inc	-	-	-	-	0.73
5151811	Plaze Incorporated-Plaze Incorporated	-	2.12	-	0.01	71.49
5152011	GDX Automotive - Danny Scott Drive-New Haven	-	0.00	-	-	34.08
5152111	Sporlan Valve Company-Plant #3 - Lange Drive	-	-	-	-	28.97
6032111	Amerenue-Labadie Plant	2.82	9,515.00	1,735.80	61,089.00	359.73
6032311	Canam Steel Corp-Canam Steel Corp	-	4.30	-	0.06	117.46
6032611	Steelweld Equipment Co-St Clair	-	0.26	-	0.00	25.73
7369411	Meramec Industries Inc-Ramsey St Plant	-	0.39	-	0.00	57.45
8243211	Integram - St Louis Seating-Pacific	-	0.73	0.06	0.00	31.97
Franklin County Totals		**2.82**	**9,525.96**	**1,740.28**	**61,089.10**	**987.78**
5258211	Doe Run Company-Herculaneum Smelter	0.38	20.50	20.59	-	2.57
5258511	Union Pacific Railroad Co-Desoto Car Shop	-	2.41	3.76	0.01	25.27
5258611	Trautman Quarry-Pevely	-	-	-	-	-
5258811	Amerenue-Rush Island Plant	1.51	3,719.00	795.25	28,006.00	191.99
5259811	Aero Metal Finishing-Aero Metal Finishing	-	4.40	-	0.62	5.52
7270711	Bussen Quarries Inc-Antire Quarry	-	-	0.12	-	-
7271811	Dow Chemical Company The-Riverside Plant	0.04	1.68	0.13	0.01	2.13
7271911	Carondelet Corporation-Carondelet Corporation	0.07	10.00	0.22	0.45	119.42
7272311	Rc Cement Company Inc-River Cement Co - Selma Plant	5.70	4,049.78	298.62	4,313.58	308.20
7272511	Metal Container Corporation-Arnold	-	14.31	4.22	0.09	176.41
7272611	Engineered Coil Company-D B A Marlo Coil	-	0.15	-	0.00	15.57
8112911	Saint-Gobain Containers Llc-Pevely	1.27	289.82	114.92	362.86	53.06
Jefferson County Totals		**8.97**	**8,112.04**	**1,237.83**	**32,683.62**	**900.13**
6783411	Amerenue-Sioux Plant	0.86	7,135.00	370.56	4,987.00	201.80
6783511	Fred Weber Inc-O'Fallon Asphalt Plant	0.04	3.00	0.17	0.29	0.59
6783611	Fred Weber Inc-O'Fallon Stone Plant	-	-	0.02	-	-
6783911	McDonnell Douglas Corp-Boeing Company	0.08	3.25	0.06	0.02	22.81
6784211	St Joseph Health Center-St Joseph Health Center	0.03	5.28	0.40	0.18	0.32
6797711	Superior Home Products Inc-Superior Home Products Inc	-	-	-	-	18.51
7273311	Memc Electronic Materials Inc-St Peters Plant	5.11	35.52	7.74	0.17	25.48

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
7284511	General Motors-Wentzville Center	0.34	279.39	1.75	451.30	929.58
7387111	Woodbridge Corporation-St Peters	-	-	-	-	83.27
7387311	True Manufacturing Co-O'Fallon	-	4.76	0.40	0.03	62.20
8100411	O Fallon Casting Llc-O Fallon	1.59	2.35	1.09	0.01	134.16
St. Charles County Totals		**8.04**	**7,468.55**	**382.19**	**5,439.00**	**1,478.72**
10735111	KV Pharmaceutical - Bridgeton	-	-	0.00	-	29.55
5113811	Nesco Container Corp-Fenton	0.04	3.00	0.03	0.02	134.81
5113911	McDonnell Douglas Corp /Boeing Company-Lindbergh Plant	0.77	28.57	0.84	0.45	116.85
5114011	St Louis Lithographing Company-Heege Avenue	-	-	-	-	25.24
5114511	Bussen Quarries Inc-Bussen Road	-	-	0.72	-	-
5114611	Ruprecht Quarry-Paule Rd	-	-	-	-	-
5114711	BFI Missouri Pass Landfill-Maryland Heights	-	9.17	0.77	2.92	7.32
5114811	Color Art Inc-Crestwood	0.04	1.52	0.03	0.01	33.86
5115911	Onyx Oak Ridge Landfill Inc-(West County)	-	2.39	1.25	0.84	5.84
5116011	Bridgeton Landfill Authority-Bridgeton	-	13.03	5.54	4.56	11.75
5116311	Pro-Tect Mfg Inc-Ferguson Ave	-	-	-	-	27.71
5116411	St Marys Health Center-Richmond Heights	0.05	8.85	0.17	0.18	0.52
5167511	St Joseph Hospital-Kirkwood	0.02	3.82	0.07	0.07	3.27
5181011	Pan-Glo St Louis-Trenton Avenue	-	-	-	-	7.89
5278111	Camie-Campbell Inc-Watson Industrial Park	-	-	-	-	7.92
5278311	Belt Service Corp-Earth City	0.02	0.71	0.01	0.00	65.68
5278411	Kv Pharmaceutical Company-Brentwood	-	-	0.18	-	96.75
5278611	Depaul Health Center-Bridgeton	0.04	7.72	0.59	0.05	0.42
5278811	Kv Pharmaceutical Company-Schuetz Rd	0.05	1.85	1.24	0.01	9.61
5278911	Veterans Admin Medical Center-Jefferson Barracks Drive	-	-	-	-	1.33
5279511	St Luke's Hospital-Woods Mill Road	0.04	6.83	0.14	0.74	0.37
5366411	Printpack Inc-Hazelwood Plant	0.13	5.22	0.10	0.03	332.73
5366611	Metropolitan St Louis Sewer District-Lemay Waste Water Treatment Plant	505.36	73.47	2.64	2.94	26.43
6816611	Amerenue-Meramec Plant	1.30	4,886.00	553.77	17,510.00	131.25
6822011	Whitmire Microgen Research Laboratory-Kirkwood	-	-	-	-	9.41
6822111	Metropolitan St Louis Sewer District-Mo River Wasterwater Treatment Plant	101.19	91.27	0.27	1.41	12.84
6822411	Metropolitan St Louis Sewer District-Coldwater Creek Sewage Treatment Plant	105.85	74.23	0.40	2.03	3.58
6822811	Simpson Construction Materials Llc-Valley Park	-	10.24	0.94	7.51	2.65
6824011	Fred Weber Inc-South Asphalt	-	5.71	0.02	0.46	0.86
6824111	Fred Weber Inc-North Asphalt H & B	-	12.87	0.62	1.49	2.74
6824211	Fred Weber Inc-North Asphalt B & G	-	3.96	-	0.73	1.30
6828611	Fred Weber Inc-North Stone	-	-	6.99	-	-

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
6828711	Fred Weber Inc-South Stone	-	-	0.03	-	-
6828811	Monsanto World Headquarters-Lindbergh Blvd	0.39	15.63	0.30	0.09	0.86
6828911	U S Silica Company-Pacific	0.13	5.31	4.18	0.03	0.29
6829311	Pharmacia-Chesterfield Village	0.44	18.85	0.34	0.43	32.78
6829611	Washington University-Millbrook Blvd	0.70	28.54	0.58	0.32	1.57
6829711	St Louis Post-Dispatch-Dunlap Ind Dr	0.00	0.21	0.00	0.00	30.83
6829911	Sunnen Products Company-Maplewood	0.04	1.53	0.03	0.01	8.29
7285311	Multiplex Display Fixture-Fenton	-	0.75	0.06	0.00	1.60
7286211	Reichhold Chemicals Inc-Valley Park	0.17	6.66	0.26	0.04	51.82
7387411	St Louis Airport Authority-Lambert International Blvd	0.32	18.35	0.34	3.68	16.66
7387811	Fred Weber Inc Sanitary Landfill-St Louis County	-	6.94	3.45	2.43	11.41
7388011	Chrysler Assembly Plant 1-Fenton	0.83	32.87	5.44	0.20	335.32
7400611	Flex-O-Lite Inc-Fenton	-	-	-	-	35.03
7578011	Gkn Aerospace Services Inc-Berkeley	0.44	10.83	23.06	0.28	83.84
7579111	F & S Real Eastate Inc-St Louis	-	-	-	-	87.29
7688111	Simpson Construction Materials Llc-West Lake Quarry & Material Co	-	7.97	0.14	5.85	0.54
7703011	Energy Petroleum Company-Kienlen	-	-	-	-	9.21
8029111	Chrysler Corp-North Plant	1.69	76.12	7.74	0.55	781.54
8100511	Dana Corporation-Perfect Circle Division	0.01	1.11	0.02	0.01	3.00
8100611	Rockwood Pigments Na Inc-E Hoffmeister	0.37	15.22	0.30	4.94	0.89
St. Louis County Totals		**720.41**	**5,497.33**	**623.59**	**17,555.29**	**2,603.27**
10738111	Washington University – Hilltop Campus	0.01	1.35	0.10	0.01	0.07
5129911	U S Ringbinder Corp-Loose Leaf Metals	-	-	-	-	5.26
5131011	St Louis Post Dispatch-St Louis Post Dispatch	0.00	0.57	0.01	0.00	2.83
5131711	National Geospatial-Intelligence Agency-National Geospatial-Intelligence Agency	0.05	2.54	0.17	0.05	0.15
5132111	Southern Metal Processing-Southern Metal Processing	-	8.65	0.56	12.74	1.77
5132411	Allied Health Care Products-Allied Health Care Products	-	-	-	-	6.38
5132511	Energy Center (The)-St Louis Univ Health Sciences Center	-	12.80	0.44	1.20	0.81
5146111	Connector Castings-Connector Castings	0.01	0.24	1.10	0.03	1.71
5146411	J S Alberici Construction-J S Alberici Construction	-	-	-	-	37.54
5341711	Chemisphere Corporation-Chemisphere	-	-	-	-	4.77
5341811	PQ Corporation (The)-St Louis	0.53	185.62	108.81	0.25	8.45
5342111	Interstate Brands Corp-Interstate Brands Corp	0.05	2.74	0.15	0.01	53.31
5342911	Goodwin Printing Co -St Louis	-	-	-	-	12.47
5343111	Mid-West Industrial Chemical-Mid-West Industrial Chemical	-	-	-	-	9.63
5343211	Brenntag Mid-South Inc-Brenntag Mid-South Inc	-	0.00	-	-	0.33
6009311	ADM Gromark River Systems-St Louis	-	0.00	1.29	-	-

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
6009611	Trigen-St Louis Energy Corp-Ashley Street Station	2.13	43.60	6.60	1.39	3.91
6009711	Washington Univ Medical School-Boiler Plant	0.18	41.24	3.10	2.00	2.17
6009811	Fred Weber Inc-Asphalt Plant	0.00	2.44	-	0.18	0.35
6009911	Metropolitan St Louis Sewer District-Bissel Plant	534.96	126.55	5.14	15.50	61.29
6010311	Dial Corp-Dial Corp	-	12.36	38.54	0.07	2.91
6110211	Astaris Llc-Carondelet Plant	0.55	10.62	1.66	0.40	1.67
6123811	Alumax Foils Inc-Alcoa Foil Products/Alumax Foils Inc	0.01	30.97	88.10	1.10	920.45
6124211	ADM/TPC Milling Co-Pillsbury Company	-	-	20.64	-	11.15
6124311	Marquette Tool & Die-Marquette Tool & Die	-	-	-	-	13.03
6124811	Italgrani Elevator-Italgrani Elevator	0.12	4.11	1.23	0.02	0.95
6125211	St Alexius Hospital-St Louis	-	1.43	-	0.01	0.03
6125311	Bjc Health System-Pavillion	-	9.84	-	0.54	0.53
6125511	Sensient Colors Inc-Baldwin Plant	0.09	3.69	0.29	0.14	0.27
6126211	Hermann Oak Leather Co-Hermann Oak Leather Co	-	-	-	-	9.65
6126311	Lange-Stegmann Co-Lange-Stegmann Co	-	0.00	-	-	0.00
7287111	Poly One Corporation-St Louis	-	-	-	-	5.57
7287211	St Louis Metallizing-St Louis	-	0.42	-	0.00	7.70
7301011	Elementis Specialties Inc-Elementis Specialties Inc	0.26	10.21	0.48	0.06	83.94
7304011	Precoat Metals-Precoat Metals	-	7.72	-	0.05	53.00
7765811	Anheuser-Busch Inc-St Louis	24.25	686.14	28.44	5,561.21	288.59
7766311	Sigma - Aldrich Co-Sigma Chemical Company	-	7.45	-	0.04	15.57
7766411	Procter & Gamble-Procter & Gamble	0.38	15.12	75.36	0.88	0.82
7766811	Ashland Distribution Company-St Louis Plant	-	-	-	-	12.59
7767411	P D George Co (The)-P D George Co (The)	0.30	6.01	2.11	0.03	61.12
7767511	U S Paint Div Of Grow Group-U S Paint Div Of Grow Group	-	-	-	-	49.97
7768911	Sigma - Aldrich Co-Sigma - Aldrich Co	-	3.69	-	0.03	6.68
7769011	Permacel St Louis Inc-Permacel St Louis Inc	0.03	2.49	0.10	0.01	1.24
7833711	Superior Solvent & Chemical-St Louis	-	-	-	-	4.38
7833811	Laclede Tower Associates Llc-Laclede Gas Building	0.00	263.65	1.10	0.07	3.44
7834011	New World Pasta- Marceau Facility-New World Pasta	0.17	6.94	1.27	0.04	0.38
7834611	Southwestern Bell Telephone Company-Southwestern Bell Telephone Company	0.11	16.68	0.60	0.85	0.71
7835511	St Louis University-Facilities Svcs	0.06	12.38	0.94	0.07	0.68
8398811	Mallinckrodt Inc -Mallinckrodt Inc	4.13	119.32	31.06	277.12	68.88
St. Louis City Totals		**568.40**	**1,659.59**	**419.39**	**5,876.12**	**1,839.10**
Grand Total		**1,308.64**	**32,263.48**	**4,403.28**	**122,643.13**	**7,809.01**

Appendix D-3 2025 Area Source Emissions

Similarly to the 2025 point source emission projections, the 2025 area source emission projections for all categories of NO_X and SO_2, as well as the majority of categories for $PM_{2.5}$ and VOC, were calculated using the 2008 area source emissions inventory and applying growth factors to project the emissions in 2025. The growth factor file included SCCs with non-numeric characters. These were identified and determined not to be placeholder SCCs that would be used to match to Missouri SCCs, and so they were removed. When the Missouri area SCCs were initially matched to the growth factors generated by EGAS 5.0, there were several categories that did not have a growth factor. Area SCCs added since 2006 would not be included in EGAS, so a similar growth factor had to be found. The area residential wood category has seen new SCCs added to account for EPA-certified stoves, hydronic heaters, and wax firelogs. EGAS provides a single growth factor for all other residential wood combustion, and so this single factor is used for the new SCCs. New SCCs for portable fuel containers are assigned the most similar growth factor for gasoline product storage. SCCs for bulk plant evaporation of gasoline are assigned the growth factor for bulk terminal evaporation of gasoline.

Once all area SCCs had an assigned growth factor, the annual 2008 emissions were multiplied by the growth factor specific to that county and SCC to get the 2025 forecast emissions. The county totals are summarized below in Table D-6. This table includes refueling emissions for on-road motor vehicles estimated by MOVES2010b. The stage II controls in MOVES2010b were "turned off" by setting the stage II control efficiencies in the countyyear input table to zero (0) for all counties in the Missouri portion of the St. Louis nonattainment area. This was done, because the Air Program is currently developing a SIP revision to remove stage II control requirements in the St. Louis area due to the widespread use of on-board vapor recovery systems. These 2017 refueling stage II VOC emissions are displayed by county in Table D-7.

EGAS 5.0 growth factors were not used to project future year ammonia emissions from any area source categories, nor were these growth factors used to project the $PM_{2.5}$ emissions from the following five fugitive dust categories: paved roads, unpaved roads, residential construction, commercial/industrial/institutional construction, road construction, and agricultural tilling.

In order to project the future year ammonia emissions from area source categories, total area source ammonia emissions in 2008 were compared to total area source ammonia emissions in 2011 to determine current trends in area source ammonia emissions. In total, area source ammonia emissions decreased from 3,514.98 tons in 2008 to 3,207.16 tons in 2011. Because these emissions are trending downwards, EGAS growth factors are not appropriate to use to project the future year emissions. In order to ensure conservative estimates are used to help protect air quality, the 2008 area source ammonia emissions were held level to project the area source ammonia emissions in 2025 even though, over recent years, there has been a downward trend in these emissions.

Fugitive dust emissions from paved roads, unpaved roads, residential construction, commercial/industrial/institutional construction, road construction, and agricultural tilling were also held at 2008 levels when projecting 2025 emissions from these categories as opposed to using EGAS growth factors. These emissions result from dust disturbed during the above

mentioned activities. These types of emissions, in aggregate, comprise a significant total amount of direct $PM_{2.5}$ emissions; however these emissions have negligible impact on urban-wide or region-wide $PM_{2.5}$ concentrations because they settle out of the air quickly and disburse. These types of emissions can impact the immediate local area surrounding the emissions release point; however, $PM_{2.5}$ concentrations quickly return to normal background levels within a few hundred yards of the source. In addition, these types of emissions are difficult, if not impossible, to control. The Air Program reviewed the 2008 and 2011 emissions from these categories. In 2008, direct $PM_{2.5}$ emissions from these five categories totaled 10,964.19 tons/year in the Missouri portion of the nonattainment area and in 2011the emissions totaled 10,092.17 tons/year in the Missouri portion of the nonattainment area, which is a reduction of 872.02 tons/year. In order to ensure conservative estimates are used to help protect air quality, the 2008 direct $PM_{2.5}$ emissions from these five categories were held level to project the emissions in 2025 even though, over recent years, there has been a downward trend in these emissions.

As stated in Appendix B, the 2008 NEI data, which was used as the base year to project 2025 emissions, includes nonpoint emissions. These emissions were used to generate the area source emissions listed in Table D-6. However, due to the methods that are used to calculate the emissions for the marine and rail categories, these categories are included as area source emissions in the National Emissions Inventory (NEI), although they really should be classified as off-road mobile source emissions. Therefore, the emissions for rail and marine are not included in the total area source emissions listed in Table D-6. The SCC codes for the rail and marine categories are listed in Table D-8, and the emissions from these categories are included in Table D-18, to be included as off-road mobile source emissions.

Table D-6
2025 Annual Area Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1,300.09	297.72	2,353.02	997.57	2,195.82
Jefferson County	165.26	408.40	3,500.36	912.72	3,810.63
St. Charles County	883.43	475.47	2,353.20	898.51	7,524.56
St. Louis County	1,036.69	2,283.66	4,655.28	5,496.07	25,869.18
St. Louis City	129.5	1,065.77	1,453.01	3,302.01	10,058.43
Totals	**3,514.98**	**4,531.02**	**14,314.86**	**11,606.89**	**49,458.63**

Table D-7
2025 Annual Refueling Stage II
VOC Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (MO Counties Only)

County Name	Stage II VOC Emissions (tons/year)
Franklin County	36.52
Jefferson County	43.90
St. Charles County	65.34
St. Louis County	286.93
St. Louis City	83.53
Totals	**516.22**

Table D-8
SCC Codes and Descriptions Not Included in the Analysis for Area Source Emissions

SCC	SCC Level One	SCC Level Two	SCC Level Three	SCC Level Four
2275001000	Mobile Sources	Aircraft	Military Aircraft	Total
2275020000	Mobile Sources	Aircraft	Commercial Aircraft	Total: All Types
2275050011	Mobile Sources	Aircraft	General Aviation	Piston
2275050012	Mobile Sources	Aircraft	General Aviation	Turbine
2275060011	Mobile Sources	Aircraft	Air Taxi	Piston
2275060012	Mobile Sources	Aircraft	Air Taxi	Turbine
2275085000	Mobile Sources	Aircraft	Unpaved Airstrips	Total
2275087000	Mobile Sources	Aircraft	In-flight (non-Landing-Takeoff cycle)	Total
2280002100	Mobile Sources	Marine Vessels, Commercial	Diesel	Port emissions
2280002200	Mobile Sources	Marine Vessels, Commercial	Diesel	Underway emissions
2280003100	Mobile Sources	Marine Vessels, Commercial	Residual	Port emissions
2280003200	Mobile Sources	Marine Vessels, Commercial	Residual	Underway emissions
2280004000	Mobile Sources	Marine Vessels, Commercial	Gasoline	Total, All Vessel Types
2285002006	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Class I Operations
2285002007	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Class II / III Operations
2285002008	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Passenger Trains (Amtrak)
2285002009	Mobile Sources	Railroad Equipment	Diesel	Line Haul Locomotives: Commuter Lines
2285002010	Mobile Sources	Railroad Equipment	Diesel	Yard Locomotives
28500201	Internal Combustion Engines	Railroad Equipment	Diesel	Yard Locomotives

Table D-9 includes all of the area source emissions from 2025 and the associated growth factors for each source classification code. As mentioned above, area source ammonia emissions from all categories were held level from 2008 levels based on current emissions inventory trends for these emissions. Therefore, any growth factor for a category listed below in Table D-9, which includes NH_3 emissions along with other pollutants was not applied to the ammonia emissions when projecting the 2025 area source inventory.

Table D-9 Projected 2025 Annual Area Source Emissions and Growth Factors in the Missouri Portion of the St. Louis $PM_{2.5}$ Nonattainment Area

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2102001000	1.009322405	-	-	-	-	-
Franklin	2102002000	1.009322405	0.38	138.99	-	912.26	0.63
Franklin	2102004000	1.188436747	0.04	1.31	-	2.78	0.01
Franklin	2102005000	0.998385787	0.01	0.95	-	6.12	0.00
Franklin	2102006000	1.270973802	0.02	0.96	-	0.01	0.05
Franklin	2102007000	1.237169385	-	-	-	-	-
Franklin	2102008000	1.400884032	4.66	16.68	-	1.90	1.29
Franklin	2102011000	1.098169804	-	-	-	-	-
Franklin	2103001000	0.997882962	-	-	-	-	-
Franklin	2103002000	0.997882962	0.01	5.46	-	34.89	0.02
Franklin	2103004000	1.299942493	0.00	0.09	-	0.19	0.00
Franklin	2103005000	1.006532907	0.00	0.05	-	0.35	0.00
Franklin	2103006000	1.071742177	0.07	14.29	-	0.09	0.79
Franklin	2103007000	1.013854623	0.00	0.59	-	0.00	0.03
Franklin	2103008000	1.000007153	0.38	0.98	-	0.11	0.08
Franklin	2103011000	1.045214295	-	0.03	-	0.08	-
Franklin	2104001000	0.895575404	-	-	-	-	-
Franklin	2104002000	0.895575404	-	-	-	-	-
Franklin	2104004000	0.771962166	0.58	8.01	0.95	18.96	0.31
Franklin	2104006000	1.021433949	2.97	14.26	0.07	0.09	0.83
Franklin	2104007000	1.023646474	0.10	29.80	0.09	0.13	1.16
Franklin	2104008100	0.988447428	1.52	2.16	19.65	0.33	15.73
Franklin	2104008210	0.988447428	1.39	2.26	24.66	0.32	42.71
Franklin	2104008220	0.988447428	0.24	0.59	5.07	0.10	3.10
Franklin	2104008230	0.988447428	0.08	0.17	1.76	0.03	1.30
Franklin	2104008310	0.988447428	1.25	2.04	22.32	0.29	38.67
Franklin	2104008320	0.988447428	0.21	0.53	4.58	0.09	2.80
Franklin	2104008330	0.988447428	0.07	0.16	1.58	0.03	1.16
Franklin	2104008400	0.988447428	0.07	0.88	0.71	0.07	0.01
Franklin	2104008510	0.988447428	0.79	0.80	12.01	0.88	5.13
Franklin	2104008610	0.988447428	0.80	0.81	28.19	0.89	29.69
Franklin	2104009000	0.988447428	-	0.85	3.15	-	4.39
Franklin	2104011000	1.193187237	0.24	5.26	0.62	12.44	0.20
Franklin	2294000000	1.000000000	-	-	240.75	-	-
Franklin	2296000000	1.000000000	-	-	1,555.69	-	-
Franklin	2302002100	1.167123318	-	-	2.93	-	0.71
Franklin	2302002200	1.167123318	-	-	20.77	-	2.44
Franklin	2302003000	1.167123318	-	-	-	-	0.74
Franklin	2302003100	1.167123318	-	-	6.07	-	0.35
Franklin	2302003200	1.167123318	-	-	0.41	-	0.01
Franklin	2311010000	1.000000000	-	-	2.37	-	-
Franklin	2311020000	1.000000000	-	-	26.14	-	-
Franklin	2311030000	1.000000000	-	-	13.00	-	-
Franklin	2325000000	1.409649134	-	-	13.49	-	-
Franklin	2401001000	1.363849998	-	-	-	-	207.79
Franklin	2401005000	1.422920942	-	-	-	-	37.42
Franklin	2401008000	1.029492736	-	-	-	-	17.34
Franklin	2401015000	1.458659649	-	-	-	-	1.60
Franklin	2401020000	1.760393381	-	-	-	-	45.54
Franklin	2401025000	1.760393381	-	-	-	-	46.62
Franklin	2401030000	1.506688952	-	-	-	-	-
Franklin	2401040000	1.559493661	-	-	-	-	-
Franklin	2401050000	1.691363096	-	-	-	-	109.82
Franklin	2401055000	2.581917048	-	-	-	-	116.40

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2401060000	1.915094376	-	-	-	-	-
Franklin	2401065000	1.153413892	-	-	-	-	5.67
Franklin	2401070000	1.673876524	-	-	-	-	29.95
Franklin	2401075000	1.562869549	-	-	-	-	3.01
Franklin	2401080000	1.40625	-	-	-	-	20.10
Franklin	2401085000	1.79831934	-	-	-	-	-
Franklin	2401090000	1.700410366	-	-	-	-	68.80
Franklin	2401100000	1.439516187	-	-	-	-	79.88
Franklin	2401200000	1.543543577	-	-	-	-	0.55
Franklin	2415000000	1.760393381	-	-	-	-	163.41
Franklin	2420000000	1.332657218	-	-	-	-	1.94
Franklin	2425000000	1.427901983	-	-	-	-	107.71
Franklin	2460100000	1.189453244	-	-	-	-	114.01
Franklin	2460200000	1.189453244	-	-	-	-	108.01
Franklin	2460400000	1.189453244	-	-	-	-	81.61
Franklin	2460500000	1.189453244	-	-	-	-	57.01
Franklin	2460600000	1.189453244	-	-	-	-	34.20
Franklin	2460800000	1.189453244	-	-	-	-	106.81
Franklin	2460900000	1.189453244	-	-	-	-	4.20
Franklin	2461021000	1.447671771	-	-	-	-	53.55
Franklin	2461022000	1.447671771	-	-	-	-	28.00
Franklin	2461850000	1.385499954	-	-	-	-	87.19
Franklin	2501011011	1.281122684	-	-	-	-	19.50
Franklin	2501011012	1.281122684	-	-	-	-	38.07
Franklin	2501011013	1.281122684	-	-	-	-	4.43
Franklin	2501011014	1.281122684	-	-	-	-	1.46
Franklin	2501011015	1.281122684	-	-	-	-	0.12
Franklin	2501012011	1.281122684	-	-	-	-	0.62
Franklin	2501012012	1.281122684	-	-	-	-	1.22
Franklin	2501012013	1.281122684	-	-	-	-	6.05
Franklin	2501012014	1.281122684	-	-	-	-	2.80
Franklin	2501012015	1.281122684	-	-	-	-	0.24
Franklin	2501050120	1.029492736	-	-	-	-	7.23
Franklin	2501055120	1.281122684	-	-	-	-	7.00
Franklin	2501060053	1.029492736	-	-	-	-	20.95
Franklin	2501060201	1.029492736	-	-	-	-	29.63
Franklin	2501080050	1.572300792	-	-	-	-	18.11
Franklin	2501080100	1.572300792	-	-	-	-	0.94
Franklin	2505030120	1.029492736	-	-	-	-	1.94
Franklin	2505040120	1.285714269	-	-	-	-	7.67
Franklin	2610000100	1.189453244	-	0.98	2.69	0.12	4.43
Franklin	2610000400	1.189453244	-	0.79	2.41	0.26	3.01
Franklin	2610000500	1.189453244	-	24.44	64.07	-	56.71
Franklin	2610030000	1.189453244	-	21.22	123.07	3.54	30.27
Franklin	2630020000	1.418750048	0.38	-	-	-	2.72
Franklin	2801000003	1.000000000	-	-	151.11	-	-
Franklin	2801500000	1.385499954	-	0.83	2.63	0.11	1.66
Franklin	2801700001	1.000000000	81.45	-	-	-	-
Franklin	2801700002	1.385499954	-	-	-	-	-
Franklin	2801700003	1.000000000	0.03	-	-	-	-
Franklin	2801700004	1.000000000	400.32	-	-	-	-
Franklin	2801700005	1.000000000	27.01	-	-	-	-
Franklin	2801700006	1.000000000	2.63	-	-	-	-
Franklin	2801700007	1.385499954	-	-	-	-	-
Franklin	2801700010	1.000000000	5.02	-	-	-	-
Franklin	2801700011	1.385499954	-	-	-	-	-

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2801700012	1.385499954	-	-	-	-	-
Franklin	2801700013	1.000000000	41.32	-	-	-	-
Franklin	2801700014	1.385499954	-	-	-	-	-
Franklin	2801700015	1.385499954	-	-	-	-	-
Franklin	2801700099	1.000000000	0.08	-	-	-	-
Franklin	2805001100	1.000000000	17.29	-	-	-	-
Franklin	2805001200	1.000000000	0.01	-	-	-	-
Franklin	2805001300	1.000000000	13.17	-	-	-	-
Franklin	2805002000	1.000000000	116.29	-	-	-	-
Franklin	2805003100	1.000000000	113.26	-	-	-	-
Franklin	2805007100	1.000000000	1.49	-	-	-	-
Franklin	2805007300	1.000000000	0.03	-	-	-	-
Franklin	2805008100	1.385499954	-	-	-	-	-
Franklin	2805008200	1.385499954	-	-	-	-	-
Franklin	2805008300	1.385499954	-	-	-	-	-
Franklin	2805009100	1.000000000	0.05	-	-	-	-
Franklin	2805009200	1.000000000	0.01	-	-	-	-
Franklin	2805009300	1.000000000	0.04	-	-	-	-
Franklin	2805010100	1.000000000	0.02	-	-	-	-
Franklin	2805010200	1.000000000	0.00	-	-	-	-
Franklin	2805010300	1.000000000	0.01	-	-	-	-
Franklin	2805018000	1.000000000	22.18	-	-	-	-
Franklin	2805019100	1.000000000	0.53	-	-	-	-
Franklin	2805019200	1.000000000	1.49	-	-	-	-
Franklin	2805019300	1.000000000	0.15	-	-	-	-
Franklin	2805021100	1.000000000	14.12	-	-	-	-
Franklin	2805021200	1.000000000	19.14	-	-	-	-
Franklin	2805021300	1.000000000	23.76	-	-	-	-
Franklin	2805022100	1.000000000	2.07	-	-	-	-
Franklin	2805022200	1.000000000	0.10	-	-	-	-
Franklin	2805022300	1.000000000	1.20	-	-	-	-
Franklin	2805023100	1.000000000	9.42	-	-	-	-
Franklin	2805023200	1.000000000	0.17	-	-	-	-
Franklin	2805023300	1.000000000	12.57	-	-	-	-
Franklin	2805025000	1.385499954	-	-	-	-	-
Franklin	2805030000	1.000000000	0.14	-	-	-	-
Franklin	2805030007	1.000000000	0.21	-	-	-	-
Franklin	2805030008	1.000000000	0.16	-	-	-	-
Franklin	2805035000	1.000000000	38.28	-	-	-	-
Franklin	2805039100	1.000000000	93.85	-	-	-	-
Franklin	2805039200	1.000000000	171.60	-	-	-	-
Franklin	2805039300	1.000000000	14.78	-	-	-	-
Franklin	2805040000	1.000000000	4.20	-	-	-	-
Franklin	2805045000	1.000000000	3.75	-	-	-	-
Franklin	2805047100	1.000000000	20.99	-	-	-	-
Franklin	2805047300	1.000000000	8.95	-	-	-	-
Franklin	2805053100	1.000000000	0.45	-	-	-	-
Franklin	2810060100	1.440233231	-	0.50	0.03	0.08	0.00
Franklin County Total			**1,300.09**	**297.72**	**2,353.02**	**997.57**	**2,159.30**
Jefferson	2102001000	1.009322405	-	-	-	-	-
Jefferson	2102002000	1.009322405	0.36	132.81	-	871.75	0.60
Jefferson	2102004000	1.188436747	0.04	1.25	-	2.66	0.01
Jefferson	2102005000	0.998385787	0.01	0.91	-	5.85	0.00
Jefferson	2102006000	1.270973802	0.02	0.91	-	0.01	0.05
Jefferson	2102007000	1.237169385	-	-	-	-	-
Jefferson	2102008000	1.400884032	4.46	15.94	-	1.81	1.23

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2102011000	1.098169804	-	-	-	-	-
Jefferson	2103001000	0.997882962	-	-	-	-	-
Jefferson	2103002000	0.997882962	0.00	1.09	-	6.96	0.00
Jefferson	2103004000	1.299942493	0.00	0.02	-	0.04	0.00
Jefferson	2103005000	1.006532907	0.00	0.01	-	0.07	0.00
Jefferson	2103006000	1.071742177	0.01	2.85	-	0.02	0.16
Jefferson	2103007000	1.013854623	0.00	0.12	-	0.00	0.01
Jefferson	2103008000	1.000007153	0.08	0.19	-	0.02	0.02
Jefferson	2103011000	1.045214295	-	0.01	-	0.02	-
Jefferson	2104001000	0.895575404	-	-	-	-	-
Jefferson	2104002000	0.895575404	-	-	-	-	-
Jefferson	2104004000	0.771962166	0.27	3.80	0.45	9.00	0.15
Jefferson	2104006000	1.021433949	16.58	79.61	0.36	0.51	4.66
Jefferson	2104007000	1.023646474	0.14	40.96	0.12	0.17	1.59
Jefferson	2104008100	0.988447428	3.21	4.59	41.66	0.71	33.37
Jefferson	2104008210	0.988447428	2.94	4.79	52.34	0.68	90.66
Jefferson	2104008220	0.988447428	0.50	1.25	10.77	0.22	6.59
Jefferson	2104008230	0.988447428	0.17	0.37	3.74	0.07	2.75
Jefferson	2104008310	0.988447428	2.66	4.33	47.36	0.62	82.03
Jefferson	2104008320	0.988447428	0.45	1.13	9.73	0.20	5.96
Jefferson	2104008330	0.988447428	0.15	0.33	3.37	0.07	2.47
Jefferson	2104008400	0.988447428	0.15	1.83	1.48	0.15	0.02
Jefferson	2104009000	0.988447428	-	1.78	6.59	-	9.18
Jefferson	2104011000	1.193187237	0.12	2.50	0.30	5.91	0.10
Jefferson	2294000000	1.000000000	-	-	229.48	-	-
Jefferson	2296000000	1.000000000	-	-	2,484.70	-	-
Jefferson	2302002100	1.167123318	-	-	6.32	-	1.53
Jefferson	2302002200	1.167123318	-	-	44.81	-	5.27
Jefferson	2302003000	1.167123318	-	-	-	-	1.60
Jefferson	2302003100	1.167123318	-	-	13.09	-	0.75
Jefferson	2302003200	1.167123318	-	-	0.89	-	0.03
Jefferson	2311010000	1.000000000	-	-	6.82	-	-
Jefferson	2311020000	1.000000000	-	-	56.75	-	-
Jefferson	2311030000	1.000000000	-	-	43.02	-	-
Jefferson	2325000000	1.409649134	-	-	26.97	-	-
Jefferson	2401001000	1.363849998	-	-	-	-	448.29
Jefferson	2401005000	1.422920942	-	-	-	-	42.99
Jefferson	2401008000	1.029492736	-	-	-	-	17.21
Jefferson	2401015000	1.458659649	-	-	-	-	0.25
Jefferson	2401020000	1.760393381	-	-	-	-	18.15
Jefferson	2401025000	1.760393381	-	-	-	-	2.19
Jefferson	2401030000	1.506688952	-	-	-	-	27.45
Jefferson	2401040000	1.559493661	-	-	-	-	-
Jefferson	2401050000	1.691363096	-	-	-	-	29.72
Jefferson	2401055000	2.581917048	-	-	-	-	28.85
Jefferson	2401060000	1.915094376	-	-	-	-	1.77
Jefferson	2401065000	1.153413892	-	-	-	-	-
Jefferson	2401070000	1.673876524	-	-	-	-	2.43
Jefferson	2401075000	1.562869549	-	-	-	-	3.01
Jefferson	2401080000	1.40625	-	-	-	-	1.15
Jefferson	2401085000	1.79831934	-	-	-	-	-
Jefferson	2401090000	1.700410366	-	-	-	-	20.82
Jefferson	2401100000	1.439516187	-	-	-	-	172.34
Jefferson	2401200000	1.543543577	-	-	-	-	1.18
Jefferson	2415000000	1.760393381	-	-	-	-	89.20
Jefferson	2420000000	1.332657218	-	-	-	-	14.00

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2425000000	1.427901983	-	-	-	-	104.90
Jefferson	2460100000	1.189453244	-	-	-	-	245.97
Jefferson	2460200000	1.189453244	-	-	-	-	233.03
Jefferson	2460400000	1.189453244	-	-	-	-	176.06
Jefferson	2460500000	1.189453244	-	-	-	-	122.99
Jefferson	2460600000	1.189453244	-	-	-	-	73.79
Jefferson	2460800000	1.189453244	-	-	-	-	230.44
Jefferson	2460900000	1.189453244	-	-	-	-	9.06
Jefferson	2461021000	1.447671771	-	-	-	-	97.06
Jefferson	2461022000	1.447671771	-	-	-	-	50.75
Jefferson	2461850000	1.385499954	-	-	-	-	18.57
Jefferson	2501011011	1.281122684	-	-	-	-	42.54
Jefferson	2501011012	1.281122684	-	-	-	-	83.05
Jefferson	2501011013	1.281122684	-	-	-	-	9.67
Jefferson	2501011014	1.281122684	-	-	-	-	3.17
Jefferson	2501011015	1.281122684	-	-	-	-	0.27
Jefferson	2501012011	1.281122684	-	-	-	-	1.36
Jefferson	2501012012	1.281122684	-	-	-	-	2.65
Jefferson	2501012013	1.281122684	-	-	-	-	13.19
Jefferson	2501012014	1.281122684	-	-	-	-	6.12
Jefferson	2501012015	1.281122684	-	-	-	-	0.52
Jefferson	2501050120	1.029492736	-	-	-	-	82.03
Jefferson	2501055120	1.281122684	-	-	-	-	79.43
Jefferson	2501060052	1.029492736	-	-	-	-	536.11
Jefferson	2501060201	1.029492736	-	-	-	-	52.30
Jefferson	2501080050	1.572300792	-	-	-	-	2.47
Jefferson	2501080100	1.572300792	-	-	-	-	0.13
Jefferson	2505030120	1.029492736	-	-	-	-	3.42
Jefferson	2505040120	1.285714269	-	-	-	-	87.03
Jefferson	2610000100	1.189453244	-	1.26	3.46	0.15	5.71
Jefferson	2610000400	1.189453244	-	1.02	3.10	0.34	3.87
Jefferson	2610000500	1.189453244	-	74.33	194.82	-	172.44
Jefferson	2610030000	1.189453244	-	27.32	158.46	4.55	38.98
Jefferson	2630020000	1.418750048	0.82	-	-	-	5.86
Jefferson	2801000003	1.000000000	-	-	49.33	-	-
Jefferson	2801700001	1.385499954	-	-	-	-	-
Jefferson	2801700002	1.385499954	-	-	-	-	-
Jefferson	2801700003	1.385499954	-	-	-	-	-
Jefferson	2801700004	1.000000000	15.47	-	-	-	-
Jefferson	2801700005	1.385499954	-	-	-	-	-
Jefferson	2801700006	1.000000000	0.01	-	-	-	-
Jefferson	2801700007	1.385499954	-	-	-	-	-
Jefferson	2801700010	1.000000000	6.04	-	-	-	-
Jefferson	2801700011	1.385499954	-	-	-	-	-
Jefferson	2801700012	1.385499954	-	-	-	-	-
Jefferson	2801700013	1.000000000	2.18	-	-	-	-
Jefferson	2801700014	1.385499954	-	-	-	-	-
Jefferson	2801700015	1.385499954	-	-	-	-	-
Jefferson	2801700099	1.000000000	0.05	-	-	-	-
Jefferson	2805001100	1.000000000	1.91	-	-	-	-
Jefferson	2805001200	1.000000000	0.00	-	-	-	-
Jefferson	2805001300	1.000000000	1.45	-	-	-	-
Jefferson	2805002000	1.000000000	16.10	-	-	-	-
Jefferson	2805003100	1.000000000	20.20	-	-	-	-
Jefferson	2805007100	1.000000000	0.94	-	-	-	-
Jefferson	2805007300	1.000000000	0.02	-	-	-	-

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2805008100	1.385499954	-	-	-	-	-
Jefferson	2805008200	1.385499954	-	-	-	-	-
Jefferson	2805008300	1.385499954	-	-	-	-	-
Jefferson	2805009100	1.000000000	0.02	-	-	-	-
Jefferson	2805009200	1.000000000	0.00	-	-	-	-
Jefferson	2805009300	1.000000000	0.02	-	-	-	-
Jefferson	2805010100	1.000000000	0.02	-	-	-	-
Jefferson	2805010200	1.000000000	0.00	-	-	-	-
Jefferson	2805010300	1.000000000	0.01	-	-	-	-
Jefferson	2805018000	1.000000000	6.19	-	-	-	-
Jefferson	2805019100	1.000000000	0.16	-	-	-	-
Jefferson	2805019200	1.000000000	0.45	-	-	-	-
Jefferson	2805019300	1.000000000	0.04	-	-	-	-
Jefferson	2805021100	1.000000000	4.63	-	-	-	-
Jefferson	2805021200	1.000000000	6.27	-	-	-	-
Jefferson	2805021300	1.000000000	7.79	-	-	-	-
Jefferson	2805022100	1.000000000	0.67	-	-	-	-
Jefferson	2805022200	1.000000000	0.03	-	-	-	-
Jefferson	2805022300	1.000000000	0.39	-	-	-	-
Jefferson	2805023100	1.000000000	3.08	-	-	-	-
Jefferson	2805023200	1.000000000	0.06	-	-	-	-
Jefferson	2805023300	1.000000000	4.11	-	-	-	-
Jefferson	2805025000	1.385499954	-	-	-	-	-
Jefferson	2805030000	1.000000000	0.20	-	-	-	-
Jefferson	2805030007	1.000000000	0.20	-	-	-	-
Jefferson	2805030008	1.000000000	0.18	-	-	-	-
Jefferson	2805035000	1.000000000	22.70	-	-	-	-
Jefferson	2805039100	1.000000000	1.04	-	-	-	-
Jefferson	2805039200	1.000000000	2.02	-	-	-	-
Jefferson	2805039300	1.000000000	0.17	-	-	-	-
Jefferson	2805040000	1.000000000	1.91	-	-	-	-
Jefferson	2805045000	1.000000000	5.03	-	-	-	-
Jefferson	2805047100	1.000000000	0.23	-	-	-	-
Jefferson	2805047300	1.000000000	0.10	-	-	-	-
Jefferson	2805053100	1.000000000	0.00	-	-	-	-
Jefferson	2810060100	1.440233231	-	1.08	0.07	0.17	0.00
Jefferson County Total			**165.26**	**408.40**	**3,500.36**	**912.72**	**3,766.73**
St. Charles	2102001000	1.009322405	-	-	-	-	-
St. Charles	2102002000	1.009322405	0.33	122.87	-	806.50	0.56
St. Charles	2102004000	1.188436747	0.04	1.15	-	2.46	0.01
St. Charles	2102005000	0.998385787	0.01	0.84	-	5.41	0.00
St. Charles	2102006000	1.270973802	0.02	0.84	-	0.01	0.05
St. Charles	2102007000	1.237169385	-	-	-	-	-
St. Charles	2102008000	1.400884032	4.12	14.74	-	1.68	1.14
St. Charles	2102011000	1.098169804	-	-	-	-	-
St. Charles	2103001000	0.997882962	-	-	-	-	-
St. Charles	2103002000	0.997882962	0.01	4.55	-	29.08	0.02
St. Charles	2103004000	1.299942493	0.00	0.08	-	0.16	0.00
St. Charles	2103005000	1.006532907	0.00	0.05	-	0.29	0.00
St. Charles	2103006000	1.071742177	0.05	11.91	-	0.07	0.66
St. Charles	2103007000	1.013854623	0.00	0.49	-	0.00	0.03
St. Charles	2103008000	1.000007153	0.32	0.81	-	0.09	0.06
St. Charles	2103011000	1.045214295	-	0.03	-	0.06	-
St. Charles	2104001000	0.895575404	-	-	-	-	-
St. Charles	2104002000	0.895575404	0.82	3.32	1.40	38.37	3.65
St. Charles	2104004000	0.771962166	0.14	1.97	0.23	4.67	0.08

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2104006000	1.021433949	52.03	249.78	1.14	1.59	14.61
St. Charles	2104007000	1.023646474	0.08	24.30	0.07	0.10	0.95
St. Charles	2104008100	0.988447428	5.06	7.22	65.52	1.11	52.47
St. Charles	2104008210	0.988447428	4.63	7.53	82.34	1.08	142.61
St. Charles	2104008220	0.988447428	0.79	1.97	16.92	0.35	10.36
St. Charles	2104008230	0.988447428	0.26	0.58	5.88	0.12	4.32
St. Charles	2104008310	0.988447428	4.19	6.82	74.51	0.97	129.05
St. Charles	2104008320	0.988447428	0.71	1.78	15.30	0.31	9.37
St. Charles	2104008330	0.988447428	0.24	0.52	5.30	0.10	3.89
St. Charles	2104008400	0.988447428	0.23	2.94	2.36	0.25	0.03
St. Charles	2104009000	0.988447428	-	2.85	10.52	-	14.65
St. Charles	2104011000	1.193187237	0.06	1.30	0.15	3.07	0.05
St. Charles	2294000000	1.000000000	-	-	260.13	-	-
St. Charles	2296000000	1.000000000	-	-	964.31	-	-
St. Charles	2302002100	1.167123318	-	-	10.15	-	2.46
St. Charles	2302002200	1.167123318	-	-	71.92	-	8.46
St. Charles	2302003000	1.167123318	-	-	-	-	2.57
St. Charles	2302003100	1.167123318	-	-	21.01	-	1.21
St. Charles	2302003200	1.167123318	-	-	1.43	-	0.05
St. Charles	2311010000	1.000000000	-	-	14.67	-	-
St. Charles	2311020000	1.000000000	-	-	92.66	-	-
St. Charles	2311030000	1.000000000	-	-	77.73	-	-
St. Charles	2325000000	1.409649134	-	-	26.60	-	-
St. Charles	2401001000	1.363849998	-	-	-	-	719.57
St. Charles	2401005000	1.422920942	-	-	-	-	101.12
St. Charles	2401008000	1.029492736	-	-	-	-	19.34
St. Charles	2401015000	1.458659649	-	-	-	-	3.45
St. Charles	2401020000	1.760393381	-	-	-	-	19.78
St. Charles	2401025000	1.760393381	-	-	-	-	-
St. Charles	2401030000	1.506688952	-	-	-	-	-
St. Charles	2401040000	1.559493661	-	-	-	-	-
St. Charles	2401050000	1.691363096	-	-	-	-	150.33
St. Charles	2401055000	2.581917048	-	-	-	-	356.22
St. Charles	2401060000	1.915094376	-	-	-	-	1.77
St. Charles	2401065000	1.153413892	-	-	-	-	-
St. Charles	2401070000	1.673876524	-	-	-	-	162.38
St. Charles	2401075000	1.562869549	-	-	-	-	-
St. Charles	2401080000	1.40625	-	-	-	-	1.15
St. Charles	2401085000	1.79831934	-	-	-	-	10.63
St. Charles	2401090000	1.700410366	-	-	-	-	103.14
St. Charles	2401100000	1.439516187	-	-	-	-	276.64
St. Charles	2401200000	1.543543577	-	-	-	-	1.89
St. Charles	2415000000	1.760393381	-	-	-	-	325.17
St. Charles	2420000000	1.332657218	-	-	-	-	149.99
St. Charles	2425000000	1.427901983	-	-	-	-	1,187.46
St. Charles	2460100000	1.189453244	-	-	-	-	394.82
St. Charles	2460200000	1.189453244	-	-	-	-	374.04
St. Charles	2460400000	1.189453244	-	-	-	-	282.61
St. Charles	2460500000	1.189453244	-	-	-	-	197.41
St. Charles	2460600000	1.189453244	-	-	-	-	118.45
St. Charles	2460800000	1.189453244	-	-	-	-	369.89
St. Charles	2460900000	1.189453244	-	-	-	-	14.55
St. Charles	2461021000	1.447671771	-	-	-	-	107.92
St. Charles	2461022000	1.447671771	-	-	-	-	56.43
St. Charles	2461850000	1.385499954	-	-	-	-	133.07
St. Charles	2501011011	1.281122684	-	-	-	-	85.46

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2501011012	1.281122684	-	-	-	-	166.86
St. Charles	2501011013	1.281122684	-	-	-	-	19.42
St. Charles	2501011014	1.281122684	-	-	-	-	6.38
St. Charles	2501011015	1.281122684	-	-	-	-	0.54
St. Charles	2501012011	1.281122684	-	-	-	-	2.73
St. Charles	2501012012	1.281122684	-	-	-	-	5.33
St. Charles	2501012013	1.281122684	-	-	-	-	26.50
St. Charles	2501012014	1.281122684	-	-	-	-	12.29
St. Charles	2501012015	1.281122684	-	-	-	-	1.04
St. Charles	2501050120	1.029492736	-	-	-	-	42.15
St. Charles	2501055120	1.281122684	-	-	-	-	40.77
St. Charles	2501060052	1.029492736	-	-	-	-	818.63
St. Charles	2501060201	1.029492736	-	-	-	-	79.86
St. Charles	2501080050	1.572300792	-	-	-	-	42.14
St. Charles	2501080100	1.572300792	-	-	-	-	2.19
St. Charles	2505030120	1.029492736	-	-	-	-	5.22
St. Charles	2505040120	1.285714269	-	-	-	-	44.73
St. Charles	2610000100	1.189453244	-	-	-	-	-
St. Charles	2610000400	1.189453244	-	-	-	-	-
St. Charles	2610000500	1.189453244	-	-	-	-	-
St. Charles	2610030000	1.189453244	-	-	-	-	-
St. Charles	2630020000	1.418750048	1.32	-	-	-	9.40
St. Charles	2801000003	1.000000000	-	-	522.93	-	-
St. Charles	2801500000	1.385499954	-	2.49	7.90	0.33	4.99
St. Charles	2801700001	1.000000000	51.93	-	-	-	-
St. Charles	2801700002	1.385499954	-	-	-	-	-
St. Charles	2801700003	1.000000000	375.03	-	-	-	-
St. Charles	2801700004	1.000000000	102.23	-	-	-	-
St. Charles	2801700005	1.000000000	0.01	-	-	-	-
St. Charles	2801700006	1.000000000	0.83	-	-	-	-
St. Charles	2801700007	1.000000000	0.17	-	-	-	-
St. Charles	2801700010	1.000000000	30.78	-	-	-	-
St. Charles	2801700011	1.385499954	-	-	-	-	-
St. Charles	2801700012	1.385499954	-	-	-	-	-
St. Charles	2801700013	1.000000000	14.66	-	-	-	-
St. Charles	2801700014	1.000000000	6.03	-	-	-	-
St. Charles	2801700015	1.000000000	2.90	-	-	-	-
St. Charles	2801700099	1.000000000	0.04	-	-	-	-
St. Charles	2805001100	1.000000000	8.40	-	-	-	-
St. Charles	2805001200	1.000000000	0.00	-	-	-	-
St. Charles	2805001300	1.000000000	6.38	-	-	-	-
St. Charles	2805002000	1.000000000	17.42	-	-	-	-
St. Charles	2805003100	1.000000000	25.21	-	-	-	-
St. Charles	2805007100	1.000000000	0.63	-	-	-	-
St. Charles	2805007300	1.000000000	0.01	-	-	-	-
St. Charles	2805008100	1.385499954	-	-	-	-	-
St. Charles	2805008200	1.385499954	-	-	-	-	-
St. Charles	2805008300	1.385499954	-	-	-	-	-
St. Charles	2805009100	1.385499954	-	-	-	-	-
St. Charles	2805009200	1.385499954	-	-	-	-	-
St. Charles	2805009300	1.385499954	-	-	-	-	-
St. Charles	2805010100	1.385499954	-	-	-	-	-
St. Charles	2805010200	1.385499954	-	-	-	-	-
St. Charles	2805010300	1.385499954	-	-	-	-	-
St. Charles	2805018000	1.000000000	3.79	-	-	-	-
St. Charles	2805019100	1.000000000	0.18	-	-	-	-

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2805019200	1.000000000	0.52	-	-	-	-
St. Charles	2805019300	1.000000000	0.05	-	-	-	-
St. Charles	2805021100	1.000000000	4.42	-	-	-	-
St. Charles	2805021200	1.000000000	5.99	-	-	-	-
St. Charles	2805021300	1.000000000	7.44	-	-	-	-
St. Charles	2805022100	1.000000000	0.67	-	-	-	-
St. Charles	2805022200	1.000000000	0.03	-	-	-	-
St. Charles	2805022300	1.000000000	0.39	-	-	-	-
St. Charles	2805023100	1.000000000	2.96	-	-	-	-
St. Charles	2805023200	1.000000000	0.05	-	-	-	-
St. Charles	2805023300	1.000000000	3.95	-	-	-	-
St. Charles	2805025000	1.385499954	-	-	-	-	-
St. Charles	2805030000	1.000000000	0.14	-	-	-	-
St. Charles	2805030007	1.000000000	0.02	-	-	-	-
St. Charles	2805030008	1.000000000	0.02	-	-	-	-
St. Charles	2805035000	1.000000000	10.40	-	-	-	-
St. Charles	2805039100	1.000000000	35.38	-	-	-	-
St. Charles	2805039200	1.000000000	70.75	-	-	-	-
St. Charles	2805039300	1.000000000	5.82	-	-	-	-
St. Charles	2805040000	1.000000000	0.68	-	-	-	-
St. Charles	2805045000	1.000000000	0.15	-	-	-	-
St. Charles	2805047100	1.000000000	7.95	-	-	-	-
St. Charles	2805047300	1.000000000	3.39	-	-	-	-
St. Charles	2805053100	1.000000000	0.17	-	-	-	-
St. Charles	2810060100	1.440233231	-	1.73	0.11	0.27	0.01
St. Charles County Total			**883.43**	**475.47**	**2,353.20**	**898.51**	**7,459.22**
St. Louis	2102001000	1.009322405	-	-	-	-	-
St. Louis	2102002000	1.009322405	2.20	812.86	-	5,335.34	3.69
St. Louis	2102004000	1.188436747	0.26	7.64	-	16.26	0.08
St. Louis	2102005000	0.998385787	0.08	5.58	-	35.82	0.03
St. Louis	2102006000	1.270973802	0.14	5.59	-	0.03	0.31
St. Louis	2102007000	1.237169385	-	-	-	-	-
St. Louis	2102008000	1.400884032	27.28	97.54	-	11.08	7.54
St. Louis	2102011000	1.098169804	-	-	-	-	-
St. Louis	2103001000	0.997882962	-	-	-	-	-
St. Louis	2103002000	0.997882962	0.01	5.20	-	33.24	0.02
St. Louis	2103004000	1.299942493	0.00	0.09	-	0.19	0.00
St. Louis	2103005000	1.006532907	0.00	0.05	-	0.33	0.00
St. Louis	2103006000	1.071742177	0.06	13.61	-	0.08	0.75
St. Louis	2103007000	1.013854623	0.00	0.56	-	0.00	0.03
St. Louis	2103008000	1.000007153	0.36	0.93	-	0.11	0.07
St. Louis	2103011000	1.045214295	-	0.03	-	0.07	-
St. Louis	2104001000	0.895575404	-	-	-	-	-
St. Louis	2104002000	0.895575404	0.61	2.49	1.05	28.78	2.74
St. Louis	2104004000	0.771962166	0.24	3.30	0.39	7.81	0.13
St. Louis	2104006000	1.021433949	250.92	1,204.60	5.51	7.69	70.48
St. Louis	2104007000	1.023646474	0.06	16.59	0.05	0.07	0.65
St. Louis	2104008100	0.988447428	15.64	22.34	202.75	3.44	162.37
St. Louis	2104008210	0.988447428	14.32	23.31	254.74	3.33	441.21
St. Louis	2104008220	0.988447428	2.43	6.09	52.33	1.07	32.04
St. Louis	2104008230	0.988447428	0.81	1.78	18.17	0.36	13.36
St. Louis	2104008310	0.988447428	12.95	21.09	230.49	3.01	399.21
St. Louis	2104008320	0.988447428	2.20	5.51	47.34	0.97	28.98
St. Louis	2104008330	0.988447428	0.73	1.61	16.41	0.32	12.07
St. Louis	2104008400	0.988447428	0.74	9.23	7.43	0.78	0.10
St. Louis	2104009000	0.988447428	-	8.96	33.11	-	46.12

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2104011000	1.193187237	0.10	2.17	0.26	5.13	0.08
St. Louis	2294000000	1.000000000	-	-	1,041.13	-	-
St. Louis	2296000000	1.000000000	-	-	563.24	-	-
St. Louis	2302002100	1.167123318	-	-	28.82	-	6.98
St. Louis	2302002200	1.167123318	-	-	204.16	-	24.01
St. Louis	2302003000	1.167123318	-	-	-	-	7.30
St. Louis	2302003100	1.167123318	-	-	59.64	-	3.44
St. Louis	2302003200	1.167123318	-	-	4.05	-	0.13
St. Louis	2311010000	1.000000000	-	-	7.11	-	-
St. Louis	2311020000	1.000000000	-	-	1,634.59	-	-
St. Louis	2311030000	1.000000000	-	-	37.90	-	-
St. Louis	2325000000	1.409649134	-	-	131.11	-	-
St. Louis	2401001000	1.363849998	-	-	-	-	2,042.59
St. Louis	2401005000	1.422920942	-	-	-	-	526.95
St. Louis	2401008000	1.029492736	-	-	-	-	53.76
St. Louis	2401015000	1.458659649	-	-	-	-	6.24
St. Louis	2401020000	1.760393381	-	-	-	-	174.14
St. Louis	2401025000	1.760393381	-	-	-	-	152.80
St. Louis	2401030000	1.506688952	-	-	-	-	32.68
St. Louis	2401040000	1.559493661	-	-	-	-	1.57
St. Louis	2401050000	1.691363096	-	-	-	-	126.00
St. Louis	2401055000	2.581917048	-	-	-	-	537.81
St. Louis	2401060000	1.915094376	-	-	-	-	-
St. Louis	2401065000	1.153413892	-	-	-	-	0.31
St. Louis	2401070000	1.673876524	-	-	-	-	694.33
St. Louis	2401075000	1.562869549	-	-	-	-	-
St. Louis	2401080000	1.40625	-	-	-	-	11.94
St. Louis	2401085000	1.79831934	-	-	-	-	-
St. Louis	2401090000	1.700410366	-	-	-	-	321.45
St. Louis	2401100000	1.439516187	-	-	-	-	785.26
St. Louis	2401200000	1.543543577	-	-	-	-	5.36
St. Louis	2415000000	1.760393381	-	-	-	-	991.88
St. Louis	2420000000	1.332657218	-	-	-	-	538.64
St. Louis	2425000000	1.427901983	-	-	-	-	4,913.16
St. Louis	2460100000	1.189453244	-	-	-	-	1,120.75
St. Louis	2460200000	1.189453244	-	-	-	-	1,061.76
St. Louis	2460400000	1.189453244	-	-	-	-	802.22
St. Louis	2460500000	1.189453244	-	-	-	-	560.37
St. Louis	2460600000	1.189453244	-	-	-	-	336.22
St. Louis	2460800000	1.189453244	-	-	-	-	1,049.97
St. Louis	2460900000	1.189453244	-	-	-	-	41.29
St. Louis	2461021000	1.447671771	-	-	-	-	460.77
St. Louis	2461022000	1.447671771	-	-	-	-	240.91
St. Louis	2461850000	1.385499954	-	-	-	-	26.42
St. Louis	2501011011	1.281122684	-	-	-	-	489.78
St. Louis	2501011012	1.281122684	-	-	-	-	956.28
St. Louis	2501011013	1.281122684	-	-	-	-	111.32
St. Louis	2501011014	1.281122684	-	-	-	-	36.56
St. Louis	2501011015	1.281122684	-	-	-	-	3.09
St. Louis	2501012011	1.281122684	-	-	-	-	15.64
St. Louis	2501012012	1.281122684	-	-	-	-	30.54
St. Louis	2501012013	1.281122684	-	-	-	-	151.86
St. Louis	2501012014	1.281122684	-	-	-	-	70.45
St. Louis	2501012015	1.281122684	-	-	-	-	5.95
St. Louis	2501050120	1.029492736	-	-	-	-	210.20
St. Louis	2501055120	1.281122684	-	-	-	-	210.70

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2501060052	1.029492736	-	-	-	-	3,677.26
St. Louis	2501060201	1.029492736	-	-	-	-	358.71
St. Louis	2501080050	1.572300792	-	-	-	-	86.85
St. Louis	2501080100	1.572300792	-	-	-	-	4.51
St. Louis	2505030120	1.029492736	-	-	-	-	23.46
St. Louis	2505040120	1.285714269	-	-	-	-	230.88
St. Louis	2610000100	1.189453244	-	-	-	-	-
St. Louis	2610000400	1.189453244	-	-	-	-	-
St. Louis	2610000500	1.189453244	-	-	-	-	-
St. Louis	2610030000	1.189453244	-	-	-	-	-
St. Louis	2630020000	1.418750048	3.74	-	-	-	26.70
St. Louis	2801000003	1.000000000	-	-	73.19	-	-
St. Louis	2801700001	1.000000000	0.08	-	-	-	-
St. Louis	2801700002	1.385499954	-	-	-	-	-
St. Louis	2801700003	1.385499954	-	-	-	-	-
St. Louis	2801700004	1.000000000	532.02	-	-	-	-
St. Louis	2801700005	1.000000000	12.04	-	-	-	-
St. Louis	2801700006	1.000000000	1.23	-	-	-	-
St. Louis	2801700007	1.385499954	-	-	-	-	-
St. Louis	2801700010	1.000000000	59.69	-	-	-	-
St. Louis	2801700011	1.385499954	-	-	-	-	-
St. Louis	2801700012	1.385499954	-	-	-	-	-
St. Louis	2801700013	1.000000000	2.84	-	-	-	-
St. Louis	2801700014	1.000000000	0.08	-	-	-	-
St. Louis	2801700015	1.000000000	0.16	-	-	-	-
St. Louis	2801700099	1.000000000	2.22	-	-	-	-
St. Louis	2805001100	1.000000000	3.06	-	-	-	-
St. Louis	2805001200	1.000000000	0.00	-	-	-	-
St. Louis	2805001300	1.000000000	2.32	-	-	-	-
St. Louis	2805002000	1.000000000	2.06	-	-	-	-
St. Louis	2805003100	1.385499954	-	-	-	-	-
St. Louis	2805007100	1.000000000	0.05	-	-	-	-
St. Louis	2805007300	1.000000000	0.00	-	-	-	-
St. Louis	2805008100	1.385499954	-	-	-	-	-
St. Louis	2805008200	1.385499954	-	-	-	-	-
St. Louis	2805008300	1.385499954	-	-	-	-	-
St. Louis	2805009100	1.385499954	-	-	-	-	-
St. Louis	2805009200	1.385499954	-	-	-	-	-
St. Louis	2805009300	1.385499954	-	-	-	-	-
St. Louis	2805010100	1.000000000	0.00	-	-	-	-
St. Louis	2805010200	1.000000000	0.00	-	-	-	-
St. Louis	2805010300	1.000000000	0.00	-	-	-	-
St. Louis	2805018000	1.385499954	-	-	-	-	-
St. Louis	2805019100	1.385499954	-	-	-	-	-
St. Louis	2805019200	1.385499954	-	-	-	-	-
St. Louis	2805019300	1.385499954	-	-	-	-	-
St. Louis	2805021100	1.385499954	-	-	-	-	-
St. Louis	2805021200	1.385499954	-	-	-	-	-
St. Louis	2805021300	1.385499954	-	-	-	-	-
St. Louis	2805022100	1.385499954	-	-	-	-	-
St. Louis	2805022200	1.385499954	-	-	-	-	-
St. Louis	2805022300	1.385499954	-	-	-	-	-
St. Louis	2805023100	1.385499954	-	-	-	-	-
St. Louis	2805023200	1.385499954	-	-	-	-	-
St. Louis	2805023300	1.385499954	-	-	-	-	-
St. Louis	2805025000	1.385499954	-	-	-	-	-

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2805030000	1.385499954	-	-	-	-	-
St. Louis	2805030007	1.385499954	-	-	-	-	-
St. Louis	2805030008	1.000000000	0.03	-	-	-	-
St. Louis	2805035000	1.000000000	10.35	-	-	-	-
St. Louis	2805039100	1.000000000	21.78	-	-	-	-
St. Louis	2805039200	1.000000000	40.00	-	-	-	-
St. Louis	2805039300	1.000000000	3.54	-	-	-	-
St. Louis	2805040000	1.385499954	-	-	-	-	-
St. Louis	2805045000	1.000000000	0.16	-	-	-	-
St. Louis	2805047100	1.000000000	4.90	-	-	-	-
St. Louis	2805047300	1.000000000	2.09	-	-	-	-
St. Louis	2805053100	1.000000000	0.10	-	-	-	-
St. Louis	2810060100	1.440233231	-	4.92	0.32	0.76	0.02
St. Louis County Total			**1.036.69**	**2,283.66**	**4.655.28**	**5,496.07**	**25,582.25**
St. Louis City	2102001000	1.009322405	-	-	-	-	-
St. Louis City	2102002000	1.009322405	1.31	485.67	-	3,187.76	2.21
St. Louis City	2102004000	1.188436747	0.15	4.56	-	9.72	0.05
St. Louis City	2102005000	0.998385787	0.05	3.33	-	21.40	0.02
St. Louis City	2102006000	1.270973802	0.08	3.34	-	0.02	0.18
St. Louis City	2102007000	1.237169385	-	-	-	-	-
St. Louis City	2102008000	1.400884032	16.30	58.28	-	6.62	4.50
St. Louis City	2102011000	1.098169804	-	-	-	-	-
St. Louis City	2103001000	0.997882962	-	-	-	-	-
St. Louis City	2103002000	0.997882962	0.01	4.54	-	28.99	0.02
St. Louis City	2103004000	1.299942493	0.00	0.08	-	0.16	0.00
St. Louis City	2103005000	1.006532907	0.00	0.05	-	0.29	0.00
St. Louis City	2103006000	1.071742177	0.05	11.87	-	0.07	0.65
St. Louis City	2103007000	1.013854623	0.00	0.49	-	0.00	0.03
St. Louis City	2103008000	1.000007153	0.32	0.81	-	0.09	0.06
St. Louis City	2103011000	1.045214295	-	0.03	-	0.06	-
St. Louis City	2104001000	0.895575404	-	-	-	-	-
St. Louis City	2104002000	0.895575404	0.61	2.49	1.05	28.78	2.74
St. Louis City	2104004000	0.771962166	0.19	2.64	0.31	6.25	0.10
St. Louis City	2104006000	1.021433949	91.88	441.12	2.02	2.82	25.81
St. Louis City	2104007000	1.023646474	0.03	8.40	0.03	0.04	0.33
St. Louis City	2104008100	0.988447428	5.36	7.65	69.45	1.18	55.62
St. Louis City	2104008210	0.988447428	4.91	7.99	87.28	1.14	151.17
St. Louis City	2104008220	0.988447428	0.83	2.08	17.92	0.37	10.97
St. Louis City	2104008230	0.988447428	0.28	0.61	6.21	0.12	4.56
St. Louis City	2104008310	0.988447428	4.44	7.23	78.97	1.03	136.77
St. Louis City	2104008320	0.988447428	0.75	1.89	16.21	0.33	9.92
St. Louis City	2104008330	0.988447428	0.25	0.55	5.61	0.11	4.12
St. Louis City	2104008400	0.988447428	0.27	3.35	2.70	0.28	0.04
St. Louis City	2104009000	0.988447428	-	3.25	12.01	-	16.72
St. Louis City	2104011000	1.193187237	0.08	1.73	0.21	4.10	0.07
St. Louis City	2294000000	1.000000000	-	-	321.54	-	-
St. Louis City	2296000000	1.000000000	-	-	-	-	-
St. Louis City	2302002100	1.167123318	-	-	10.30	-	2.49
St. Louis City	2302002200	1.167123318	-	-	72.94	-	8.58
St. Louis City	2302003000	1.167123318	-	-	-	-	2.61
St. Louis City	2302003100	1.167123318	-	-	21.31	-	1.23
St. Louis City	2302003200	1.167123318	-	-	1.45	-	0.05
St. Louis City	2311010000	1.000000000	-	-	2.90	-	-
St. Louis City	2311020000	1.000000000	-	-	477.56	-	-
St. Louis City	2311030000	1.000000000	-	-	13.44	-	-
St. Louis City	2325000000	1.409649134	-	-	231.52	-	-

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis City	2401001000	1.363849998	-	-	-	-	729.78
St. Louis City	2401005000	1.422920942	-	-	-	-	89.98
St. Louis City	2401008000	1.029492736	-	-	-	-	12.94
St. Louis City	2401015000	1.458659649	-	-	-	-	4.45
St. Louis City	2401020000	1.760393381	-	-	-	-	195.15
St. Louis City	2401025000	1.760393381	-	-	-	-	332.36
St. Louis City	2401030000	1.506688952	-	-	-	-	20.96
St. Louis City	2401040000	1.559493661	-	-	-	-	99.51
St. Louis City	2401050000	1.691363096	-	-	-	-	305.93
St. Louis City	2401055000	2.581917048	-	-	-	-	76.19
St. Louis City	2401060000	1.915094376	-	-	-	-	-
St. Louis City	2401065000	1.153413892	-	-	-	-	2.50
St. Louis City	2401070000	1.673876524	-	-	-	-	63.63
St. Louis City	2401075000	1.562869549	-	-	-	-	-
St. Louis City	2401080000	1.40625	-	-	-	-	1.99
St. Louis City	2401085000	1.79831934	-	-	-	-	-
St. Louis City	2401090000	1.700410366	-	-	-	-	74.46
St. Louis City	2401100000	1.439516187	-	-	-	-	280.56
St. Louis City	2401200000	1.543543577	-	-	-	-	1.91
St. Louis City	2415000000	1.760393381	-	-	-	-	473.70
St. Louis City	2420000000	1.332657218	-	-	-	-	294.37
St. Louis City	2425000000	1.427901983	-	-	-	-	2,420.94
St. Louis City	2460100000	1.189453244	-	-	-	-	400.42
St. Louis City	2460200000	1.189453244	-	-	-	-	379.35
St. Louis City	2460400000	1.189453244	-	-	-	-	286.62
St. Louis City	2460500000	1.189453244	-	-	-	-	200.21
St. Louis City	2460600000	1.189453244	-	-	-	-	120.13
St. Louis City	2460800000	1.189453244	-	-	-	-	375.13
St. Louis City	2460900000	1.189453244	-	-	-	-	14.75
St. Louis City	2461021000	1.447671771	-	-	-	-	166.87
St. Louis City	2461022000	1.447671771	-	-	-	-	87.24
St. Louis City	2461850000	1.385499954	-	-	-	-	-
St. Louis City	2501011011	1.281122684	-	-	-	-	75.86
St. Louis City	2501011012	1.281122684	-	-	-	-	148.11
St. Louis City	2501011013	1.281122684	-	-	-	-	17.24
St. Louis City	2501011014	1.281122684	-	-	-	-	5.66
St. Louis City	2501011015	1.281122684	-	-	-	-	0.48
St. Louis City	2501012011	1.281122684	-	-	-	-	2.42
St. Louis City	2501012012	1.281122684	-	-	-	-	4.73
St. Louis City	2501012013	1.281122684	-	-	-	-	23.52
St. Louis City	2501012014	1.281122684	-	-	-	-	10.91
St. Louis City	2501012015	1.281122684	-	-	-	-	0.92
St. Louis City	2501050120	1.029492736	-	-	-	-	225.53
St. Louis City	2501055120	1.281122684	-	-	-	-	218.16
St. Louis City	2501060052	1.029492736	-	-	-	-	939.94
St. Louis City	2501060201	1.029492736	-	-	-	-	91.69
St. Louis City	2501080050	1.572300792	-	-	-	-	1.14
St. Louis City	2501080100	1.572300792	-	-	-	-	0.06
St. Louis City	2505030120	1.029492736	-	-	-	-	6.00
St. Louis City	2505040120	1.285714269	-	-	-	-	239.34
St. Louis City	2610000100	1.189453244	-	-	-	-	-
St. Louis City	2610000400	1.189453244	-	-	-	-	-
St. Louis City	2610000500	1.189453244	-	-	-	-	-
St. Louis City	2610030000	1.189453244	-	-	-	-	-
St. Louis City	2630020000	1.418750048	1.34	-	-	-	9.54
St. Louis City	2801000003	1.000000000	-	-	-	-	-

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis City	2801700001	1.385499954	-	-	-	-	-
St. Louis City	2801700002	1.385499954	-	-	-	-	-
St. Louis City	2801700003	1.385499954	-	-	-	-	-
St. Louis City	2801700004	1.385499954	-	-	-	-	-
St. Louis City	2801700005	1.385499954	-	-	-	-	-
St. Louis City	2801700006	1.385499954	-	-	-	-	-
St. Louis City	2801700007	1.385499954	-	-	-	-	-
St. Louis City	2801700010	1.385499954	-	-	-	-	-
St. Louis City	2801700011	1.385499954	-	-	-	-	-
St. Louis City	2801700012	1.385499954	-	-	-	-	-
St. Louis City	2801700013	1.385499954	-	-	-	-	-
St. Louis City	2801700014	1.385499954	-	-	-	-	-
St. Louis City	2801700015	1.385499954	-	-	-	-	-
St. Louis City	2801700099	1.385499954	-	-	-	-	-
St. Louis City	2805001100	1.385499954	-	-	-	-	-
St. Louis City	2805001200	1.385499954	-	-	-	-	-
St. Louis City	2805001300	1.385499954	-	-	-	-	-
St. Louis City	2805002000	1.385499954	-	-	-	-	-
St. Louis City	2805003100	1.385499954	-	-	-	-	-
St. Louis City	2805007100	1.385499954	-	-	-	-	-
St. Louis City	2805007300	1.385499954	-	-	-	-	-
St. Louis City	2805008100	1.385499954	-	-	-	-	-
St. Louis City	2805008200	1.385499954	-	-	-	-	-
St. Louis City	2805008300	1.385499954	-	-	-	-	-
St. Louis City	2805009100	1.385499954	-	-	-	-	-
St. Louis City	2805009200	1.385499954	-	-	-	-	-
St. Louis City	2805009300	1.385499954	-	-	-	-	-
St. Louis City	2805010100	1.385499954	-	-	-	-	-
St. Louis City	2805010200	1.385499954	-	-	-	-	-
St. Louis City	2805010300	1.385499954	-	-	-	-	-
St. Louis City	2805018000	1.385499954	-	-	-	-	-
St. Louis City	2805019100	1.385499954	-	-	-	-	-
St. Louis City	2805019200	1.385499954	-	-	-	-	-
St. Louis City	2805019300	1.385499954	-	-	-	-	-
St. Louis City	2805021100	1.385499954	-	-	-	-	-
St. Louis City	2805021200	1.385499954	-	-	-	-	-
St. Louis City	2805021300	1.385499954	-	-	-	-	-
St. Louis City	2805022100	1.385499954	-	-	-	-	-
St. Louis City	2805022200	1.385499954	-	-	-	-	-
St. Louis City	2805022300	1.385499954	-	-	-	-	-
St. Louis City	2805023100	1.385499954	-	-	-	-	-
St. Louis City	2805023200	1.385499954	-	-	-	-	-
St. Louis City	2805023300	1.385499954	-	-	-	-	-
St. Louis City	2805025000	1.385499954	-	-	-	-	-
St. Louis City	2805030000	1.385499954	-	-	-	-	-
St. Louis City	2805030007	1.385499954	-	-	-	-	-
St. Louis City	2805030008	1.385499954	-	-	-	-	-
St. Louis City	2805035000	1.385499954	-	-	-	-	-
St. Louis City	2805039100	1.385499954	-	-	-	-	-
St. Louis City	2805039200	1.385499954	-	-	-	-	-
St. Louis City	2805039300	1.385499954	-	-	-	-	-
St. Louis City	2805040000	1.385499954	-	-	-	-	-
St. Louis City	2805045000	1.385499954	-	-	-	-	-
St. Louis City	2805047100	1.385499954	-	-	-	-	-
St. Louis City	2805047300	1.385499954	-	-	-	-	-
St. Louis City	2805053100	1.385499954	-	-	-	-	-

County Name	SCC	2025 Growth Factor	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis City	2810060100	1.440233231	-	1.76	0.12	0.27	0.01
St. Louis City Total			**129.50**	**1,065.77**	**1,453.01**	**3,302.01**	**9,974.90**
St. Louis Nonattainment Area Total			**3,514.98**	**4,531.02**	**14,314.86**	**11,606.89**	**48,942.41**

* Note: This table does not include VOC refueling emissions (Stage II) for on-road motor vehicles

Appendix D-4 2025 On-Road Mobile Source Emissions

The 2025 on-road mobile source emissions, which were used to compare to the 2008 base year emissions, were calculated using EPA's MOVES. MOVES 2010b was used to calculate the 2025 on-road mobile source emissions for all pollutants.

Both vehicle miles traveled (VMT) data and source type population data for 2025, were grown annually by 1.5% from the 2008 data. This 1.5% growth factor was discussed and agreed to by the Transportation Conformity Interagency Council. The emissions for 2008 were calculated using 2008 VMT data provided by the East West Gateway Council of Governments. The 2008 VMT data was originally generated from the Missouri Department of Transportation for state-owned roads, and then East-West Gateway used their Traffic Demand Model to calculate the actual local VMT data for each of the five counties on the Missouri side of the St. Louis Ozone nonattainment area.

The road type distribution input used in 2008 was developed from the National County Database (NCD) to distribute the county level VMT to road type. EPA's VMT converter workbook was then used to produce MOVES input tables. The same road type distribution data that was used for 2008 was also used for 2025. A vehicle registration distribution for 2008 was originally created for the National Mobile Inventory Model (NMIM) using registration data from Missouri's Department of Revenue. The vehicle distribution was converted to a MOVES age distribution table using EPA's VMT converter workbook. The same age distribution table was used for 2025. The registration data was also used to create the MOVES vehicle population input tables for 2008. Vehicle counts were converted from Mobile 6.2 vehicle classes to MOVES source types using the source type fractions from the Source Type Pop Fractions table in EPA's VMT converter workbook. As mentioned above these 2008 vehicle populations were grown annually by 1.5% to generate the vehicle populations used for the projected emissions in 2025. The meteorology data used for 2008 was developed by EPA from National Weather Service data. The 2008 meteorology data was also used for the projected emissions in 2025. Inspection and Maintenance (I/M) input tables were developed to characterize the Gateway Vehicle Inspection Program (the I/M program in place in the St. Louis Ozone nonattainment area). Additional details regarding the development of the I/M program input can be found in the I/M input table development protocol (Appendix B-5).

The stage II controls in MOVES were "turned off" when running the model to calculate the VOC emissions in 2025 by setting the stage II control efficiencies in the countyyear input table to zero (0) for all counties in the Missouri portion of the St. Louis nonattainment area. This was done, because the Air Program is currently developing a SIP revision to remove stage II control requirements in the St. Louis area due to the widespread use of on-board vapor recovery systems.

MOVES base data was used for all other inputs to calculate the 2008 and 2025 mobile source emissions, after reviewing the data to ensure accuracy. The base fuel supply tables in MOVES were used for the runs, as they already took into account the reformulated gasoline used in the St. Louis nonattainment area. A separate input database was created for each county, using county specific data where possible.

To summarize, when projecting the 2025 on-road mobile source emissions, the vehicle age distributions, road type distributions, and the meteorological data was identical to the 2008 data that was used for each county in the nonattainment area. To reduce the size of this document, these files are not repeated again in this Appendix. The files that were used for both 2008 and 2025 include the following tables in Appendix B-3 of the redesignation demonstration and maintenance plan: Table B-11 and Tables B-15 through B-29. The following input files were updated for the 2025 MOVES runs to reflect projections of data in 2025: VMT data, source type population, fuel supply, fuel formulation, and I/M data. The data for these input files are included below in Tables D-11 through D-15.

The MOVES model runs were set up selecting all available gasoline and diesel fuel vehicle type combinations, all months, days, hours, and all road types. A separate run was set-up for each pollutant. The emissions were post aggregated to the month level and the emissions from all months in 2025 were totaled to develop the annual on-road mobile source emissions. Table D-10 summarizes the 2025 annual on-road emissions by county as calculated using MOVES for the Missouri counties located in the St. Louis $PM_{2.5}$ nonattainment area.

Table D-10
2025 Annual On-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area
(Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	51.73	1,084.47	47.50	13.46	492.77
Jefferson County	60.38	1,406.72	64.74	16.29	841.91
St. Charles County	88.79	2,076.87	101.37	24.37	1,169.72
St. Louis County	389.76	8,489.89	425.15	106.27	4,037.03
St. Louis City	112.75	2,386.74	121.34	30.80	993.36
Totals	**691.88**	**16,568.44**	**533.34**	**189.22**	**8,035.80**

Table D-11 2025 Source Type Population (MOVES Inputs for 2025 On-Road Mobile Source Emissions)

			Source Type Population by County				
YearID	**SourceTypeName**	**SourceTypeID**	**Franklin**	**Jefferson**	**St Charles**	**St Louis County**	**St Louis City**
2025	Motorcycle	11	7,814	16,768	14,363	24,785	3,998
2025	Passenger Car	21	59,980	126,238	186,043	678,978	162,002
2025	Passenger Truck	31	59,107	106,273	142,179	390,651	76,516
2025	Light Commercial Truck	32	21,599	36,607	46,257	126,026	26,011
2025	Refuse Truck	41	10	53	46	121	89
2025	Single Unit Short-haul Truck	42	33	159	137	362	268
2025	Single Unit Long-haul Truck	43	389	697	707	3,490	852
2025	Motor Home	51	28	25	25	64	21
2025	School Bus	52	1,049	1,160	1,313	4,667	1,609
2025	Transit Bus	53	79	87	98	348	119
2025	Intercity Bus	54	56	91	106	488	185
2025	Combination Short-haul Truck	61	477	418	422	1,019	319
2025	Combination Long-haul Truck	62	395	331	332	702	206

Table D-12 2025 Annual VMT by HPMS Vehicle Type, County, and Year (MOVES Inputs for 2025 On-Road Mobile Source Emissions)

			HPMSBaseYearVMT by County				
HPMSVtypeID	**HPMSVtypeName**	**YearID**	**Franklin**	**Jefferson**	**St. Charles**	**St. Louis**	**St. Louis City**
10	Motorcycles	2025	14,965,924	17,828,328	26,752,934	118,484,952	34,345,144
20	Passenger Cars	2025	910,848,271	1,044,808,097	1,508,585,656	6,589,338,428	1,903,044,399
30	Other 2 axle-4 tire vehicles	2025	1,029,296,460	1,190,639,346	1,729,290,186	7,568,049,573	2,192,810,219
40	Buses	2025	6,159,081	7,185,593	10,540,023	46,276,615	13,485,395
50	Single Unit Trucks	2025	37,805,915	43,002,868	61,354,180	266,913,972	77,095,898
60	Combination Trucks	2025	109,060,971	124,079,785	177,139,868	770,813,976	223,517,955

Table D-13 Inspection and Maintenance Data for 2025 (MOVES Inputs for 2025 On-Road Mobile Source Emissions)

Pol Process ID	State ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspect Freq.	Test Standards ID	Beg Model Year ID	End Model Year ID	Use IM Y/N	Compliance Factor
101	29	2025	21	1	1	1	11	1971	1995	N	93.12
101	29	2025	21	1	10	2	51	1996	2023	Y	97.94
101	29	2025	31	1	1	1	11	1971	1995	N	93.12
101	29	2025	31	1	10	2	51	1996	2023	Y	92.06
101	29	2025	32	1	1	1	11	1971	1995	N	93.12
101	29	2025	32	1	10	2	51	1996	2023	Y	86.18
102	29	2025	21	1	1	1	11	1971	1995	N	93.12
102	29	2025	21	1	10	2	51	1996	2023	Y	97.94
102	29	2025	31	1	1	1	11	1971	1995	N	93.12
102	29	2025	31	1	10	2	51	1996	2023	Y	92.06
102	29	2025	32	1	1	1	11	1971	1995	N	93.12
102	29	2025	32	1	10	2	51	1996	2023	Y	86.18
112	29	2025	21	1	7	1	41	1971	1995	N	93.12
112	29	2025	21	1	8	2	43	1996	2023	Y	97.94
112	29	2025	31	1	7	1	41	1971	1995	N	93.12
112	29	2025	31	1	8	2	43	1996	2023	Y	92.06
112	29	2025	32	1	7	1	41	1971	1995	N	93.12
112	29	2025	32	1	8	2	43	1996	2023	Y	86.18
113	29	2025	21	1	7	1	41	1971	1995	N	93.12
113	29	2025	21	1	8	2	43	1996	2023	Y	97.94
113	29	2025	31	1	7	1	41	1971	1995	N	93.12
113	29	2025	31	1	8	2	43	1996	2023	Y	92.06
113	29	2025	32	1	7	1	41	1971	1995	N	93.12
113	29	2025	32	1	8	2	43	1996	2023	Y	86.18
201	29	2025	21	1	1	1	11	1971	1995	N	93.12
201	29	2025	21	1	10	2	51	1996	2023	Y	97.94
201	29	2025	31	1	1	1	11	1971	1995	N	93.12
201	29	2025	31	1	10	2	51	1996	2023	Y	92.06
201	29	2025	32	1	1	1	11	1971	1995	N	93.12
201	29	2025	32	1	10	2	51	1996	2023	Y	86.18

Pol Process ID	State ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspect Freq.	Test Standards ID	Beg Model Year ID	End Model Year ID	Use IM Y/N	Compliance Factor
202	29	2025	21	1	1	1	11	1971	1995	N	93.12
202	29	2025	21	1	10	2	51	1996	2023	Y	97.94
202	29	2025	31	1	1	1	11	1971	1995	N	93.12
202	29	2025	31	1	10	2	51	1996	2023	Y	92.06
202	29	2025	32	1	1	1	11	1971	1995	N	93.12
202	29	2025	32	1	10	2	51	1996	2023	Y	86.18
301	29	2025	21	1	10	2	51	1996	2023	Y	97.94
301	29	2025	31	1	10	2	51	1996	2023	Y	92.06
301	29	2025	32	1	10	2	51	1996	2023	Y	86.18
302	29	2025	21	1	10	2	51	1996	2023	Y	97.94
302	29	2025	31	1	10	2	51	1996	2023	Y	92.06
302	29	2025	32	1	10	2	51	1996	2023	Y	86.18

Table D-14 Fuel Formulation for 2025 (MOVES Inputs for 2025 On-Road Mobile Source Emissions)

Fuel FormulationID	Fuel SubtypeID	FuelSubtypeDesc	RVP	Sulfur Level	ETOH Volume	MTBE Volume	ETBE Volume	TAME Volume	Aromatic Content	Olefin Content
3820	12	Gasohol (E10)	11.1487	23.4846	10	0	0	0	20	10.7096
3821	12	Gasohol (E10)	8.77801	22.8285	10	0	0	0	20	9.32538
3822	12	Gasohol (E10)	7	22.3364	10	0	0	0	20	8.28724
3823	12	Gasohol (E10)	12.9267	23.9767	10	0	0	0	20	11.7477
20011	20	Conventional Diesel	0	11	0	0	0	0	0	0

Fuel FormulationID	Fuel SubtypeID	FuelSubtypeDesc	Benzene Content	e200	e300	biodiesel EsterVolume	cetaneIndex	PAHContent
3820	12	Gasohol (E10)	0.6	61.1946	84.2534	0	0	0
3821	12	Gasohol (E10)	0.6	56.2713	84.2534	0	0	0
3822	12	Gasohol (E10)	0.6	52.5789	84.2534	0	0	0
3823	12	Gasohol (E10)	0.6	64.887	84.2534	0	0	0
20011	20	Conventional Diesel	0	0	0	0	0	0

Table D-15 2025 Fuel Supply (MOVES Inputs for 2025 On-Road Mobile Source Emissions)

FuelYearID	Month GroupID	Fuel FormulationID	Market Share	Market ShareCV
2025	1	3823	1	0.5
2025	1	20011	1	0.5
2025	2	20011	1	0.5
2025	2	3820	1	0.5
2025	3	3820	1	0.5
2025	3	20011	1	0.5
2025	4	20011	1	0.5
2025	4	3821	1	0.5
2025	5	3821	1	0.5
2025	5	20011	1	0.5
2025	6	20011	1	0.5
2025	6	3822	1	0.5
2025	7	3822	1	0.5
2025	7	20011	1	0.5
2025	8	20011	1	0.5
2025	8	3822	1	0.5
2025	9	3822	1	0.5
2025	9	20011	1	0.5
2025	10	20011	1	0.5
2025	10	3821	1	0.5
2025	11	3820	1	0.5
2025	11	20011	1	0.5
2025	12	20011	1	0.5
2025	12	3820	1	0.5

Appendix D-5 2025 Off-Road Mobile Source Emissions

Off-road mobile source emissions were calculated for the Missouri counties in the St. Louis $PM_{2.5}$ nonattainment area using the NONROAD 2008a model. Fuel and meteorological data from the NCD was used to run the non-road model and create annual emissions for 2025. The modeling protocol, which was submitted by EPA Region 7 and is included in Appendix E-2 of the redesignation demonstration and maintenance plan, was followed except the Air Program used an oxygen weight percent of 3.5%, an ethanol market share of 100%, a gasoline sulfur percent of 0.0011%, and a diesel sulfur percent of 0.0011% instead of the values listed in the EPA protocol in Appendix E-2. The correct input data for the NONROAD 2008a model that was used in this latest modeling run is listed below in Table D-16.

Table D-16 NONROAD Model Temperature & Fuel Characteristic Input Values by County & Season for 2025

County	Season	Oxygen Weight %	RVP (psi)	Gasoline Sulfur %	Ethanol Volume %	Ethanol Market Share %	Diesel Sulfur	Marine Diesel Sulfur %	CNG/LPG Sulfur %	Temperatures		
										Min.	Max.	Avg.
Franklin	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	19.7	47	33.4
Franklin	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	33.5	76.9	55.2
Franklin	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	61.8	90	75.9
Franklin	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	34.3	80.9	57.6
Jefferson	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	18.6	45.6	32.1
Jefferson	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	32.4	75.8	54.1
Jefferson	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	61	88.6	74.8
Jefferson	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	33.6	79.8	56.7
St. Charles	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	18.7	43.9	31.3
St. Charles	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	32.3	75.8	54.1
St. Charles	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	62.2	89.2	75.7
St. Charles	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	34.8	80.3	57.6
St. Louis	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	19.8	44.2	32
St. Louis	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	34.5	76.1	55.3
St. Louis	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	64.1	89.5	76.8
St. Louis	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	35.5	80.2	57.9
St. Louis City	Winter	3.5	11.5	0.0043	10	100	0.0355	0.0402	0.003	20.7	45.5	32.6
St. Louis City	Spring	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	35.7	76.4	56
St. Louis City	Summer	3.5	7	0.0049	10	100	0.0355	0.0402	0.003	65.1	89.8	77.5
St. Louis City	Autumn	3.5	9	0.0046	10	100	0.0355	0.0402	0.003	36.6	80.4	58.5

The data generated by the NONROAD model for the 2025 off-road mobile source emissions for the Missouri counties in the St. Louis $PM_{2.5}$ nonattainment area are summarized in Table D-17. As stated in Appendices D-2 and D-3, EPA classifies emissions data for aircraft as point sources and they classify marine and rail sources on nonpoint sources in the NEI. Therefore, 2008 NEI data for aircraft and rail emissions were grown using EGAS 5.0 growth factors in order to estimate the emissions from these sources in 2025. For marine emissions, the 2011 NEI data was grown to 2025 using EGAS 5.0 growth factors. This is due to the fact that EPA changed the way that marine emissions are calculated in 2011, and although EPA created an NEI version 3 for 2008, which used the new method, some counties were not assigned any commercial marine emissions in 2008 even though some amount of emissions from this category were expected for

each Missouri county in the nonattainment area. The 2011 NEI data used the new method of calculating commercial marine emissions and included emissions values for each of the Missouri counties in the nonattainment area, which is why the 2011 NEI data for marine emissions were used to be grown to 2025. The 2025 emissions for aircraft, marine, and rail sources are summarized by county in Table D-18. The total off-road mobile source emissions for 2025 by county are listed in Table D-19.

Table D-17
2025 Annual Off-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area as Modeled by NONROAD 2008a (Excludes Aircraft, Marine, and Rail Emissions) (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	0.87	265.53	23.96	0.99	436.84
Jefferson County	1.14	309.29	33.85	1.06	503.90
St. Charles County	2.75	799.95	74.38	2.68	956.75
St. Louis County	9.00	2,301.61	328.02	9.17	4,271.29
St. Louis City	1.14	362.45	36.96	1.78	588.41
Totals	**14.91**	**4,038.83**	**497.17**	**15.67**	**6,757.20**

Table D-18
2025 Annual Aircraft, Marine, and Rail Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	0.48	837.64	26.50	8.91	44.92
Jefferson County	0.13	196.49	6.19	2.21	9.50
St. Charles County	0.59	418.29	14.71	5.78	29.36
St. Louis County	1.00	2,158.42	58.42	174.06	282.77
St. Louis City	0.51	1,246.14	37.69	13.27	54.54
Totals	**2.72**	**4,856.98**	**143.51**	**204.23**	**421.09**

Table D-19
Total 2025 Annual Off-Road Mobile Source Emissions by County in the St. Louis $PM_{2.5}$ Nonattainment Area (Missouri Counties Only)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1.35	1,103.17	50.46	9.89	481.76
Jefferson County	1.28	505.78	40.03	3.27	513.40
St. Charles County	3.34	1,218.25	89.09	8.46	986.11
St. Louis County	10.01	4,460.02	386.44	183.23	4,554.07
St. Louis City	1.65	1,608.59	74.66	15.05	642.95
Totals	**17.63**	**8,895.81**	**640.68**	**219.90**	**7,178.29**

Appendix E
2008 Base Year Emissions Inventory for the Missouri Portion of the 1997 St. Louis $PM_{2.5}$ Nonattainment Area

Missouri Department of Natural Resources
Division of Environmental Quality
Air Pollution Control Program
Jefferson City, Missouri

Public Hearing
December 30, 2013

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1.0 Introduction

1.1 Purpose

This document meets the nonattainment plan provisions under the Clean Air Act Section 172 (c)(3):

> *"Such plan provisions shall include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including such periodic revisions as the Administrator may determine necessary to assure that the requirements of this part are met."*

Missouri's redesignation request and maintenance plan for the 1997 $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) require a base year emissions inventory for 2008. The inventory is comprehensive in its inclusion of multiple source categories (point, nonpoint or area, and mobile sources), it is accurate based on the quality assurance steps outlined in Section 4, contains current 2008 actual emissions for the pollutants of concern for $PM_{2.5}$, and can be updated through the triennial National Emissions Inventory (NEI). Emissions are documented for both the statewide inventory and the St. Louis Nonattainment (STLNA) counties. Though the nonattainment area is bi-state, the inventory documentation that follows covers the five-county Missouri portion of the nonattainment area.

1.2 Inventory Coverage

1.2.1 Geography

The inventory covers the St. Louis Nonattainment counties of Jefferson, Franklin, St. Charles, and St. Louis Counties and the City of St. Louis. Several summaries of statewide Missouri totals are also included for reference. There are no inventory components provided by local or tribal agencies.

1.2.2 Emission Year

Emission year 2008 is the base year, including both annual emissions for the entire state and ozone season day emissions for the Missouri St. Louis Ozone Nonattainment Area.

1.2.3 Pollutants

The pollutants covered in the inventory include NH_3, SO_2, NO_x, $PM_{2.5}$ Primary (and its components $PM_{2.5}$ Filterable and PM Condensable), and VOC.

1.3 Contents of Report

This report documents the 2008 inventory in detail, from its creation, quality assurance, and final summaries. It also details the qualifications and limitations of the inventory. The document is arranged by purpose, emission summaries, documentation, quality assurance, and detailed appendices with lengthy emissions data tables and EPA provided category documentation.

1.4 Automated Systems Used

The 2008 emission inventory is maintained across multiple computing systems. Point source inventories are compiled from facility-supplied information in the Missouri Emissions Inventory System (MoEIS) database. Point sources are allowed to submit their inventory data via the MoEIS web interface or on hardcopy paper forms which are data entered to the electronic system. Nonpoint emissions are calculated using Microsoft® Excel spreadsheet and Access database tools. Mobile emissions are estimated using EPA's Motor Vehicle Emissions Simulator (MOVES), the MOBILE6 model, and the National Mobile Inventory Model (NMIM) which incorporates the NONROAD2008 model.

1.5 Inventory Exclusions

This inventory does not include hazardous air pollutant (HAP) inventories as they are not relevant pollutants for the Ozone and $PM_{2.5}$ nonattainment plans. The HAP inventory is documented in Missouri's 2008 National Emissions Inventory Documentation and is available on EPA's NEI page at http://www.epa.gov/ttn/chief/net/2008inventory.html. Point emissions data is summarized at the facility level in this document, though facility operational data and emission process data is collected and submitted to the NEI.

1.6 Guidance and Reference Documents

This document is completed with the following references:

- Emissions Inventory Guidance for Implementation of Ozone and Particulate matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations (August 2005, EPA-454/R-05-001, http://www.epa.gov/ttnchie1/eidocs/eiguid/index.html)
- Emission Inventory Improvement Plan (EIIP) (July 1997, http://www.epa.gov/ttn/chief/eiip/index.html)
- 2008 National Emissions Inventory Data version 1.5 and documentation (May 2011, http://www.epa.gov/ttn/chief/net/2008inventory.html)
- Air Emission Reporting Rule (Dec 2008, http://www.epa.gov/ttn/chief/aerr/)
- AP-42, Compilation of Air Pollutant Emission Factors (http://www.epa.gov/ttn/chief/ap42/index.html)

- MOVES Technical Guidance, Policy Memos, etc at (http://www.epa.gov/otaq/models/moves/index.htm)
- National Mobile Inventory Model (NMIM) (http://www.epa.gov/oms/nmim.htm)

1.7 List of Contacts

The emission inventory is compiled by Stacy Allen, Environmental Specialist IV and Emission Inventory/Data Management Unit Chief with the Missouri Department of Natural Resources. Specific contacts for other portions of the inventory are:

Point and Nonpoint Emissions: Stacy Allen, stacy.allen@dnr.mo.gov
Mobile (Onroad and Nonroad) Emissions: Nathan O'Neil, nathan.o'neil@dnr.mo.gov

2.0 Emissions Summary

2.1 Summary by County and Category

Table 1 STLNA Total Emissions by County and Category (tons per year)

	County Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
Point	Franklin	2.82	9,178.19	1,448.96	57,944.69	685.48
	Jefferson	8.97	7,016.40	945.65	68,569.22	600.04
	St. Charles	8.04	7,649.32	316.21	48,595.24	936.97
	St. Louis	720.41	5,843.53	510.91	20,861.90	1,689.72
	St. Louis City	568.40	1,415.83	271.66	5,729.67	1,155.67
	Point Totals	**1,308.64**	**31,103.26**	**3,493.39**	**201,700.73**	**5,067.89**
Nonpoint	Franklin	1,300.09	283.00	2,315.04	991.12	1,604.16
	Jefferson	165.26	383.49	3,428.01	904.61	3,116.32
	St. Charles	883.43	463.05	2,331.71	895.42	5,744.68
	St. Louis	1,036.69	2,219.83	4,584.76	5,445.70	20,110.91
	St. Louis City	129.50	1,033.57	1,374.12	3,273.63	7,639.28
	Nonpoint Totals	**3,514.98**	**4,382.94**	**14,033.64**	**11,510.48**	**38,215.34**
On-road	Franklin	77.75	4,187.90	142.46	30.12	1,555.66
	Jefferson	90.68	5,313.80	183.94	36.32	2,522.89
	St. Charles	133.29	7,788.01	284.16	54.30	3,613.71
	St. Louis	585.26	32,363.41	1,215.47	237.05	12,865.54
	St. Louis City	169.20	9,166.46	353.26	68.87	3,236.00
	On-road Totals	**1,056.17**	**58,819.58**	**2,179.28**	**426.65**	**23,793.80**
Non-road	Franklin	1.81	3,056.59	138.11	36.52	1,036.21
	Jefferson	1.08	1,199.29	85.82	19.29	914.76
	St. Charles	2.82	3,043.73	205.09	57.55	1,934.74
	St. Louis	7.75	9,344.46	618.20	329.93	6,513.17
	St. Louis City	2.22	4,078.51	152.60	101.01	1,146.65
	Non-road Totals	**15.68**	**20,722.57**	**1,199.82**	**544.30**	**11,545.53**
STLNA Total Anthropogenic Emissions		**5,895.47**	**115,028.35**	**20,906.13**	**214,182.16**	**78,622.56**
Biogenic	Franklin	-	265.2	-	-	15,127.2
	Jefferson	-	124.2	-	-	12,624.7
	St. Charles	-	257.4	-	-	7,715.3
	St. Louis	-	159.6	-	-	7,137.8
	St. Louis City	-	31.2	-	-	1,296.7
	Non-road Totals	**-**	**837.6**	**-**	**-**	**43,901.7**
STLNA Total Anthropogenic and Biogenic Emissions		**5,895.47**	**115,865.95**	**20,906.13**	**214,182.16**	**122,524.26**

3.0 Inventory Documentation

3.1 Point Source Emissions

3.1.1 Procedures and Methodologies

The point source inventory is based on information collected on Emissions Inventory Questionnaires (EIQs). Facilities with a construction or operating permit from the Air Pollution Control Program are required to submit an EIQ on an annual basis per 10 CSR 10-6.110. The EIQ details the amount of air pollution emitted and other operational data for the previous calendar year.

2008 point sources include those with Part 70 and Intermediate operating permits. The EIQ solicitation was mailed to facilities in January 2009. The due date for 2008 reporting was June 1, 2009, and all point source reports were received and included in this document summary.

3.1.2 Emission Inventory Questionnaire (EIQ)

All point source emissions data for the State of Missouri is contained in a database called the Missouri Emissions Inventory System (MoEIS). Emission reports may be submitted either directly via the MoEIS web interface, a user-friendly, online portal linked directly to the MoEIS database, or they may be submitted on the hardcopy EIQ forms. Hardcopy EIQ submittals are then data entered into the MoEIS database by EI unit staff members. As a result, the MoEIS database is updated yearly with the most current emissions data for the State of Missouri.

Hardcopy EIQ forms are described in

Table 2. All hardcopy forms have an electronic counterpart in the MoEIS web interface system. In general, forms beginning with number one (1) provide general information about a facility, forms beginning with a two (2) provide the detailed annual emission calculations, including activity or throughput, emission factors, emissions, and operational characteristics. More information on EIQ forms and instructions and MoEIS is available at http://www.dnr.mo.gov/env/apcp/moeis/emissionsreporting.htm

Table 2 List of EIQ Forms

FORM NAME	FORM DESCRIPTION	FORM NUMBER
FORM 1.0 GENERAL PLANT INFORMATION	GENERAL PLANT INFORMATION, PLANT-WIDE EMISSIONS TOTALS, SIGNATURE SECTION CERTIFYING SUBMITTED INFORMATION IS ACCURATE AND COMPLETE	780-1431
FORM 1.1 PROCESS FLOW DIAGRAM	DIAGRAM IDENTIFYING AND LINKING ALL EMISSION UNITS, PROCESSES, AIR POLLUTION CONTROL DEVICES, AND EMISSION RELEASE POINTS FOR A FACILITY. SUBMIT ONLY IF THERE HAVE BEEN CHANGES.	780-1619
FORM 1.2 SUMMARY OF EMISSION UNITS AND RELATED PROCESSES	LIST OF ALL EMISSION UNITS AND ASSOCIATED PROCESSES AND THE STATUS OF EACH (ACTIVE, INSIGNIFICANT, DISMANTLED)	780-1620
FORM 2.0 EMISSION UNIT INFORMATION	MAIN EMISSIONS REPORTING FORM; SEPARATE FORM 2.0 REQUIRED FOR EACH PROCESS FOR WHICH EMISSIONS ARE BEING REPORTED (I.E., FORM 2.0 NOT REQUIRED FOR EMISSIONS BELOW REPORTING THRESHOLDS)	780-1621
FORM 2.0C CONTROL DEVICE INFORMATION	CONTROL DEVICE INFORMATION WHEN THERE IS A CONTROL DEVICE OPERATIVE AT AN EMISSION UNIT; SEPARATE FORM 2.0C REQUIRED FOR EACH CONTROL DEVICE	780-1434
FORM 2.0K CHARCOAL KILN INFORMATION	DETAILS THE OPERATIONS AND CHARACTERISTICS OF CHARCOAL KILNS	780-1530
FORM 2.0L LANDFILL INFORMATION	FORM FOR REPORTING EMISSIONS FROM LANDFILLS	780-1583
FORM 2.0P PORTABLE EQUIPMENT INFORMATION	DETAILS THE LOCATIONS AND OPERATIONS FOR PORTABLE EQUIPMENT OPERATIONS INCLUDING QUARRIES, ASPHALT PLANTS, AND CONCRETE BATCH PLANTS	780-1433
FORM 2.0S STACK/VENT INFORMATION	STACK INFORMATION FOR EMISSION UNITS WHERE EMISSIONS FROM A PROCESS ENTER THE AMBIENT AIR THROUGH ONE OR MORE STACKS/VENTS	780-1435
FORM 2.0Z OZONE SEASON INFORMATION FORM	CALCULATION OF OZONE SEASON DAY EMISSIONS OF VOC, NO_X, OR CO; REQUIRED FROM FACILITIES LOCATED IN ST. LOUIS, ST. CHARLES, FRANKLIN AND JEFFERSON COUNTIES AND ST. LOUIS CITY WITH 10 TONS OR MORE OF VOC, NO_X OR CO ANNUAL EMISSIONS.	780-1452
FORM 2.1 FUEL COMBUSTION WORKSHEET	INFORMATION RELATED TO COMBUSTION EQUIPMENT, FUEL USAGE, AND THE CALCULATIONS ASSOCIATED WITH COMBUSTION PROCESSES	780-1436

FORM NAME	FORM DESCRIPTION	FORM NUMBER
FORM 2.2 INCINERATOR WORKSHEET	INFORMATION RELATED TO THE INCINERATOR, WASTE MATERIAL(S) INCINERATED, AND THE ANNUAL WASTE MATERIAL THROUGHPUT	780-1438
FORM 2.3 VOC PROCESS MASS-BALANCE WORKSHEET	CALCULATES A VOC MASS BALANCE EMISSION FACTOR	780-1440
FORM 2.4 VOLATILE ORGANIC LIQUID LOADING WORKSHEET	CALCULATES AN EMISSION FACTOR FOR PETROLEUM LIQUID LOADING INTO TANK TRUCKS, RAIL CARS, AND BARGES BASED ON AP-42	780-1625
FORM 2.5L GENERAL LIQUID STORAGE TANK INFORMATION	INFORMATION ABOUT STORAGE TANKS	780-1444
FORM 2.7 HAUL ROAD FUGITIVE EMISSIONS WORKSHEET	CALCULATES AN EMISSION FACTOR FOR UNPAVED HAUL ROADS BASED ON AP-42 FORMULA	780-1445
FORM 2.8 STORAGE PILE WORKSHEET	CALCULATES EMISSION FACTORS FOR ACTIVITY AND WIND EROSION FROM STORAGE PILES BASED ON AP-42 FORMULAS	780-1446
FORM 2.9 STACK TEST/CONTINUOUS EMISSION MONITORING WORKSHEET	DOCUMENTATION FOR EMISSION FACTORS DERIVED FROM STACK TESTS OR CEM DEVICES	780-1447
FORM 2.T HAZARDOUS AIR POLLUTANT WORKSHEET	INFORMATION ON HAP CHEMICALS EMITTED AT THE PROCESS LEVEL; SEPARATES INDIVIDUAL HAPS FROM THOSE INCLUDED IN VOC/PM EMISSIONS	780-1448
FORM 3.0 EMISSION FEE CALCULATION	SUMMARY TABLE SHOWING EMISSIONS FROM ALL PROCESSES	780-1509
FORM 3.0CK EMISSION FEE CALCULATION FOR CHARCOAL KILNS	SUMMARY TABLE SHOWING EMISSIONS FROM CHARCOAL KILN OPERATIONS	780-1508
DRY CLEANER – NON-CHLORINATED AND PETROLEUM BASED SOLVENTS	EMISSIONS CALCULATIONS FOR DRY CLEANERS USING NON-CHLORINATED SOLVENT AND WITH COMBINED DRYER CAPACITY OF 84 POUNDS OR MORE	780-1954

FORM NAME	FORM DESCRIPTION	FORM NUMBER
FORM 4.0 FINANCIAL COST ESTIMATE	ESTIMATE THE COST OF COMPLYING WITH AIR POLLUTION REGULATION	780-1622

Point source EIQ data received via hard copy forms is data entered to the MoEIS emissions database by emission inventory staff. During this step, process-level emissions and operational information are checked for consistency between the hardcopy forms and database calculations, and inconsistencies are flagged for review. Problems include, but are not limited to:

- Incorrect Source Classification Codes (SCCs)
- Emission unit numbering changes
- Calculation errors
- Missing or incomplete records
- Transposition errors

If no errors are found during data entry, and the emissions reported on the hardcopy full EIQ match what is calculated by the MoEIS database, then the emission report is considered complete and data entered.

EIQs with inconsistencies are moved from emission inventory data entry staff to a member of the technical review team. The technical review team will address the problems encountered during data entry by identifying the specific issue(s) and possible causes and contacting the facility to resolve those issues. Other issues may also be addressed during the review, including the appropriate use of emission estimation methods, documentation of source data, and consistency with permit emission calculations. Supplemental EIQ information may be collected by staff via telephone or email contact with the facility in question. Information collected in this manner will be recorded on the EIQ for reference, tracking and QA auditing. If the facility is requested to submit follow up verification or additional information in writing, a statement pertaining to this request will also be recorded on the EIQ. The information recorded will include the date of the call or contact, staff person's name, contact person's name, and written documentation of the call.

After the submission deadline of June 1 has passed, a list of unsubmitted EIQs is generated and sent to the compliance and enforcement section of the Air Pollution Control Program. With all emissions data contained in the MoEIS database, further quality assurance steps are completed as described in Section 4.

3.1.3 List of Facilities and Emissions

There are 139 facilities in the point source inventory for the Missouri counties of the St. Louis nonattainment area. Their primary economic activity described by their North American Industry Classification System (NAICS) code is listed in Table 3 by county. The emissions of each facility in tons per year are listed in Table 4.

Table 3 STLNA Point Sources by NAICS

Primary Economic Activity Description	Franklin	Jefferson	St. Charles	St. Louis	St. Louis City
Adhesive Manufacturing				1	1
Administration of Air and Water Resource and Solid Waste Management Programs					1
Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing			1		
Aircraft Manufacturing				1	
All Other Basic Organic Chemical Manufacturing					1
All Other Miscellaneous Textile Product Mills					1
All Other Rubber Product Manufacturing					1
Asphalt Paving Mixture and Block Manufacturing			1	6	1
Automobile Manufacturing			1	2	
Biological Product (except Diagnostic) Manufacturing					1
Breweries					1
Carburetor, Piston, Piston Ring, and Valve Manufacturing				1	
Cement Manufacturing		1			
Coated and Laminated Packaging Paper Manufacturing				1	
Coffee and Tea Manufacturing					1
Colleges, Universities, and Professional Schools				1	1
Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance				1	
Commercial and Institutional Building Construction					1
Commercial Bakeries					1
Commercial Flexographic Printing				1	
Commercial Lithographic Printing				2	2
Crushed and Broken Limestone Mining and Quarrying		2	1	3	
Dry Pasta Manufacturing					1
Electronic Coil, Transformer, and Other Inductor Manufacturing			1		
Electroplating, Plating, Polishing, Anodizing, and Coloring	1	1			
Fabric Coating Mills	1				
Fabricated Structural Metal Manufacturing	1				
Farm Supplies Merchant Wholesalers					1
Flour Milling					2
Folding Paperboard Box Manufacturing	1				
Fossil Fuel Electric Power Generation	1	1	1	1	1
General Medical and Surgical Hospitals			1	5	3
General Warehousing and Storage					1
Glass Container Manufacturing		1			
Glass Product Manufacturing Made of Purchased Glass				1	
Grain and Field Bean Merchant Wholesalers					1
Heating Equipment (except Warm Air Furnaces) Manufacturing					1
Industrial Sand Mining				1	
Industrial Valve Manufacturing	1				
Inorganic Dye and Pigment Manufacturing				1	1
Institutional Furniture Manufacturing				1	
Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	1				

Primary Economic Activity Description	Franklin	Jefferson	St. Charles	St. Louis	St. Louis City
Laminated Aluminum Foil Manufacturing for Flexible Packaging Uses					1
Leather and Hide Tanning and Finishing					1
Machine Tool (Metal Cutting Types) Manufacturing				1	
Manifold Business Forms Printing					1
Metal Can Manufacturing		1			
Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers					2
Motor Vehicle Body Manufacturing	1				
Motor Vehicle Seating and Interior Trim Manufacturing	1				
National Security					1
Natural Gas Distribution					1
Natural Gas Liquid Extraction					2
Newspaper Publishers				1	1
Offices of Physicians (except Mental Health Specialists)					1
Other Aircraft Parts and Auxiliary Equipment Manufacturing				1	
Other Metal Container Manufacturing				1	
Other Metal Valve and Pipe Fitting Manufacturing	1				1
Paint and Coating Manufacturing					3
Pesticide and Other Agricultural Chemical Manufacturing				1	
Petrochemical Manufacturing				1	2
Petroleum Bulk Stations and Terminals				1	
Pharmaceutical Preparation Manufacturing				3	
Plastics Material and Resin Manufacturing		1		1	
Polystyrene Foam Product Manufacturing			1	1	
Primary Smelting and Refining of Nonferrous Metal (except Copper and Aluminum)		1			
Railroad Rolling Stock Manufacturing		1			
Research and Development in the Physical, Engineering, and Life Sciences				1	
Rubber and Plastics Hoses and Belting Manufacturing				1	
Secondary Smelting and Alloying of Aluminum					1
Semiconductor and Related Device Manufacturing			1		
Sewage Treatment Facilities				3	
Ship Building and Repairing		1			
Sign Manufacturing	1				
Soap and Other Detergent Manufacturing					2
Solid Waste Landfill				4	
Spice and Extract Manufacturing	2				1
Steel Foundries (except Investment)		1			
Steel Investment Foundries			1		
Toy and Hobby Goods and Supplies Merchant Wholesalers					1
Truck Trailer Manufacturing				1	
Unlaminated Plastics Profile Shape Manufacturing	2		1		
Wired Telecommunications Carriers					1
Total Number of Facilities	15	12	11	52	49

Table 4 STLNA 2008 Point Source Listing by Facility (tons per year)

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
5150011	Jefferson Smurfit Corp-Pacific	-	-	-	-	29.68
5150511	Bull Moose Tube Company-Bull Moose Tube Company	-	0.55	0.06	0.00	18.70
5151111	Sullivan Precision Metal Finishing Inc-Sullivan Precision Metal Finishing Inc	-	-	-	-	18.58
5151211	Sporlan Valve Company-Plant #2 - West Main	-	-	-	-	43.42
5151411	Aerofil Technology Inc-Aerofil Technology Inc	-	1.95	2.77	0.01	50.17
5151511	Magnet Llc-Washington	-	-	-	-	9.73
5151611	Marble Decor Inc-Marble Decor Inc	-	-	-	-	0.45
5151811	Plaze Incorporated-Plaze Incorporated	-	1.67	-	0.01	44.87
5152011	GDX Automotive - Danny Scott Drive-New Haven	-	0.00	-	-	23.67
5152111	Sporlan Valve Company-Plant #3 - Lange Drive	-	-	-	-	16.46
6032111	Amerenue-Labadie Plant	2.82	9,170.39	1,446.08	57,944.63	299.61
6032311	Canam Steel Corp-Canam Steel Corp	-	2.54	-	0.03	57.77
6032611	Steelweld Equipment Co-St Clair	-	0.20	-	0.00	15.94
7369411	Meramec Industries Inc-Ramsey St Plant	-	0.31	-	0.00	37.84
8243211	Integram - St Louis Seating-Pacific	-	0.58	0.04	0.00	18.61
Franklin County Totals		**2.82**	**9,178.19**	**1,448.96**	**57,944.69**	**685.48**
5258211	Doe Run Company-Herculaneum Smelter	0.38	12.32	10.83	35,997.75	2.20
5258511	Union Pacific Railroad Co-Desoto Car Shop	-	1.77	2.52	0.01	17.56
5258611	Trautman Quarry-Pevely	-	-	-	-	-
5258811	Amerenue-Rush Island Plant	1.51	4,195.26	662.52	29,592.97	159.93
5259811	Aero Metal Finishing-Aero Metal Finishing	-	2.16	-	0.30	3.10
7270711	Bussen Quarries Inc-Antire Quarry	-	-	0.09	-	-
7271811	Dow Chemical Company The-Riverside Plant	0.04	1.32	0.10	0.01	1.42
7271911	Carondelet Corporation-Carondelet Corporation	0.07	6.48	0.16	0.25	67.10
7272311	Rc Cement Company Inc-River Cement Co - Selma Plant	5.70	2,608.15	197.39	2,758.03	195.65
7272511	Metal Container Corporation-Arnold	-	11.26	2.79	0.07	111.91
7272611	Engineered Coil Company-D B A Marlo Coil	-	0.12	-	0.00	9.47
8112911	Saint-Gobain Containers Llc-Pevely	1.27	177.56	69.26	219.84	31.69
Jefferson County Totals		**8.97**	**7,016.40**	**945.65**	**68,569.22**	**600.04**
6783411	Amerenue-Sioux Plant	0.86	7,336.12	308.71	48,147.62	168.11
6783511	Fred Weber Inc-O'Fallon Asphalt Plant	0.04	2.06	0.12	0.17	0.36
6783611	Fred Weber Inc-O'Fallon Stone Plant	-	-	0.01	-	-
6783911	McDonnell Douglas Corp-Boeing Company	0.08	2.56	0.05	0.02	14.85
6784211	St Joseph Health Center-St Joseph Health Center	0.03	4.67	0.35	0.14	0.28
6797711	Superior Home Products Inc-Superior Home Products Inc	-	-	-	-	10.79
7273311	Memc Electronic Materials Inc-St Peters Plant	5.11	23.58	4.47	0.14	15.08

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
7284511	General Motors-Wentzville Center	0.34	274.20	1.54	447.12	550.70
7387111	Woodbridge Corporation-St Peters	-	-	-	-	49.74
7387311	True Manufacturing Co-O'Fallon	-	4.29	0.36	0.03	37.09
8100411	O Fallon Casting Llc-O Fallon	1.59	1.85	0.60	0.01	89.98
St. Charles County Totals		**8.04**	**7,649.32**	**316.21**	**48,595.24**	**936.97**
10735111	KV Pharmaceutical - Bridgeton	-	-	0.00	-	18.49
5113811	Nesco Container Corp-Fenton	0.04	2.36	0.02	0.01	93.66
5113911	McDonnell Douglas Corp /Boeing Company-Lindbergh Plant	0.77	22.32	0.66	0.35	69.39
5114011	St Louis Lithographing Company-Heege Avenue	-	-	-	-	17.91
5114511	Bussen Quarries Inc-Bussen Road	-	-	0.51	-	-
5114611	Ruprecht Quarry-Paule Rd	-	-	-	-	-
5114711	BFI Missouri Pass Landfill-Maryland Heights	-	9.17	0.65	2.92	5.25
5114811	Color Art Inc-Crestwood	0.04	1.20	0.02	0.01	24.04
5115911	Onyx Oak Ridge Landfill Inc-(West County)	-	2.39	1.14	0.84	4.14
5116011	Bridgeton Landfill Authority-Bridgeton	-	13.03	5.54	4.56	8.42
5116311	Pro-Tect Mfg Inc-Ferguson Ave	-	-	-	-	19.25
5116411	St Marys Health Center-Richmond Heights	0.05	8.23	0.15	0.15	0.49
5167511	St Joseph Hospital-Kirkwood	0.02	3.56	0.07	0.06	2.25
5181011	Pan-Glo St Louis-Trenton Avenue	-	-	-	-	4.82
5278111	Camie-Campbell Inc-Watson Industrial Park	-	-	-	-	5.13
5278311	Belt Service Corp-Earth City	0.02	0.56	0.01	0.00	42.47
5278411	Kv Pharmaceutical Company-Brentwood	-	-	0.11	-	58.93
5278611	Depaul Health Center-Bridgeton	0.04	7.20	0.55	0.04	0.40
5278811	Kv Pharmaceutical Company-Schuetz Rd	0.05	1.45	0.77	0.01	6.40
5278911	Veterans Admin Medical Center-Jefferson Barracks Drive	-	-	-	-	0.89
5279511	St Luke's Hospital-Woods Mill Road	0.04	6.34	0.13	0.58	0.34
5366411	Printpack Inc-Hazelwood Plant	0.13	4.11	0.08	0.02	233.46
5366611	Metropolitan St Louis Sewer District-Lemay Waste Water Treatment Plant	505.36	51.79	1.86	2.07	18.63
6816611	Amerenue-Meramec Plant	1.30	5,331.86	461.34	20,826.77	109.35
6822011	Whitmire Microgen Research Laboratory-Kirkwood	-	-	-	-	5.91
6822111	Metropolitan St Louis Sewer District-Mo River Wasterwater Treatment Plant	101.19	91.27	0.27	1.41	11.15
6822411	Metropolitan St Louis Sewer District-Coldwater Creek Sewage Treatment Plant	105.85	69.15	0.38	2.02	3.32
6822811	Simpson Construction Materials Llc-Valley Park	-	6.05	0.66	4.44	1.56
6824011	Fred Weber Inc-South Asphalt	-	3.98	0.01	0.28	0.52
6824111	Fred Weber Inc-North Asphalt H & B	-	9.19	0.62	0.88	1.64
6824211	Fred Weber Inc-North Asphalt B & G	-	2.34	-	0.43	0.77
6828611	Fred Weber Inc-North Stone	-	-	4.96	-	-

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
6828711	Fred Weber Inc-South Stone	-	-	0.02	-	-
6828811	Monsanto World Headquarters-Lindbergh Blvd	0.39	12.29	0.23	0.07	0.68
6828911	U S Silica Company-Pacific	0.13	4.18	2.96	0.03	0.23
6829311	Pharmacia-Chesterfield Village	0.44	15.36	0.27	0.36	20.66
6829611	Washington University-Millbrook Blvd	0.70	22.45	0.45	0.25	1.24
6829711	St Louis Post-Dispatch-Dunlap Ind Dr	0.00	0.19	0.00	0.00	19.15
6829911	Sunnen Products Company-Maplewood	0.04	1.21	0.02	0.01	5.77
7285311	Multiplex Display Fixture-Fenton	-	0.59	0.04	0.00	1.11
7286211	Reichhold Chemicals Inc-Valley Park	0.17	5.24	0.18	0.03	33.03
7387411	St Louis Airport Authority-Lambert International Blvd	0.32	14.92	0.28	3.09	11.67
7387811	Fred Weber Inc Sanitary Landfill-St Louis County	-	6.94	3.30	2.43	8.12
7388011	Chrysler Assembly Plant 1-Fenton	0.83	25.86	3.38	0.16	203.84
7400611	Flex-O-Lite Inc-Fenton	-	-	-	-	24.34
7578011	Gkn Aerospace Services Inc-Berkeley	0.44	7.23	13.36	0.17	51.28
7579111	F & S Real Eastate Inc-St Louis	-	-	-	-	61.13
7688111	Simpson Construction Materials Llc-West Lake Quarry & Material Co	-	4.71	0.08	3.46	0.32
7703011	Energy Petroleum Company-Kienlen	-	-	-	-	7.19
8029111	Chrysler Corp-North Plant	1.69	61.69	5.53	0.47	468.58
8100511	Dana Corporation-Perfect Circle Division	0.01	1.04	0.02	0.01	1.73
8100611	Rockwood Pigments Na Inc-E Hoffmeister	0.37	12.09	0.24	3.53	0.71
St. Louis County Totals		**720.41**	**5,843.53**	**510.91**	**20,861.90**	**1,689.72**
10738111	Washington University – Hilltop Campus	0.01	1.26	0.10	0.01	0.07
5129911	U S Ringbinder Corp-Loose Leaf Metals	-	-	-	-	2.99
5131011	St Louis Post Dispatch-St Louis Post Dispatch	0.00	0.53	0.01	0.00	1.92
5131711	National Geospatial-Intelligence Agency-National Geospatial-Intelligence Agency	0.05	1.92	0.13	0.03	0.11
5132111	Southern Metal Processing-Southern Metal Processing	-	6.93	0.45	6.49	1.26
5132411	Allied Health Care Products-Allied Health Care Products	-	-	-	-	3.63
5132511	Energy Center (The)-St Louis Univ Health Sciences Center	-	11.64	0.39	0.92	0.70
5146111	Connector Castings-Connector Castings	0.01	0.12	0.58	0.01	0.91
5146411	J S Alberici Construction-J S Alberici Construction	-	-	-	-	24.79
5341711	Chemisphere Corporation-Chemisphere	-	-	-	-	3.20
5341811	PQ Corporation (The)-St Louis	0.53	113.75	66.57	0.18	5.19
5342111	Interstate Brands Corp-Interstate Brands Corp	0.05	2.12	0.11	0.01	43.55
5342911	Goodwin Printing Co -St Louis	-	-	-	-	8.86
5343111	Mid-West Industrial Chemical-Mid-West Industrial Chemical	-	-	-	-	6.24
5343211	Brenntag Mid-South Inc-Brenntag Mid-South Inc	-	0.00	-	-	0.22

EIS Facility ID	Facility Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
6009311	ADM Gromark River Systems-St Louis	-	0.00	0.90	-	-
6009611	Trigen-St Louis Energy Corp-Ashley Street Station	2.13	37.02	5.60	1.18	3.32
6009711	Washington Univ Medical School-Boiler Plant	0.18	38.06	2.86	1.58	2.00
6009811	Fred Weber Inc-Asphalt Plant	0.00	1.75	-	0.11	0.22
6009911	Metropolitan St Louis Sewer District-Bissel Plant	534.96	89.34	3.62	10.93	43.21
6010311	Dial Corp-Dial Corp	-	9.99	24.47	0.06	1.95
6110211	Astaris Llc-Carondelet Plant	0.55	8.36	1.31	0.33	1.31
6123811	Alumax Foils Inc-Alcoa Foil Products/Alumax Foils Inc	0.01	22.94	46.99	0.68	488.67
6124211	ADM/TPC Milling Co-Pillsbury Company	-	-	15.60	-	6.96
6124311	Marquette Tool & Die-Marquette Tool & Die	-	-	-	-	7.40
6124811	Italgrani Elevator-Italgrani Elevator	0.12	3.84	0.93	0.02	0.62
6125211	St Alexius Hospital-St Louis	-	1.33	-	0.01	0.03
6125311	Bjc Health System-Pavillion	-	6.56	-	0.40	0.32
6125511	Sensient Colors Inc-Baldwin Plant	0.09	2.90	0.23	0.09	0.20
6126211	Hermann Oak Leather Co-Hermann Oak Leather Co	-	-	-	-	6.70
6126311	Lange-Stegmann Co-Lange-Stegmann Co	-	0.00	-	-	0.00
7287111	Poly One Corporation-St Louis	-	-	-	-	3.34
7287211	St Louis Metallizing-St Louis	-	0.33	-	0.00	4.38
7301011	Elementis Specialties Inc-Elementis Specialties Inc	0.26	8.07	0.38	0.05	56.32
7304011	Precoat Metals-Precoat Metals	-	6.07	-	0.04	29.21
7765811	Anheuser-Busch Inc-St Louis	24.25	668.29	24.38	5,431.34	250.30
7766311	Sigma - Aldrich Co-Sigma Chemical Company	-	5.86	-	0.04	9.47
7766411	Procter & Gamble-Procter & Gamble	0.38	11.91	47.35	0.73	0.65
7766811	Ashland Distribution Company-St Louis Plant	-	-	-	-	8.44
7767411	P D George Co (The)-P D George Co (The)	0.30	4.66	1.43	0.03	38.27
7767511	U S Paint Div Of Grow Group-U S Paint Div Of Grow Group	-	-	-	-	33.00
7768911	Sigma - Aldrich Co-Sigma - Aldrich Co	-	2.91	-	0.02	4.05
7769011	Permacel St Louis Inc-Permacel St Louis Inc	0.03	1.73	0.08	0.01	0.75
7833711	Superior Solvent & Chemical-St Louis	-	-	-	-	2.94
7833811	Laclede Tower Associates Llc-Laclede Gas Building	0.00	207.44	0.87	0.05	2.71
7834011	New World Pasta- Marceau Facility-New World Pasta	0.17	5.46	0.98	0.03	0.30
7834611	Southwestern Bell Telephone Company-Southwestern Bell Telephone Company	0.11	14.06	0.50	0.72	0.60
7835511	St Louis University-Facilities Svcs	0.06	11.55	0.88	0.07	0.64
8398811	Mallinckrodt Inc -Mallinckrodt Inc	4.13	107.11	23.96	273.50	43.76
St. Louis City Totals		**568.40**	**1,415.83**	**271.66**	**5,729.67**	**1,155.67**
Grand Total		**1,308.64**	**31,103.26**	**3,493.39**	**201,700.73**	**5,067.89**

3.1.4 Point Source Emission Summary

Point source emissions for the five-county Missouri portion of the St. Louis Nonattainment Area are summarized in Table 5. Point source emissions for the entire state of Missouri are summarized by category in Table 6 and by county in Table 7. Appendix E-1 is a listing of statewide point source emissions by facility.

Table 5 STLNA Point Source Emissions by County (tons per year)

County	NH_3	NO_X	PM_{25}-PRI	SO_2	VOC
Franklin	2.82	9,178.19	1,448.96	57,944.69	685.48
Jefferson	8.97	7,016.40	945.65	68,569.22	600.04
St. Charles	8.04	7,649.32	316.21	48,595.24	936.97
St. Louis	720.41	5,843.53	510.91	20,861.90	1,689.72
St. Louis City	568.40	1,415.83	271.66	5,729.67	1,155.67
Total	**1,308.64**	**31,103.26**	**3,493.39**	**201,700.73**	**5,067.89**

Table 6 Statewide Point Source Emissions by Category (tons per year)

Description	Number of Facilities	NH3	NOX	PM25-PRI	SO2	VOC
Fossil Fuel Electric Power Generation	70	202	95,206	6,689	291,981	1,630
Primary Smelting and Refining of Nonferrous Metal (except Copper and Aluminum)	3	0	76	69	38,517	4
Cement Manufacturing	5	31	13,009	673	11,029	878
Petrochemical Manufacturing	6	21	1,078	48	5,861	292
Breweries	1	24	668	24	5,431	250
Primary Aluminum Production	1	1	36	257	4,688	239
Lime Manufacturing	2	0	5,159	62	4,433	43
Pesticide and Other Agricultural Chemical Manufacturing	5	1	601	144	2,438	100
Automobile Manufacturing	4	5	430	51	448	2,523
Glass Container Manufacturing	1	1	178	69	220	32
Sewage Treatment Facilities	3	712	212	3	6	33
Pipeline Transportation of Natural Gas	10	2	8,551	115	2	328
Motor Vehicle Body Manufacturing	11	0	30	6	1	579
Laminated Aluminum Foil Manufacturing for Flexible Packaging Uses	1	0	23	47	1	489
Soybean Processing	4	0	40	71	0	1,009
Nitrogenous Fertilizer Manufacturing	1	25	929	57		
All Other Categories	422	628	3,727	612	2,315	9,003
Missouri Total	**550**	**1,655**	**129,953**	**8,997**	**367,370**	**17,432**

Table 7 Statewide Point Emissions by County (tons per year)

State County FIPS Code	County Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
29001	Adair		0.19		0.00	0.01
29003	Andrew		0.54	0.12	0.10	0.18
29007	Audrain	1.95	96.24	44.82	19.94	398.65
29009	Barry	2.75	59.74	5.85	15.84	527.72
29011	Barton		8.67	4.00	2.34	4.39
29013	Bates		8.06	0.73	0.77	0.59
29017	Bollinger	2.36	2,497.11	27.15	0.33	67.43
29019	Boone	51.78	3,153.74	143.53	9,966.06	157.51
29021	Buchanan	0.81	3,251.50	39.69	3,704.35	746.92
29023	Butler	0.26	154.10	4.08	4.86	145.81
29025	Caldwell			0.15		-
29027	Callaway	0.31	53.40	19.27	42.87	63.95
29029	Camden	0.01	2.80		0.00	13.08
29031	CapeGirardeau	23.61	1,398.71	188.48	450.57	367.56
29033	Carroll	0.02	5.23	1.08	0.18	87.16
29037	Cass	22.80	162.26	20.95	5.25	6.59
29039	Cedar	0.21	6.55	33.42	0.06	0.54
29041	Chariton					5.13
29047	Clay	2.46	649.95	202.44	2,676.97	1,508.81
29049	Clinton		-	0.02	-	1.68

State County FIPS Code	County Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
29051	Cole	0.08	39.22	8.10	9.33	202.83
29053	Cooper	0.11	29.94	2.81	4.05	63.11
29055	Crawford					36.04
29061	Daviess		6.21	0.49	0.41	1.17
29063	DeKalb		9.26	-	-	1.30
29065	Dent	-	32.20	17.58	1.59	5.00
29069	Dunklin	23.58	55.87	2.32	1.82	5.95
29071	Franklin	2.82	9,178.19	1,448.96	57,944.69	685.48
29073	Gasconade	0.06	1.88	0.14	0.01	145.12
29075	Gentry		-		-	-
29077	Greene	3.01	4,904.76	140.69	8,682.05	364.20
29079	Grundy	0.13	5.39	0.40	0.44	51.82
29081	Harrison		47.03	-	-	3.47
29083	Henry	0.98	6,420.34	245.94	12,123.91	242.39
29087	Holt	0.97	16.84	23.65	117.57	154.17
29091	Howell	0.14	87.42	6.06	3.18	485.66
29093	Iron		63.64	59.98	2,518.78	3.87
29095	Jackson	18.62	13,339.46	1,124.98	28,174.46	930.77
29097	Jasper	77.72	5,127.28	529.85	10,827.85	571.27
29099	Jefferson	8.97	7,016.40	945.65	68,569.22	600.04
29101	Johnson	0.48	66.12	3.66	7.96	70.63
29105	Laclede	1.38	37.29	6.69	1.63	173.10
29107	Lafayette	0.24	8.23	1.60	0.08	88.97
29109	Lawrence	0.01	13.40	0.10	0.03	122.77
29111	Lewis					44.80
29113	Lincoln		39.91	5.40	0.29	80.39
29115	Linn	0.02	0.21	0.02	0.00	55.68
29117	Livingston	0.04	3.21	0.13	0.05	2.90
29119	McDonald	10.79	38.65	23.93	0.38	3.45
29121	Macon		55.20	4.26	1.38	61.11
29123	Madison	-	324.94	0.96	0.03	74.93
29125	Maries		112.17		15.75	54.77
29127	Marion	0.12	555.05	142.19	2,437.52	40.73
29131	Miller	0.00	0.08	0.13	0.00	25.23
29133	Mississippi		1.10	0.28	0.01	0.22
29137	Monroe		0.18		0.01	0.01
29139	Montgomery		170.16	25.04	578.44	0.00
29143	NewMadrid	6.85	11,835.86	606.03	19,674.94	556.53
29145	Newton	0.13	83.65	1.29	0.97	62.07
29147	Nodaway	0.07	1,037.33	26.28	1.32	220.23
29151	Osage	0.10	2,409.99	247.69	5,038.05	55.48
29155	Pemiscot	-	7.42	1.19	0.04	126.81
29157	Perry	0.01	10.00	0.73	25.80	430.82
29159	Pettis	9.85	2,067.85	41.82	153.30	298.26
29161	Phelps	2.46	44.26	0.50	460.68	50.86
29163	Pike	44.96	7,244.57	287.55	13,422.43	686.71
29165	Platte	2.12	6,982.63	297.31	15,077.12	233.79
29167	Polk		-	-	-	36.65
29169	Pulaski	9.01	40.45	0.76	29.79	21.70
29171	Putnam		1.50	0.02	0.26	0.20
29173	Ralls	-	2,413.44	32.25	135.46	34.36
29175	Randolph	1.63	12,126.80	439.61	15,102.36	203.60
29179	Reynolds		-	1.61	-	2.00
29183	St.Charles	8.04	7,649.32	316.21	48,595.24	936.97
29186	Ste.Genevieve	0.06	5,246.81	63.58	4,432.97	59.96
29187	St.Francois	17.59	403.95	27.36	25.71	46.73

State County FIPS Code	County Name	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
29189	St.Louis	720.41	5,843.53	510.91	20,861.90	1,689.72
29195	Saline	0.35	659.55	157.89	3,147.31	37.33
29201	Scott	-	2,921.37	120.58	6,530.38	90.68
29203	Shannon		15.96	0.58	0.81	0.55
29205	Shelby	-	2.69	0.00	0.02	23.59
29207	Stoddard		77.18	22.84	1.78	262.64
29209	Stone					
29213	Taney	2.79	25.69	6.88	7.34	10.21
29215	Texas		10.25		0.05	36.76
29217	Vernon		39.12	2.81	0.23	279.89
29219	Warren	0.77	10.24	0.86	0.06	171.17
29221	Washington	0.09	5.42	0.72	0.03	18.31
29225	Webster	0.06	0.80	0.07	0.00	7.04
29229	Wright	0.10	3.04	2.11	0.67	28.11
29510	St.Louiscity	568.40	1,415.83	271.66	5,729.67	1,155.67
Missouri Total		**1,655.45**	**129,952.55**	**8,997.41**	**367,370.10**	**17,432.49**

3.2 Nonpoint Source Emissions

3.2.1 Procedures and Methodologies

The nonpoint (also known as area) source categories with published methods of estimation are too numerous to calculate county-level inventories given current resources. The EPA, in conjunction with the Eastern Region Technical Advisory Committee (ERTAC), will complete inventory documentation and calculation for most nonpoint source categories using national defaults. Several categories are then improved with state-level information or with point-source subtraction.

Missouri prepared inventories for 18 categories that required point source subtraction or state-specific data. These categories are listed in the Missouri Category Summary section below. Documentation of the calculation methodology and data sources is included in Table 10. Categories that did not require point source subtraction that were calculated by EPA are listed in the EPA Category Summary section. Table 9 lists the total nonpoint VOC emissions by county for the Missouri portion of the St. Louis $PM_{2.5}$ nonattainment area, including refueling VOC emissions, which were calculated using EPA's Motor Vehicle Emissions Simulator (MOVES).

3.2.2 List of Source Categories and Emissions

Table 8 STLNA 2008 Nonpoint Emission Records (tons per year)

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2102001000	-	-	-	-	-
Franklin	2102002000	0.38	137.70	-	903.83	0.63
Franklin	2102004000	0.04	1.10	-	2.34	0.01
Franklin	2102005000	0.01	0.96	-	6.13	0.00
Franklin	2102006000	0.02	0.75	-	0.00	0.04
Franklin	2102007000	-	-	-	-	-
Franklin	2102008000	4.66	11.90	-	1.35	0.92
Franklin	2102011000	-	-	-	-	-
Franklin	2103001000	-	-	-	-	-
Franklin	2103002000	0.01	5.47	-	34.96	0.02
Franklin	2103004000	0.00	0.07	-	0.15	0.00
Franklin	2103005000	0.00	0.05	-	0.35	0.00
Franklin	2103006000	0.07	13.33	-	0.08	0.73
Franklin	2103007000	0.00	0.58	-	0.00	0.03
Franklin	2103008000	0.38	0.98	-	0.11	0.08
Franklin	2103011000	-	0.03	-	0.08	-
Franklin	2104001000	-	-	-	-	-
Franklin	2104002000	-	-	-	-	-
Franklin	2104004000	0.58	10.38	1.23	24.56	0.40
Franklin	2104006000	2.97	13.96	0.06	0.09	0.82
Franklin	2104007000	0.10	29.11	0.09	0.12	1.13
Franklin	2104008100	1.52	2.19	19.88	0.34	15.92
Franklin	2104008210	1.39	2.28	24.95	0.33	43.21
Franklin	2104008220	0.24	0.60	5.13	0.10	3.14
Franklin	2104008230	0.08	0.17	1.78	0.03	1.31
Franklin	2104008310	1.25	2.07	22.58	0.30	39.12
Franklin	2104008320	0.21	0.54	4.63	0.09	2.84
Franklin	2104008330	0.07	0.16	1.60	0.03	1.18
Franklin	2104008400	0.07	0.89	0.72	0.07	0.01
Franklin	2104008510	0.79	0.81	12.15	0.89	5.19
Franklin	2104008610	0.80	0.82	28.52	0.90	30.04
Franklin	2104009000	-	0.86	3.19	-	4.44
Franklin	2104011000	0.24	4.41	0.52	10.43	0.17
Franklin	2294000000	-	-	240.75	-	-
Franklin	2296000000	-	-	1,555.69	-	-
Franklin	2302002100	-	-	2.51	-	0.61
Franklin	2302002200	-	-	17.79	-	2.09
Franklin	2302003000	-	-	-	-	0.64
Franklin	2302003100	-	-	5.20	-	0.30
Franklin	2302003200	-	-	0.35	-	0.01
Franklin	2311010000	-	-	2.37	-	-
Franklin	2311020000	-	-	26.14	-	-
Franklin	2311030000	-	-	13.00	-	-
Franklin	2325000000	-	-	9.57	-	-
Franklin	2401001000	-	-	-	-	152.36
Franklin	2401005000	-	-	-	-	26.30
Franklin	2401008000	-	-	-	-	16.84
Franklin	2401015000	-	-	-	-	1.10
Franklin	2401020000	-	-	-	-	25.87

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2401025000	-	-	-	-	26.48
Franklin	2401030000	-	-	-	-	-
Franklin	2401040000	-	-	-	-	-
Franklin	2401050000	-	-	-	-	64.93
Franklin	2401055000	-	-	-	-	45.08
Franklin	2401060000	-	-	-	-	-
Franklin	2401065000	-	-	-	-	4.92
Franklin	2401070000	-	-	-	-	17.90
Franklin	2401075000	-	-	-	-	1.93
Franklin	2401080000	-	-	-	-	14.29
Franklin	2401085000	-	-	-	-	-
Franklin	2401090000	-	-	-	-	40.46
Franklin	2401100000	-	-	-	-	55.49
Franklin	2401200000	-	-	-	-	0.35
Franklin	2415000000	-	-	-	-	92.82
Franklin	2420000000	-	-	-	-	1.46
Franklin	2425000000	-	-	-	-	75.43
Franklin	2460100000	-	-	-	-	95.85
Franklin	2460200000	-	-	-	-	90.81
Franklin	2460400000	-	-	-	-	68.61
Franklin	2460500000	-	-	-	-	47.93
Franklin	2460600000	-	-	-	-	28.76
Franklin	2460800000	-	-	-	-	89.80
Franklin	2460900000	-	-	-	-	3.53
Franklin	2461021000	-	-	-	-	36.99
Franklin	2461022000	-	-	-	-	19.34
Franklin	2461850000	-	-	-	-	62.93
Franklin	2501011011	-	-	-	-	15.22
Franklin	2501011012	-	-	-	-	29.72
Franklin	2501011013	-	-	-	-	3.46
Franklin	2501011014	-	-	-	-	1.14
Franklin	2501011015	-	-	-	-	0.10
Franklin	2501012011	-	-	-	-	0.49
Franklin	2501012012	-	-	-	-	0.95
Franklin	2501012013	-	-	-	-	4.72
Franklin	2501012014	-	-	-	-	2.19
Franklin	2501012015	-	-	-	-	0.18
Franklin	2501050120	-	-	-	-	7.02
Franklin	2501055120	-	-	-	-	5.46
Franklin	2501060053	-	-	-	-	20.35
Franklin	2501060201	-	-	-	-	28.78
Franklin	2501080050	-	-	-	-	11.52
Franklin	2501080100	-	-	-	-	0.60
Franklin	2505030120	-	-	-	-	1.88
Franklin	2505040120	-	-	-	-	5.97
Franklin	2610000100	-	0.83	2.26	0.10	3.73
Franklin	2610000400	-	0.67	2.02	0.22	2.53
Franklin	2610000500	-	20.55	53.86	-	47.67
Franklin	2610030000	-	17.84	103.47	2.97	25.45
Franklin	2630020000	0.38	-	-	-	1.91
Franklin	2801000003	-	-	151.11	-	-

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2801500000	-	0.60	1.90	0.08	1.20
Franklin	2801700001	81.45	-	-	-	-
Franklin	2801700002	-	-	-	-	-
Franklin	2801700003	0.03	-	-	-	-
Franklin	2801700004	400.32	-	-	-	-
Franklin	2801700005	27.01	-	-	-	-
Franklin	2801700006	2.63	-	-	-	-
Franklin	2801700007	-	-	-	-	-
Franklin	2801700010	5.02	-	-	-	-
Franklin	2801700011	-	-	-	-	-
Franklin	2801700012	-	-	-	-	-
Franklin	2801700013	41.32	-	-	-	-
Franklin	2801700014	-	-	-	-	-
Franklin	2801700015	-	-	-	-	-
Franklin	2801700099	0.08	-	-	-	-
Franklin	2805001100	17.29	-	-	-	-
Franklin	2805001200	0.01	-	-	-	-
Franklin	2805001300	13.17	-	-	-	-
Franklin	2805002000	116.29	-	-	-	-
Franklin	2805003100	113.26	-	-	-	-
Franklin	2805007100	1.49	-	-	-	-
Franklin	2805007300	0.03	-	-	-	-
Franklin	2805008100	-	-	-	-	-
Franklin	2805008200	-	-	-	-	-
Franklin	2805008300	-	-	-	-	-
Franklin	2805009100	0.05	-	-	-	-
Franklin	2805009200	0.01	-	-	-	-
Franklin	2805009300	0.04	-	-	-	-
Franklin	2805010100	0.02	-	-	-	-
Franklin	2805010200	0.00	-	-	-	-
Franklin	2805010300	0.01	-	-	-	-
Franklin	2805018000	22.18	-	-	-	-
Franklin	2805019100	0.53	-	-	-	-
Franklin	2805019200	1.49	-	-	-	-
Franklin	2805019300	0.15	-	-	-	-
Franklin	2805021100	14.12	-	-	-	-
Franklin	2805021200	19.14	-	-	-	-
Franklin	2805021300	23.76	-	-	-	-
Franklin	2805022100	2.07	-	-	-	-
Franklin	2805022200	0.10	-	-	-	-
Franklin	2805022300	1.20	-	-	-	-
Franklin	2805023100	9.42	-	-	-	-
Franklin	2805023200	0.17	-	-	-	-
Franklin	2805023300	12.57	-	-	-	-
Franklin	2805025000	-	-	-	-	-
Franklin	2805030000	0.14	-	-	-	-
Franklin	2805030007	0.21	-	-	-	-
Franklin	2805030008	0.16	-	-	-	-
Franklin	2805035000	38.28	-	-	-	-
Franklin	2805039100	93.85	-	-	-	-
Franklin	2805039200	171.60	-	-	-	-

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Franklin	2805039300	14.78	-	-	-	-
Franklin	2805040000	4.20	-	-	-	-
Franklin	2805045000	3.75	-	-	-	-
Franklin	2805047100	20.99	-	-	-	-
Franklin	2805047300	8.95	-	-	-	-
Franklin	2805053100	0.45	-	-	-	-
Franklin	2810060100	-	0.35	0.02	0.05	0.00
Franklin County Total		**1,300.09**	**283.00**	**2,315.04**	**991.12**	**1,585.82**
Jefferson	2102001000	-	-	-	-	-
Jefferson	2102002000	0.36	131.59	-	863.70	0.60
Jefferson	2102004000	0.04	1.05	-	2.24	0.01
Jefferson	2102005000	0.01	0.91	-	5.86	0.00
Jefferson	2102006000	0.02	0.72	-	0.00	0.04
Jefferson	2102007000	-	-	-	-	-
Jefferson	2102008000	4.46	11.38	-	1.29	0.88
Jefferson	2102011000	-	-	-	-	-
Jefferson	2103001000	-	-	-	-	-
Jefferson	2103002000	0.00	1.09	-	6.97	0.00
Jefferson	2103004000	0.00	0.01	-	0.03	0.00
Jefferson	2103005000	0.00	0.01	-	0.07	0.00
Jefferson	2103006000	0.01	2.66	-	0.02	0.15
Jefferson	2103007000	0.00	0.12	-	0.00	0.01
Jefferson	2103008000	0.08	0.19	-	0.02	0.02
Jefferson	2103011000	-	0.01	-	0.02	-
Jefferson	2104001000	-	-	-	-	-
Jefferson	2104002000	-	-	-	-	-
Jefferson	2104004000	0.27	4.93	0.58	11.66	0.19
Jefferson	2104006000	16.58	77.94	0.36	0.50	4.56
Jefferson	2104007000	0.14	40.01	0.12	0.17	1.56
Jefferson	2104008100	3.21	4.64	42.15	0.71	33.76
Jefferson	2104008210	2.94	4.85	52.95	0.69	91.72
Jefferson	2104008220	0.50	1.27	10.89	0.22	6.67
Jefferson	2104008230	0.17	0.37	3.78	0.07	2.78
Jefferson	2104008310	2.66	4.38	47.91	0.63	82.99
Jefferson	2104008320	0.45	1.15	9.84	0.20	6.03
Jefferson	2104008330	0.15	0.33	3.40	0.07	2.50
Jefferson	2104008400	0.15	1.86	1.49	0.16	0.02
Jefferson	2104009000	-	1.80	6.67	-	9.29
Jefferson	2104011000	0.12	2.09	0.25	4.95	0.08
Jefferson	2294000000	-	-	229.48	-	-
Jefferson	2296000000	-	-	2,484.70	-	-
Jefferson	2302002100	-	-	5.42	-	1.31
Jefferson	2302002200	-	-	38.39	-	4.51
Jefferson	2302003000	-	-	-	-	1.37
Jefferson	2302003100	-	-	11.22	-	0.65
Jefferson	2302003200	-	-	0.76	-	0.03
Jefferson	2311010000	-	-	6.82	-	-
Jefferson	2311020000	-	-	56.75	-	-
Jefferson	2311030000	-	-	43.02	-	-
Jefferson	2325000000	-	-	19.13	-	-
Jefferson	2401001000	-	-	-	-	328.70

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2401005000	-	-	-	-	30.22
Jefferson	2401008000	-	-	-	-	16.71
Jefferson	2401015000	-	-	-	-	0.17
Jefferson	2401020000	-	-	-	-	10.31
Jefferson	2401025000	-	-	-	-	1.25
Jefferson	2401030000	-	-	-	-	18.22
Jefferson	2401040000	-	-	-	-	-
Jefferson	2401050000	-	-	-	-	17.57
Jefferson	2401055000	-	-	-	-	11.18
Jefferson	2401060000	-	-	-	-	0.93
Jefferson	2401065000	-	-	-	-	-
Jefferson	2401070000	-	-	-	-	1.45
Jefferson	2401075000	-	-	-	-	1.93
Jefferson	2401080000	-	-	-	-	0.82
Jefferson	2401085000	-	-	-	-	-
Jefferson	2401090000	-	-	-	-	12.24
Jefferson	2401100000	-	-	-	-	119.72
Jefferson	2401200000	-	-	-	-	0.76
Jefferson	2415000000	-	-	-	-	50.67
Jefferson	2420000000	-	-	-	-	10.51
Jefferson	2425000000	-	-	-	-	73.46
Jefferson	2460100000	-	-	-	-	206.80
Jefferson	2460200000	-	-	-	-	195.91
Jefferson	2460400000	-	-	-	-	148.02
Jefferson	2460500000	-	-	-	-	103.40
Jefferson	2460600000	-	-	-	-	62.04
Jefferson	2460800000	-	-	-	-	193.73
Jefferson	2460900000	-	-	-	-	7.62
Jefferson	2461021000	-	-	-	-	67.05
Jefferson	2461022000	-	-	-	-	35.06
Jefferson	2461850000	-	-	-	-	13.40
Jefferson	2501011011	-	-	-	-	33.20
Jefferson	2501011012	-	-	-	-	64.83
Jefferson	2501011013	-	-	-	-	7.55
Jefferson	2501011014	-	-	-	-	2.48
Jefferson	2501011015	-	-	-	-	0.21
Jefferson	2501012011	-	-	-	-	1.06
Jefferson	2501012012	-	-	-	-	2.07
Jefferson	2501012013	-	-	-	-	10.29
Jefferson	2501012014	-	-	-	-	4.78
Jefferson	2501012015	-	-	-	-	0.40
Jefferson	2501050120	-	-	-	-	79.68
Jefferson	2501055120	-	-	-	-	62.00
Jefferson	2501060052	-	-	-	-	520.75
Jefferson	2501060201	-	-	-	-	50.80
Jefferson	2501080050	-	-	-	-	1.57
Jefferson	2501080100	-	-	-	-	0.08
Jefferson	2505030120	-	-	-	-	3.32
Jefferson	2505040120	-	-	-	-	67.69
Jefferson	2610000100	-	1.06	2.91	0.13	4.80
Jefferson	2610000400	-	0.86	2.61	0.28	3.26

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2610000500	-	62.49	163.79	-	144.98
Jefferson	2610030000	-	22.97	133.22	3.83	32.77
Jefferson	2630020000	0.82	-	-	-	4.13
Jefferson	2801000003	-	-	49.33	-	-
Jefferson	2801700001	-	-	-	-	-
Jefferson	2801700002	-	-	-	-	-
Jefferson	2801700003	-	-	-	-	-
Jefferson	2801700004	15.47	-	-	-	-
Jefferson	2801700005	-	-	-	-	-
Jefferson	2801700006	0.01	-	-	-	-
Jefferson	2801700007	-	-	-	-	-
Jefferson	2801700010	6.04	-	-	-	-
Jefferson	2801700011	-	-	-	-	-
Jefferson	2801700012	-	-	-	-	-
Jefferson	2801700013	2.18	-	-	-	-
Jefferson	2801700014	-	-	-	-	-
Jefferson	2801700015	-	-	-	-	-
Jefferson	2801700099	0.05	-	-	-	-
Jefferson	2805001100	1.91	-	-	-	-
Jefferson	2805001200	0.00	-	-	-	-
Jefferson	2805001300	1.45	-	-	-	-
Jefferson	2805002000	16.10	-	-	-	-
Jefferson	2805003100	20.20	-	-	-	-
Jefferson	2805007100	0.94	-	-	-	-
Jefferson	2805007300	0.02	-	-	-	-
Jefferson	2805008100	-	-	-	-	-
Jefferson	2805008200	-	-	-	-	-
Jefferson	2805008300	-	-	-	-	-
Jefferson	2805009100	0.02	-	-	-	-
Jefferson	2805009200	0.00	-	-	-	-
Jefferson	2805009300	0.02	-	-	-	-
Jefferson	2805010100	0.02	-	-	-	-
Jefferson	2805010200	0.00	-	-	-	-
Jefferson	2805010300	0.01	-	-	-	-
Jefferson	2805018000	6.19	-	-	-	-
Jefferson	2805019100	0.16	-	-	-	-
Jefferson	2805019200	0.45	-	-	-	-
Jefferson	2805019300	0.04	-	-	-	-
Jefferson	2805021100	4.63	-	-	-	-
Jefferson	2805021200	6.27	-	-	-	-
Jefferson	2805021300	7.79	-	-	-	-
Jefferson	2805022100	0.67	-	-	-	-
Jefferson	2805022200	0.03	-	-	-	-
Jefferson	2805022300	0.39	-	-	-	-
Jefferson	2805023100	3.08	-	-	-	-
Jefferson	2805023200	0.06	-	-	-	-
Jefferson	2805023300	4.11	-	-	-	-
Jefferson	2805025000	-	-	-	-	-
Jefferson	2805030000	0.20	-	-	-	-
Jefferson	2805030007	0.20	-	-	-	-
Jefferson	2805030008	0.18	-	-	-	-

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
Jefferson	2805035000	22.70	-	-	-	-
Jefferson	2805039100	1.04	-	-	-	-
Jefferson	2805039200	2.02	-	-	-	-
Jefferson	2805039300	0.17	-	-	-	-
Jefferson	2805040000	1.91	-	-	-	-
Jefferson	2805045000	5.03	-	-	-	-
Jefferson	2805047100	0.23	-	-	-	-
Jefferson	2805047300	0.10	-	-	-	-
Jefferson	2805053100	0.00	-	-	-	-
Jefferson	2810060100	-	0.75	0.05	0.12	0.00
Jefferson County Total		**165.26**	**383.49**	**3,428.01**	**904.61**	**3,094.23**
St. Charles	2102001000	-	-	-	-	-
St. Charles	2102002000	0.33	121.74	-	799.05	0.55
St. Charles	2102004000	0.04	0.97	-	2.07	0.01
St. Charles	2102005000	0.01	0.84	-	5.42	0.00
St. Charles	2102006000	0.02	0.66	-	0.00	0.04
St. Charles	2102007000	-	-	-	-	-
St. Charles	2102008000	4.12	10.52	-	1.20	0.81
St. Charles	2102011000	-	-	-	-	-
St. Charles	2103001000	-	-	-	-	-
St. Charles	2103002000	0.01	4.56	-	29.14	0.02
St. Charles	2103004000	0.00	0.06	-	0.13	0.00
St. Charles	2103005000	0.00	0.05	-	0.29	0.00
St. Charles	2103006000	0.05	11.11	-	0.07	0.61
St. Charles	2103007000	0.00	0.48	-	0.00	0.03
St. Charles	2103008000	0.32	0.81	-	0.09	0.06
St. Charles	2103011000	-	0.03	-	0.06	-
St. Charles	2104001000	-	-	-	-	-
St. Charles	2104002000	0.82	3.71	1.57	42.85	4.08
St. Charles	2104004000	0.14	2.56	0.30	6.05	0.10
St. Charles	2104006000	52.03	244.54	1.12	1.56	14.31
St. Charles	2104007000	0.08	23.74	0.07	0.10	0.92
St. Charles	2104008100	5.06	7.30	66.29	1.12	53.09
St. Charles	2104008210	4.63	7.62	83.30	1.09	144.28
St. Charles	2104008220	0.79	1.99	17.11	0.35	10.48
St. Charles	2104008230	0.26	0.58	5.95	0.12	4.37
St. Charles	2104008310	4.19	6.90	75.38	0.99	130.56
St. Charles	2104008320	0.71	1.80	15.48	0.32	9.47
St. Charles	2104008330	0.24	0.53	5.36	0.11	3.94
St. Charles	2104008400	0.23	2.97	2.39	0.25	0.03
St. Charles	2104009000	-	2.88	10.64	-	14.82
St. Charles	2104011000	0.06	1.09	0.13	2.57	0.04
St. Charles	2294000000	-	-	260.13	-	-
St. Charles	2296000000	-	-	964.31	-	-
St. Charles	2302002100	-	-	8.70	-	2.11
St. Charles	2302002200	-	-	61.62	-	7.25
St. Charles	2302003000	-	-	-	-	2.20
St. Charles	2302003100	-	-	18.00	-	1.04
St. Charles	2302003200	-	-	1.22	-	0.04
St. Charles	2311010000	-	-	14.67	-	-
St. Charles	2311020000	-	-	92.66	-	-

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2311030000	-	-	77.73	-	-
St. Charles	2325000000	-	-	18.87	-	-
St. Charles	2401001000	-	-	-	-	527.61
St. Charles	2401005000	-	-	-	-	71.07
St. Charles	2401008000	-	-	-	-	18.78
St. Charles	2401015000	-	-	-	-	2.37
St. Charles	2401020000	-	-	-	-	11.24
St. Charles	2401025000	-	-	-	-	-
St. Charles	2401030000	-	-	-	-	-
St. Charles	2401040000	-	-	-	-	-
St. Charles	2401050000	-	-	-	-	88.88
St. Charles	2401055000	-	-	-	-	137.97
St. Charles	2401060000	-	-	-	-	0.93
St. Charles	2401065000	-	-	-	-	-
St. Charles	2401070000	-	-	-	-	97.01
St. Charles	2401075000	-	-	-	-	-
St. Charles	2401080000	-	-	-	-	0.82
St. Charles	2401085000	-	-	-	-	5.91
St. Charles	2401090000	-	-	-	-	60.66
St. Charles	2401100000	-	-	-	-	192.17
St. Charles	2401200000	-	-	-	-	1.22
St. Charles	2415000000	-	-	-	-	184.72
St. Charles	2420000000	-	-	-	-	112.55
St. Charles	2425000000	-	-	-	-	831.61
St. Charles	2460100000	-	-	-	-	331.94
St. Charles	2460200000	-	-	-	-	314.47
St. Charles	2460400000	-	-	-	-	237.60
St. Charles	2460500000	-	-	-	-	165.97
St. Charles	2460600000	-	-	-	-	99.58
St. Charles	2460800000	-	-	-	-	310.97
St. Charles	2460900000	-	-	-	-	12.23
St. Charles	2461021000	-	-	-	-	74.55
St. Charles	2461022000	-	-	-	-	38.98
St. Charles	2461850000	-	-	-	-	96.05
St. Charles	2501011011	-	-	-	-	66.71
St. Charles	2501011012	-	-	-	-	130.25
St. Charles	2501011013	-	-	-	-	15.16
St. Charles	2501011014	-	-	-	-	4.98
St. Charles	2501011015	-	-	-	-	0.42
St. Charles	2501012011	-	-	-	-	2.13
St. Charles	2501012012	-	-	-	-	4.16
St. Charles	2501012013	-	-	-	-	20.68
St. Charles	2501012014	-	-	-	-	9.60
St. Charles	2501012015	-	-	-	-	0.81
St. Charles	2501050120	-	-	-	-	40.94
St. Charles	2501055120	-	-	-	-	31.82
St. Charles	2501060052	-	-	-	-	795.18
St. Charles	2501060201	-	-	-	-	77.57
St. Charles	2501080050	-	-	-	-	26.80
St. Charles	2501080100	-	-	-	-	1.39
St. Charles	2505030120	-	-	-	-	5.07

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2505040120	-	-	-	-	34.79
St. Charles	2610000100	-	-	-	-	-
St. Charles	2610000400	-	-	-	-	-
St. Charles	2610000500	-	-	-	-	-
St. Charles	2610030000	-	-	-	-	-
St. Charles	2630020000	1.32	-	-	-	6.63
St. Charles	2801000003	-	-	522.93	-	-
St. Charles	2801500000	-	1.80	5.70	0.24	3.60
St. Charles	2801700001	51.93	-	-	-	-
St. Charles	2801700002	-	-	-	-	-
St. Charles	2801700003	375.03	-	-	-	-
St. Charles	2801700004	102.23	-	-	-	-
St. Charles	2801700005	0.01	-	-	-	-
St. Charles	2801700006	0.83	-	-	-	-
St. Charles	2801700007	0.17	-	-	-	-
St. Charles	2801700010	30.78	-	-	-	-
St. Charles	2801700011	-	-	-	-	-
St. Charles	2801700012	-	-	-	-	-
St. Charles	2801700013	14.66	-	-	-	-
St. Charles	2801700014	6.03	-	-	-	-
St. Charles	2801700015	2.90	-	-	-	-
St. Charles	2801700099	0.04	-	-	-	-
St. Charles	2805001100	8.40	-	-	-	-
St. Charles	2805001200	0.00	-	-	-	-
St. Charles	2805001300	6.38	-	-	-	-
St. Charles	2805002000	17.42	-	-	-	-
St. Charles	2805003100	25.21	-	-	-	-
St. Charles	2805007100	0.63	-	-	-	-
St. Charles	2805007300	0.01	-	-	-	-
St. Charles	2805008100	-	-	-	-	-
St. Charles	2805008200	-	-	-	-	-
St. Charles	2805008300	-	-	-	-	-
St. Charles	2805009100	-	-	-	-	-
St. Charles	2805009200	-	-	-	-	-
St. Charles	2805009300	-	-	-	-	-
St. Charles	2805010100	-	-	-	-	-
St. Charles	2805010200	-	-	-	-	-
St. Charles	2805010300	-	-	-	-	-
St. Charles	2805018000	3.79	-	-	-	-
St. Charles	2805019100	0.18	-	-	-	-
St. Charles	2805019200	0.52	-	-	-	-
St. Charles	2805019300	0.05	-	-	-	-
St. Charles	2805021100	4.42	-	-	-	-
St. Charles	2805021200	5.99	-	-	-	-
St. Charles	2805021300	7.44	-	-	-	-
St. Charles	2805022100	0.67	-	-	-	-
St. Charles	2805022200	0.03	-	-	-	-
St. Charles	2805022300	0.39	-	-	-	-
St. Charles	2805023100	2.96	-	-	-	-
St. Charles	2805023200	0.05	-	-	-	-
St. Charles	2805023300	3.95	-	-	-	-

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Charles	2805025000	-	-	-	-	-
St. Charles	2805030000	0.14	-	-	-	-
St. Charles	2805030007	0.02	-	-	-	-
St. Charles	2805030008	0.02	-	-	-	-
St. Charles	2805035000	10.40	-	-	-	-
St. Charles	2805039100	35.38	-	-	-	-
St. Charles	2805039200	70.75	-	-	-	-
St. Charles	2805039300	5.82	-	-	-	-
St. Charles	2805040000	0.68	-	-	-	-
St. Charles	2805045000	0.15	-	-	-	-
St. Charles	2805047100	7.95	-	-	-	-
St. Charles	2805047300	3.39	-	-	-	-
St. Charles	2805053100	0.17	-	-	-	-
St. Charles	2810060100	-	1.20	0.08	0.19	0.00
St. Charles County Total		**883.43**	**463.05**	**2,331.71**	**895.42**	**5,711.78**
St. Louis	2102001000	-	-	-	-	-
St. Louis	2102002000	2.20	805.36	-	5,286.06	3.66
St. Louis	2102004000	0.26	6.43	-	13.69	0.06
St. Louis	2102005000	0.08	5.59	-	35.88	0.03
St. Louis	2102006000	0.14	4.40	-	0.03	0.24
St. Louis	2102007000	-	-	-	-	-
St. Louis	2102008000	27.28	69.63	-	7.91	5.38
St. Louis	2102011000	-	-	-	-	-
St. Louis	2103001000	-	-	-	-	-
St. Louis	2103002000	0.01	5.21	-	33.31	0.02
St. Louis	2103004000	0.00	0.07	-	0.14	0.00
St. Louis	2103005000	0.00	0.05	-	0.33	0.00
St. Louis	2103006000	0.06	12.70	-	0.08	0.70
St. Louis	2103007000	0.00	0.55	-	0.00	0.03
St. Louis	2103008000	0.36	0.93	-	0.11	0.07
St. Louis	2103011000	-	0.03	-	0.07	-
St. Louis	2104001000	-	-	-	-	-
St. Louis	2104002000	0.61	2.78	1.17	32.14	3.06
St. Louis	2104004000	0.24	4.28	0.51	10.12	0.17
St. Louis	2104006000	250.92	1,179.32	5.39	7.53	69.00
St. Louis	2104007000	0.06	16.21	0.05	0.07	0.63
St. Louis	2104008100	15.64	22.60	205.12	3.48	164.27
St. Louis	2104008210	14.32	23.58	257.71	3.37	446.37
St. Louis	2104008220	2.43	6.16	52.94	1.08	32.41
St. Louis	2104008230	0.81	1.80	18.38	0.36	13.52
St. Louis	2104008310	12.95	21.34	233.18	3.05	403.88
St. Louis	2104008320	2.20	5.57	47.89	0.98	29.32
St. Louis	2104008330	0.73	1.63	16.61	0.33	12.21
St. Louis	2104008400	0.74	9.34	7.52	0.79	0.10
St. Louis	2104009000	-	9.06	33.49	-	46.66
St. Louis	2104011000	0.10	1.82	0.21	4.30	0.07
St. Louis	2294000000	-	-	1,041.13	-	-
St. Louis	2296000000	-	-	563.24	-	-
St. Louis	2302002100	-	-	24.69	-	5.98
St. Louis	2302002200	-	-	174.92	-	20.57
St. Louis	2302003000	-	-	-	-	6.25

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2302003100	-	-	51.10	-	2.95
St. Louis	2302003200	-	-	3.47	-	0.11
St. Louis	2311010000	-	-	7.11	-	-
St. Louis	2311020000	-	-	1,634.59	-	-
St. Louis	2311030000	-	-	37.90	-	-
St. Louis	2325000000	-	-	93.01	-	-
St. Louis	2401001000	-	-	-	-	1,497.67
St. Louis	2401005000	-	-	-	-	370.33
St. Louis	2401008000	-	-	-	-	52.22
St. Louis	2401015000	-	-	-	-	4.28
St. Louis	2401020000	-	-	-	-	98.92
St. Louis	2401025000	-	-	-	-	86.80
St. Louis	2401030000	-	-	-	-	21.69
St. Louis	2401040000	-	-	-	-	1.01
St. Louis	2401050000	-	-	-	-	74.50
St. Louis	2401055000	-	-	-	-	208.30
St. Louis	2401060000	-	-	-	-	-
St. Louis	2401065000	-	-	-	-	0.27
St. Louis	2401070000	-	-	-	-	414.80
St. Louis	2401075000	-	-	-	-	-
St. Louis	2401080000	-	-	-	-	8.49
St. Louis	2401085000	-	-	-	-	-
St. Louis	2401090000	-	-	-	-	189.04
St. Louis	2401100000	-	-	-	-	545.51
St. Louis	2401200000	-	-	-	-	3.47
St. Louis	2415000000	-	-	-	-	563.45
St. Louis	2420000000	-	-	-	-	404.19
St. Louis	2425000000	-	-	-	-	3,440.83
St. Louis	2460100000	-	-	-	-	942.24
St. Louis	2460200000	-	-	-	-	892.65
St. Louis	2460400000	-	-	-	-	674.45
St. Louis	2460500000	-	-	-	-	471.12
St. Louis	2460600000	-	-	-	-	282.67
St. Louis	2460800000	-	-	-	-	882.73
St. Louis	2460900000	-	-	-	-	34.71
St. Louis	2461021000	-	-	-	-	318.28
St. Louis	2461022000	-	-	-	-	166.41
St. Louis	2461850000	-	-	-	-	19.07
St. Louis	2501011011	-	-	-	-	382.31
St. Louis	2501011012	-	-	-	-	746.44
St. Louis	2501011013	-	-	-	-	86.89
St. Louis	2501011014	-	-	-	-	28.53
St. Louis	2501011015	-	-	-	-	2.41
St. Louis	2501012011	-	-	-	-	12.21
St. Louis	2501012012	-	-	-	-	23.84
St. Louis	2501012013	-	-	-	-	118.54
St. Louis	2501012014	-	-	-	-	54.99
St. Louis	2501012015	-	-	-	-	4.65
St. Louis	2501050120	-	-	-	-	204.18
St. Louis	2501055120	-	-	-	-	164.47
St. Louis	2501060052	-	-	-	-	3,571.91

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2501060201	-	-	-	-	348.44
St. Louis	2501080050	-	-	-	-	55.24
St. Louis	2501080100	-	-	-	-	2.87
St. Louis	2505030120	-	-	-	-	22.79
St. Louis	2505040120	-	-	-	-	179.58
St. Louis	2610000100	-	-	-	-	-
St. Louis	2610000400	-	-	-	-	-
St. Louis	2610000500	-	-	-	-	-
St. Louis	2610030000	-	-	-	-	-
St. Louis	2630020000	3.74	-	-	-	18.82
St. Louis	2801000003	-	-	73.19	-	-
St. Louis	2801700001	0.08	-	-	-	-
St. Louis	2801700002	-	-	-	-	-
St. Louis	2801700003	-	-	-	-	-
St. Louis	2801700004	532.02	-	-	-	-
St. Louis	2801700005	12.04	-	-	-	-
St. Louis	2801700006	1.23	-	-	-	-
St. Louis	2801700007	-	-	-	-	-
St. Louis	2801700010	59.69	-	-	-	-
St. Louis	2801700011	-	-	-	-	-
St. Louis	2801700012	-	-	-	-	-
St. Louis	2801700013	2.84	-	-	-	-
St. Louis	2801700014	0.08	-	-	-	-
St. Louis	2801700015	0.16	-	-	-	-
St. Louis	2801700099	2.22	-	-	-	-
St. Louis	2805001100	3.06	-	-	-	-
St. Louis	2805001200	0.00	-	-	-	-
St. Louis	2805001300	2.32	-	-	-	-
St. Louis	2805002000	2.06	-	-	-	-
St. Louis	2805003100	-	-	-	-	-
St. Louis	2805007100	0.05	-	-	-	-
St. Louis	2805007300	0.00	-	-	-	-
St. Louis	2805008100	-	-	-	-	-
St. Louis	2805008200	-	-	-	-	-
St. Louis	2805008300	-	-	-	-	-
St. Louis	2805009100	-	-	-	-	-
St. Louis	2805009200	-	-	-	-	-
St. Louis	2805009300	-	-	-	-	-
St. Louis	2805010100	0.00	-	-	-	-
St. Louis	2805010200	0.00	-	-	-	-
St. Louis	2805010300	0.00	-	-	-	-
St. Louis	2805018000	-	-	-	-	-
St. Louis	2805019100	-	-	-	-	-
St. Louis	2805019200	-	-	-	-	-
St. Louis	2805019300	-	-	-	-	-
St. Louis	2805021100	-	-	-	-	-
St. Louis	2805021200	-	-	-	-	-
St. Louis	2805021300	-	-	-	-	-
St. Louis	2805022100	-	-	-	-	-
St. Louis	2805022200	-	-	-	-	-
St. Louis	2805022300	-	-	-	-	-

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis	2805023100	-	-	-	-	-
St. Louis	2805023200	-	-	-	-	-
St. Louis	2805023300	-	-	-	-	-
St. Louis	2805025000	-	-	-	-	-
St. Louis	2805030000	-	-	-	-	-
St. Louis	2805030007	-	-	-	-	-
St. Louis	2805030008	0.03	-	-	-	-
St. Louis	2805035000	10.35	-	-	-	-
St. Louis	2805039100	21.78	-	-	-	-
St. Louis	2805039200	40.00	-	-	-	-
St. Louis	2805039300	3.54	-	-	-	-
St. Louis	2805040000	-	-	-	-	-
St. Louis	2805045000	0.16	-	-	-	-
St. Louis	2805047100	4.90	-	-	-	-
St. Louis	2805047300	2.09	-	-	-	-
St. Louis	2805053100	0.10	-	-	-	-
St. Louis	2810060100	-	3.42	0.23	0.53	0.01
St. Louis County Total		**1,036.69**	**2,219.83**	**4,584.76**	**5,445.70**	**19,966.90**
St. Louis City	2102001000	-	-	-	-	-
St. Louis City	2102002000	1.31	481.19	-	3,158.32	2.19
St. Louis City	2102004000	0.15	3.84	-	8.18	0.04
St. Louis City	2102005000	0.05	3.34	-	21.43	0.02
St. Louis City	2102006000	0.08	2.63	-	0.02	0.14
St. Louis City	2102007000	-	-	-	-	-
St. Louis City	2102008000	16.30	41.60	-	4.73	3.21
St. Louis City	2102011000	-	-	-	-	-
St. Louis City	2103001000	-	-	-	-	-
St. Louis City	2103002000	0.01	4.55	-	29.05	0.02
St. Louis City	2103004000	0.00	0.06	-	0.12	0.00
St. Louis City	2103005000	0.00	0.05	-	0.29	0.00
St. Louis City	2103006000	0.05	11.08	-	0.07	0.61
St. Louis City	2103007000	0.00	0.48	-	0.00	0.03
St. Louis City	2103008000	0.32	0.81	-	0.09	0.06
St. Louis City	2103011000	-	0.03	-	0.06	-
St. Louis City	2104001000	-	-	-	-	-
St. Louis City	2104002000	0.61	2.78	1.17	32.14	3.06
St. Louis City	2104004000	0.19	3.42	0.41	8.10	0.13
St. Louis City	2104006000	91.88	431.86	1.98	2.76	25.27
St. Louis City	2104007000	0.03	8.20	0.02	0.03	0.32
St. Louis City	2104008100	5.36	7.74	70.27	1.19	56.27
St. Louis City	2104008210	4.91	8.08	88.30	1.15	152.94
St. Louis City	2104008220	0.83	2.11	18.13	0.37	11.10
St. Louis City	2104008230	0.28	0.62	6.28	0.12	4.62
St. Louis City	2104008310	4.44	7.31	79.89	1.04	138.37
St. Louis City	2104008320	0.75	1.91	16.40	0.33	10.04
St. Louis City	2104008330	0.25	0.56	5.67	0.11	4.17
St. Louis City	2104008400	0.27	3.39	2.73	0.29	0.04
St. Louis City	2104009000	-	3.29	12.15	-	16.92
St. Louis City	2104011000	0.08	1.45	0.17	3.44	0.06
St. Louis City	2294000000	-	-	321.54	-	-
St. Louis City	2296000000	-	-	-	-	-

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis City	2302002100	-	-	8.82	-	2.14
St. Louis City	2302002200	-	-	62.50	-	7.35
St. Louis City	2302003000	-	-	-	-	2.23
St. Louis City	2302003100	-	-	18.26	-	1.05
St. Louis City	2302003200	-	-	1.24	-	0.04
St. Louis City	2311010000	-	-	2.90	-	-
St. Louis City	2311020000	-	-	477.56	-	-
St. Louis City	2311030000	-	-	13.44	-	-
St. Louis City	2325000000	-	-	164.24	-	-
St. Louis City	2401001000	-	-	-	-	535.09
St. Louis City	2401005000	-	-	-	-	63.23
St. Louis City	2401008000	-	-	-	-	12.57
St. Louis City	2401015000	-	-	-	-	3.05
St. Louis City	2401020000	-	-	-	-	110.85
St. Louis City	2401025000	-	-	-	-	188.80
St. Louis City	2401030000	-	-	-	-	13.91
St. Louis City	2401040000	-	-	-	-	63.81
St. Louis City	2401050000	-	-	-	-	180.88
St. Louis City	2401055000	-	-	-	-	29.51
St. Louis City	2401060000	-	-	-	-	-
St. Louis City	2401065000	-	-	-	-	2.17
St. Louis City	2401070000	-	-	-	-	38.01
St. Louis City	2401075000	-	-	-	-	-
St. Louis City	2401080000	-	-	-	-	1.42
St. Louis City	2401085000	-	-	-	-	-
St. Louis City	2401090000	-	-	-	-	43.79
St. Louis City	2401100000	-	-	-	-	194.90
St. Louis City	2401200000	-	-	-	-	1.24
St. Louis City	2415000000	-	-	-	-	269.09
St. Louis City	2420000000	-	-	-	-	220.89
St. Louis City	2425000000	-	-	-	-	1,695.45
St. Louis City	2460100000	-	-	-	-	336.64
St. Louis City	2460200000	-	-	-	-	318.93
St. Louis City	2460400000	-	-	-	-	240.97
St. Louis City	2460500000	-	-	-	-	168.32
St. Louis City	2460600000	-	-	-	-	100.99
St. Louis City	2460800000	-	-	-	-	315.38
St. Louis City	2460900000	-	-	-	-	12.40
St. Louis City	2461021000	-	-	-	-	115.27
St. Louis City	2461022000	-	-	-	-	60.27
St. Louis City	2461850000	-	-	-	-	-
St. Louis City	2501011011	-	-	-	-	59.21
St. Louis City	2501011012	-	-	-	-	115.61
St. Louis City	2501011013	-	-	-	-	13.46
St. Louis City	2501011014	-	-	-	-	4.42
St. Louis City	2501011015	-	-	-	-	0.37
St. Louis City	2501012011	-	-	-	-	1.89
St. Louis City	2501012012	-	-	-	-	3.69
St. Louis City	2501012013	-	-	-	-	18.36
St. Louis City	2501012014	-	-	-	-	8.52
St. Louis City	2501012015	-	-	-	-	0.72

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis City	2501050120	-	-	-	-	219.07
St. Louis City	2501055120	-	-	-	-	170.29
St. Louis City	2501060052	-	-	-	-	913.01
St. Louis City	2501060201	-	-	-	-	89.06
St. Louis City	2501080050	-	-	-	-	0.73
St. Louis City	2501080100	-	-	-	-	0.04
St. Louis City	2505030120	-	-	-	-	5.82
St. Louis City	2505040120	-	-	-	-	186.16
St. Louis City	2610000100	-	-	-	-	-
St. Louis City	2610000400	-	-	-	-	-
St. Louis City	2610000500	-	-	-	-	-
St. Louis City	2610030000	-	-	-	-	-
St. Louis City	2630020000	1.34	-	-	-	6.72
St. Louis City	2801000003	-	-	-	-	-
St. Louis City	2801700001	-	-	-	-	-
St. Louis City	2801700002	-	-	-	-	-
St. Louis City	2801700003	-	-	-	-	-
St. Louis City	2801700004	-	-	-	-	-
St. Louis City	2801700005	-	-	-	-	-
St. Louis City	2801700006	-	-	-	-	-
St. Louis City	2801700007	-	-	-	-	-
St. Louis City	2801700010	-	-	-	-	-
St. Louis City	2801700011	-	-	-	-	-
St. Louis City	2801700012	-	-	-	-	-
St. Louis City	2801700013	-	-	-	-	-
St. Louis City	2801700014	-	-	-	-	-
St. Louis City	2801700015	-	-	-	-	-
St. Louis City	2801700099	-	-	-	-	-
St. Louis City	2805001100	-	-	-	-	-
St. Louis City	2805001200	-	-	-	-	-
St. Louis City	2805001300	-	-	-	-	-
St. Louis City	2805002000	-	-	-	-	-
St. Louis City	2805003100	-	-	-	-	-
St. Louis City	2805007100	-	-	-	-	-
St. Louis City	2805007300	-	-	-	-	-
St. Louis City	2805008100	-	-	-	-	-
St. Louis City	2805008200	-	-	-	-	-
St. Louis City	2805008300	-	-	-	-	-
St. Louis City	2805009100	-	-	-	-	-
St. Louis City	2805009200	-	-	-	-	-
St. Louis City	2805009300	-	-	-	-	-
St. Louis City	2805010100	-	-	-	-	-
St. Louis City	2805010200	-	-	-	-	-
St. Louis City	2805010300	-	-	-	-	-
St. Louis City	2805018000	-	-	-	-	-
St. Louis City	2805019100	-	-	-	-	-
St. Louis City	2805019200	-	-	-	-	-
St. Louis City	2805019300	-	-	-	-	-
St. Louis City	2805021100	-	-	-	-	-
St. Louis City	2805021200	-	-	-	-	-
St. Louis City	2805021300	-	-	-	-	-

CountyName	SCC	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC *
St. Louis City	2805022100	-	-	-	-	-
St. Louis City	2805022200	-	-	-	-	-
St. Louis City	2805022300	-	-	-	-	-
St. Louis City	2805023100	-	-	-	-	-
St. Louis City	2805023200	-	-	-	-	-
St. Louis City	2805023300	-	-	-	-	-
St. Louis City	2805025000	-	-	-	-	-
St. Louis City	2805030000	-	-	-	-	-
St. Louis City	2805030007	-	-	-	-	-
St. Louis City	2805030008	-	-	-	-	-
St. Louis City	2805035000	-	-	-	-	-
St. Louis City	2805039100	-	-	-	-	-
St. Louis City	2805039200	-	-	-	-	-
St. Louis City	2805039300	-	-	-	-	-
St. Louis City	2805040000	-	-	-	-	-
St. Louis City	2805045000	-	-	-	-	-
St. Louis City	2805047100	-	-	-	-	-
St. Louis City	2805047300	-	-	-	-	-
St. Louis City	2805053100	-	-	-	-	-
St. Louis City	2810060100	-	1.22	0.08	0.19	0.00
St. Louis City Total		**129.50**	**1,033.57**	**1,374.12**	**3,273.63**	**7,597.40**
St. Louis Nonattainment Area Total		**3,514.98**	**4,382.94**	**14,033.64**	**11,510.48**	**37,956.13**

* Note: This table does not include VOC refueling emissions (Stage II) for on-road motor vehicles

Because, Stage II refueling VOC emissions were calculated by the Air Program using MOVES, they are not included in the Table 8. The Stage II refueling emissions were added to the totals from the other area source categories in Table 8 to get the complete area source emissions inventory summaries for the Missouri counties of the St. Louis nonattainment area, which are listed below in Table 9.

Table 9 STLNA Nonpoint Annual VOC Emissions (tons per year)

County	VOC*
Franklin	1,604.16
Jefferson	3,116.32
St. Charles	5,744.68
St. Louis	20,110.91
St. Louis City	7,639.28
STLNA Total	**38,215.34**

*Note: Includes VOC emissions from refueling (Stage II)

Table 10 Nonpoint Category Overview of Methodology

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
21030* and 21020*	Industrial and Commercial Institutional Fuel Combustion	16	CAP	Yes	EPA/CENRAP Template including energy intensity per sector NAICS		Huntley 2009 [6]	2006 EIA's SEDS [1]	2006
2401005000	Automobile Refinishing	1	VOC and 5 HAPS	No	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401015000	Wood and Flat Stock (Factory Finished Wood)	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401020000	Wood Furniture	1	VOC only	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2401025000	Metal Furniture	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401030000	Paper Film Foil	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401040000	Metal Cans	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401045000	Metal Coil Only	1	VOC and 6 HAPs	No	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2401050000	Metal Sheet Strip and Coil	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment, HAPs not included in template were created by MODNR		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401055000	Machinery and Equipment	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401060000	Appliances	1	VOC and 6 HAPs	No	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401065000	Electronic and other special coatings	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2401070000	Motor Vehicles	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment, HAPs not included in template were created by MODNR		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401075000	Aircraft	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment, HAPs not included in template were created by MODNR		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401085000	Railroads	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2401080000	Marine Coatings	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment, HAPs not included in template were created by MODNR		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401090000	Misc Manufacturing	1	VOC and 6 HAPs	Yes	EPA Template - emissions based on employment, HAPs not included in template were created by MODNR		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2415000000	Degreasing	1	VOC and 1 HAP	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2420000000	Dry Cleaning	1	VOC only	No	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2425000000	Graphic Arts	1	VOC and 5 HAPs	Yes	EPA Template - emissions based on employment		Solvent Documentation [4]	Employment from 2006 *County Business Patterns* [2]	2006
2401001000	Architectural Coatings	1	VOC and 5 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008
2401008000	Traffic Paints	1	VOC and 4 HAPs	No		Template - emissions based on 2006 highway miles	Solvent Documentation [4]	2006 FHWA HPMS[5]	2006
2401100000	Industrial Maintenance Coatings	1	VOC and 6 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008
2401200000	Other Special Purpose Coatings	1	VOC and 6 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2460100000	Personal Care Products	1	VOC and 2 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008
2460200000	Cleaning Products: household	1	VOC and 2 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008
2460400000	Automotive Aftermarket	1	VOC and 2 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008
2460500000	Coatings and Related Products	1	VOC and 2 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008
2460600000	Adhesives and Sealants	1	VOC and 2 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2460800000	FIFRA Regulated Products	1	VOC and 2 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008
2460900000	Misc Products	1	VOC and 2 HAPs	No		Template - population based emissions	Solvent Documentation [4]	Population from US Census [3]	2008
2501050120	Bulk Terminal	1	VOC and 8 HAPs	Yes	EPA Template - point source emissions subtracted by NAICS and county		No emission factor, scaled up 1998 VOC emission from MACT analysis[8]	Scaled 1998 emissions by 2008 DOE [7]	2008
2501055120	Bulk Plants	1	VOC and 8 HAPs	Yes	EPA Template - point source emissions subtracted by NAICS and county		From Gas distribution MACT standards[8]	9% of total gasoline consumption from 2008 EIA Petroleum Navigator[10]	2008
2505040120	Petroleum Pipeline	1	VOC and 8 HAPs	No	EPA Template		No emission factor, scaled up 1998 VOC emission from MACT analysis[8]	Scaled 1998 emissions by 2008 DOE[7]	2008

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2501060201	Gasoline Stage 1 Underground Storage Tanks	1	VOC and 8 HAPs	No	EPA Template		EIIP 2001 [9]	2008 NMIM county-level onroad and nonroad estimates	2008
2505030120	Gasoline Stage 1 Trucks in Transit	1	VOC and 8 HAPs	No	EPA Template		EIIP 2001 [9]	2008 NMIM county-level onroad and nonroad estimates	2008
250106005*	Gasoline Service Station Loading (submerg, splash, and balanced fill)	3	VOC and 8 HAPs	No	EPA Template		AP-42 Section 5.2[11]	2008 NMIM county-level onroad and nonroad estimates	2008
2501060100	Gasoline Distribution: Stage II	1	VOC and 8 HAPs	No	EPA Template		AP-42 Section 5.2[11]	2008 NMIM county-level onroad and nonroad estimates	2008
21040*	Residential Fuel Combustion (multiple fuel types)	16	CAPs	No		EPA Templates and Residential Wood Combustion Tool[25]	AP-42	EIA[1]	2006

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2280002*	Mobile Sources - Marine Vessels - port and underway emissions	2	CAP	No		2002 estimates adjusted for 2008 activity	EPA's Office of Transportation and Air Quality (OTAQ) CAP, SEPA HAP speciation[13]	Regional growth factor for vessel activity	2002 grown to 2008
2294000000 and 2296000000	Paved and Unpaved Roads	2	PM10 FIL/PRI, PM25 FIL/PRI	No		AP-42 Equation with state or regional constants	AP-42 Section 13.2.2	2007 FHWA Highway Statistics[14]	2007
230200*	Commerical Cooking	5	CAP and HAP	No		Template - population based emissions	2002 emissions divided by population to create per captia factors	Population from US Census [3]	2008
23110*	Construction Dust (residential, industrial/commercial, roadway)	3	PM10 PRI, PM25 PRI	No		Residential activity by county used, allocate national roadway by employment	EPA documentation	Construction from Census[15] and highway construction FHWA[14]	2006 for roadway, 2008 for residential and non-residential construction,
246102*	Asphalt (cutback and emulsified)	2	CAP and HAP	No		National usage allocated to county by paved road VMT	EIIP 2001 [17]	Asphalt Institute's *2008 Asphalt Usage Survey*	2008

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2501011*	Residential Portable Fuel Container	5	VOC And HAP	No		Linear fit between 2002 and 2010 emission estimates	EPA[18]	Nonroad activity from NMIM	2002 grown to 2010 with a linear fit to 2008
2501012*	Commercial Portable Fuel Container	5	VOC and HAP	No		Linear fit between 2002 and 2010 emission estimates	EPA[18]	Nonroad activity from NMIM	2002 grown to 2010 with a linear fit to 2008
2501080*	Aviation Petroleum Product use (Stage 1 and 2)	2	VOC and HAP	No		National use allocated by regions and 2008 landing and take-off activity	Four EPA documents	EIA Petroleum Annual Supply, 2008[19]	2008
26100*	Waste Disposal - Open Burning	4	VOC and HAP	No		Per capita emissions including controls	EPA documentation, EF based on 2007 report	EPA Report[20] and construction activity SCC 23110*	2008
2630020000	Waste Disposal Public Treatment	1	VOC and NH3	No		Calculate national emissions, allocate to counties by population	EPA[23,24] reports	EPA Report[22]	2004 and 2010 figures interpolated to 2008

SCC	Category Name	Number of SCCs	Pollutants Included	Point Source Subtraction	Category Submitted by Missouri - Calculation Method	Category Submitted by EPA - Calculation Method	Emission Factor Source	Activity for Category	Activity Base Year
2801700*	Fertilizer Application	14	NH3	No		Activity used in CMU Ammonia Model	CMU Ammonia Model	2002 and 2007 activity from the Fertilizer Institute[21] grown to 2008	grown 2008 figure
28050*	Animal Husbandry (by animal and manure system)	42	NH3	No		CMU Ammonia Model	CMU Ammonia Model	2007 Census of Agriculture[12]	2007

[1] EIA SEDS - Energy Information Administration - State Energy Data System http://www.eia.doe.gov/emeu/states/_seds.html

[2] Employment US Census Bureau *County Business Patterns* http://www.census.gov/epcd/cbp/download/06_data/index.html

[3] Population from US Census http://factfinder.census.gov

[4] Solvent Documentation, Table 2 and Table 3

[5] FHWA HPMS - Federal Highway Administration Highway Performance Monitoring System http://www.fhwa.dot.gov/policy/ohpi/hpms/index.cfm

[6] Huntley, Roy 2009, Criteria Pollutant Emission Factors for ICI Combustion Area Source Categories

[7] DOE - Department of Energy Energy Information Administration *Petroleum Supply Annual 2008, Volume 1,* Table 2

[8] "Gasoline Distribution Industry (Stage 1) - Background Information for Proposed Standards," EPA-453/R94-002a, OAQPS, Jan 1994 and "Gasoline Distribution Industry (Stage 1) - Background Information for Promulgated Standards," EPA-453/R94-002b, OAQPS, Nov 1994

[9] EIIP, Emission Inventory Improvement Program "Volume III: Chapter 11, Gasoline Marketing (Stage I and Stage II), Revised Final", Jan 2001

[10] EIA Energy Information Administration Petroleum Navigator - Product Supplied from http://tonto.eia.doe.gov/dnav/pet/pet_cons_psup_dc_nus_mbblpd_a.htm

[11] AP-42 Section 5.2 "Transportation and Marketing of Petroleum Liquids"

[12] 2007 Census of Agriculture, US Department of Agriculture, http://www.agcensus.usda.gov/

[13] SEPA - Swedish Environmental Protection Agency report 2004-02-02
http://westcoastcollaborative.org/files/sector-marine/SMED%20Methodology%20for%20Calculating%20Emissions%20from%20Ships.pdf

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[18] EPA Document *Estimating Emissions from Portable Fuel Containers (PFCs)* http://www.epa.gov/otaq/regs/toxics/420r07001.pdf

[19] EIA 2008 Petroleum Annual Supply,
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[20] EPA *Municipal Solid Waste in the United States: 2007 Facts and Figures*, EPA530-R-08-010,
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[21] Assn of American Plant Food Control Officials with The Fertilizer Institute, *Commercial Fertilizers 2002 and Commercial Fertilizers 2007*,
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[22] *Biosolids Generation, Use, and Disposal in the United States*, Table A-8 EPA530-R-99-009, September 1999

[23] EPA EIIP Emission Inventory Improvement Program, April 2004, *Estimating Ammonia Emissions from Anthropogenic Nonagricultural Sources – Draft Final Report*

[24] VOC Emissions from Wastewater Treatment Plants: Characterization, Control, and Compliance, Lewis Publishers, 2003, p. 261

[25] Residential Wood Combustion Tool, http://www.epa.gov/ttn/chief/net/2008inventory.html

3.2.3 Source Category Documentation

The following documentation covers nonpoint categories that were prepared with guidance from EPA and CENRAP. The documentation files include methodologies to be applied nationally, and include Missouri-specific updates and information.

3.2.3.1 Fugitive Dust from Paved Roads

a. Source Category Description

Fugitive dust emissions from paved road traffic were estimated for PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL. Since there are no PM-CON emissions for this category, PM10-PRI emissions are equal to PM10-FIL emissions and PM25-PRI emissions are equal to PM25-FIL.

For this source category, the following SCC was assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2294000000	Mobile Sources	Paved Roads	All Paved Roads	Total: Fugitives

The table below provides a national summary of the estimated 2008 annual vehicle miles traveled (VMT) activity and emissions by pollutant. VMT from 2007 were used to estimate the VMT from 2008 which were unavailable.

2008 National Criteria Air Pollutant Emissions Summary for Fugitive Dust from Paved Roads

Pollutant Description and NIF 3.0 Pollutant Code	Emission Factor	National Activity (Million Miles)	National Emissions (Tons)
PM10-FIL	Reference 1	2,755,891	2,090,319
PM10-PRI	Reference 1	2,755,891	2,090,319
PM25-FIL	Reference 1	2,755,891	128,959
PM25-PRI	Reference 1	2,755,891	128,959

Uncontrolled paved road emissions were calculated at the State level by roadway class and month. This was done by multiplying the State/roadway class VMT by the appropriate monthly temporal allocation factor and by the paved road emission factor. After the paved road dust emissions were calculated at the State/road class/monthly level of detail, the uncontrolled emissions were then allocated to the county level using total VMT as a surrogate. Next, control factors were applied to the paved road emissions in PM_{10} nonattainment area counties. Emissions and VMT by roadway class were then totaled to the county level for reporting in the NEI. The following provides further details on the emission factor equation, temporal and spatial allocation procedures, and controls.

b. Emission Factor Equation

Reentrained road dust emissions for paved roads were estimated using paved road VMT and the emission factor equation from AP-42:[1]

$$E = [\ k * (sL/2)^{0.65} * (W/3)^{1.5} - C\ ] * [1 - P/(4*N)]$$

where: E = paved road dust emission factor (gram [g]/VMT)
k = particle size multiplier (7.3 g/VMT for PM10-PRI/-FIL and 1.1 g/VMT for PM25-PRI/-FIL)
sL = road surface silt loading (g/square meter [m^2])
W = average weight (tons) of all vehicles traveling the road
C = emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear (0.2119 g/VMT for PM10-PRI/-FIL and 0.1617 g/VMT for PM 2.5-PRI/-FIL)
N = number of days in the month
P = number of days in the month with at least 0.01 inches of precipitation

The uncontrolled PM10-PRI/-FIL and PM25-PRI/-FIL emission factors are provided in attached file "Paved Roads PM Emission Factors.xls" by State, roadway class, and month.

Paved road silt loadings were assigned to each of the twelve functional roadway classes (six urban and six rural) based on the average annual traffic volume of each functional system by State.[2] The resulting paved road silt loadings calculated from the average annual traffic volume data are shown in Table 2.

The AP-42 equation listed above includes a correction factor to adjust for the number of days with measurable precipitation in each month. The factor of "4" in the precipitation adjustment accounts for the fact that paved roads dry more quickly than unpaved roads and that precipitation may not occur over the entire 24-hour day period. The number of days with at least 0.01 inches of precipitation in each month by State was obtained from the National Climatic Data Center.[3] Data were collected from a meteorological station selected to be representative of urban areas within each State. There are cases where the emission factor calculated using the equation above ends up negative due to the subtraction of the C term that accounts for vehicle exhaust, brake wear, and tire wear. In these cases, the emission factor was reset to 0, under the assumption that the emissions have been accounted for in the onroad emission inventory.

c. Activity

Total annual VMT estimates by State and roadway class were obtained from the Federal Highway Administration's (FHWA) annual Highway Statistics report.[2] Paved road VMT was calculated by subtracting the State/roadway class unpaved road VMT from total State/roadway class VMT.

d. Allocation

The paved road VMT estimates by State/roadway class were first temporally allocated by season using the National Acid Precipitation Assessment Program (NAPAP) Inventory seasonal temporal allocations factors for VMT.[4] These factors are included in the attachment "Unpaved Road county allocation fractions.xls." The seasonal VMT values were then multiplied by the ratio of the number of days in a month to the number of days in a season to adjust to monthly VMT. The emission factors were then applied to estimate emissions by month.

The paved road activity and emissions were spatially allocated to counties according to the fraction of total VMT in each county for the specific roadway class as shown by the following equation:

$$EMIS_{x,y} = EMIS_{ST,y} * VMT_{x,y} / VMT_{ST,y}$$

where: $EMIS_{x,y}$ = paved road emissions (tons) for county x and roadway class y
$EMIS_{ST,y}$ = paved road emissions (tons) for the entire State for roadway class y $VMT_{x,y}$ = total VMT (million miles) in county x and

roadway class y $VMT_{ST,y}$ = total VMT (million miles) in entire State for roadway class y

The county-level VMT by roadway class developed to calculate onroad mobile source emissions was used in this equation.[5] Note that because of differences in the methodologies for calculating total and unpaved road VMT, there are rural counties where unpaved road VMT was higher than total VMT. For these counties, unpaved VMT was reduced to total VMT and paved road VMT was assigned a value of zero.

e. Controls

Paved road dust controls were applied by county to urban and rural roads in serious PM_{10} nonattainment areas and to urban roads in moderate PM_{10} nonattainment areas. The assumed control measure is vacuum sweeping of paved roads twice per month. A control efficiency of 79 percent was assumed for this control measure.[6] The assumed rule penetration varies by roadway class and PM_{10} nonattainment area classification (serious or moderate).[6] The rule penetration rates are shown in Table 3. Rule effectiveness was assumed to be 100% for all counties where this control was applied.

Note that the controls were applied at the county/roadway class level, and the controls differ by roadway class. In the NIF 3.0 emissions table, the emissions for all roadway classes were summed to the county level. Therefore, the emissions at the county level can represent several different control, rule effectiveness, and rule penetration levels. As a result, the control efficiency, rule effectiveness, and rule penetration values were reported in the control equipment table as a composite, overall control level for each county; the rule effectiveness and rule penetration values were not reported separately in the emission table.

2008 Silt Loadings by State and Roadway Class Modeled in Paved Road Emission Factor Calculations (g/m^2)

	Rural Roadway Classes						Urban Roadway Classes					
State	Inter-State	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Inter-state	Freeways & Express-ways	Other Principal Arterial	Minor Arterial	Collector	Local
Alabama	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Alaska	0.015	0.2	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.03	0.2	0.2
Arizona	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.06	0.2
Arkansas	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.6
California	0.015	0.03	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.2	0.2
Colorado	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Connecticut	0.015	0.03	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Delaware	0.015	0.03	0.03	0.2	0.2	0.2	0.015	0.015	0.03	0.03	0.06	0.2
Dist. of Columbia	0.015	0.6	0.6	0.6	0.6	0.6	0.015	0.015	0.03	0.03	0.06	0.2
Florida	0.015	0.03	0.06	0.2	0.2	0.2	0.015	0.015	0.03	0.03	0.06	0.2
Georgia	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.06	0.2
Hawaii	0.015	0.03	0.06	0.2	0.2	0.2	0.015	0.015	0.03	0.03	0.06	0.2
Idaho	0.015	0.2	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Illinois	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.03	0.06	0.2
Indiana	0.015	0.06	0.06	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Iowa	0.015	0.2	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Kansas	0.015	0.2	0.2	0.6	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Kentucky	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.2	0.2
Louisiana	0.015	0.06	0.06	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.6
Maine	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Maryland	0.015	0.03	0.06	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.06	0.2
Massachusetts	0.015	0.03	0.06	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Michigan	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.2	0.2
Minnesota	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Mississippi	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Missouri	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Montana	0.015	0.2	0.2	0.6	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Nebraska	0.015	0.2	0.2	0.6	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Nevada	0.015	0.2	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.03	0.06	0.2
New Hampshire	0.015	0.03	0.06	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
New Jersey	0.015	0.03	0.06	0.2	0.2	0.2	0.015	0.015	0.03	0.06	0.2	0.2
New Mexico	0.015	0.2	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
New York	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.06	0.2
North Carolina	0.015	0.03	0.06	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
North Dakota	0.015	0.2	0.2	0.6	0.6	0.6	0.015	0.015	0.03	0.2	0.2	0.2
Ohio	0.015	0.03	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Oklahoma	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Oregon	0.015	0.2	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Pennsylvania	0.015	0.03	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Rhode Island	0.015	0.03	0.06	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.6
South Carolina	0.015	0.06	0.06	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.2	0.6

	Rural Roadway Classes						Urban Roadway Classes					
State	Inter-State	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Inter-state	Freeways & Express-ways	Other Principal Arterial	Minor Arterial	Collector	Local
South Dakota	0.015	0.2	0.2	0.6	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.6
Tennessee	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Texas	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.6
Utah	0.015	0.2	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.03	0.06	0.2
Vermont	0.015	0.06	0.2	0.2	0.2	0.2	0.015	0.015	0.03	0.06	0.2	0.2
Virginia	0.015	0.03	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.03	0.2	0.2
Washington	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
West Virginia	0.015	0.06	0.2	0.2	0.2	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Wisconsin	0.015	0.06	0.2	0.2	0.6	0.6	0.015	0.015	0.03	0.06	0.2	0.2
Wyoming	0.015	0.2	0.2	0.2	0.6	0.6	0.015	0.015	0.06	0.2	0.2	0.2

Penetration Rate of Paved Road Vacuum Sweeping

PM_{10} Nonattainment Status	Roadway Class	Vacuum Sweeping Penetration Rate
Moderate	Urban Interstate	0.42
Moderate	Urban Freeway & Expressway	0.67
Moderate	Urban Other Principal Arterial	0.90
Moderate	Urban Minor Arterial	0.67
Moderate	Urban Collector	0.64
Moderate	Urban Local	0.88
Serious	Rural Interstate	0.55
Serious	Rural Other Principal Arterial	0.37
Serious	Rural Minor Arterial	0.71
Serious	Rural Major Collector	0.83
Serious	Rural Minor Collector	0.59
Serious	Rural Local	0.35
Serious	Urban Interstate	0.42
Serious	Urban Freeway & Expressway	0.67
Serious	Urban Other Principal Arterial	0.90
Serious	Urban Minor Arterial	0.67
Serious	Urban Collector	0.64
Serious	Urban Local	0.88

f. References

1. United States Environmental Protection Agency, Office of Air Quality Planning and Standards. "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 13.2.1, Paved Roads." Research Triangle Park, NC. 2006.

2. U.S. Department of Transportation, Federal Highway Administration. *Highway Statistics 2007*. Office of Highway Policy Information. Washington, DC. 2008. Available at http://www.fhwa.dot.gov/policyinformation/statistics/2007/.

3. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. Summary of the Day Element TD-3200, 2008 data provided via FTP. National Climatic Data Center. 2009.

4. U.S. Environmental Protection Agency. “The 1985 NAPAP Emissions Inventory: Development of Temporal Allocation Factors,” EPA-600/7-89-010d. Air & Energy Engineering Research Laboratory. Research Triangle Park, NC. April 1990.

5. E.H. Pechan & Associates, Inc. “Documentation for the Onroad National Emission Inventory (NEI) for Base Years 1970 - 2002,” report prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. January 2004.

6. E.H. Pechan & Associates, Inc. “Phase II Regional Particulate Strategies; Task 4: Particulate Control Technology Characterization,” draft report prepared for U.S. Environmental Protection Agency, Office of Policy, Planning and Evaluation. Washington, DC. June 1995.

7. EPA, 2006. Western Governors' Association. 2006. Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. Western Regional Air Partnership (WRAP), 1515 Cleveland Place, Suite 200, Denver, Colorado 80202 .

3.2.3.2 Fugitive Dust from Unpaved Roads

a. Source Category Description

Fugitive dust emissions from unpaved road traffic were estimated for PM10-PRI, PM10-FIL, PM25-PRI, and PM25-FIL. Since there are no PM-CON emissions for this category, PM10-PRI emissions are equal to PM10-FIL emissions and PM25-PRI emissions are equal to PM25-FIL.

For this source category, the following SCC was assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2296000000	Mobile Sources	Unpaved Roads	All Unpaved Roads	Total: Fugitives

The table below provides a national summary of the 2008 annual VMT activity and emissions by pollutant.

2008 National Criteria Air Pollutant Emissions Summary for Fugitive Dust from Unpaved Roads

Pollutant Description and NIF 3.0 Pollutant Code	Emission Factor Reference	National Activity (Million Miles)	National Emissions (Tons)
PM10-FIL	Reference 1	41,700	8,448,784
PM10-PRI	Reference 1	41,700	8,448,784
PM25-FIL	Reference 1	41,700	841,571
PM25-PRI	Reference 1	41,700	841,571

Uncontrolled unpaved road emissions were calculated at the State level by roadway class and month. This was done by multiplying the State/roadway class unpaved roadway VMT by the appropriate monthly temporal allocation factor and by the monthly unpaved road emission factor. After the unpaved road dust emissions were calculated at the State/roadway class/monthly level of detail, the uncontrolled emissions were then allocated to the county level using 1990 rural population data as a surrogate. Next, control factors were applied to the unpaved road emissions in PM_{10} nonattainment area counties. Emissions and VMT by roadway class were then totaled to the county level for reporting in the NEI. The following provides further details on the emission factor equation, temporal and spatial allocation procedures, and controls.

b. Emission Factor Equation

Reentrained road dust emissions for unpaved roads were estimated using unpaved road VMT and the emission factor equation from AP-42:[1]

$$E = [\, k * (s/12)^{1} * (SPD/30)^{0.5}] \,/$$

$(M/0.5)^{0.2}$ - C where k, and C are empirical constants given in Table

2, with

k = particle size multiplier (lb/VMT)
E = size specific emission factor (lb/VMT)

s = surface material silt content (%)
SPD = mean vehicle speed (mph)
M = surface material moisture content (%)
C = emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear (lb/VMT)

The uncontrolled emission factors are provided in the attachment "Unpaved Roads PM Emission Factors.xls" by State, roadway class, and month.

Average State-level unpaved road silt content values, developed as part of the 1985 NAPAP Inventory, were obtained from the Illinois State Water Survey.[2] Silt contents of over 200 unpaved roads from over 30 States were obtained. Average silt contents of unpaved roads were calculated for each sate that had three or more samples for that State. For States that did not have three or more samples, the average for all samples from all States was used as a default value. The silt content values by State, and identifies if the values were based on a sample average or default value.

Constants for Unpaved Roads Reentrained Dust Emission Factor Equation[1]

Constant	PM25-PRI/ PM25-FIL	PM10-PRI/ PM10-FIL
k (lb/VMT)	0.18	1.8
C	0.00036	0.00047

The table below lists the speeds modeled on the unpaved roads by roadway class. These speeds were determined based on the average speeds modeled for onroad emission calculations and weighted to determine a single average speed for each of the roadway classes. The value of 0.5 percent for M was chosen as the national default as sufficient resources were not available at the time the emissions were calculated to determine more locally-specific values for this variable.

Speeds Modeled by Roadway Type on Unpaved Roads

Unpaved Roadway Type	Speed (mph)
Rural Minor Arterial	39
Rural Major Collector	34
Rural Minor Collector	30
Rural Local	30
Urban Other Principal Arterial	20
Urban Minor Arterial	20
Urban Collector	20
Urban Local	20

Correction factors were applied to the emission factors to account for the number of days with a sufficient amount of precipitation to prevent road dust resuspension. Monthly corrected emission factors by State and roadway classification were calculated using the following equation:

$$E_{corr} = E * [(D-p)/D]$$

where: E_{corr} = unpaved road dust emission factor corrected for precipitation effects
E = uncorrected emission factor
D = number of days in the month
p = number of days in the month with at least 0.01 inches of precipitation

The number of days with at least 0.01 inches of precipitation in each month was obtained from the National Climatic Data Center.[3] Data were collected from a meteorological station selected to be representative of rural areas within the State.

c. Activity

Unpaved roadway mileage estimates were obtained from the FHWA's annual Highway Statistics report.[4] Unpaved mileage data for 2007 were used, as data for 2008 were not yet available. Separate calculations of VMT were performed for county- and noncounty- (State or federally) maintained roadways. State-level, county-maintained roadway mileage was organized by surface type (rural and urban) and the average daily traffic volume (ADTV) groups shown in Table 4. From these data, State-level unpaved roadway mileage estimates were made. The following equation was then used to calculate State-level unpaved road VMT estimates:

$$VMT_{UP} = ADTV * FSRM * 366 \text{ days/year}$$

where: VMT_{UP} = VMT on unpaved roads (miles/year)
ADTV = average daily traffic volume (vehicles/day/mile) FSRM = functional system roadway mileage (miles)

State and federally maintained roadway mileage was categorized by arterial classification, not roadway traffic volume; therefore, the VMT was calculated differently than for county-maintained roadways. The ADTV was assumed to not vary by roadway maintenance responsibility, so the ADTV calculated from county-maintained VMT and mileage (ADTV = VMT / Mileage) was used with noncounty-maintained roadway mileage to calculate VMT in the above equation.

Table 4. Assumed Values for Average Daily Traffic Volume (ADTV) by Volume Group

Rural Roads				
Volume Category (vehicles per day per mile)	< 50	50-199	200-499	> 500
Assumed ADTV	5*	125**	350**	550***
Urban Roads				
Volume Category (vehicles per day per mile)	< 200	200-499	500-1999	> 2000
Assumed ADTV	20*	350**	1250**	2200***

Notes: *10% of volume group's maximum range endpoint.
** Average of volume group's range endpoints.
*** 110% of volume group's minimum range endpoint.

d. Allocation

The unpaved road VMT estimates by State/roadway class were first temporally allocated by season using the NAPAP Inventory seasonal temporal allocations factors for VMT.[5] These factors are provided in the attachment "Paved and Unpaved Road VMT temp factors.xls". The seasonal VMT values were then multiplied by the ratio of the number of days in a month to the number of days in a season to adjust to monthly VMT. The emission factors were then applied to estimate emissions by month.

The State/roadway class unpaved road emissions were then spatially allocated to each county using estimates of the ratio of 1990 county rural population to the State rural population from the U.S. Census Bureau[6] as shown by the following equation:

$$EMIS_{x,y} = (CL_x / SL) * EMIS_{,y}$$

where: $EMIS_{x,y}$ = unpaved road emissions (tons) for county x and roadway class y
CL_x = rural population in county x SL = rural population in the State $EMIS_{,y}$ = unpaved road emissions in entire State for roadway class y

The county-level allocation factors are provided in the attachment "Unpaved Road county allocation fractions.xls."

e. Controls

The controls assumed for unpaved roads varied by PM_{10} nonattainment area classification and by urban and rural areas. On urban unpaved roads in moderate PM_{10} nonattainment areas, paving of the unpaved road was assumed, and a control efficiency of 96 percent and a rule penetration of 50 percent were applied. Chemical stabilization, with a control efficiency or 75 percent and a rule penetration of 50 percent, was assumed for rural areas in serious PM_{10} nonattainment areas. A combination of paving and chemical stabilization, with a control efficiency of 90 percent and a rule penetration of 75 percent, was assumed for urban unpaved roads in serious PM_{10} nonattainment areas.[7]

Note that the controls were applied at the county/roadway class level, and the controls differ by roadway class. In the NIF 3.0 emissions table, the emissions for all roadway classes were summed to the county level. Therefore, the emissions at the county level can represent several different control, rule effectiveness, and rule penetration levels. As a result, the control efficiency, rule effectiveness, and rule penetration values were reported in the control equipment table as a composite, overall control level for each county; the rule effectiveness and rule penetration values were not reported separately in the emissions table.

f. References

1. United States Environmental Protection Agency, Office of Air Quality Planning and Standards. "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 13.2.2, Unpaved Roads." Research Triangle Park, NC. 2003.

2. W. Barnard, G. Stensland, and D. Gatz, Illinois State Water Survey, "Evaluation of Potential Improvements in the Estimation of Unpaved Road Fugitive Emission Inventories," paper 87-58.1, presented at the 80th Annual Meeting of the APCA . New York, New York. June 21-26, 1987.

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4. U.S. Department of Transportation, Federal Highway Administration. *Highway Statistics 2007.* Office of Highway Policy Information. Washington, DC. 2009. Available at http://www.fhwa.dot.gov/policyinformation/statistics/2007/.

5. U.S. Environmental Protection Agency. "The 1985 NAPAP Emissions Inventory: Development of Temporal Allocation Factors," EPA-600/7-89-010d. Air & Energy Engineering Research Laboratory. Research Triangle Park, NC. April 1990.

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7. E.H. Pechan & Associates, Inc. "Phase II Regional Particulate Strategies; Task 4: Particulate Control Technology Characterization," draft report prepared for U.S. Environmental Protection Agency, Office of Policy, Planning and Evaluation. Washington, DC. June 1995.

8. EPA, 2006. Western Governors' Association. 2006. Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. Western Regional Air Partnership (WRAP), 1515 Cleveland Place, Suite 200, Denver, Colorado 80202 .

3.2.3.3 Fossil Fuel Combustion – Residential – Coal Combustion

a. Source Category Description

Residential Coal Combustion is coal that is burned to heat residential housing.

The general approach to calculating emissions for these two SCCs is to take State Coal Consumption from the EIA and allocate it to the county level using methods described below. County-level coal consumption is multiplied by the emission factors to calculate emissions.

For this source category, the following SCCs were assigned:

SCC	Descriptor 1	Descriptor 3	Descriptor 6	Descriptor 8
2104001000	Stationary Source Fuel Combustion	Residential	Anthracite Coal	All Boiler Types
2104002000	Stationary Source Fuel Combustion	Residential	Bituminous/ Subbituminous Coal	All Boiler Types

b. Activity Data

The mass of coal consumed by residential combustion in the U.S. was used to estimate emissions. Coal consumption by energy use sector is presented in State Energy Data 2006 Consumption tables published by the Energy Information Administration (EIA).[1] Year 2006 consumption data were used as a surrogate for 2008 emissions because year 2006 data were the latest data available when this inventory was prepared.

EIA data do not distinguish between anthracite and bituminous coal consumption estimates. The EIA table "Domestic Distribution of U.S. Coal by Destination State, Consumer, Origin and Method of Transportation," provides state-level residential coal distribution data for 2006 that was used to estimate anthracite and bituminous coal consumption. The amount of anthracite distributed to each state and the total coal delivered to each state were used to estimate the proportion of anthracite and bituminous coal consumption.[2] The 2006 ratio of anthracite (and bituminous) coal consumption to total coal consumption was used to distribute the EIA's total residential sector coal consumption data by coal type. Table 1 presents the 2006 anthracite and bituminous coal ratios for each state.

State-level coal consumption was allocated to each county using the US Census Bureau's 2000 Census Detailed Housing Information.[3] These data include the number of housing units using a specific type of fuel for residential heating. State coal consumption was allocated to each county using the ratio of the number of houses burning coal in each county to the total number of houses burning coal in the State.

c. Control Factors

No controls were assumed for this category

d. Emission Factors

In some cases (see Table 2), SO_2 and PM emission factors required information on the sulfur and/or ash content of the coal burned. State-specific sulfur and ash contents of anthracite and bituminous coal were obtained from data compiled in preparing the 1999 residential coal combustion emissions estimates.[4] This study mostly relied on data obtained from USGS COALQUAL database. States not included in the database but that reported coal usage were assigned values based on their proximity to coal seams or using an average value for Pennsylvania (see report for details of the analysis). Table 3 presents the bituminous coal sulfur content values used for each state. For anthracite coal, an ash content value of 13.38% and a sulfur content of 0.89% were applied to all states except New Mexico (ash content 16.61%, sulfur content 0.77%), Washington (ash content 12%, sulfur content 0.9%), and Virginia (ash content 13.38%, sulfur content 0.43%).

The remaining criteria pollutant and HAP emissions were calculated by multiplying the total coal consumed in each county per year by an emission factor. All emission factors except ammonia are from AP-42.[5] The ammonia emission factor is from EPA's *Estimating Ammonia Emissions from Anthropogenic Sources, Draft Final Report*.[6] Table 4 presents a summary of the emission factors for residential anthracite coal combustion (SCC 2104001000). Table 5 presents a summary of the emission factors for residential bituminous coal combustion (SCC 2104002000).

e. Sample Calculations

Annual emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = FC_x \times (1 - CE_{x,p}) \times EF_{x,p}$$

where:

$E_{x,p}$ = annual emissions for fuel type x and pollutant p (ton/year),
FC_x = annual fuel consumption for fuel type x,
$CE_{x,p}$ = control efficiency for fuel type x and pollutant p, and
$EF_{x,p}$ = emission factor for fuel type x and pollutant p.

County level fuel consumption is calculated using:

$$FC_x = A_{State} \text{ x } Ratio_{Anth,\ Bit} \text{ x } Ratio_{County\ houses}$$

where:

A_{State} = total tons of coal reported by the EIA,
$Ratio_{Anth,\ Bit}$ = ratio reported in Table 1, and
$Ratio_{County\ houses}$ = county allocation ratio based on number of houses burning coal.

<u>Example:</u>
Using Allegheny County, PA as an example:

The State of Pennsylvania had a reported use of 49,935 tons of coal in the residential sector in 2006.

Statewide Anthracite coal use is calculated using the ratio of Anthracite to Bituminous in Table 1 for PA: 80.64%. Allegheny County, PA had 183 houses out of the state total of 67,986 that use coal as the primary heating fuel. This equates to a share of 0.27% of the coal used for residential heating in the state.

The emission factor for $PM_{2.5}$-PRI (See Table 4) is 0.6 × state-specific % ash content + 0.08 lbs/ton× state-specific % ash content. The ash content is 13.38%, (See Table 2) so the emission factor is 9.09 lbs/ton.

$FC_{Allegheny,\ anth}$ = 49,935 × 0.8064 × 0.0027 = 109 tons anthracite coal

$Emis_{Allegheny,\ anth,\ PM2.5\text{-}PRI}$ = 109 tons Coal × 9.09 lbs $PM_{2.5}$-PRI per ton coal
= 990 lbs $PM_{2.5}$-PRI

f. References

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3. U.S. Census Bureau. "Table H40. House Heating Fuel Type", Census 2000: Summary File 3. Internet address: http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=&_lang=en&_ts=, accessed July 2009.

4. U.S. Environmental Protection Agency. Emission Factor and Inventory Group. Final Summary of the Development and Results of a Methodology for Calculating Area Source Emissions from Residential Fuel Combustion. Prepared by Pacific Environmental Services, Inc. Research Triangle Park, NC. September 2002. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/draft1999_residfuel_inven_apr2003.zip accessed November 2004.

5. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

6. U.S. Environmental Protection Agency. Emission Inventory Improvement Program. Estimating Ammonia Emissions from Anthropogenic Sources, Draft Final Report. Prepared by E.H. Pechan and Associates, Inc. Research Triangle Park, NC. April 2004.

Table 1. 2006 Anthracite and Bituminous Coal Distribution for the Residential and Commercial Sectors

State	Ratio of Bituminous	Ratio of Anthracite	State	Ratio of Bituminous	Ratio of Anthracite
Alabama	1.0000	0.0000	Montana	1.0000	0.0000
Alaska	1.0000	0.0000	Nebraska	1.0000	0.0000
Arizona	0.8140	0.1860	Nevada	1.0000	0.0000
Arkansas	0.8140	0.1860	New Hampshire	0.0000	1.0000
California	1.0000	0.0000	New Jersey	0.0000	1.0000
Colorado	0.9962	0.0038	New Mexico	1.0000	0.0000
Connecticut	0.0000	1.0000	New York	0.6000	0.4000
Delaware	0.8140	0.1860	North Carolina	1.0000	0.0000
Dist. Columbia	1.0000	0.0000	North Dakota	1.0000	0.0000
Florida	0.8140	0.1860	Ohio	0.8727	0.1273
Georgia	1.0000	0.0000	Oklahoma	0.9167	0.0833
Hawaii	1.0000	0.0000	Oregon	1.0000	0.0000
Idaho	0.9792	0.0208	Pennsylvania	0.1936	0.8064
Illinois	0.9981	0.0019	Rhode Island	0.0000	1.0000
Indiana	0.9474	0.0526	South Carolina	0.9972	0.0028
Iowa	0.9992	0.0008	South Dakota	1.0000	0.0000
Kansas	1.0000	0.0000	Tennessee	0.9939	0.0061
Kentucky	0.9981	0.0019	Texas	0.8140	0.1860
Louisiana	1.0000	0.0000	Utah	1.0000	0.0000
Maine	0.0000	1.0000	Vermont	0.0000	1.0000
Maryland	0.9286	0.0714	Virginia	0.9630	0.0370
Massachusetts	0.5000	0.5000	Washington	1.0000	0.0000
Michigan	0.6667	0.3333	West Virginia	0.9048	0.0952
Minnesota	0.9973	0.0027	Wisconsin	0.9914	0.0086
Mississippi	1.0000	0.0000	Wyoming	1.0000	0.0000
Missouri	1.0000	0.0000			

Table 2. SO_2 and PM Emission Factors for Industrial Anthracite and Bituminous Coal Combustion

Pollutant	Emission Factor (lb/ton)	AP-42 Table
Anthracite Emission Factors (SCC 2104001000)		
PM-CON	0.08* % Ash	1.2-3
PM10-FIL	10	1.2-4
PM25-FIL	0.6 * % Ash	1.2-4
PM10-PRI	10 + 0.08* % Ash	1.2-3 and 1.2-4
PM25-PRI	0.6 * % Ash + 0.08* % Ash	1.2-3 and 1.2-4
Sulfur Dioxide	39 * % Sulfur	1.2-1
Bituminous Emission Factors (SCC 2104002000)		

PM-CON	.04	1.1-5
PM10-FIL	6.2	1.1-9
PM25-FIL	3.8	1.1-9
PM10-PRI	6.24	1.1-5 and 1.1-9
PM25-PRI	3.84	1.1-5 and 1.1-9
Sulfur Dioxide	31 * % Sulfur	1.1-3
NOTE: PM_{10}, $PM_{2.5}$, and condensable PM emission factors for bituminous coal do not require ash content, nor does the condensable PM emission factor for anthracite coal.		

Table 3. State-Specific Sulfur Content for Bituminous Coal (SCC 2104002000)

State	Percent Sulfur Content	State	Percent Sulfur Content
Alabama	2.08	Montana	0.60
Alaska	0.31	Nebraska	2.43
Arizona	0.47	Nevada	2.30
Arkansas	1.20	New Hampshire	2.42
California	0.47	New Jersey	2.42
Colorado	0.61	New Mexico	0.75
Connecticut	2.42	New York	2.42
Delaware	1.67	North Carolina	1.62
District of Columbia	1.67	North Dakota	0.97
Florida	1.28	Ohio	3.45
Georgia	1.28	Oklahoma	3.08
Hawaii	1.00	Oregon	0.50
Idaho	0.31	Pennsylvania	2.42
Illinois	3.48	Rhode Island	2.42
Indiana	2.49	South Carolina	1.28
Iowa	4.64	South Dakota	0.97
Kansas	5.83	Tennessee	1.62
Kentucky	1.93	Texas	1.14
Louisiana	0.86	Utah	0.80
Maine	2.42	Vermont	2.42
Maryland	1.67	Virginia	1.19
Massachusetts	2.42	Washington	0.50
Michigan	1.20	West Virginia	1.25
Minnesota	0.97	Wisconsin	1.00
Mississippi	1.24	Wyoming	0.87
Missouri	3.39		

Table 4. National Criteria and HAP Emission Factors for Residential Anthracite Coal Combustion (SCC 2104001000): Not Adjusted for Point Source Fuel Consumption

SCC	Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
2104001000	100414	ETHYL BENZENE	0.000094	LB	TON
2104001000	100425	STYRENE	0.000025	LB	TON
2104001000	107028	ACROLEIN	0.00029	LB	TON
2104001000	107062	ETHYLENE DICHLORIDE	0.00004	LB	TON
2104001000	108883	TOLUENE	0.00024	LB	TON
2104001000	108907	CHLOROBENZENE	0.000022	LB	TON
2104001000	108952	PHENOL	0.000016	LB	TON
2104001000	110543	HEXANE	0.000067	LB	TON
2104001000	117817	BIS(2-ETHYLHEXYL)PHTHALATE	0.000073	LB	TON
2104001000	120127	ANTHRACENE	0.00000021	LB	TON
2104001000	123386	PROPIONALDEHYDE	0.00038	LB	TON
2104001000	127184	TETRACHLOROETHYLENE	0.000043	LB	TON
2104001000	129000	PYRENE	0.00000033	LB	TON
2104001000	191242	BENZO[G,H,I,]PERYLENE	0.000000027	LB	TON
2104001000	193395	INDENO[1,2,3-C,D]PYRENE	0.000000061	LB	TON
2104001000	206440	FLUORANTHENE	0.00000071	LB	TON
2104001000	208968	ACENAPHTHYLENE	0.00000025	LB	TON
2104001000	218019	CHRYSENE	0.0000001	LB	TON
2104001000	50000	FORMALDEHYDE	0.00024	LB	TON
2104001000	50328	BENZO[A]PYRENE	0.000000038	LB	TON
2104001000	56553	BENZ[A]ANTHRACENE	0.00000008	LB	TON
2104001000	56832736	Benzofluoranthenes	0.00000011	LB	TON
2104001000	71432	BENZENE	0.0013	LB	TON
2104001000	7439921	LEAD	0.00042	LB	TON
2104001000	7439965	MANGANESE	0.00049	LB	TON
2104001000	7439976	MERCURY	0.000083	LB	TON
2104001000	7440020	NICKEL	0.00028	LB	TON
2104001000	7440360	ANTIMONY	0.000018	LB	TON
2104001000	7440382	ARSENIC	0.00041	LB	TON
2104001000	7440417	BERYLLIUM	0.000021	LB	TON
2104001000	7440439	CADMIUM	0.000051	LB	TON
2104001000	7440473	CHROMIUM	0.000264	LB	TON
2104001000	7440484	COBALT	0.0001	LB	TON
2104001000	74839	METHYL BROMIDE	0.00016	LB	TON
2104001000	74873	METHYL CHLORIDE	0.00053	LB	TON

SCC	Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
2104001000	75070	ACETALDEHYDE	0.00057	LB	TON
2104001000	75092	METHYLENE CHLORIDE	0.00029	LB	TON
2104001000	75150	CARBON DISULFIDE	0.00013	LB	TON
2104001000	7647010	HYDROCHLORIC ACID	1.2	LB	TON
2104001000	7664393	HYDROGEN FLUORIDE	0.15	LB	TON
2104001000	7782492	SELENIUM	0.0013	LB	TON
2104001000	78591	ISOPHORONE	0.00058	LB	TON
2104001000	78933	METHYL ETHYL KETONE	0.00039	LB	TON
2104001000	83329	ACENAPHTHENE	0.00000051	LB	TON
2104001000	85018	PHENANTHRENE	0.0000027	LB	TON
2104001000	86737	FLUORENE	0.00000091	LB	TON
2104001000	91203	NAPHTHALENE	0.000013	LB	TON
2104001000	98862	ACETOPHENONE	0.000015	LB	TON
2104001000	CO	CARBON MONOXIDE	275	LB	TON
2104001000	NH3	AMMONIA	2	LB	TON
2104001000	NOX	NITROGEN OXIDES	3	LB	TON
2104001000	VOC	VOLATILE ORGANIC COMPOUNDS	10	LB	TON

Table 5. National Criteria and HAP Emission Factors for Residential Bituminous Coal Combustion (SCC 2104002000): Not Adjusted for Point Source Fuel Consumption

SCC	Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
2104002000	100414	ETHYL BENZENE	0.000094	LB	TON
2104002000	100425	STYRENE	0.000025	LB	TON
2104002000	107028	ACROLEIN	0.00029	LB	TON
2104002000	107062	ETHYLENE DICHLORIDE	0.00004	LB	TON
2104002000	108883	TOLUENE	0.00024	LB	TON
2104002000	108907	CHLOROBENZENE	0.000022	LB	TON
2104002000	108952	PHENOL	0.000016	LB	TON

SCC	Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
2104002000	110543	HEXANE	0.000067	LB	TON
2104002000	117817	BIS(2-ETHYLHEXYL)PHTHALATE	0.000073	LB	TON
2104002000	123386	PROPIONALDEHYDE	0.00038	LB	TON
2104002000	127184	TETRACHLOROETHYLENE	0.000043	LB	TON
2104002000	129000	PYRENE	0.00000033	LB	TON
2104002000	191242	BENZO[G,H,I,]PERYLENE	0.000000027	LB	TON
2104002000	193395	INDENO[1,2,3-C,D]PYRENE	0.000000061	LB	TON
2104002000	205992	BENZO[B]FLUORANTHENE	0.00000011	LB	TON
2104002000	218019	CHRYSENE	0.0000001	LB	TON
2104002000	50000	FORMALDEHYDE	0.00024	LB	TON
2104002000	56553	BENZ[A]ANTHRACENE	0.00000008	LB	TON
2104002000	71432	BENZENE	0.0013	LB	TON
2104002000	7439921	LEAD	0.00042	LB	TON
2104002000	7439965	MANGANESE	0.00049	LB	TON
2104002000	7439976	MERCURY	0.000083	LB	TON
2104002000	7440020	NICKEL	0.00028	LB	TON
2104002000	7440360	ANTIMONY	0.000018	LB	TON
2104002000	7440382	ARSENIC	0.00041	LB	TON
2104002000	7440417	BERYLLIUM	0.000021	LB	TON
2104002000	7440439	CADMIUM	0.000051	LB	TON
2104002000	7440473	CHROMIUM	0.00026	LB	TON
210400200	7440484	COBALT	0.0001	LB	TON

SCC	Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
0					
2104002000	74839	METHYL BROMIDE	0.00016	LB	TON
2104002000	74873	METHYL CHLORIDE	0.00053	LB	TON
2104002000	75070	ACETALDEHYDE	0.00057	LB	TON
2104002000	75092	METHYLENE CHLORIDE	0.00029	LB	TON
2104002000	75150	CARBON DISULFIDE	0.00013	LB	TON
2104002000	7782492	SELENIUM	0.0013	LB	TON
2104002000	78591	ISOPHORONE	0.00058	LB	TON
2104002000	78933	METHYL ETHYL KETONE	0.00039	LB	TON
2104002000	98862	ACETOPHENONE	0.000015	LB	TON
2104002000	CO	CARBON MONOXIDE	275	LB	TON
2104002000	NH3	AMMONIA	2.0	LB	TON
2104002000	NOX	NITROGEN OXIDES	9.1	LB	TON
2104002000	VOC	VOLATILE ORGANIC COMPOUNDS	10	LB	TON

3.2.3.4 Fossil Fuel Combustion – Residential – Distillate Oil

a. Source Category Description

Residential Distillate Oil Combustion is oil that is burned in residential housing

The general approach to calculating emissions for this SCC is to take State Distillate Oil Consumption from the EIA and allocate it out to the county level using methods described below. County-level oil consumption is multiplied by the emission factors to calculate emissions.

For this source category, the following SCCs were assigned:

SCC	Descriptor 1	Descriptor 3	Descriptor 6	Descriptor 8
2104004000	Stationary Source Fuel Combustion	Residential	Distillate Oil	Total Boilers and IC Engines

b. Activity Data

The state-level volume of distillate oil consumed by residential combustion in the U.S. was used to estimate emissions. Distillate oil consumption by energy use sector is presented in State Energy Data 2006 Consumption tables published by the Energy Information Administration (EIA).[1] Year 2006 consumption data were used as a surrogate for 2008 emissions because year 2006 data were the latest data available when this inventory was prepared.

State-level distillate oil consumption was allocated to each county using the US Census Bureau's 2000 Census Detailed Housing Information.[2] These data include the number of housing units using a specific type of fuel for residential heating. State distillate oil consumption was allocated to each county using the ratio of the number of houses burning distillate oil in each county to the total number of houses burning distillate oil in the State.

c. Control Factors

No control measures are assumed for this category.

d. Emission Factors

Criteria pollutant emission factors for distillate oil are from AP-42.[3] For all counties in the United States, the distillate oil consumed by commercial/institutional combustion is assumed to be No. 2 fuel oil with a heating value of 140,000 Btu per gallon and a sulfur content of 0.30%.[4] Dioxin/furan and HAP emission factors are from "Documentation of Emissions Estimation methods for Year 2000 and 2001 Mobile Source and Nonpoint Source Dioxin Inventories"[5] and "Documentation for the 1999 Base Year Nonpoint Area Source National Emission Inventory for Hazardous Air Pollutants,"[6] respectively. Sulfur content was 0.30% and was obtained from data compiled in preparing the 1999 residential coal combustion emissions estimates.[7] The ammonia emission factor is from EPA's *Estimating Ammonia Emissions from Anthropogenic Sources, Draft Report*.[8]

e. Sample Calculations

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = FC_x \times EF_{x,p}$$

where:

$E_{x,p}$ = annual emissions for fuel type x and pollutant p
FC_x = annual fuel consumption for fuel type x
$EF_{x,p}$ = emission factor for fuel type x and pollutant p

And $FC_x = A_{State}$ x (H_{county} / H_{State})

where :

A_{State} = State activity data from EIA
H_{County} = number of houses in the county using distillate oil as the primary heating fuel
H_{State} = number of houses in the state using distillate oil as the primary heating fuel

Example:
Using Allegheny County, PA as an example:

The State of Pennsylvania had a reported use of 16,902 thousand barrels of distillate oil in the residential sector in 2006. Allegheny County, PA had 8,123 houses out of the state total of 1,217,155 that use distillate oil as the primary heating fuel. This equates to a share of 0.67% of the distillate oil used for residential heating in the state. From Table 5, the emission factor for CO is 5 lb/thousand gallons. Because the emission factor is in lbs/thousand gallons, a conversion factor of 42 gallons per barrel is applied.

$$A_{Alegheny} = 16{,}902 \text{ thousand barrels} \times 8{,}123 \text{ houses} / 1{,}217{,}155 \text{ houses}) \times 42 \text{ gal / barrel} = 4{,}737.6 \text{ thousand gallons}$$

$$Emis_{Alegheny,\ CO} = \quad = 4{,}737.6 \text{ thousand gallons} \times 5 \text{ lb CO/ thousand gallons}$$

= 23,688 lbs CO or 11.8 tons CO

f. References

1. U.S. Department of Energy, Energy Information Administration (EIA). State Energy Data 2006 Consumption. Washington, DC 2008. Internet Address: http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_all_phy.csv, accessed November 2008.

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4. U.S. Environmental Protection Agency. Emission Factor and Inventory Group. Final Summary of the Development and Results of a Methodology for Calculating Area Source Emissions from Residential Fuel Combustion. Prepared by Pacific Environmental Services, Inc. Research Triangle Park, NC. September 2002. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/draft1999_residfuel_inven_apr2003.zip accessed November 2004.

5. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. "Documentation of Emissions Estimation methods for Year 2000 and 2001 Mobile Source and Nonpoint Source Dioxin Inventories." Prepared by E.H. Pechan & Associates, Inc., Durham, NC. May 2003.

6. U.S. Environmental Protection Agency, Emission Factors and Inventory Group. "Documentation for the 1999 Base Year Nonpoint Area Source National Emission Inventory for Hazardous Air Pollutants." Prepared by Eastern Research Group, Inc. Morrisville, NC. September 2002.

7. U.S. Environmental Protection Agency. Emission Factor and Inventory Group. Final Summary of the Development and Results of a Methodology for Calculating Area Source Emissions from Residential Fuel Combustion. Prepared by Pacific Environmental Services, Inc. Research Triangle Park, NC. September 2002. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/draft1999_residfuel_inven_apr2003.zip accessed November 2004.

8. U.S. Environmental Protection Agency. Emission Factor and Inventory Group. Estimating Ammonia Emissions from Anthropogenic Sources, Draft Report. Prepared by E.H. Pechan and Associates, Inc. Research Triangle Park, NC. September 2003.

Table 1. National Emission Factors for Residential Distillate Oil Combustion

Code	Pollutant	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
102	Benzo[B+K]Fluoranthene	1.54517E-06	LB	E3GAL
120127	Anthracene	1.22209E-06	LB	E3GAL
129000	Pyrene	4.2141E-06	LB	E3GAL
1746016	2,3,7,8-Tetrachlorodibenzo-P-Dioxin	4.6592E-10	LB	E3GAL
191242	Benzo[G,H,I,]Perylene	2.24752E-06	LB	E3GAL
193395	Indeno[1,2,3-C,D]Pyrene	2.10705E-06	LB	E3GAL
206440	Fluoranthene	4.91645E-06	LB	E3GAL
208968	Acenaphthylene	2.52846E-07	LB	E3GAL
218019	Chrysene	2.38799E-06	LB	E3GAL
30402154	Total Pentachlorodibenzofuran	3.4944E-09	LB	E3GAL
3268879	Octachlorodibenzo-P-Dioxin	5.4912E-10	LB	E3GAL
36088229	Total Pentachlorodibenzo-P-Dioxin	6.8224E-10	LB	E3GAL
37871004	Total Heptachlorodibenzo-P-Dioxin	5.2416E-10	LB	E3GAL
38998753	Total Heptachlorodibenzofuran	6.0736E-10	LB	E3GAL
39001020	Octachlorodibenzofuran	2.496E-10	LB	E3GAL
50000	Formaldehyde	0.0337128	LB	E3GAL
51207319	2,3,7,8-Tetrachlorodibenzofuran	4.4096E-10	LB	E3GAL
53703	Dibenzo[A,H]Anthracene	1.68564E-06	LB	E3GAL
55684941	Total Hexachlorodibenzofuran	1.4144E-09	LB	E3GAL
56553	Benz[A]Anthracene	4.07363E-06	LB	E3GAL
622	Hexachlorodibenzo-P-Dioxins, Total	5.4912E-10	LB	E3GAL
71432	Benzene	0.000210705	LB	E3GAL
7439921	Lead	0.00126423	LB	E3GAL
7439965	Manganese	0.00084282	LB	E3GAL
7439976	Mercury	0.00042141	LB	E3GAL
7440020	Nickel	0.00042141	LB	E3GAL
7440382	Arsenic	0.00056188	LB	E3GAL
7440417	Beryllium	0.00042141	LB	E3GAL
7440439	Cadmium	0.00042141	LB	E3GAL

Code	Pollutant	Emission Factor	Emission Factor Numerator	Emission Factor Denominator
7440473	Chromium	0.00042141	LB	E3GAL
75070	Acetaldehyde	0.00491645	LB	E3GAL
7782492	Selenium	0.00210705	LB	E3GAL
83329	Acenaphthene	2.10705E-05	LB	E3GAL
85018	Phenanthrene	1.05353E-05	LB	E3GAL
86737	Fluorene	4.49504E-06	LB	E3GAL
91203	Naphthalene	0.001137807	LB	E3GAL
NH3	Ammonia	1.0	LB	E3GAL
CO	Carbon Monoxide	5	LB	E3GAL
NOX	Nitrogen Oxides	18	LB	E3GAL
PM10-FIL	Primary PM10, Filterable Portion Only	1.08	LB	E3GAL
PM25-FIL	Primary PM2.5, Filterable Portion Only	0.83	LB	E3GAL
PM-CON	Primary PM Condensible Portion Only (All Less Than 1 Micron)	1.3	LB	E3GAL
SO2	Sulfur Dioxide	42.6	LB	E3GAL
VOC	Volatile Organic Compounds	0.7	LB	E3GAL
102	Benzo[B+K]Fluoranthene	1.54517E-06	LB	E3GAL
120127	Anthracene	1.22209E-06	LB	E3GAL
129000	Pyrene	4.2141E-06	LB	E3GAL
1746016	2,3,7,8-Tetrachlorodibenzo-P-Dioxin	4.6592E-10	LB	E3GAL
191242	Benzo[G,H,I,]Perylene	2.24752E-06	LB	E3GAL
193395	Indeno[1,2,3-C,D]Pyrene	2.10705E-06	LB	E3GAL
206440	Fluoranthene	4.91645E-06	LB	E3GAL
208968	Acenaphthylene	2.52846E-07	LB	E3GAL
218019	Chrysene	2.38799E-06	LB	E3GAL
30402154	Total Pentachlorodibenzofuran	3.4944E-09	LB	E3GAL

3.2.3.5 Fossil Fuel Combustion – Residential - Kerosene

a. Source Category Description

Residential Kerosene Combustion is kerosene that is burned in residential housing. Common uses of energy associated with this sector include space heating, water heating, cooking, and running a wide variety of other equipment.

The general approach to calculating emissions for this SCC is to take State Kerosene Consumption from the EIA and allocate it to the county level using methods described below. County-level kerosene consumption is multiplied by the emission factors to calculate emissions.

For this source category, the following SCC was assigned:

SCC	Descriptor 1	Descriptor 3	Descriptor 6	Descriptor 8
2104011000	Stationary Source Fuel Combustion	Residential	Kerosene	Total: All Combustor Types

b. Activity Data

The volume of kerosene consumed by residential combustion in the U.S. was used to estimate emissions. Kerosene consumption by energy use sector is presented in State Energy Data 2006 Consumption tables published by the Energy Information Administration (EIA).[1] Year 2006 consumption data were used as a surrogate for 2008 emissions because year 2006 data were the latest data available when this inventory was prepared.

State-level kerosene consumption was allocated to each county using the US Census Bureau's 2000 Census Detailed Housing Information.[2] These data include the number of housing units using a specific type of fuel for residential heating. State kerosene consumption was allocated to each county using the ratio of the number of houses burning kerosene in each county to the total number of houses burning kerosene in the State.

c. Control Factors

No control measures are assumed for this category.

d. Emission Factors

Emission factors for distillate oil were used for kerosene, but the distillate oil emission factors were multiplied by a factor of 135/140 to convert them for this use. This factor is based on the ratio of the heat content of kerosene (135,000 Btu/gallon) to the heat content of distillate oil (140,000 Btu/gallon).[3] Criteria pollutant emission factors are from AP-42.[4] Dioxin/furan and HAP emission factors are from "Documentation of Emissions Estimation methods for Year 2000 and 2001 Mobile Source and Nonpoint Source Dioxin Inventories"[5] and "Documentation for the 1999 Base Year Nonpoint Area Source National Emission Inventory for Hazardous Air Pollutants,"[6] respectively. Distillate sulfur content (0.30%) was used for kerosene as well.[7]

e. Sample Calculations

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = FC_x \times EF_{x,p}$$

where:

$E_{x,p}$ = annual emissions for fuel type x and pollutant p,
FC_x = annual fuel consumption for fuel type x,
$EF_{x,p}$ = emission factor for fuel type x and pollutant p,

And $FC_x = A_{State}$ x (H_{county} / H_{State})

where :

A_{State} = State activity data from EIA
H_{County} = number of houses in the county using kerosene as the primary heating fuel
H_{State} = number of houses in the state using kerosene as the primary heating fuel

Example:
Using Allegheny County, PA as an example:

The State of Pennsylvania had a reported use of 1,419.7 thousand barrels of kerosene in the residential sector in 2006. Allegheny County, PA had 8,123 houses out of the state total of 1,217,155 that used kerosene as the primary heating fuel. This equates to a share of 0.67% of the kerosene used for residential heating in the state. From Table 1, CO Emission factor is 202.5 lb/thousand barrels.

E_{CO} = 1,419.7 thousand barrels × (8,123 houses / 1,217,155 houses) × 202.5 lb/thousand barrels
= 1,918.6 lbs CO or 0.96 tons CO

f. References

1. U.S. Department of Energy, Energy Information Administration (EIA). State Energy Data 2006 Consumption. Washington, DC 2008. Internet address: http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_all_phy.csv, accessed November 2008.

2. U.S. Census Bureau. "Table H40. House Heating Fuel Type", Census 2000: Summary File 3. Internet address: http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=&_lang=en&_ts=, accessed July 2009.

3. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

4. U.S. Environmental Protection Agency. Emission Factor and Inventory Group. Final Summary of the Development and Results of a Methodology for Calculating Area Source Emissions from Residential Fuel Combustion. Prepared by Pacific Environmental Services, Inc. Research Triangle Park, NC. September 2002. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/draft1999_ residfuel_inven_apr2003.zip accessed November 2004.

5. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. "Documentation of Emissions Estimation methods for Year 2000 and 2001 Mobile Source and Nonpoint Source Dioxin Inventories." Prepared by E.H. Pechan & Associates, Inc., Durham, NC. May 2003.

6. U.S. Environmental Protection Agency, Emission Factors and Inventory Group. "Documentation for the 1999 Base Year Nonpoint Area Source National Emission Inventory for Hazardous Air Pollutants." Prepared by Eastern Research Group, Inc. Morrisville, NC. September 2002.

7. U.S. Environmental Protection Agency. Emission Factor and Inventory Group. Final Summary of the Development and Results of a Methodology for Calculating Area Source Emissions from Residential Fuel Combustion. Prepared by Pacific Environmental Services, Inc. Research Triangle Park, NC. September 2002. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/draft1999_ residfuel_inven_apr2003.zip, accessed November 2004.

Table 1. National Emission Factors for Residential Kerosene Combustion

Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
102	BENZO[B+K]FLUORANTHENE	6.2579E-05	LB	E3BBL
120127	ANTHRACENE	4.9495E-05	LB	E3BBL
129000	PYRENE	0.00017067	LB	E3BBL
1746016	2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN	1.887E-08	LB	E3BBL
191242	BENZO[G,H,I,]PERYLENE	9.1025E-05	LB	E3BBL
193395	INDENO[1,2,3-C,D]PYRENE	8.5336E-05	LB	E3BBL
206440	FLUORANTHENE	0.00019912	LB	E3BBL
208968	ACENAPHTHYLENE	1.024E-05	LB	E3BBL
218019	CHRYSENE	9.6714E-05	LB	E3BBL
30402154	TOTAL PENTACHLORODIBENZOFURAN	1.4152E-07	LB	E3BBL
3268879	OCTACHLORODIBENZO-P-DIOXIN	2.2239E-08	LB	E3BBL
36088229	TOTAL PENTACHLORODIBENZO-P-DIOXIN	2.7631E-08	LB	E3BBL
37871004	TOTAL HEPTACHLORODIBENZO-P-DIOXIN	2.1228E-08	LB	E3BBL
38998753	TOTAL HEPTACHLORODIBENZOFURAN	2.4598E-08	LB	E3BBL
39001020	OCTACHLORODIBENZOFURAN	1.0109E-08	LB	E3BBL
50000	FORMALDEHYDE	1.3653684	LB	E3BBL
51207319	2,3,7,8-TETRACHLORODIBENZOFURAN	1.7859E-08	LB	E3BBL
53703	DIBENZO[A,H]ANTHRACENE	6.8268E-05	LB	E3BBL
55684941	TOTAL HEXACHLORODIBENZOFURAN	5.7283E-08	LB	E3BBL
56553	BENZ[A]ANTHRACENE	0.00016498	LB	E3BBL
622	HEXACHLORODIBENZO-P-DIOXINS, TOTAL	2.2239E-08	LB	E3BBL
71432	BENZENE	0.00853355	LB	E3BBL
7439921	LEAD	0.05120132	LB	E3BBL
7439965	MANGANESE	0.03413421	LB	E3BBL
7439976	MERCURY	0.01706711	LB	E3BBL
7440020	NICKEL	0.01706711	LB	E3BBL
7440382	ARSENIC	0.02275614	LB	E3BBL
7440417	BERYLLIUM	0.01706711	LB	E3BBL
7440439	CADMIUM	0.01706711	LB	E3BBL
7440473	CHROMIUM	0.01706711	LB	E3BBL
75070	ACETALDEHYDE	0.19911623	LB	E3BBL
7782492	SELENIUM	0.08533553	LB	E3BBL
83329	ACENAPHTHENE	0.00085336	LB	E3BBL
85018	PHENANTHRENE	0.00042668	LB	E3BBL
86737	FLUORENE	0.00018205	LB	E3BBL
91203	NAPHTHALENE	0.04608118	LB	E3BBL

Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
NH3	AMMONIA	40.5	LB	E3BBL
CO	CARBON MONOXIDE	202.5	LB	E3BBL
NOX	NITROGEN OXIDES	729	LB	E3BBL
PM10-FIL	PRIMARY PM10, FILTERABLE PORTION ONLY	43.74	LB	E3BBL
PM25-FIL	PRIMARY PM2.5, FILTERABLE PORTION ONLY	33.615	LB	E3BBL
PM-CON	PRIMARY PM CONDENSIBLE PORTION ONLY (ALL LESS THAN 1 MICRON)	52.65	LB	E3BBL
SO2	SULFUR DIOXIDE	1,725.3	LB	E3BBL
VOC	VOLATILE ORGANIC COMPOUNDS	28.35	LB	E3BBL

3.2.3.6 Fossil Fuel Combustion – Residential – Natural Gas

a. Source Category Description

Residential Natural Gas Combustion is natural gas that is burned to heat residential housing as well as in grills, hot water heaters, and dryers.

The general approach to calculating emissions for this SCC is to take State Natural Gas Consumption from the EIA and allocate it to the county level using the methods described below. County level natural gas consumption is multiplied by the emission factors to calculate emissions.

For this source category, the following SCC was assigned:

SCC	Descriptor 1	Descriptor 3	Descriptor 6	Descriptor 8
2104006000	Stationary Source Fuel Combustion	Residential	Natural Gas	Total: Boilers and IC Engines

b. Activity Data

The state-level volume of natural gas consumed by residential combustion in the United States was used to estimate emissions. Natural gas consumption by energy use sector was obtained from the State Energy Data 2006 Consumption tables published by the EIA.[1] Year 2006 consumption data were used as a surrogate for 2008 emissions because these data were the latest data available when this inventory was prepared.

State-level natural gas consumption was allocated to each county using the US Census Bureau's 2000 Census Detailed Housing Information.[2] These data include the number of housing units using a specific type of fuel for residential heating. State natural gas consumption was allocated to each county using the ratio of the number of houses burning natural gas in each county to the total number of houses burning natural gas in the State.

c. Control Factors

No control measures are assumed for this category.

d. Emission Factors

Criteria pollutant emission factors for natural gas are from AP-42.[3] The ammonia emission factor is from EPA's *Estimating Ammonia Emissions from Anthropogenic Sources, Draft Final Report*.[4] HAP emission factors are from AP-42 and "Documentation for the 1999 Base Year Nonpoint Area Source National Emission Inventory for Hazardous Air Pollutants."[5] According to AP-42 (maximum value provided)[2], natural gas has a heat content of 1,050 million BTU per million cubic feet. This value was required to convert those emission factors originally given in units "pounds per million Btu" to units "pounds per million cubic feet." The grains of sulfur per million cubic feet are assumed to be 2000.[6] Some emission factors were revised based on recommendations by an ERTAC advisory panel composed of state and EPA personnel.

County-level criteria pollutant and HAP emissions were calculated by multiplying the total natural gas consumed in each county per year by an emission factor. Table 1 provides a summary of the pollutants, pollutant codes, and emissions factors for residential combustion of natural gas.

e. Sample Calculations

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = FC_x \times EF_{x,p}$$

where:

$E_{x,p}$ = annual emissions for fuel type x and pollutant p,
FC_x = annual fuel consumption for fuel type x,
$EF_{x,p}$ = emission factor for fuel type x and pollutant p,

And $FC_x = A_{State}$ x (H_{county} / H_{State})

where :

A_{State} = State activity data from EIA
H_{County} = number of houses in the county using natural gas as the primary heating fuel
H_{State} = number of houses in the state using natural gas as the primary heating fuel

Example:
Using Allegheny County, PA as an example:

The State of Pennsylvania had a reported use of 205,812 million cubic feet of natural gas in the residential sector in 2006. Allegheny County, PA had 474,292 houses out of the state total of 2,452,941 that use natural gas as the primary heating fuel. This equates to a share of 19.34% of the natural gas used for residential heating in the state. From Table 1, CO emission factor is 40 lb/million ft^3.

E_{CO}= 205,812 million ft^3 × (474,292 houses / 2,452,941 houses) × 40 lb CO/ million ft^3

= 1,591,803 lb CO or 795.9 ton CO

f. References

1. U.S. Department of Energy, Energy Information Administration (EIA). State Energy Data 2006 Consumption. Washington, DC 2008. Internet address: http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_all_phy.csv, accessed November 2008.

2. U.S. Census Bureau. "Table H40. House Heating Fuel Type", Census 2000: Summary File 3. Internet address:

http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=&_lang=en&_ts=, accessed July 2009.

3. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

4. U.S. Environmental Protection Agency. Emission Inventory Improvement Program. Estimating Ammonia Emissions from Anthropogenic Sources, Draft Final Report. Prepared by E.H. Pechan and Associates, Inc. Research Triangle Park, NC. April 2004.

5. U.S. Environmental Protection Agency, Emission Factors and Inventory Group. "Documentation for the 1999 Base Year Nonpoint Area Source National Emission Inventory for Hazardous Air Pollutants." Prepared by Eastern Research Group, Inc. Morrisville, NC. September 2002.

6. U.S. Environmental Protection Agency. Emission Factor and Inventory Group. Final Summary of the Development and Results of a Methodology for Calculating Area Source Emissions from Residential Fuel Combustion. Prepared by Pacific Environmental Services, Inc. Research Triangle Park, NC. September 2002. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/draft1999_ residfuel_inven_apr2003.zip, accessed November 2004.

Table 1. National Criteria Pollutant and HAP Emission Factors for Residential Natural Gas Combustion

Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
129000	PYRENE	0.00000525	LB	E6FT3
206440	FLUORANTHENE	0.00000315	LB	E6FT3
50000	FORMALDEHYDE	0.07875	LB	E6FT3
71432	BENZENE	0.002205	LB	E6FT3
75070	ACETALDEHYDE	0.00001365	LB	E6FT3
85018	PHENANTHRENE	0.00001785	LB	E6FT3
86737	FLUORENE	0.00000294	LB	E6FT3
91203	NAPHTHALENE	0.0006405	LB	E6FT3
CO	CARBON MONOXIDE	40	LB	E6FT3
NH3	AMMONIA	20	LB	E6FT3
NOX	NITROGEN OXIDES	94	LB	E6FT3
PM10-FIL	PRIMARY PM10, FILTERABLE PORTION ONLY	0. 2	LB	E6FT3
PM25-FIL	PRIMARY PM2.5, FILTERABLE PORTION ONLY	0.11	LB	E6FT3

Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
PM-CON	PRIMARY PM CONDENSIBLE PORTION ONLY	0.32	LB	E6FT3
SO2	SULFUR DIOXIDE	0.6	LB	E6FT3
VOC	VOLATILE ORGANIC COMPOUNDS	5.5	LB	E6FT3

3.2.3.7 Non-Residential Construction

a. Source Category Description

Emissions from non-residential construction activity are a function of the acreage disturbed for non-residential construction.
For this source category, the following SCC was assigned:

Source Classification Code	SCC Level One	SCC Level Two	SCC Level Three	SCC Level Four
2311020000	Industrial Processes	Construction: SIC 15 - 17	Heavy Construction	Total

b. Activity Data

Annual Value of Construction Put in Place in the U.S[1] has the 2008 National Value of Non-residential construction. The national value of non-residential construction put in place (in millions of dollars) was allocated to counties using county-level non-residential construction (NAICS Code 2362) employment data obtained from County Business Patterns[2] (CBP). Because some counties employment data was withheld due to privacy concerns, the following procedure was adopted:
State totals for the known county level employees was subtracted from the number of employees reported in the state level version of CBP. This results in the total number of withheld employees in the state.
A starting guess of the midpoint of the range code was used (so for instance in the 1-19 employees range, a guess of 10 employees would be used) and a state total of the withheld counties was computed.
A ratio of guessed employees (Step 2) to withheld employees (Step 1) was then used to adjust the county level guesses up or down so the state total of adjusted guesses should match state total of withheld employees (Step 1)
In 1999 a figure of 2 acres/$\$10^6$ was developed. The Bureau of Labor Statistics Producer Price Index[3] lists costs of the construction industry from 1999-2007.
2007 acres per $\$10^6$ = 1999 acres per $\$10^6$ x (1999 PPI / 2007 PPI)
=2 acres/$\$10^6$ (132.9 / 204.3)
= 1.301 acres per $\$10^6$

c. Emission Factors

Initial PM_{10} emissions from construction of non-residential buildings are calculated using an emission factor of 0.19 tons/acre/month. The duration of construction activity for non-residential construction is assumed to be 11 months.
Regional variances in construction emissions are corrected using soil moisture level and silt content. These correction parameters are applied to initial PM_{10} emissions from non-residential construction to develop the final emissions inventory.

To account for the soil moisture level, the PM_{10} emissions are weighted using the 30-year average precipitation-evaporation (PE) values from Thornthwaite's PE Index. Average precipitation evaporation values for each State were estimated based on PE values for specific climatic divisions within a State. These values range from 7 to 41.
To account for the silt content, thePM_{10} emissions are weighted using average silt content for each county. A data base containing county-level dry silt values was complied. These values were derived by applying a correction factor developed by the California Air Resources Board to convert wet silt values to dry silt values.[7]
The equation for PM_{10} emissions corrected for soil moisture and silt content is:

$$Corrected\ E_{PM10} = Initial\ \mathrm{E}_{PM10} \times \frac{24}{PE} \times \frac{S}{9\%}$$

where: Corrected E_{PM10} = PM_{10} emissions corrected for soil moisture and silt content,
PE = precipitation-evaporation value for each State,
S = % dry silt content in soil for area being inventoried.
Once PM_{10} adjustments have been made, PM_{25} emissions are set to 10% of PM_{10}

d. Control Factors

No control measures are assumed for this category.

e. Example Calculation

$Emissions_{PM10} = N_{Spending}$ x (Emp_{county} / $Emp_{National}$) x Apd x EF_{Adj}
Where $N_{Spending}$ = National spending
Emp_{county} = county level employment data
$Emp_{National}$ = National level employment data
Apd = Acres per million dollars
EF_{Adj} = Adjusted PM10 emission factor

f. References

Annual Value of Construction Put in Place: http://www.census.gov/const/www/ototpage.html
County Business Patterns: http://www.census.gov/econ/cbp/index.html
Bureau of Labor Statistics: http://www.bls.gov/data/ Table BMNR

3.2.3.8 Residential Construction

a. Source Category Description

Emissions from residential construction activity are a function of the acreage disturbed and volume of soil excavated for residential construction. Residential construction activity is developed from data obtained from the U.S. Department of Commerce (DOC)'s Bureau of the Census

Source Classification Code	SCC Level One	SCC Level Two	SCC Level Three	SCC Level Four
2311010000	Industrial Processes	Construction: SIC 15 - 17	Residential	Total

b. Activity Data

There are really two types of activity calculations going on for this SCC, acres of surface soil disturbed, and volume of soil removed for basements

Surface Soil disturbed

The US Census Bureau has 2008 data for *Housing Starts - New Privately Owned Housing Units Started*[1] which provides regional level housing starts based on the groupings of 1 unit, 2-4 units, 5 or more units. A consultation with the Census Bureau in 2002 gave a breakdown of approximately 1/3 of the housing starts being for 2 unit structures, and 2/3 being for 3 and 4 unit structures. The 2-4 unit category was then divided into 2-units, and 3-4 units based on this ratio. To get the number of structures for each grouping, the 1unit category was divided by 1, 2 unit category was divided by 2, and the 3-4 unit category was divided by 3.5. The 5 or more unit category listed may be made up of more than one structure. *New Privately Owned Housing Units Authorized Unadjusted Units*[2] gives a conversion factor to determine the ratio of structures to units in the 5 or more unit category. For example if a county has one 40unit apartment building, the ratio would be 40/1. If there are 5 different 8 unit buildings in the same project, the ratio would be 40/5. Structures started by category are then calculated at a regional level. The table *Annual Housing Units Authorized by Building Permit*[3] has 2007 data at the county level to allocate regional housing starts to the county level. This results in county level housing starts by number of units. The following surface areas were assumed disturbed for each unit type:

Table 1: Surface Soil removed per unit type

1-Unit	1/4 acre/structure
2-Unit	1/3 acre/structure
Apartment	1/2 acre/structure

The 3-4 unit category was considered to be an apartment. Multiplication of housing starts to soil removed results in number of acres disturbed for each unit category.

Basement soil removal
To calculate basement soil removal, 2007 *Characteristics of New Houses*[4] is used to estimate the percentage of 1 unit structures that have a basement (on the regional level). The county level estimate of number of 1 unit starts is multiplied by the percent of 1 unit houses in the region that have a basement to get the number of basements in a county. Basement volume is calculated by assuming a 2000 square foot house has a basement dug to a depth of 8 feet (making 1600 ft^3 per basement). An additional 10% is added for peripheral dirt bringing the total to 1760 ft^3 per basement.

c. Emission Factors

Initial PM_{10} emissions from construction of single family, two family, and apartments structures are calculated using the emission factors given in Table 2. The duration of construction activity for houses is assumed to be 6 months and the duration of construction for apartments is assumed to be 12 months.

Table 2. Emission Factors for Residential Construction

Type of Structure	Emission Factor	Duration of Construction
Apartments	0.11 tons PM10/acre-month	12 months
2-Unit Structures	0.032 tons PM10/acre-month	6 months
1-Unit Structures w/o Basements	0.032 tons PM10/acre-month	6 months
1-unit Structures with Basements	0.011 tons PM10/acre-month	6 months
	0.059 tons PM10/1000 cubic yards	

Regional variances in construction emissions are corrected using soil moisture level, silt content, and control efficiency. These correction parameters are applied to initial PM_{10} emissions from residential construction to develop the final emissions inventory.

To account for the soil moisture level, the PM_{10} emissions are weighted using the precipitation-evaporation (PE) values from Thornthwaite's PE Index. Average precipitation evaporation values for each State were estimated based on PE values for specific climatic divisions within a State. These values range from 7 to 41.

To account for the silt content, thePM_{10} emissions are weighted using average silt content for each county. A data base containing county-level dry silt values was complied. These values

were derived by applying a correction factor developed by the California Air Resources Board to convert wet silt values to dry silt values.[5]

The equation for PM_{10} emissions corrected for soil moisture and silt content is:

$$Corrected\ E_{PM10} = Initial\ E_{PM10} \times \frac{24}{PE} \times \frac{S}{9\%}$$

where: Corrected E_{PM10} = PM_{10} emissions corrected for soil moisture and silt content,
PE = precipitation-evaporation value for each State,
S = % dry silt content in soil for area being inventoried.

Once PM_{10} adjustments have been made, PM_{25} emissions are set to 20% of PM_{10}

d. Control Factors

No control measures are assumed for this category.

e. Example Calculation

PM_{10} Emissions = $\sum(A_{unit} \text{ x } T_{construction} \text{ x } EF_{unit}) \text{ x } Adj_{PM}$
Where $A_{unit} = HS_{Unit} \text{ x } SM_{Unit}$
HS_{Unit} = Regional Housing Starts x (county building permits/Regional building permits)
SM_{Unit} = Area or volume of soil moved for the given unit type
$T_{Construction}$ = Construction time (in months) for given unit type
EF_{Unit} = Unadjusted emission factor for PM_{10} for the given unit type
Adj_{PM} = PM Adjustment factor

f. References

New Privately Owned Housing Units Started for 2008 (Not seasonally adjusted)
http://www.census.gov/const/startsua.pdf
Table 2au. New Privately Owned Housing Units Authorized Unadjusted Units for Regions, Divisions, and States http://www.census.gov/const/C40/Table2/tb2u2007.txt
Annual Housing Units Authorized by Building Permits CO2007A, purchased from US Department of Census
Type of Foundation in New One-Family Houses Completed,
http://www.census.gov/const/C25Ann/sftotalfoundation.pdf

3.2.3.9 Road Construction

a. Source Category Description

Emissions from road construction activity are a function of the acreage disturbed for road construction. Road construction activity is developed from data obtained from the Federal Highway Administration (FHWA).

Source Classification Code	SCC Level One	SCC Level Two	SCC Level Three	SCC Level Four
2311030000	Industrial Processes	Construction: SIC 15 - 17	Road Construction	Total

b. Activity

The Federal Highway Administration has *Highway Statistics, Section IV - Highway Finance, Table SF-12A, State Highway Agency Capital Outlay*[1] for 2006 which outlines spending by state in several different categories. For this SCC, the following columns are used: New Construction, Relocation, Added Capacity, Major Widening, and Minor Widening. These columns are also differentiated according to the following six classifications:

1. Interstate, urban
2. Interstate, rural
3. Other arterial, urban
4. Other arterial, rural
5. Collectors, urban
6. Collectors, rural

The State expenditure data are then converted to new miles of road constructed using $/mile conversions obtained from the North Carolina Department of Transportation (NCDOT) in 2000. A conversion of $4 million/mile is applied to the interstate expenditures. For expenditures on other arterial and collectors, a conversion factor of $1.9 million/mile is applied, which corresponds to all other projects.
The new miles of road constructed is used to estimate the acreage disturbed due to road construction. The total area disturbed in each state is calculated by converting the new miles of road constructed to acres using an acres disturbed/mile conversion factor for each road type as given in the table below:

Table 1: Spending per mile and Acres disturbed per mile by highway type

Road Type	Thousand Dollars per mile	Acres Disturbed per mile
URBAN AREAS, INTERSTATE	4000	15.2
RURAL AREAS, INTERSTATE	4000	15.2

Road Type	Thousand Dollars per mile	Acres Disturbed per mile
URBAN AREAS, OTHER ARTERIALS	1900	15.2
RURAL AREAS, OTHER ARTERIALS	1900	12.7
URBAN AREAS, COLLECTORS	1900	9.8
RURAL AREAS, COLLECTORS	1900	7.9

Residential building starts[2] are used to allocate the state-level acres disturbed by road construction to the county. A ratio of the number of building starts in each county to the total number of building starts in each state is applied to the state-level acres disturbed to estimate the total number of acres disturbed by road construction in each county.

c. Emission Factors

Initial PM_{10} emissions from construction of roads are calculated using an emission factor of 0.42 tons/acre/month. Since most road construction consists of grading and leveling of land, the higher emission factor more accurately reflects the high level of cut and fill activity that occurs at road construction sites. The duration of construction activity for road construction is assumed to be 12 months.

Regional variances in construction emissions are corrected using soil moisture level, silt content, and control efficiency. These correction parameters are applied to initial PM_{10} emissions from non-residential construction to develop the final emissions inventory.

To account for the soil moisture level, the PM_{10} emissions are weighted using the precipitation-evaporation (PE) values from Thornthwaite's PE Index. Average precipitation evaporation values for each State were estimated based on PE values for specific climatic divisions within a State. These values range from 7 to 41.

To account for the silt content, thePM_{10} emissions are weighted using average silt content for each county. A data base containing county-level dry silt values was complied. These values were derived by applying a correction factor developed by the California Air Resources Board to convert wet silt values to dry silt values.

The equation for PM_{10} emissions corrected for soil moisture and silt content is:

$$Corrected\ E_{PM10} = Initial\ \mathrm{E}_{PM10} \times \frac{24}{PE} \times \frac{S}{9\%}$$

where: Corrected E_{PM10} = PM_{10} emissions corrected for soil moisture and silt content,
PE = precipitation-evaporation value for each State,
S = % dry silt content in soil for area being inventoried.

Once PM_{10} adjustments have been made, PM_{25} emissions are set to 20% of PM_{10}

d. Control Factors

No control measures are assumed for this category.

e. Example Calculation

$Emissions_{PM10} = \sum(HD_{rt} \times MC_{rt} \times AC_{rt}) \times (HS_{County} / HS_{State}) \times EFAdj$

Where HD_{rt} = Highway Spending for a specific road type

MC_{rt} = Mileage conversion for a specific road type

AC_{rt} = Acreage conversion for a specific road type

HS_{County} = Housing Starts in a given county

HS_{State} = Housing Starts in a given State

EF_{Adj} = Adjusted PM10 Emission Factor

f. References

2006 Highway Spending : http://www.fhwa.dot.gov/policy/ohim/hs06/xls/sf12a.xls

Annual Housing Units Authorized by Building Permits CO2007A, purchased from US Department of Census

3.2.3.10 Agricultural Production – Livestock

a. Source Category Description

Livestock refers to domesticated animals intentionally reared for the production of food, fiber, or other goods or for the use of their labor. The definition of livestock in this category includes beef cattle, dairy cattle, ducks, geese, goats, horses, poultry, sheep, and swine.

The approach to calculating emissions for the assigned SCCs consisted of four general steps, as follows:

- Determining county-level population of animals for 2007.
- For beef, dairy, poultry, and swine, apportioning animal populations to a manure management train (MMT) for each county. Animal populations for ducks, geese, goats, horses, and sheep were not apportioned to MMTs.
- Modifying the emission factor files provided with the CMU Ammonia Model v. 3.6 to ensure that every county had an assigned emission factor.[1]
- Using the CMU Ammonia Model v. 3.6 to calculate ammonia emissions based on the updated county-level animal populations and emission factors.

For this source category, the following SCCs were assigned:

SCC	Descriptor 2	Descriptor 4	Descriptor 7	Descriptor 8
2805001100	Miscellaneous Area Sources	Agriculture Production - Livestock	Beef cattle - finishing operations on feedlots (drylots)	Confinement
2805001200	Miscellaneous Area Sources	Agriculture Production - Livestock	Beef cattle - finishing operations on feedlots (drylots)	Manure handling and storage
2805001300	Miscellaneous Area Sources	Agriculture Production - Livestock	Beef cattle - finishing operations on feedlots (drylots)	Land application of manure
2805002000	Miscellaneous Area Sources	Agriculture Production - Livestock	Beef cattle production composite	Not Elsewhere Classified
2805003100	Miscellaneous Area Sources	Agriculture Production - Livestock	Beef cattle - finishing operations on pasture/range	Confinement
2805007100	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - layers with dry manure management systems	Confinement

SCC	Descriptor 2	Descriptor 4	Descriptor 7	Descriptor 8
2805007300	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - layers with dry manure management systems	Land application of manure
2805008100	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - layers with wet manure management systems	Confinement
2805008200	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - layers with wet manure management systems	Manure handling and storage
2805008300	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - layers with wet manure management systems	Land application of manure
2805009100	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - broilers	Confinement
2805009200	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - broilers	Manure handling and storage
2805009300	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - broilers	Land application of manure
2805010100	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - turkeys	Confinement
2805010200	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - turkeys	Manure handling and storage
2805010300	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry production - turkeys	Land application of manure
2805018000	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle composite	Not Elsewhere Classified
2805019100	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - flush dairy	Confinement
2805019200	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - flush dairy	Manure handling and storage
2805019300	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - flush dairy	Land application of manure
2805021100	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - scrape dairy	Confinement

SCC	Descriptor 2	Descriptor 4	Descriptor 7	Descriptor 8
2805021200	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - scrape dairy	Manure handling and storage
2805021300	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - scrape dairy	Land application of manure
2805022100	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - deep pit dairy	Confinement
2805022200	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - deep pit dairy	Manure handling and storage
2805022300	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - deep pit dairy	Land application of manure
2805023100	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - drylot/pasture dairy	Confinement
2805023200	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - drylot/pasture dairy	Manure handling and storage
2805023300	Miscellaneous Area Sources	Agriculture Production - Livestock	Dairy cattle - drylot/pasture dairy	Land application of manure
2805025000	Miscellaneous Area Sources	Agriculture Production - Livestock	Swine production composite	Not Elsewhere Classified (see also 28-05-039, -047, -053)
2805030000	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry Waste Emissions	Not Elsewhere Classified (see also 28-05-007, -008, -009)
2805030007	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry Waste Emissions	Ducks
2805030008	Miscellaneous Area Sources	Agriculture Production - Livestock	Poultry Waste Emissions	Geese
2805035000	Miscellaneous Area Sources	Agriculture Production - Livestock	Horses and Ponies Waste Emissions	Not Elsewhere Classified
2805039100	Miscellaneous Area Sources	Agriculture Production - Livestock	Swine production - operations with lagoons (unspecified animal age)	Confinement
2805039200	Miscellaneous Area Sources	Agriculture Production - Livestock	Swine production - operations with lagoons (unspecified animal age)	Manure handling and storage

SCC	Descriptor 2	Descriptor 4	Descriptor 7	Descriptor 8
2805039300	Miscellaneous Area Sources	Agriculture Production - Livestock	Swine production - operations with lagoons (unspecified animal age)	Land application of manure
2805040000	Miscellaneous Area Sources	Agriculture Production - Livestock	Sheep and Lambs Waste Emissions	Total
2805045000	Miscellaneous Area Sources	Agriculture Production - Livestock	Goats Waste Emissions	Not Elsewhere Classified
2805047100	Miscellaneous Area Sources	Agriculture Production - Livestock	Swine production - deep-pit house operations (unspecified animal age)	Confinement
2805047300	Miscellaneous Area Sources	Agriculture Production - Livestock	Swine production - deep-pit house operations (unspecified animal age)	Land application of manure
2805053100	Miscellaneous Area Sources	Agriculture Production - Livestock	Swine production - outdoor operations (unspecified animal age)	Confinement

b. Activity Data

County-level animal numbers for 2007 were obtained from the U.S. Department of Agriculture's 2007 Census of Agriculture report.[2] For Virginia, the county-level census data includes animal populations from Virginia's 39 independent cities. For some counties and states, census data was withheld to avoid disclosing data for individual farms. However, the total national-level animal numbers and most state-level animal numbers for each livestock type reported in the Census include those animal numbers not disclosed at the county-level. When available, state-level animal numbers from the USDA NASS online database were used for states with undisclosed animal numbers in the 2007 Census of Agriculture.[3] To determine the total number of undisclosed animals, disclosed county-level animal numbers for each livestock type were summed and subtracted from the total state animal numbers. The total undisclosed animal population for a specific livestock type was then allocated to those counties reporting undisclosed data based on the number of farms raising that livestock in each county.[2] If the state-level data was undisclosed and not available in the NASS database, then national animal numbers were used to determine undisclosed state numbers. The disclosed county-level data was then summed and subtracted from the state-level data to determine animal numbers not disclosed at the county-level. These numbers were then allocated to those counties reporting undisclosed data based on the number of farms raising that livestock in each county.

County-level animal numbers were apportioned to manure management trains. A MMT consists of an animal confinement area (e.g., drylot, pasture, flush, scrape); components used to store,

process, or stabilize the manure (e.g., anaerobic lagoons, deep pits); and a land application site where manure is used as a fertilizer source.[4] The apportionment was based on county-level MMT percentages derived from the CMU Ammonia Model. For each livestock type, the county-level number of animals in each MMT was divided by the total county-level animal population for that livestock type to calculate the percentage of total animals managed by each MMT. In cases where the county-level numbers were zero in the 2002 CMU Ammonia Model input files, the county was assigned state-level MMT percentages. The county-level animal population for each livestock type from the 2007 Census of Agriculture was multiplied by the MMT percentages to determine the total number of animals in each MMT in 2007. Animal populations for ducks, geese, goats, horses, and sheep were not apportioned to MMTs.

Cattle reported as "Other Cattle" in the 2007 Census of Agriculture were divided between dairy cattle and beef cattle at the county-level using percent allocations derived from county-level dairy and beef cattle reported in the 2007 Census of Agriculture and corrected for undisclosed data. The animal numbers from "Other Cattle" apportioned to dairy and beef cattle were used to create the Dairy Cattle – Composite and Beef Cattle – Composite activity input files for the CMU Ammonia Model.

County-level pullet numbers reported in the 2007 Census of Agriculture were used to create the Poultry – Composite activity input file for the CMU Ammonia Model.

c. Emission Factors

The emission factor for the poultry composite categories was obtained from an EPA report and is reported in Table 1 below.[4] The county-level emission factors for the beef composite and dairy composite categories were developed using beef and dairy cattle emission factors provided with the 2002 CMU Model. Specifically, weighted average emission factors were calculated based on the number of beef or dairy cattle in each MMT from the 2002 CMU Model activity files and the emission factor assigned to each MMT. All other emission factors were provided with the CMU Ammonia Model v.3.6. The emission factors for some counties in the CMU Ammonia Model files were zero. To ensure that all counties with animal populations were assigned emissions factors, the emission factor input files provided with the CMU Ammonia Model were modified. For all counties with an emission factor of zero, the emission factor was replaced with the state average emission factor. If all counties in the state had emission factors of zero, then the county emission factor was replaced with the national average emission factor. The state average emission factor was calculated by summing the counties with non-zero emission factors in the state and dividing the total by the number of counties in that state with non-zero emission factors. The national average emission factor was calculated by summing the counties with non-zero emission factors in the nation and dividing the total by the number of counties in the nation with non-zero emission factors.

d. Emissions

The livestock activity files provided with the CMU Ammonia Model v.3.6 were replaced with the updated county-level animal population files and modified emissions files. County-level ammonia emissions were then calculated by running the model.

e. Sample Calculations

Allocation of Undisclosed Data

From the 2007 Census of Agriculture, the total national number of beef cattle in Alabama is 678,949. The total number of beef cattle disclosed at the county-level is 388,827.

Total number of beef cattle undisclosed at the county-level = 678,949 - 338,827 = 340,122

From the 2007 Census of Agriculture, the total number of farms in Alabama not disclosing beef cattle numbers is 10,518.

Average beef cattle per farm not disclosing data = 340,122 / 10,518 = 32.3

For 2007, Baldwin County, Alabama beef cattle data was not disclosed. The total number of farms with beef cattle in Baldwin County is 343.

Estimated number of beef cattle in Baldwin County = 32.3 x 343 = 11,092

Manure Management Train

From the 2002 CMU Ammonia Model input files, Chilton County, Alabama had 79 beef cattle under drylot management and 18,900 beef cattle under pasture management in 2002.

Total beef cattle = 79 + 18,900 = 18,979
% of beef cattle under drylot management = 79 / 18,979 = 0.42
% of beef cattle under pasture management = 18,900 / 18,979 = 99.58

The total number of beef cattle for Chilton County reported in the 2007 Census of Agriculture is 7,939.

Number of beef cattle under drylot management in 2007 = 7,939 x 0.0042 = 33
Number of beef cattle under pasture management in 2007 = 7,939 x 0.9958 = 7,906

"Other Cattle"

For Clay County, Alabama, the 2007 Census of Agriculture reports the number of "Other Cattle" as 5,471, the number of dairy cattle as 216, and the number of beef cattle as 9,096.

Total beef and dairy cattle reported = 216 + 9,096 = 9,312
% of other cattle assigned to beef cattle = (9,096/9,312)*100 = 97.68
% of other cattle assigned to dairy cattle = (216/9,312)*100 = 2.32
Other cattle allocated to beef cattle = 5,471 x .9768 = 5,344
Other cattle allocated to dairy cattle = 5,471 x 0.0232 = 127

f. References

1. Cliff Davidson, Peter Adams, Ross Strader, Rob Pinder, Natalie Anderson, Marian Goebes, and Josh Ayers. The Environmental Institute, Carnegie Mellon University, *CMU Ammonia Model v.3.6.*, 2004, at http://www.cmu.edu/ammonia/, accessed 25 April 2009.

2. U.S. Department of Agriculture, *2007 Census of Agriculture*, at http://www.agcensus.usda.gov/, accessed 30 April 2009.

3. U.S. Department of Agriculture, National Agricultural Statistics Service, at http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/, accessed 28 January 2010.

4. U.S. Environmental Protection Agency, *National Emission Inventory – Ammonia Emissions from Animal Agricultural Operations*, Revised Draft Report, 22 April 2005, p. 4-6, at http://www.epa.gov/ttn/chief/net/2002inventory.html, accessed 5 May 2009.

5. Jonathan Dorn, E.H. Pechan & Associates. 2009. A weighted average emission factor calculated using data from the 2002 CMU Ammonia Model v.3.6.

Table 1. Livestock Emission Factors

Description	Pollutant Code	Emission Factor	Emission Factor Unit	Emission Factor Reference
Beef Cattle - Composite	NH3	county-specific	kg NH_3/cow/month	5
Beef Cattle - Drylot Operation - Confinement	NH3	9.45E-01	kg NH_3/cow/month	1
Beef Cattle - Drylot Operation - Land Application	NH3	state-specific	kg NH_3/cow/month	1
Beef Cattle - Drylot Operation - Manure Storage	NH3	3.78E-04	kg NH_3/cow/month	1
Beef Cattle - Pasture Operation - Confinement	NH3	county-specific	kg NH_3/cow/month	1
Dairy Cattle - Composite	NH3	county-specific	kg NH_3/cow/month	5
Dairy Cattle - Deep Pit Dairy Confinement	NH3	2.42E+00	kg NH_3/cow/month	1

Description	Pollutant Code	Emission Factor	Emission Factor Unit	Emission Factor Reference
Dairy Cattle - Deep Pit Dairy Land Application	NH3	state-specific	kg NH_3/cow/month	1
Dairy Cattle - Deep Pit Dairy Manure Storage	NH3	1.13E-01	kg NH_3/cow/month	1
Dairy Cattle - Drylot Dairy Confinement	NH3	state-specific	kg NH_3/cow/month	1
Dairy Cattle - Drylot Dairy Land Application	NH3	state-specific	kg NH_3/cow/month	1
Dairy Cattle - Drylot Dairy Manure Storage	NH3	state-specific	kg NH_3/cow/month	1
Dairy Cattle - Flush Dairy Confinement	NH3	2.00E+00	kg NH_3/cow/month	1
Dairy Cattle - Flush Dairy Land Application	NH3	state-specific	kg NH_3/cow/month	1
Dairy Cattle - Flush Dairy Manure Storage	NH3	state-specific	kg NH_3/cow/month	1
Dairy Cattle - Scrape Dairy Confinement	NH3	state-specific	kg NH_3/cow/month	1
Dairy Cattle - Scrape Dairy Land Application	NH3	state-specific	kg NH_3/cow/month	1
Dairy Cattle - Scrape Dairy Manure Storage	NH3	state-specific	kg NH_3/cow/month	1
Ducks	NH3	7.67E-02	kg NH_3/duck/month	1
Geese	NH3	7.67E-02	kg NH_3/goose/month	1
Goats	NH3	5.29E-01	kg NH_3/goat/month	1
Horses	NH3	1.02E+00	kg NH_3/horse/month	1
Poultry - Broiler Operation - Confinement	NH3	8.32E-03	kg NH_3/bird/month	1
Poultry - Broiler Operation - Land Application	NH3	6.80E-03	kg NH_3/bird/month	1
Poultry - Broiler Operation - Manure Storage	NH3	1.51E-03	kg NH_3/bird/month	1
Poultry - Composite	NH3	2.00E-02	kg NH_3/bird/month	4
Poultry - Layers - Dry Manure Operation - Confinement	NH3	3.36E-02	kg NH_3/bird/month	1
Poultry - Layers - Dry Manure Operation - Land Application	NH3	county-specific	kg NH_3/bird/month	1
Poultry - Layers - Wet Manure Operation - Confinement	NH3	9.45E-03	kg NH_3/bird/month	1
Poultry - Layers - Wet Manure Operation - Land Application	NH3	county-specific	kg NH_3/bird/month	1
Poultry - Layers - Wet Manure Operation - Manure Storage	NH3	county-specific	kg NH_3/bird/month	1

Description	Pollutant Code	Emission Factor	Emission Factor Unit	Emission Factor Reference
Poultry - Turkey Operation - Confinement	NH3	3.78E-02	kg NH_3/bird/month	1
Poultry - Turkey Operation - Land Application	NH3	3.40E-02	kg NH_3/bird/month	1
Poultry - Turkey Operation - Storage	NH3	6.80E-03	kg NH_3/bird/month	1
Sheep	NH3	2.65E-01	kg NH_3/sheep/month	1
Swine - Composite	NH3	county-specific	kg NH_3/pig/month	1
Swine - Deep Pit Operation - Confinement	NH3	2.65E-01	kg NH_3/pig/month	1
Swine - Deep Pit Operation - Land Application	NH3	county-specific	kg NH_3/pig/month	1
Swine - Lagoon Operation - Confinement	NH3	2.27E-01	kg NH_3/pig/month	1
Swine - Lagoon Operation - Land Application	NH3	county-specific	kg NH_3/pig/month	1
Swine - Lagoon Operation - Manure Storage	NH3	county-specific	kg NH_3/pig/month	1
Swine - Outdoor Operation - Confinement	NH3	county-specific	kg NH_3/pig/month	1

3.2.3.11 Commercial Cooking

a. Source Category Description

Commercial Cooking emissions are for 5 source categories based on equipment type. Emissions estimates are for all types of meat cooked in a particular piece of equipment. Deep fat frying of french fries was also included.

For this source category, the following SCCs were assigned:

Source Classification Code	SCC Level One	SCC Level Two	SCC Level Three	SCC Level Four
2302002100	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Charbroiling	Conveyorized Charbroiling
2302002200	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Charbroiling	Under-fired Charbroiling
2302003000	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Frying	Deep Fat Frying
2302003100	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Frying	Flat Griddle Frying
2302003200	Industrial Processes	Food and Kindred Products: SIC 20	Commercial Cooking - Frying	Clamshell Griddle Frying

b. Activity Data

Activity data was collected from the US Census Bureau's county level population estimates for July 1, 2008.[1]

c. Control Factors

No controls were assumed for this category.

d. Emission Factors

Emission factors were developed and reviewed by an ERTAC advisory panel composed of state and EPA personnel (Contact: Roy Huntley, huntley.roy@epa.gov). They were created by taking 2002 emissions in the NEI and dividing by the 2002 population to develop per capita emission factors. These emission factors are listed in Table 1.

e. Sample Calculations

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = A_x \times EF_{x,p}$$

where:

$E_{x,p}$ = annual emissions for category x and pollutant p;
A_x = population data associated with category x;
$EF_{x,p}$ = emission factor for category x and pollutant p.

Example:
Using conveyorized charbroiling in Allegheny County, PA as an example:

According to the US Census Bureau, population on July 1, 2008 is 1,215,103
The emission factor for VOC is 0.01205 lb/person

$$E_{VOC} = 1{,}215{,}103 \text{ people} \times 0.01205 \text{ lb VOC/ person}$$

$$= 14{,}650 \text{ lb VOC or } 7.3 \text{ ton VOC}$$

f. References

1. DOC, 2008: U.S. Department of Commerce, Bureau of the Census, 2008 *Population Estimates Program GCT-T1: Population Estimates*, Washington, DC.

Table 1: Commercial Cooking Emission Factors Developed by ERTAC

SCC	SCC description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
2302002100	Conveyorized Charbroiling	100027	1.326E-05	LB	EACH
2302002200	Under-fired Charbroiling	100027	6.385E-05	LB	EACH
2302002100	Conveyorized Charbroiling	100414	7.668E-05	LB	EACH
2302002200	Under-fired Charbroiling	100414	5.312E-04	LB	EACH
2302002100	Conveyorized Charbroiling	100425	3.730E-04	LB	EACH
2302002200	Under-fired Charbroiling	100425	2.747E-03	LB	EACH
2302002100	Conveyorized Charbroiling	106445	7.003E-06	LB	EACH
2302002200	Under-fired Charbroiling	106445	4.214E-05	LB	EACH
2302002100	Conveyorized Charbroiling	107062	2.682E-05	LB	EACH
2302002200	Under-fired Charbroiling	107062	2.183E-04	LB	EACH
2302002100	Conveyorized Charbroiling	108883	3.597E-04	LB	EACH
2302002200	Under-fired Charbroiling	108883	2.496E-03	LB	EACH
2302002100	Conveyorized Charbroiling	108952	4.421E-05	LB	EACH
2302002200	Under-fired Charbroiling	108952	3.063E-04	LB	EACH
2302002100	Conveyorized Charbroiling	120127	5.943E-06	LB	EACH
2302002200	Under-fired Charbroiling	120127	1.914E-05	LB	EACH
2302003100	Flat Griddle Frying	120127	8.487E-06	LB	EACH
2302002100	Conveyorized Charbroiling	123386	1.466E-04	LB	EACH
2302002200	Under-fired Charbroiling	123386	1.113E-03	LB	EACH

SCC	SCC description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
2302002100	Conveyorized Charbroiling	129000	8.852E-06	LB	EACH
2302002200	Under-fired Charbroiling	129000	3.587E-05	LB	EACH
2302003100	Flat Griddle Frying	129000	3.139E-05	LB	EACH
2302002100	Conveyorized Charbroiling	130498292	2.709E-04	LB	EACH
2302002200	Under-fired Charbroiling	130498292	7.911E-04	LB	EACH
2302003100	Flat Griddle Frying	130498292	2.589E-04	LB	EACH
2302002100	Conveyorized Charbroiling	1330207	7.799E-07	LB	EACH
2302002200	Under-fired Charbroiling	1330207	1.560E-06	LB	EACH
2302002100	Conveyorized Charbroiling	191242	1.309E-06	LB	EACH
2302002200	Under-fired Charbroiling	191242	2.542E-06	LB	EACH
2302002100	Conveyorized Charbroiling	193395	1.278E-06	LB	EACH
2302002200	Under-fired Charbroiling	193395	1.723E-06	LB	EACH
2302002100	Conveyorized Charbroiling	206440	6.484E-06	LB	EACH
2302002200	Under-fired Charbroiling	206440	2.638E-05	LB	EACH
2302003100	Flat Griddle Frying	206440	2.371E-05	LB	EACH
2302002100	Conveyorized Charbroiling	208968	2.476E-05	LB	EACH
2302002200	Under-fired Charbroiling	208968	6.372E-05	LB	EACH
2302003100	Flat Griddle Frying	208968	4.886E-06	LB	EACH
2302002100	Conveyorized Charbroiling	50000	7.796E-04	LB	EACH
2302002200	Under-fired Charbroiling	50000	5.876E-03	LB	EACH
2302002100	Conveyorized Charbroiling	50328	1.450E-06	LB	EACH
2302002200	Under-fired Charbroiling	50328	2.332E-06	LB	EACH
2302003100	Flat Griddle Frying	50328	1.154E-06	LB	EACH
2302002100	Conveyorized Charbroiling	56553	1.772E-06	LB	EACH
2302002200	Under-fired Charbroiling	56553	5.432E-06	LB	EACH
2302003100	Flat Griddle Frying	56553	2.918E-06	LB	EACH
2302002100	Conveyorized Charbroiling	71432	1.006E-03	LB	EACH
2302002200	Under-fired Charbroiling	71432	7.351E-03	LB	EACH
2302002100	Conveyorized Charbroiling	75070	5.562E-04	LB	EACH
2302002200	Under-fired Charbroiling	75070	4.242E-03	LB	EACH
2302002100	Conveyorized Charbroiling	83329	1.613E-06	LB	EACH
2302002200	Under-fired Charbroiling	83329	2.776E-06	LB	EACH
2302003100	Flat Griddle Frying	83329	1.357E-06	LB	EACH
2302002100	Conveyorized Charbroiling	84742	4.140E-06	LB	EACH
2302002200	Under-fired Charbroiling	84742	2.413E-05	LB	EACH

SCC	SCC description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
2302002100	Conveyorized Charbroiling	85018	2.771E-05	LB	EACH
2302002200	Under-fired Charbroiling	85018	8.647E-05	LB	EACH
2302003100	Flat Griddle Frying	85018	6.021E-05	LB	EACH
2302002100	Conveyorized Charbroiling	86737	6.408E-06	LB	EACH
2302002200	Under-fired Charbroiling	86737	2.003E-05	LB	EACH
2302003100	Flat Griddle Frying	86737	6.484E-06	LB	EACH
2302002100	Conveyorized Charbroiling	91203	1.135E-04	LB	EACH
2302002200	Under-fired Charbroiling	91203	2.649E-04	LB	EACH
2302003100	Flat Griddle Frying	91203	1.308E-04	LB	EACH
2302002100	Conveyorized Charbroiling	92524	1.271E-05	LB	EACH
2302002200	Under-fired Charbroiling	92524	2.613E-05	LB	EACH
2302003100	Flat Griddle Frying	92524	2.788E-06	LB	EACH
2302002100	Conveyorized Charbroiling	95476	6.167E-05	LB	EACH
2302002200	Under-fired Charbroiling	95476	4.387E-04	LB	EACH
2302002100	Conveyorized Charbroiling	95487	3.482E-06	LB	EACH
2302002200	Under-fired Charbroiling	95487	2.111E-05	LB	EACH
2302002100	Conveyorized Charbroiling	98862	4.991E-06	LB	EACH
2302002200	Under-fired Charbroiling	98862	3.250E-05	LB	EACH
2302002100	Conveyorized Charbroiling	CO	4.245E-02	LB	EACH
2302002200	Under-fired Charbroiling	CO	1.350E-01	LB	EACH
2302003000	Deep Fat Flying	CO	0.000E+00	LB	EACH
2302003100	Flat Griddle Frying	CO	1.269E-02	LB	EACH
2302003200	Clamshell Griddle Frying	CO	0.000E+00	LB	EACH
2302002200	Under-fired Charbroiling	NOX	0.000E+00	LB	EACH
2302002100	Conveyorized Charbroiling	PM10-FIL	1.648E-04	LB	EACH
2302002200	Under-fired Charbroiling	PM10-FIL	1.048E-03	LB	EACH
2302003100	Flat Griddle Frying	PM10-FIL	2.727E-04	LB	EACH
2302003200	Clamshell Griddle Frying	PM10-FIL	1.981E-05	LB	EACH
2302002100	Conveyorized Charbroiling	PM10-PRI	4.980E-02	LB	EACH
2302002200	Under-fired Charbroiling	PM10-PRI	3.528E-01	LB	EACH
2302003000	Deep Fat Flying	PM10-PRI	0.000E+00	LB	EACH
2302003100	Flat Griddle Frying	PM10-PRI	1.031E-01	LB	EACH
2302003200	Clamshell Griddle Frying	PM10-PRI	6.994E-03	LB	EACH
2302002100	Conveyorized Charbroiling	PM25-FIL	1.597E-04	LB	EACH
2302002200	Under-fired Charbroiling	PM25-FIL	1.013E-03	LB	EACH
2302003100	Flat Griddle Frying	PM25-FIL	2.074E-04	LB	EACH
2302003200	Clamshell Griddle Frying	PM25-FIL	1.685E-05	LB	EACH

SCC	SCC description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
2302002100	Conveyorized Charbroiling	PM25-PRI	4.827E-02	LB	EACH
2302002200	Under-fired Charbroiling	PM25-PRI	3.415E-01	LB	EACH
2302003000	Deep Fat Flying	PM25-PRI	0.000E+00	LB	EACH
2302003100	Flat Griddle Frying	PM25-PRI	7.834E-02	LB	EACH
2302003200	Clamshell Griddle Frying	PM25-PRI	5.910E-03	LB	EACH
2302002200	Under-fired Charbroiling	SO2	0.000E+00	LB	EACH
2302002100	Conveyorized Charbroiling	VOC	1.206E-02	LB	EACH
2302002200	Under-fired Charbroiling	VOC	4.148E-02	LB	EACH
2302003000	Deep Fat Flying	VOC	1.261E-02	LB	EACH
2302003100	Flat Griddle Frying	VOC	5.943E-03	LB	EACH
2302003200	Clamshell Griddle Frying	VOC	2.316E-04	LB	EACH

3.2.3.12 Asphalt Paving – Cutback

a. Source Category Description

Asphalt paving is the process of applying asphalt concrete to seal or repair the surface of roads, parking lots, driveways, walkways, or airport runways. Asphalt concrete is a composite material comprised of a binder and a mineral aggregate. The binder, referred to as asphalt cement, is a byproduct of petroleum refining and contains the semi-solid residual material left after the more volatile chemical fractions have been distilled off.[1]

Asphalt cements thinned with petroleum distillates are known as cutback asphalts. The primary uses of cutback asphalt include tack and seal operations, priming roadbeds, and paving operations for pavements up to several inches thick. Cut-back asphalt is produced by thinning the binder in a diluent containing 25 to 45 percent petroleum distillates by volume prior to mixing with the aggregate. This reduces the viscosity of the asphalt making it easier to work with the mixture.

Emissions from cutback asphalt result from the evaporation of VOCs and HAPS after the mixture is laid down. Of all asphalt types, cutback asphalt has the highest diluent content and, as a result, emits the highest levels of VOCs per ton used. The timeframe and quantity of VOC and HAP emissions depend on the type and the quantity of organic solvent used as a diluent.

For this source category, the following SCC was assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2461021000	Solvent Utilization	Miscellaneous Non-industrial: Commercial	Cutback Asphalt	Total: All Solvent Types

The general approach to calculating emissions from cutback asphalt paving is to multiply the estimated county-level cutback asphalt usage by emission factors for VOCs and HAPs.

b. Activity Data

State-level cutback asphalt usage in 2008 was obtained from the Asphalt Institute's *2008 Asphalt Usage Survey*.[2] State-level data were allocated to county-level according to the fraction of paved road vehicle miles traveled (VMT) in each county.

Total annual VMT estimates by State and roadway class were obtained from the Federal Highway Administration's (FHWA) annual Highway Statistics report.[3] Paved road VMT was calculated by subtracting the State/roadway class unpaved road VMT from total State/roadway class VMT. State-level paved road VMT was spatially allocated to counties according to the fraction of total VMT in each county for the specific roadway class as shown by the following equation:

$$VMT_{x,total} = \sum VMT_{ST,y} * VMT_{x,y} / VMT_{ST,y}$$

where: $VMT_{x,total}$ = VMT (million miles) in county x on all paved roadways
$VMT_{ST,y}$ = paved road VMT for the entire State for roadway class y
$VMT_{x,y}$ = total VMT (million miles) in county x and roadway class y

$VMT_{ST,y}$ = total VMT (million miles) in entire State for roadway class y

The county-level total VMT by roadway class used in this calculation was previously developed by E.H. Pechan and Associates, Inc. to support the onroad national emissions inventory.[4]

c. Emission Factors

Emission factors for cutback asphalt usage were obtained from the *Technical Report Series* produced by the U.S. EPA's Emission Inventory Improvement Program and are reported in Table 1 below.[1]

d. Emissions

Emissions were calculated by multiplying the county-level asphalt usage (barrels) by the emission factors listed in Table 1 and then dividing by 2000 to convert pounds to tons.

$$\text{Emissions}_{x,y} = (\text{Asphalt Usage}_x * EF_y) / 2000$$

where: $\text{Emissions}_{x,y}$ = emissions (tons) of pollutant y in county x
Asphalt Usage_x = cutback asphalt (barrels) used in county x
EF_y = emission factor for pollutant y

To convert tons of asphalt reported in the *2008 Asphalt Usage Survey* to barrels, it was assumed that the density of asphalt is similar to that of water, 8.34 lbs/gal, and that one barrel equals 42 gallons.

$$\text{Barrels of Asphalt} = (\text{tons of asphalt} * 2000 \text{ lbs} / 8.34 \text{ lbs/gal}) / 42 \text{ gal/barrel}$$

Note that one barrel of asphalt weights approximately 350 pounds.

e. Sample Calculation

VOC emissions from cutback asphalt usage in Autauga County, Alabama:

From the *2008 Asphalt Usage Survey*, the state of Alabama used 1,728 tons of cutback asphalt in 2008. The fraction of paved road VMT traveled in Autauga County is 497 million miles divided by 53,633 million miles which equals 0.0093.

$$\text{Asphalt Usage}_{Autauga} = ((1{,}728 \text{ tons} * 2000 \text{ lbs} / 8.34 \text{ lbs/gal}) / 42 \text{ gal/barrel}) * 0.0093$$

$$\text{Asphalt Usage}_{Autauga} = 91.41 \text{ barrels}$$

$$\text{VOC Emissions}_{Autauga} = (91.41 \text{ barrels} * 88 \text{ lbs/barrel}) / 2000 \text{ lbs/ton}$$

$$\text{VOC Emissions}_{Autauga} = 4.022 \text{ tons}$$

Table 1. Criteria and HAP Emission Factors for Cutback Asphalt Paving

Pollutant Description	Pollutant Code	Emission Factor (LBS/BARREL)	Emission Factor Reference
VOLATILE ORGANIC COMPOUNDS	VOC	88.00	1
ETHYL BENZENE	100414	2.02	1
TOLUENE	108883	5.63	1
XYLENES (MIXTURE OF O, M, AND P ISOMERS)	1330207	10.74	1

f. References

1. U.S. Environmental Protection Agency, Emissions Inventory Improvement Program, *Technical Report Series*, Volume III – Area Sources, Chapter 17, "Asphalt Paving," prepared by Eastern Research Group, Inc. for EPA, Research Triangle Park, NC, 2001. Available at http://www.epa.gov/ttn/chief/eiip/techreport/volume03/index.html.

2. Asphalt Institute, *2008 Asphalt Usage Survey for the United States and Canada*, http://www.asphaltinstitute.org/.

3. U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2007,* Office of Highway Policy Information, Washington, DC, 2008. Available at http://www.fhwa.dot.gov/policyinformation/statistics/2007/.

4. E.H. Pechan & Associates, Inc. "Documentation for the Onroad National Emission Inventory (NEI) for Base Years 1970 - 2002," report prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. January 2004.

3.2.3.13 Asphalt Paving – Emulsified

a. Source Category Description

Asphalt paving is the process of applying asphalt concrete to seal or repair the surface of roads, parking lots, driveways, walkways, or airport runways. Asphalt concrete is a composite material comprised of a binder and a mineral aggregate. The binder, referred to as asphalt cement, is a byproduct of petroleum refining and contains the semi-solid residual material left after the more volatile chemical fractions have been distilled off.[1]

Asphalt cements thinned with water and an emulsifying agent are known as emulsified asphalts. This thinning reduces the viscosity of the asphalt making it easier to work with the mixture. The primary uses of emulsified asphalt include tack and seal operations, priming roadbeds, and paving operations for pavements up to several inches thick.

Emulsified asphalt may contain up to 12 percent organic solvents by volume.[1] Emissions from emulsified asphalt result from the evaporation of VOCs after the mixture is laid down. Compared to cutback asphalt, emulsified asphalt has lower VOCs emissions per ton used.

For this source category, the following SCC was assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2461022000	Solvent Utilization	Miscellaneous Non-industrial: Commercial	Emulsified Asphalt	Total: All Solvent Types

The general approach to calculating emissions from emulsified asphalt paving is to multiply the estimated county-level emulsified asphalt usage by emission factors for VOCs.

b. Activity Data

State-level emulsified asphalt usage in 2008 was obtained from the Asphalt Institute's *2008 Asphalt Usage Survey*.[2] State-level data were allocated to county-level according to the fraction of paved road vehicle miles traveled (VMT) in each county.

Total annual VMT estimates by State and roadway class were obtained from the Federal Highway Administration's (FHWA) annual Highway Statistics report.[3] Paved road VMT was calculated by subtracting the State/roadway class unpaved road VMT from total State/roadway class VMT. State-level paved road VMT was spatially allocated to counties according to the fraction of total VMT in each county for the specific roadway class as shown by the following equation:

$$VMT_{x,total} = \sum VMT_{ST,y} * VMT_{x,y} / VMT_{ST,y}$$

where: $VMT_{x,total}$ = VMT (million miles) in county x on all paved roadways
$VMT_{ST,y}$ = paved road VMT for the entire State for roadway class y
$VMT_{x,y}$ = total VMT (million miles) in county x and roadway class y
$VMT_{ST,y}$ = total VMT (million miles) in entire State for roadway class y

The county-level total VMT by roadway class used in this calculation was previously developed by E.H. Pechan and Associates, Inc. to support the onroad national emissions inventory.[4]

c. Emission Factors

Emission factors for emulsified asphalt usage were obtained from the *Technical Report Series* produced by the U.S. EPA's Emission Inventory Improvement Program and are reported in Table 1 below.[1]

d. Emissions

Emissions were calculated by multiplying the county-level asphalt usage (barrels) by the emission factors listed in Table 1 and then dividing by 2000 to convert pounds to tons.

$$\text{Emissions}_{x,y} = (\text{Asphalt Usage}_x * \text{EF}_y) / 2000$$

where: $\text{Emissions}_{x,y}$ = emissions (tons) of pollutant y in county x
Asphalt Usage_x = emulsified asphalt (barrels) used in county x
EF_y = emission factor for pollutant y

To convert tons of asphalt reported in the *2008 Asphalt Usage Survey* to barrels, it was assumed that the density of asphalt is similar to that of water, 8.34 lbs/gal, and that one barrel equals 42 gallons.

$$\text{Barrels of Asphalt} = (\text{tons of asphalt} * 2000 \text{ lbs} / 8.34 \text{ lbs/gal}) / 42 \text{ gal/barrel}$$

Note that one barrel of asphalt weights approximately 350 pounds.

e. Sample Calculation

VOC emissions from emulsified asphalt usage in Autauga County, Alabama:

From the *2008 Asphalt Usage Survey*, the state of Alabama used 18,988 tons of emulsified asphalt in 2008. The fraction of paved road VMT traveled in Autauga County is 497 million miles divided by 53,633 million miles which equals 0.0093.

$$\text{Asphalt Usage}_{\text{Autauga}} = ((18{,}988 \text{ tons} * 2000 \text{ lbs} / 8.34 \text{ lbs/gal}) / 42 \text{ gal/barrel}) * 0.0093$$

$$\text{Asphalt Usage}_{\text{Autauga}} = 1{,}004 \text{ barrels}$$

$$\text{VOC Emissions}_{\text{Autauga}} = (1{,}004 \text{ barrels} * 9.2 \text{ lbs/barrel}) / 2000 \text{ lbs/ton}$$

$$\text{VOC Emissions}_{\text{Autauga}} = 4.62 \text{ tons}$$

Table 1. Criteria Emission Factors for Emulsified Asphalt Paving

Pollutant Description	Pollutant Code	Emission Factor (LBS/BARREL)	Emission Factor Reference
VOLATILE ORGANIC COMPOUNDS	VOC	9.2	1

f. References

1. U.S. Environmental Protection Agency, Emissions Inventory Improvement Program, *Technical Report Series*, Volume III – Area Sources, Chapter 17, "Asphalt Paving," prepared by Eastern Research Group, Inc. for EPA, Research Triangle Park, NC, 2001. Available at http://www.epa.gov/ttn/chief/eiip/techreport/volume03/index.html.

2. Asphalt Institute, *2008 Asphalt Usage Survey for the United States and Canada*, http://www.asphaltinstitute.org/.

3. U.S. Department of Transportation, Federal Highway Administration, *Highway Statistics 2007*, Office of Highway Policy Information, Washington, DC, 2008. Available at http://www.fhwa.dot.gov/policyinformation/statistics/2007/.

4. E.H. Pechan & Associates, Inc. "Documentation for the Onroad National Emission Inventory (NEI) for Base Years 1970 - 2002," report prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC. January 2004.

3.2.3.14 Gasoline Distribution – Portable Fuel Containers

a. Source Category Description

Portable fuel containers (PFCs, or gas cans) are consumer products used to refuel a wide variety of gasoline-powered equipment.

The general approach to calculating emissions for this SCC is to take the inventories already prepared by the EPA for 2002 and 2010 and apply a linear fit between to get 2008 emissions.

For this source category, the following SCCs were assigned:

SCC	Descriptor 1	Descriptor 3	Descriptor 6	Descriptor 8
2501011011	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Gas Cans	Permeation
2501011012	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Gas Cans	Evaporation (includes Diurnal losses)
2501011013	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Gas Cans	Spillage During Transport
2501011014	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Gas Cans	Refilling at the Pump - Vapor Displacement
2501011015	Storage and Transport	Petroleum and Petroleum Product Storage	Residential Portable Gas Cans	Refilling at the Pump - Spillage
2501012011	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Gas Cans	Permeation
2501012012	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Gas Cans	Evaporation (includes Diurnal losses)
2501012013	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Gas Cans	Spillage During Transport
2501012014	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Gas Cans	Refilling at the Pump - Vapor Displacement
2501012015	Storage and Transport	Petroleum and Petroleum Product Storage	Commercial Portable Gas Cans	Refilling at the Pump - Spillage

b. Activity Data

Activity data for the 2002 and 2010 inventories were developed using EPA's Nonroad Model which uses a variety of variables like equipment size, equipment population, equipment age, RVP, and air temperature to estimate activity.

c. Control Factors

There are at least 15 states which have enacted or are considering rules for PFCs. Due to the complexities in calculating emissions, these rules have already been accounted for in the emissions, but will not be listed in the control table.

d. Emission Factors

Section 2.2 of the EPA PFC report details emission factors used for each of the activities associated with PFCs.

e. Sample Calculations

Emissions are calculated in the formula

$$Emis_{County,\ Pollutant} = m \times year_{diff} + Emis_{2002}$$

where:

$$m = (Emis_{2010} - Emis_{2002}) / (2010 - 2002)$$

Example:
Using SCC 2501011011 in Allegheny County PA as an example:

$Emis_{2010}$ = 60.7 tons VOC
$Emis_{2002}$ = 181.7 tons VOC

$$m = (60.7 - 181.7) / (2010 - 2002) = -15.125$$

$$Emis_{Alegheny,\ VOC} = -15.125 \times (2008-2002) + 181.7$$

$$= 90.95 \text{ tons VOC}$$

f. References

U.S. Environmental Protection Agency. Estimating Emissions Associated with Portable Fuel Containers (PFCs). Ann Arbor Michigan. February 2007

3.2.3.15 Aviation Gasoline Distribution – Stage I

a. Source Category Description

Aviation gasoline (also called "AvGas") is the only aviation fuel that contains tetraethyl lead (TEL) as a knock-out component for small reciprocating, piston-engine crafts in civil aviation.[1] Commercial and military aviation rarely use this fuel. AvGas is shipped to airports and is filled into bulk terminals, and then into tanker trucks. These processes fall under the definition of stage I, displacement vapors during the transfer of gasoline from tank trucks to storage tanks, and vice versa. These processes are subject to EPA's maximum available control technology (MACT) standards for gasoline distribution.[2]

For this source category, the following SCC was assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2501080050	Storage and Transport	Petroleum and Petroleum Product Storage	Airports : Aviation Gasoline	Stage 1: Total

b. Activity Data

The amount of AvGas consumed was obtained from the Petroleum Supply Annual for designated Petroleum Administration Districts, or PADs.[3] A nationwide total of 5,603,000 barrels of AvGas were consumed in 2008 (Table 1).[3] This information was used to calculate national-level emissions estimates for one criteria pollutant and ten hazardous air pollutants (HAPs). Assumptions for bulk plant processes are summarized in Table 2.

c. Emission Factors

Emission factors were provided by ESD and EIG publications (Tables 3 and 4).[1,4,5,6]

d. Emissions

In general, national-level emissions were calculated by multiplying AvGas consumption by the appropriate emission factors and then summing emissions. The national-level emission estimates were first allocated based on consumption reported for each PAD, and then allocated to the counties within the PADs based on 2008 Landing-Take Off (LTO) data for general aviation flights.[7] General aviation flights were used in this allocation because they are the primary consumers of AvGas.

There are five PADs across the United States[3]
PAD 1 comprises seventeen states plus the District of Columbia along the Atlantic Coast;
PAD 2 comprises fifteen states in the Midwest;
PAD 3 comprises six states in South Central U.S.;
PAD 4 comprises five states in the Rocky Mountains; and

PAD 5 comprises seven states along the West Coast.

Table 1 - Summary of AvGas Consumed and LTOs by PAD in 2008

PAD	AvGas Consumed (barrels)	LTOs
1	1,039,000	17,588,837
2	1,652,000	16,520,073
3	2,021,000	9,883,668
4	158,000	3,311,438
5	733,000	12,641,441
Total	**5,603,000**	**59,945,457**

e. Sample Calculations

<u>National-Level Calculations</u>

Amount of AvGas consumed in 2008 (barrels) = 5,603,000

Conversion: 1 barrel = 42 gallons
1 gallon = 3.78 liters
1 kg = 2.205 lb
1 kg = 1,000,000 mg
1 ton = 2000 lb

Step 1 - Convert AvGas consumption into gallons using conversion factors.

Amount of AvGas consumed in 2008 (gallons) = 5,603,000 barrels * 42 gallons/barrel
Amount of AvGas consumed in 2008 (gallons) = 235,326,000

Step 2 - Use the gallons of AvGas consumed and apply the non-fugitive VOC emission factors in Table 3 to calculate non-fugitive VOC estimates.

Unloading/Tank Filling: tank fill VOC emissions = 0.009021383 LB/GAL * 235,326,000 GAL / 2,000 LB/TON
Unloading/Tank Filling: tank fill VOC emissions = **1,061.48** tpy

Unloading/Tank Filling: Storage tank VOC emissions = 0.003605215 LB/GAL * 235,326,000 GAL / 2,000 LB/TON
Unloading/Tank Filling: Storage tank VOC emissions = **424.20** tpy

Tank Truck Filling - Composite VOC Emissions = 0.010306575 LB/GAL * 235,326,000 GAL * / 2,000 LB/TON
Tank Truck Filling - Composite VOC Emissions = **1,212.70** tpy

Storage Tank - Breathing losses VOC Emissions = 0.001694117 LB/GAL * 235,326,000 GAL * / 2,000 LB/TON
Storage Tank - Breathing losses VOC Emissions = **199.33** tpy

Total non-fugitive VOC emissions = 1,061.48 tpy + 424.20 tpy + 1,212.70 tpy + 199.33 tpy = **2,897.72** tpy

Step 3 - Use the assumptions in Table 2 and the fugitive VOC emission factors in Table 3 to generate fugitive VOC emissions.

AvGas - Fugitive from valves VOC Emissions = (# Bulk Plant Equivalents)*(#valves/plant)*EF*days
AvGas - Fugitive from valves VOC Emissions = (2442 plants) * (50 valves/plant) * (0.573201882 LB/valve/day)* 300 days / 2,000 LB/TON
AvGas - Fugitive from valves VOC Emissions = **10,498.19** tpy

AvGas - Fugitive from pumps VOC Emissions = (# Bulk Plant Equivalents)*(#pumps/plant)* (#seals/pump) * EF * days
AvGas - Fugitive from pumps VOC Emissions = (2442 plants) * (2 pumps/plant) * (4 seals/pump) * (5.952481079 LB/seal/day)* 300 days / 2,000 LB/TON
AvGas - Fugitive from pumps VOC Emissions = **17,443.15** tpy

Total fugitive VOC emissions = 10,498.19 tpy + 17,443.15 tpy
Total fugitive VOC emissions = **27,941.34** tpy

Step 4 - Sum the fugitive and non-fugitive VOC emissions together for total VOC emissions.

Total VOC emissions = 2,897.72 tpy + 27,941.34 tpy = **30,839.06** tpy

Step 5 - Apply the speciation emission factors in Table 4 for tetraethyl lead, 2,2,4-trimethylpentane, benzene, cumene, ethylbenzene, hexane, naphthalene, toluene, and xylene to calculate HAP emissions.

Tetraethyl Lead emissions = 30,839.06 tpy VOC * 9.78 E-6 = **0.30** tpy
2,2,4-Trimethylpentane emissions = 30,839.06 tpy VOC * 0.008 = **246.71** tpy
Benzene emissions = 30,839.06 tpy VOC * 0.009 = **277.55** tpy
Cumene emissions = 30,839.06 tpy VOC * 0.0001 = **3.08** tpy
Ethylbenzene emissions = 30,839.06 tpy VOC * 0.0010 = **30.84** tpy
Hexane emissions = 30,839.06 tpy VOC * 0.0160 = **493.43** tpy
Naphthalene emissions = 30,839.06 tpy VOC * 0.0005 = **15.42** tpy
Toluene emissions = 30,839.06 tpy VOC * 0.0130 = **400.91** tpy
Xylene emissions = 30,839.06 tpy VOC * 0.005 = **154.20** tpy

Step 6 - Use the ethylene dichloride emission factor in Table 4 to calculate ethylene dichloride emissions.

Ethylene dichloride emissions = 235,326,000 GAL * 2.167E-6 LB/GAL * TON/2000 LB = **0.25** tpy

Table 2 - Assumptions Used For Bulk Terminals Using AvGas

Parameter	Data	Reference
Number of Bulk Plant Equivalents (U.S.)	2,442 plants	1
Number of valves per bulk plant	50 valves/plant	
Number of pumps per bulk plant	2 pumps/plant	
Number of seals per bulk plant	4 seals/pump	
Number of days per year used	300 days	

Table 3 - VOC Emission Factors

Pollutant	Emission Source	Emission Factor	Emission Factor Units	Factor Reference
VOC	Aviation Gas Unloading/ Tank Filling - tank fill	0.009021383	LB/GAL AvGas	1
	Aviation Gas Unloading/ Tank Filling - Storage tank working	0.003605215		
	Aviation Gas Tank Truck Filling - Composite	0.010306575		
	Aviation Gas Storage Tank - Breathing losses	0.001694117		
	Aviation Gas - Fugitive from valves	0.573201882	LB/valve/day	
	Aviation Gas - Fugitive from pumps	5.952481079	LB/seal/day	

Table 4 - HAP Emission Factors

Pollutant	Emission Source	Emission Factor	Emission Factor Units	Factor Reference
Ethylene Dichloride	All processes	2.167 E-6	LB/GAL AvGas	4
Tetraethyl Lead (TEL)	All processes	9.78 E-6	LB/LB VOC	1
2,2,4-Trimethylpentane	All processes	0.0080	LB/ LB VOC	
Benzene	All processes	0.0090		5
Cumene	All processes	0.0001		6
Ethylbenzene	All processes	0.0010		
Hexane	All processes	0.0160		
Naphthalene	All processes	0.0005		
Toluene	All processes	0.0130		
Xylene	All processes	0.0050		5

Example Calculations for Wake County, NC

Wake County VOC emissions = (National VOC emissions) * (PAD 1 consumption/Total consumption) * (Wake County LTOs/PAD 1 LTOs)

Wake County VOC emissions = (30,839.06 tpy) * (1,039,000 bbl/5,603,000 bbl) * (95,234 LTOs/17,588,837 LTOs)

Wake County VOC emissions = **30.96** tpy

Wake County Benzene Emissions = (Wake County VOC emissions)*(Benzene Emission Factor)

Wake County Benzene Emissions = (30.96 tpy VOC) * (0.0090 LB benzene/ LB VOC)* (2000 LB VOC/2000 LB benzene)

Wake County Benzene Emissions = **0.28** tpy

f. References

1. TRC Environmental Corporation. *Estimation of Alkylated Lead Emissions, Final Report*. Prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. RTP, NC 1993.

2. U.S. Environmental Protection Agency. National Emission Standards for Source Categories: Gasoline Distribution (Stage I). 40 CFR Part 63. Office of Air Quality Planning and Standards. RTP, NC. February 28, 1997. Pages 9087-9093.

3. Energy Information Administration. *Petroleum Annual Supply, 2008*. Tables 3, 5, 7, 9, and 11. U.S. Department of Energy. Washington, D.C. June 2009. (Internet address: http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html)

4. U.S. Environmental Protection Agency. *Locating and Estimating Air Emissions from Sources of Ethylene Dichloride*. EPA-450/4-84-007d. RTP, NC. March 1984.

5. Memorandum from Greg LaFlam and Tracy Johnson (PES) to Stephen Shedd (EPA/OAQPS). *Speciated Hazardous Air Pollutants - Baseline Emissions and Emissions Reductions Under the Gasoline Distribution NESHAP*. August 9, 1996.

6. Personal Communication via e-mail from Stephen Shedd (EPA/OAQPS) to Laurel Driver (EPA/OAQPS). E-mail dated May 29, 2002.

7. [LTObyCtyandSCC.mdb], electronic file from Laurel Driver, U.S. Environmental Protection Agency, OAQPS, to U.S. Environmental Protection Agency, OAQPS, November 12, 2009. Aircraft operations data compiled from FAA's Terminal Area Forecasts (TAF) and 5010 Forms.

3.2.3.16 Aviation Gasoline Distribution – Stage II

a. Source Category Description

Aviation gasoline (also called "AvGas") is the only aviation fuel that contains tetraethyl lead (TEL) as a knock-out component for small reciprocating, piston-engine crafts in civil aviation.[1] Commercial and military aviation rarely use this fuel. AvGas is shipped to airports and is filled into bulk terminals, and then into tanker trucks. These processes fall under the definition of stage I are subject to EPA's maximum available control technology (MACT) standards for gasoline distribution.[2] Stage II, discussed here, involves the transfer of fuel from the tanker trucks into general aviation aircraft.

For this source category, the following SCC was assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2501080100	Storage and Transport	Petroleum and Petroleum Product Storage	Airports : Aviation Gasoline	Stage 2: Total

b. Activity Data

The amount of AvGas consumed was obtained from the Petroleum Supply Annual for designated Petroleum Administration Districts, or PADs.[3] A nationwide total of 5,603,000 barrels of AvGas were consumed in 2008 (Table 1).[3] This information was used to calculate national-level emissions estimates for one criteria pollutant and ten hazardous air pollutants (HAPs).

c. Emission Factors

Emission factors were provided by ESD and EIG publications (Tables 2 and 3).[1,4,5,6]

d. Emissions

In general, national-level emissions were calculated by multiplying AvGas consumption by the appropriate emission factors and then summing emissions. The national-level emission estimates were first allocated based on consumption reported for each PAD, and then allocated to the counties within the PADs based on 2008 Landing-Take Off (LTO) data for general aviation flights.[7] General aviation flights were used in this allocation because they are the primary consumers of AvGas.

There are five PADs across the United States[3]
PAD 1 comprises seventeen states plus the District of Columbia along the Atlantic Coast;
PAD 2 comprises fifteen states in the Midwest;
PAD 3 comprises six states in South Central U.S.;
PAD 4 comprises five states in the Rocky Mountains; and
PAD 5 comprises seven states along the West Coast.

Table 1 - Summary of AvGas Consumed and LTOs by PAD in 2008

PAD	AvGas Consumed (barrels)	LTOs
1	1,039,000	17,588,837
2	1,652,000	16,520,073
3	2,021,000	9,883,668
4	158,000	3,311,438
5	733,000	12,641,441
	5,603,000	**59,945,457**

e. Sample Calculations

National-Level Calculations

Amount of AvGas consumed in 2008 (barrels) = 5,603,000

Conversion: 1 barrel = 42 gallons
1 gallon = 3.78 liters
1 kg = 2.205 lb
1 kg = 1,000,000 mg
1 ton = 2000 lb

Step 1 - Convert AvGas consumption into gallons using conversion factors.

Amount of AvGas consumed in 2008 (gallons) = 5,603,000 barrels * 42 gallons/barrel
Amount of AvGas consumed in 2008 (gallons) = 235,326,000

Step 2 - Use the gallons of AvGas consumed and apply the refueling VOC emission factors from Table 2 to first calculate refueling VOC estimates.

AvGas Refueling VOC emissions = (1.36 E-2 LB/gal AvGas) * 235,326,000 gallons * 1 ton/2000 LB
AvGas Refueling VOC emissions = **1,600.22** tpy

Step 3 - Apply the speciation emission factors in Table 3 for 2,2,4-trimethylpentane, benzene, cumene, ethylbenzene, hexane, naphthalene, toluene, and xylene to calculate HAP emissions.

2,2,4-Trimethylpentane emissions = 1,600.22 tpy VOC * 0.008 = **12.80** tpy

Benzene emissions = 1,600.22 tpy VOC * 0.009 = **14.40** tpy
Cumene emissions = 1,600.22 tpy VOC * 0.0001 = **0.16** tpy
Ethylbenzene emissions = 1,600.22 tpy VOC * 0.0010 = **1.60** tpy
Hexane emissions = 1,600.22 tpy VOC * 0.0160 = **25.60** tpy
Naphthalene emissions = 1,600.22 tpy VOC * 0.0005 = **0.80** tpy
Toluene emissions = 1,600.22 tpy VOC * 0.0130 = **20.80** tpy
Xylene emissions = 1,600.22 tpy VOC * 0.005 = **8.00** tpy

Step 6 - Use the ethylene dichloride and tetraethyl lead emission factors in Table 3 to calculate ethylene dichloride emissions.

Ethylene dichloride emissions = 235,326,000 GAL * 1.883 E-6 LB/GAL * TON/2000 LB = **0.22** tpy
Tetraethyl lead emissions = 235,326,000 GAL * 1.327E-7 LB/GAL * TON/2000 LB = **0.015** tpy

Table 2 - VOC Emission Factor

Pollutant	Emission Source	Emission Factor	Emission Factor Units	Factor Reference
VOC	Fuel Transfer from Tanker Trucks to General Aviation Aircraft	0.0136	LB/GAL AvGas	1

Table 3 - HAP Emission Factors

Pollutant	Emission Source	Emission Factor	Emission Factor Units	Factor Reference
Ethylene Dichloride	All processes	1.883 E-6	LB/GAL AvGas	4
Tetraethyl Lead (TEL)	All processes	1.327 E-7	LB/GAL AvGas	1
2,2,4-Trimethylpentane	All processes	0.0080	LB/ LB VOC	
Benzene	All processes	0.0090		5
Cumene	All processes	0.0001		6
Ethylbenzene	All processes	0.0010		
Hexane	All processes	0.0160		
Naphthalene	All processes	0.0005		
Toluene	All processes	0.0130		
Xylene	All processes	0.0050		5

Example Calculations for Wake County, NC

Wake County VOC emissions = (National VOC emissions) * (PAD 1 consumption/Total consumption) * (Wake County LTOs/PAD 1 LTOs)

Wake County VOC emissions = (1,600.22 tpy) * (1,039,000 bbl/5,603,000 bbl) * (95,234 LTOs/17,588,837 LTOs)

Wake County VOC emissions = **1.61** tpy

Wake County Benzene Emissions = (Wake County VOC emissions)*(Benzene Emission Factor)

Wake County Benzene Emissions = (1.61 tpy VOC) * (0.0090 LB benzene/ LB VOC)* (2000 lb VOC/2000 lb benzene)

Wake County Benzene Emissions = **0.014** tpy

f. References

1. TRC Environmental Corporation. *Estimation of Alkylated Lead Emissions, Final Report*. Prepared for U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. RTP, NC 1993.

2. U.S. Environmental Protection Agency. National Emission Standards for Source Categories: Gasoline Distribution (Stage I). 40 CFR Part 63. Office of Air Quality Planning and Standards. RTP, NC. February 28, 1997. Pages 9087-9093.

3. Energy Information Administration. *Petroleum Annual Supply, 2008*. Tables 3, 5, 7, 9, and 11. U.S. Department of Energy. Washington, D.C. June 2009. (Internet address: http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html)

4. U.S. Environmental Protection Agency. *Locating and Estimating Air Emissions from Sources of Ethylene Dichloride*. EPA-450/4-84-007d. RTP, NC. March 1984.

5. Memorandum from Greg LaFlam and Tracy Johnson (PES) to Stephen Shedd (EPA/OAQPS). *Speciated Hazardous Air Pollutants - Baseline Emissions and Emissions Reductions Under the Gasoline Distribution NESHAP*. August 9, 1996.

6. Personal Communication via e-mail from Stephen Shedd (EPA/OAQPS) to Laurel Driver (EPA/OAQPS). E-mail dated May 29, 2002.

7. [LTObyCtyandSCC.mdb], electronic file from Laurel Driver, U.S. Environmental Protection Agency, OAQPS, to U.S. Environmental Protection Agency, OAQPS, November 12, 2009. Aircraft operations data compiled from FAA's Terminal Area Forecasts (TAF) and 5010 Forms.

3.2.3.17 Open Burning – Land Clearing Debris

a. Source Category Description

Open burning of land clearing debris is the purposeful burning of debris, such as trees, shrubs, and brush, from the clearing of land for the construction of new buildings and highways. Criteria air pollutant (CAP) and hazardous air pollutant (HAP) emission estimates from open burning of land clearing debris are a function of the amount of material or fuel subject to burning per year.

For this source category, the following SCC was assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2610000500	Waste Disposal, Treatment, and Recovery	Open Burning	All Categories	Land Clearing Debris (use 28-10-005-000 for Logging Debris Burning)

b. Activity Data

The amount of material burned was estimated using the county-level total number of acres disturbed by residential, non-residential, and road construction. County-level weighted loading factors were applied to the total number of construction acres to convert acres to tons of available fuel.

<u>Acres Disturbed from Residential Construction</u>

The US Census Bureau has 2008 data for *Housing Starts - New Privately Owned Housing Units Started*[1] which provides regional level housing starts based on the groupings of 1 unit, 2-4 units, 5 or more units. A consultation with the Census Bureau in 2002 gave a breakdown of approximately 1/3 of the housing starts being for 2 unit structures, and 2/3 being for 3 and 4 unit structures. The 2-4 unit category was divided into 2-units, and 3-4 units based on this ratio. To determine the number of structures for each grouping, the 1 unit category was divided by 1, the 2 unit category was divided by 2, and the 3-4 unit category was divided by 3.5. The 5 or more unit category may be made up of more than one structure. *New Privately Owned Housing Units Authorized Unadjusted Units*[2] gives a conversion factor to determine the ratio of structures to units in the 5 or more unit category. For example if a county has one 40 unit apartment building, the ratio would be 40/1. If there are 5 different 8 unit buildings in the same project, the ratio would be 40/5. Structures started by category are then calculated at a regional level. The table *Annual Housing Units Authorized by Building Permit*[3] has 2007 data at the county level to allocate regional housing starts to the county level. This results in county level housing starts by number of units. The following surface areas were assumed disturbed for each unit type:

Table 1: Surface Acres Disturbed per Unit Type

1-Unit	1/4 acre/structure
2-Unit	1/3 acre/structure
Apartment	1/2 acre/structure

The 3-4 unit and 5 or more unit categories were considered to be apartments. Multiplication of housing starts to surface acres disturbed results in total number of acres disturbed for each unit category.

Acres Disturbed from Non-Residential Construction

Annual Value of Construction Put in Place in the U.S[4] has the 2008 National Value of Non-residential construction. The national value of non-residential construction put in place (in millions of dollars) was allocated to counties using county-level non-residential construction (NAICS Code 2362) employment data obtained from *County Business Patterns*[5] *(CBP)*. Because some counties employment data was withheld due to privacy concerns, the following procedure was adopted:

1. State totals for the known county level employees were subtracted from the number of employees reported in the state level version of CBP. This results in the total number of withheld employees in the state.

2. A starting guess of the midpoint of the range code was used (so for instance in the 1-19 employees range, a guess of 10 employees would be used) and a state total of the withheld counties was computed.

3. A ratio of guessed employees (Step 2) to withheld employees (Step 1) was then used to adjust the county level guesses up or down so the state total of adjusted guesses should match state total of withheld employees (Step 1)

In 1999 a figure of 2 acres/$\$10^6$ was developed. The Bureau of Labor Statistics *Producer Price Index*[6] lists costs of the construction industry from 1999-2007.

$$\begin{aligned} \text{2007 acres per } \$10^6 &= \text{1999 acres per } \$10^6 \text{ x (1999 PPI / 2007 PPI)} \\ &= 2 \text{ acres}/\$10^6 \ (132.9 / 204.3) \\ &= 1.301 \text{ acres per } \$10^6 \end{aligned}$$

Acres Disturbed by Road Construction

The Federal Highway Administration has *Highway Statistics, Section IV - Highway Finance, Table SF-12A, State Highway Agency Capital Outlay*[7] for 2006 which outlines spending by state in several different categories. For this SCC, the following columns are used: New Construction, Relocation, Added Capacity, Major Widening, and Minor Widening. These columns are also differentiated according to the following six classifications:

1. Interstate, urban
2. Interstate, rural
3. Other arterial, urban
4. Other arterial, rural
5. Collectors, urban
6. Collectors, rural

The State expenditure data are then converted to new miles of road constructed using $/mile conversions obtained from the North Carolina Department of Transportation (NCDOT) in 2000. A conversion of $4 million/mile was applied to the interstate expenditures. For expenditures on other arterial and collectors, a conversion factor of $1.9 million/mile was applied, which corresponds to all other projects.

The new miles of road constructed are used to estimate the acreage disturbed due to road construction. The total area disturbed in each state was calculated by converting the new miles of road constructed to acres using an acres disturbed/mile conversion factor for each road type as given in Table 2 below:

Table 2: Spending per Mile and Acres Disturbed per Mile by Highway Type

Road Type	Thousand Dollars per mile	Acres Disturbed per mile
Urban Areas, Interstate	4000	15.2
Rural Areas, Interstate	4000	15.2
Urban Areas, Other Arterials	1900	15.2
Rural Areas, Other Arterials	1900	12.7
Urban Areas, Collectors	1900	9.8
Rural Areas, Collectors	1900	7.9

Residential building starts are used to allocate the state-level acres disturbed by road construction to the county.[3] A ratio of the number of building starts in each county to the total number of building starts in each state was applied to the state-level acres disturbed to estimate the total number of acres disturbed by road construction in each county.

Converting Acres Disturbed to Tons of Land Clearing Debris Burned

Version 2 of the Biogenic Emissions Land cover Database (BELD2) within EPA's Biogenic Emission Inventory System (BEIS) was used to identify the acres of hardwoods, softwoods, and grasses in each county. Table 3 presents the average fuel loading factors by vegetation type. The average loading factors for slash hardwood and slash softwood were adjusted by a factor of 1.5 to account for the mass of tree that is below the soil surface that would be subject to burning once the land is cleared.[8] Weighted average county-level loading factors were calculated by multiplying the average loading factors by the percent contribution of each type of vegetation class to the total land area for each county.

Table 3. Fuel Loading Factors by Vegetation Type

Vegetation Type	Unadjusted Average Fuel Loading Factor (Ton/acre)	Adjusted Average Fuel Loading Factor (Ton/acre)

Vegetation Type	Unadjusted Average Fuel Loading Factor (Ton/acre)	Adjusted Average Fuel Loading Factor (Ton/acre)
Hardwood	66	99
Softwood	38	57
Grass	4.5	Not Applicable

The total acres disturbed by all construction types was calculated by summing the acres disturbed from residential, non-residential, and road construction. The county-level total acres disturbed were then multiplied by the weighted average loading factor to derive tons of land clearing debris in 2008.

c. Controls

Controls for land clearing debris burning are generally in the form of a ban on open burning of waste in a given municipality or county. Counties that were more than 80% urban were assumed not to practice any open burning. Therefore, criteria pollutant and HAP emissions from open burning of land clearing debris are zero in these counties. In addition, the State of Colorado implemented a state-wide ban on open burning. Emissions from open burning of land clearing debris in all Colorado counties were assumed to be zero.

d. Emission Factors

Emission factors are reported in Table 4 below. Emission factors for CAPs were developed by the U.S. Environmental Protection Agency (EPA) in consultation with the Eastern Regional Technical Advisory Committee and based primarily on the AP-42 report.[9,10] Emission factors for HAPs are from an EPA Control Technology Center report and emission factors for 17 dioxin congeners were obtained from an EPA dioxin report.[11,12] The Dioxin emission factors were multiplied by 0.002 to convert from mg/kg to lb/ton.

e. Emissions

County-level criteria pollutant and HAP emissions (in lb/year) were calculated by multiplying the total mass of land clearing debris burned per year by an emission factor.

f. Example Calculations

VOC emissions in Autauga County, Alabama from open burning of land clearing debris:

Rural fraction of Autauga County population = 0.448, so no emission controls

Acres disturbed by residential, non-residential, and road construction in Autauga County = 434.26
Weighted average fuel loading factor for Autauga County = 65.48 tons/acre

Mass of land clearing debris burned = 434.26 acres * 65.48 tons/acre = 28,437 tons

VOC emission factor = 11.6 lbs/ton
Factor to convert from lbs to tons = 1/2000

VOC emissions = tons of land clearing debris burned * VOC emission factor

VOC emissions from land clearing debris burning = 28,437 tons * 11.6 lbs/ton * 1 ton/2000 lbs

VOC emissions from land clearing debris burning in Autauga County in 2008 = 165 tons

g. References

1. U.S. Census Bureau, "New Privately Owned Housing Units Started for 2008 (Not seasonally adjusted)," available at http://www.census.gov/const/startsua.pdf

2. U.S. Census Bureau, "Table 2au. New Privately Owned Housing Units Authorized Unadjusted Units for Regions, Divisions, and States, Annual 2007" available at http://www.census.gov/const/C40/Table2/tb2u2007.txt

3. Annual Housing Units Authorized by Building Permits CO2007A, purchased from US Department of Census

4. U.S. Census Bureau, "Annual Value of Construction Put in Place," available at http://www.census.gov/const/www/ototpage.html

5. U.S. Census Bureau, "County Business Patterns," available at http://www.census.gov/econ/cbp/index.html

6. Bureau of Labor Statistics, Producer Price Index, Table BMNR, available at http://www.bls.gov/data/

7. Federal Highway Administration, 2006 Highway Spending, available at http://www.fhwa.dot.gov/policy/ohim/hs06/xls/sf12a.xls

8. Ward, D.E., C.C. Hardy, D.V. Sandberg, and T.E. Reinhardt. "Mitigation of Prescribed Fire Atmospheric Pollution through Increased Utilization of Hardwoods, Piled Residues, and Long-Needled Conifers." Final Report. USDA Forest Service, Pacific Northwest Research Station, Fire and Air Resource Management. 1989.

9. Huntley, Roy, U.S. Environmental Protection Agency, "state_comparison ERTAC SS_version7_3 Oct 20 2009 [electronic file]," November 5, 2009.

10. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 2.5 Open Burning*. Research Triangle Park, NC. October 1992.

11. U.S. Environmental Protection Agency, "Evaluation of Emissions from the Open Burning of Household Waste in Barrels, EPA-600/R-97-134a," Control Technology

Center. November 1997.

12. Gullet, B.K. and T. Abderrahmne, "PCDD/F Emissions from Forest Fire Simulations," *Atmospheric Environment*, Vol. 37, No. 6, pp. 803-813. February 2003.

3.2.3.18 Open Burning – Residential Household Waste

a. Source Category Description

Open burning of residential municipal solid waste (MSW) is the purposeful burning of MSW in outdoor areas. Criteria air pollutant (CAP) and hazardous air pollutant (HAP) emission estimates for MSW burning are a function of the amount of waste burned per year.

For this source category, the following SCC was assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2610030000	Waste Disposal, Treatment, and Recovery	Open Burning	Residential	Household Waste (use 26-10-000-xxx for Yard Wastes)

b. Activity Data

The amount of household MSW burned was estimated using data from EPA's report *Municipal Solid Waste in the United States: 2007 Facts and Figures*.[1] The report presents the total mass of waste generated in the United States by type of waste for the calendar year 2007. This information was used to calculate a daily estimate of the per capita household waste subject to burning, 3.40 lbs/person/day. Non-combustible waste, such as glass and metals, was not considered to be waste subject to burning. Burning of yard waste is included in SCC 2610000100 and SCC 2610000400; therefore, it is not part of residential MSW. Approximately 25 to 32 percent of all waste that is subject to open burning is actually burned.[2] A median value of 28 percent is assumed to be burned in all counties in the United States.

Since open burning is generally not practiced in urban areas, only the rural population of each county was assumed to practice open burning. The ratio of urban to rural population was obtained from 2000 U.S. Census data.[3] This ratio was then multiplied by the 2008 U.S. Census Bureau estimate of the population in each county to obtain the county-level rural population for 2008.[4] The county-level rural population was then multiplied by the per capita household waste subject to burning to determine the amount of rural household MSW generated in each county in 2008.

c. Controls

Controls for residential MSW burning are generally in the form of a ban on open burning of waste in a given municipality or county. Counties that were more than 80% urban were assumed not to practice any open burning. Therefore, criteria pollutant and HAP emissions from residential municipal solid waste burning are zero in these counties. In addition, the State of Colorado implemented a state-wide ban on open burning. Emissions from open burning of residential waste in all Colorado counties were assumed to be zero.

d. Emission Factors

Emission factors are reported in Table 1 below. Emission factors for CAPs were developed by the U.S. Environmental Protection Agency (EPA) in consultation with the Eastern Regional Technical Advisory Committee and based primarily on the AP-42 report.[5,6] Emission factors for

HAPs are from an EPA Control Technology Center report and emission factors for 17 dioxin congeners were obtained from an EPA dioxin report.[7,8]

e. Emissions

County-level criteria pollutant and HAP emissions were calculated by multiplying the total amount of residential municipal solid waste burned per year by an emission factor.

f. Example Calculations

VOC emissions in Autauga County, Alabama from open burning of residential MSW:

Population of Autauga County in 2008 = 50,364
Rural fraction of Autauga County population = 0.448
Per capita MSW waste generated (lb/person/day) = 3.40
Fraction of rural population that burns MSW = 0.28
Number of days in a year = 365
Factor to convert from lbs to tons = 1/2000

2008 MSW burning activity in Autauga County = 50,364 * 0.448 * 3.40 * 0.28 * 365 * 1/2000

2008 leaf burning activity in Autauga County = 3,921 tons

VOC emissions = tons of leaves burned * VOC emission factor

VOC emission factor = 8.56 lb/ton

VOC emissions from leaf burning in Autauga County in 2008 = 3,921 tons * 8.56 lbs/ton * 1 ton/2000 lbs

VOC emissions from leaf burning in Autauga County in 2008 = 16.78 tons

g. References

1. U.S. Environmental Protection Agency, *Municipal Solid Waste in the United States: 2007 Facts and Figures*, EPA530-R-08-010, Office of Solid Waste and Emergency Response. November 2008. Available at http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw07-rpt.pdf

2. U.S. Environmental Protection Agency, Region V. "Emission Characteristics of Burn Barrels." Prepared by Two Rivers Regional Council of Public Officials and Patrick Engineering, Inc. June 1994.

3. U.S. Census Bureau, Decennial Censuses, 2000 Census: SF1, Table P2

4. U.S. Census Bureau. *Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2008 (NST-EST2008-01).* Available at http://www.census.gov/popest/states/NST-ann-est.html

5. Huntley, Roy, U.S. Environmental Protection Agency, "state_comparison ERTAC SS_version7_3 Oct 20 2009 [electronic file]," November 5, 2009.

6. United States Environmental Protection Agency, Office of Air Quality Planning and Standards. *Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 2.5 Open Burning*. Research Triangle Park, NC. October 1992.

7. U.S. Environmental Protection Agency, Control Technology Center. "Evaluation of Emissions from the Open Burning of Household Waste in Barrels." EPA-600/R-97-134a. November 1997.

8. United States Environmental Protection Agency, Office of Research and Development. *Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzeno-p-Dioxin (TCCD) and Related Compounds. Part I: Estimating Exposure to Dioxin-Like Compounds. Volume 2: Sources of Dioxin-Like Compounds in the United States*. EPA/600/P-00/001Ab. Washington D.C. March 2001.

Table 1. Emission Factors for Open Burning of Residential MSW (2610030000)

Pollutant	Pollutant Code	Emission Factor (lb/ton)	Emission Factor Reference
CO	CO	8.50E+01	Reference 5
NOX	NOX	6.00E+00	Reference 5
PM10-FIL	PM10-FIL	3.80E+01	Reference 5
PM10-PRI	PM10-FIL	3.80E+01	Reference 5
PM25-FIL	PM25-FIL	3.48E+01	Reference 5
PM25-PRI	PM25-FIL	3.48E+01	Reference 5
SO2	SO2	1.00E+00	Reference 5
VOC	VOC	8.56E+00	Reference 5
1,2,3,4,6,7,8-heptachlorodibenzofuran	67562394	2.48E-07	Reference 8
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	35822469	7.96E-08	Reference 8
1,2,3,4,7,8,9-heptachlorodibenzofuran	55673897	3.00E-08	Reference 8
1,2,3,4,7,8-hexachlorodibenzofuran	70648269	2.28E-07	Reference 8
1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	39227286	1.28E-08	Reference 8
1,2,3,6,7,8-hexachlorodibenzofuran	57117449	7.70E-08	Reference 8
1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	57653857	1.94E-08	Reference 8
1,2,3,7,8,9-hexachlorodibenzofuran	72918219	5.00E-09	Reference 8
1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	19408743	3.80E-08	Reference 8
1,2,3,7,8-pentachlorodibenzofuran	57117416	7.44E-08	Reference 8
1,2,3,7,8-pentachlorodibenzo-p-dioxin	40321764	1.62E-08	Reference 8
1,2,4-trichlorobenzene	120821	2.20E-04	Reference 7
1,4-dichlorobenzene	106467	3.20E-04	Reference 7
2,3,4,6,7,8-hexachlorodibenzofuran	60851345	1.24E-07	Reference 8
2,3,4,7,8-pentachlorodibenzofuran	57117314	1.30E-07	Reference 8
2,3,7,8-tetrachlorodibenzofuran	51207319	9.12E-08	Reference 8
2,3,7,8-tetrachlorodibenzo-p-dioxin	1746016	5.40E-09	Reference 8
Acenaphthene	83329	1.54E-03	Reference 7
Acenaphthylene	208968	2.26E-02	Reference 7
Anthracene	120127	3.66E-03	Reference 7
Benz[a]anthracene	56553	4.48E-03	Reference 7
Benzene	71432	2.48E+00	Reference 7
Benzo[a]pyrene	50328	4.24E-03	Reference 7
Benzo[b]fluoranthene	205992	5.26E-03	Reference 7
Benzo[g,h,i,]Perylene	191242	3.95E-03	Reference 7
Benzo[k]fluoranthene	207089	2.05E-03	Reference 7
Chlorobenzene	108907	8.48E-04	Reference 7
Chrysene	218019	5.07E-03	Reference 7
Dibenzo[a,h]anthracene	53703	6.46E-04	Reference 7
Fluoranthene	206440	8.14E-03	Reference 7
Fluorene	86737	7.31E-03	Reference 7
Hexachlorobenzene	118741	4.40E-05	Reference 7
Hydrochloric Acid	7647010	5.68E-01	Reference 7
Hydrogen Cyanide	74908	9.36E-01	Reference 7
Indeno[1,2,3-c,d]pyrene	193395	3.75E-03	Reference 7
Naphthalene	91203	3.51E-02	Reference 7
Octachlorodibenzofuran	39001020	7.28E-08	Reference 8
Octachlorodibenzo-p-dioxin	3268879	9.94E-08	Reference 8
Pentachlorophenol	87865	1.06E-04	Reference 7

Pollutant	Pollutant Code	Emission Factor (lb/ton)	Emission Factor Reference
Phenanthrene	85018	1.46E-02	Reference 7
Phenol	108952	2.80E-01	Reference 7
Polychlorinated Biphenyls	1336363	5.72E-03	Reference 7
Pyrene	129000	9.66E-03	Reference 7
Styrene	100425	1.48E+00	Reference 7

Table 4. Emission Factors for Open Burning of Land Clearing Debris (SCC 2610000500)

Pollutant	Pollutant Code	Emission Factor (lb/ton)	Emission Factor Reference
VOC	VOC	1.16E+01	Reference 9
NOX	NOX	5.00E+00	Reference 9
CO	CO	1.69E+02	Reference 9
PM10-FIL	PM10-FIL	1.70E+01	Reference 9
PM25-FIL	PM25-FIL	1.70E+01	Reference 9
PM10-PRI	PM10-PRI	1.70E+01	Reference 9
PM25-PRI	PM25-PRI	1.70E+01	Reference 9
1,2,3,4,6,7,8-HpCDD	35822469	3.33E-07	Reference 12
1,2,3,4,6,7,8-HpCDF	67562394	5.08E-08	Reference 12
1,2,3,4,7,8,9-HpCDF	55673897	6.12E-09	Reference 12
1,2,3,4,7,8-HxCDD	39227286	1.14E-08	Reference 12
1,2,3,4,7,8-HxCDF	70648269	3.34E-08	Reference 12
1,2,3,6,7,8-HxCDD	57653857	2.14E-08	Reference 12
1,2,3,6,7,8-HxCDF	57117449	1.43E-08	Reference 12
1,2,3,7,8,9-HxCDD	19408743	3.47E-08	Reference 12
1,2,3,7,8,9-HxCDF	72918219	2.23E-09	Reference 12
1,2,3,7,8-PeCDD	40321764	7.66E-09	Reference 12
1,2,3,7,8-PeCDF	57117416	1.27E-08	Reference 12
2,3,4,6,7,8-HxCDF	60851345	1.96E-08	Reference 12
2,3,4,7,8-PeCDF	57117314	2.02E-08	Reference 12
2,3,7,8-TCDD	1746016	2.30E-09	Reference 12
2,3,7,8-TCDF	51207319	1.40E-08	Reference 12
Cumene	98828	1.33E-02	Reference 11
Dibenzofuran	132649	6.75E-03	Reference 11
Ethyl Benzene	100414	4.80E-02	Reference 11
Methyl Ethyl Ketone	78933	6.70E-02	Reference 11
OCDD	3268879	1.33E-06	Reference 12
OCDF	39001020	2.05E-08	Reference 12
Phenol	108952	1.15E-01	Reference 11
Styrene	100425	1.02E-01	Reference 11

3.2.3.19 Open Burning – Yard Waste – Leaf and Brush Species

a. Source Category Description

Open burning of yard waste is the purposeful burning of leaf and brush species in outdoor areas. Criteria air pollutant (CAP) and hazardous air pollutant (HAP) emission estimates for leaf and brush waste burning are a function of the amount of waste burned per year.

For this source category, the following SCCs were assigned:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2610000100	Waste Disposal, Treatment, and Recovery	Open Burning	All Categories	Yard Waste – Leaf Species Unspecified
2610000400	Waste Disposal, Treatment, and Recovery	Open Burning	All Categories	Yard Waste – Brush Species Unspecified

b. Activity Data

The amount of leaf and brush waste burned was estimated using data from EPA's report *Municipal Solid Waste in the United States: 2007 Facts and Figures.*[1] The report presents the total mass of waste generated in the United States by type of waste, including yard waste, for the calendar year 2007. This information was used to calculate a daily estimate of the per capita yard waste, 0.59 lbs/person/day. Of the total amount of yard waste generated, the yard waste composition was assumed to be 25 percent leaves, 25 percent brush, and 50 percent grass by weight.[2]

Open burning of grass clippings is not typically practiced by homeowners, and as such only estimates for leaf burning and brush burning were developed. Approximately 25 to 32 percent of all waste that is subject to open burning is actually burned.[2] A median value of 28 percent is assumed to be burned in all counties in the United States.

The per capita estimate was then multiplied by the 2008 population in each county that is expected to burn waste. Since open burning is generally not practiced in urban areas, only the rural population of each county was assumed to practice open burning. The ratio of urban to rural population was obtained from 2000 U.S. Census data.[3] This ratio was then multiplied by the 2008 U.S. Census Bureau estimate of the population in each county to obtain the county-level rural population for 2008.[4]

The percentage of forested acres from Version 2 of BELD2 within BEIS was used to adjust for variations in vegetation. The percentage of forested acres per county (including rural forest and urban forest) was then determined. To better account for the native vegetation that would likely be occurring in the residential yards of farming States, agricultural land acreage was subtracted before calculating the percentage of forested acres. Table 1 presents the ranges that were used to make adjustments to the amount of yard waste that is assumed to be generated per county. All municipios in Puerto Rico and counties in the U.S. Virgin Islands, Hawaii, and Alaska were assumed to have greater than 50 percent forested acres.

Table 1. Adjustment for Percentage of Forested Acres

Percent Forested Acres	Adjustment for

per County	Yard Waste Generated
< 10%	0% generated
>= 10%, and < 50%	50% generated
>= 50%	100% generated

c. Controls

Controls for yard waste burning are generally in the form of a ban on open burning of waste in a given municipality or county. Counties that were more than 80% urban were assumed not to practice any open burning. Therefore, criteria pollutant and HAP emissions from residential municipal solid waste burning are zero in these counties. In addition, the State of Colorado implemented a state-wide ban on open burning. Emissions from open burning of residential waste in all Colorado counties were assumed to be zero.

d. Emission Factors

Emission factors are specific to yard waste type and are reported in Tables 2 and 3 below. Emission factors for CAPs were developed by the U.S. Environmental Protection Agency (EPA) in consultation with the Eastern Regional Technical Advisory Committee.[5] Emission factors for HAPs are from AP-42 and an EPA Control Technology Center report.[6,7] Forest fire simulation emission factors were used to estimate emissions for 17 dioxin congeners.[8]

e. Emissions

County-level criteria pollutant and HAP emissions were calculated by multiplying the total amount of yard waste (either leaf or brush) burned per year by an emission factor. Emissions for leaves and residential brush were calculated separately, since emission factors vary by yard waste type. Tons of debris burned were converted to kilograms (kg) by multiplying by 907.18474.

f. Example Calculations

VOC emissions in Autauga County, Alabama from open burning of leaf waste:

Population of Autauga County in 2008 = 50,364
Rural fraction of Autauga County population = 0.448
Per capita waste yard waste generated (lb/person/day) = 0.59
Leaf fraction of waste = 0.25
Fraction of rural population that burns yard waste = 0.28
Adjustment factor based on % forested acres = 1
Number of days in a year = 365
Factor to convert from lbs to tons = 1/2000

2008 leaf burning activity in Autauga County = 50,364 * 0.448 * 0.59 * 0.25 * 0.28 * 1 * 365 * 1/2000

2008 leaf burning activity in Autauga County = 170.11 tons

VOC emissions = tons of leaves burned * VOC emission factor

VOC emission factor = 28 lb/ton

VOC emissions from leaf burning in Autauga County in 2008 = 170.11 tons * 28 lbs/ton * 1 ton/2000 lbs

VOC emissions from leaf burning in Autauga County in 2008 = 2.38 tons

g. References

1. U.S. Environmental Protection Agency, *Municipal Solid Waste in the United States: 2007 Facts and Figures*, EPA530-R-08-010, Office of Solid Waste and Emergency Response. November 2008. Available at http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw07-rpt.pdf

2. Two Rivers Regional Council of Public Officials and Patrick Engineering, Inc. "Emission Characteristics of Burn Barrels," prepared for the U.S. Environmental Protection Agency, Region V. June 1994.

3. U.S. Census Bureau, Decennial Censuses, 2000 Census: SF1, Table P2

4. U.S. Census Bureau. *Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2000 to July 1, 2008 (NST-EST2008-01).* Available at http://www.census.gov/popest/states/NST-ann-est.html

5. Huntley, Roy, U.S. Environmental Protection Agency, "state_comparison ERTAC SS_version7_3 Oct 20 2009 [electronic file]," November 5, 2009.

6. U.S. Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 2.5 Open Burning,, Tables 2.5-5 and 2.5-6. October 1992.

7. U.S. Environmental Protection Agency, *Evaluation of Emissions from the Open Burning of Household Waste in Barrels*, EPA-600/R-97-134a, Control Technology Center. November 1997.

8. Gullet, B.K. and T. Abderrahmne, "PCDD/F Emissions from Forest Fire Simulations," *Atmospheric Environment*, Vol. 37, No. 6, pp. 803-813. February 2003.

Table 2. Emission Factors for Open Burning of Leaf Species (SCC 2610000100)

Pollutant	Pollutant Code	Emission Factor (lb/ton)	Emission Factor Reference
1,2,3,4,6,7,8-heptachlorodibenzofuran	67562394	5.08E-08	Reference 8
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	35822469	3.32E-07	Reference 8
1,2,3,4,7,8,9-heptachlorodibenzofuran	55673897	6.12E-09	Reference 8
1,2,3,4,7,8-hexachlorodibenzofuran	70648269	3.34E-08	Reference 8
1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	39227286	1.136E-08	Reference 8

1,2,3,6,7,8-hexachlorodibenzofuran	57117449	1.428E-08	Reference 8
1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	57653857	2.14E-08	Reference 8
1,2,3,7,8,9-hexachlorodibenzofuran	72918219	2.22E-09	Reference 8
1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	19408743	3.46E-08	Reference 6
1,2,3,7,8-pentachlorodibenzofuran	57117416	1.268E-06	Reference 8
1,2,3,7,8-pentachlorodibenzo-p-dioxin	40321764	7.66E-09	Reference 8
2,3,4,6,7,8-hexachlorodibenzofuran	60851345	1.962E-08	Reference 8
2,3,4,7,8-pentachlorodibenzofuran	57117314	2.02E-08	Reference 8
2,3,7,8-tetrachlorodibenzofuran	51207319	1.396E-08	Reference 8
2,3,7,8-tetrachlorodibenzo-p-dioxin	1746016	2.3E-09	Reference 6
CO	CO	112	Reference 5
Cumene	98828	0.01325	Reference 7
Ethyl Benzene	100414	0.048	Reference 6
Methyl Ethyl Ketone	78933	0.067	Reference 8
Nitrogen Oxides	NOX	6.2	Reference 5
Octachlorodibenzofuran	39001020	2.06E-08	Reference 8
Octachlorodibenzo-p-dioxin	3268879	1.328E-06	Reference 6
Phenol	108952	0.115	Reference 6
PM10-FIL	PM10-FIL	22	Reference 5
PM10-PRI	PM10-PRI	22	Reference 5
PM25-FIL	PM25-FIL	22	Reference 5
PM25-PRI	PM25-PRI	22	Reference 5
Styrene	100425	0.1015	Reference 6
Sulfur Dioxide	SO2	0.76	Reference 5
VOC	VOC	28	Reference 5

Table 3. Emission Factors for Open Burning of Brush Species (SCC 2610000400)

Pollutant	Pollutant Code	Emission Factor (lb/ton)	Emission Factor Reference
CO	CO	140	Reference 5
Nitrogen Oxides	NOX	5	Reference 5
PM10-PRI	PM10-PRI	19.73	Reference 5
PM10-FIL	PM10-FIL	19.73	Reference 5
PM25-PRI	PM25-PRI	15.21	Reference 5
PM25-FIL	PM25-FIL	15.21	Reference 5
Sulfur Dioxide	SO2	1.66	Reference 5
VOC	VOC	19	Reference 5
1,2,3,4,6,7,8-heptachlorodibenzofuran	35822469	3.32E-07	Reference 6
1,2,3,4,6,7,8-heptachlorodibenzo-p-dioxin	67562394	5.08E-08	Reference 6
1,2,3,4,7,8,9-heptachlorodibenzofuran	55673897	6.12E-09	Reference 6
1,2,3,4,7,8-hexachlorodibenzofuran	70648269	3.34E-08	Reference 6
1,2,3,4,7,8-hexachlorodibenzo-p-dioxin	39227286	1.136E-08	Reference 6
1,2,3,6,7,8-hexachlorodibenzofuran	57117449	1.428E-08	Reference 6
1,2,3,6,7,8-hexachlorodibenzo-p-dioxin	57653857	2.14E-08	Reference 8
1,2,3,7,8,9-hexachlorodibenzofuran	72918219	2.22E-09	Reference 8
1,2,3,7,8,9-hexachlorodibenzo-p-dioxin	19408743	3.46E-08	Reference 8

Pollutant	Pollutant Code	Emission Factor (lb/ton)	Emission Factor Reference
1,2,3,7,8-pentachlorodibenzofuran	57117416	1.268E-06	Reference 8
1,2,3,7,8-pentachlorodibenzo-p-dioxin	40321764	7.66E-09	Reference 8
2,3,4,6,7,8-hexachlorodibenzofuran	60851345	1.962E-08	Reference 8
2,3,4,7,8-pentachlorodibenzofuran	57117314	2.02E-08	Reference 8
2,3,7,8-tetrachlorodibenzofuran	51207319	1.396E-08	Reference 8
2,3,7,8-tetrachlorodibenzo-p-dioxin	1746016	2.3E-09	Reference 8
Cumene	98828	0.01325	Reference 8
Ethyl Benzene	100414	0.048	Reference 8
Methyl Ethyl Ketone	78933	0.067	Reference 8
Octachlorodibenzofuran	39001020	2.06E-08	Reference 8
Octachlorodibenzo-p-dioxin	3268879	1.328E-06	Reference 8
Phenol	108952	0.115	Reference 7
Styrene	100425	0.1015	Reference 7

3.2.3.20 Agricultural Production – Crops – Fertilizer

a. Source Category Description

Fertilizer in this category refers to any nitrogen-based compound, or mixture containing such a compound, that is applied to land to improve plant fitness.

The approach to calculating emissions for the assigned SCCs consisted of three general steps, as follows:

- Calculating the percent change in county-level fertilizer quantities applied between 2002 and 2007.
- Using the percent change in applied fertilizer quantity to grow the fertilizer activity files provided with the CMU Ammonia Model v.3.6.[1]
- Running the CMU Ammonia Model to calculate ammonia emissions based on the updated county-level fertilizer quantities.

For this source category, the following SCCs were assigned:

SCC	Descriptor 2	Descriptor 4	Descriptor 5	Descriptor 10
2801700001	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Anhydrous Ammonia
2801700002	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Aqueous Ammonia
2801700003	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Nitrogen Solutions
2801700004	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Urea
2801700005	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Ammonium Nitrate
2801700006	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Ammonium Sulfate
2801700007	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Ammonium Thiosulfate

2801700010	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	N-P-K (multi-grade nutrient fertilizers)
2801700011	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Calcium Ammonium Nitrate
2801700012	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Potassium Nitrate
2801700013	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Diammonium Phosphate
2801700014	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Monoammonium Phosphate
2801700015	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Liquid Ammonium Polyphosphate
2801700099	Miscellaneous Area Sources	Agriculture Production - Crops	Fertilizer Application	Miscellaneous Fertilizers

b. Activity Data

County-level fertilizer consumption data for 2002 and 2007 was obtained from the Fertilizer Institute's Commercial Fertilizers 2002 and 2007 reports.[2] The consumption data includes total fertilizer sales or shipments for farm and non-farm use and is reported semi-annually for the fiscal year. To make the fertilizer types listed in the Commercial Fertilizers reports match the activity input files from the CMU Ammonia Model, the fertilizer types were grouped according to Table 1 below. For any state in 2002 reporting fertilizer quantities from unknown counties, the quantities were apportioned to every county in the state based on cropland area obtained from the U.S. Department of Agriculture's 2002 Census of Agriculture.[3] Similarly for 2007, fertilizer quantities from unknown counties were apportioned based on cropland area reported in the 2007 Census of Agriculture.[4] For each fertilizer group, the percent difference in fertilizer consumption between 2002 and 2007 was calculated for each county. These percentages were used to grow the 2002 county-level nitrogen quantities from the fertilizer activity files provided with the CMU Ammonia Model v.3.6.

The average nitrogen content for each fertilizer group, reported in Table 2, was calculated by summing the county-level fertilizer quantities for all counties from the CMU Ammonia Model activity files to generate total nitrogen applied. For each fertilizer group, the total nitrogen applied was then divided by the 2002 fertilizer consumption data from the 2002 Commercial Fertilizers report to obtain the percent nitrogen content for each fertilizer group. For any county with fertilizer consumption in 2007, but not in 2002, the fertilizer quantity obtained from the

2007 Commercial Fertilizer's report was multiplied by the percent nitrogen content of each fertilizer group to determine tons of nitrogen. The tons of nitrogen were then converted to kilograms and allocated temporally by month according to the state-level percentage of total fertilizer in that group applied each month. The state-level percentage was calculated using data in the CMU Ammonia Model input files.

c. Emission Factors

Emission factors for each fertilizer group were provided with the CMU Ammonia Model and are reported in Table 3 below.[3]

d. Emissions

The fertilizer activity files provided with the CMU Ammonia Model v.3.6 were replaced with the updated county-level fertilizer files. County-level ammonia emissions were then calculated by running the model. The model corrects for the difference in mass between nitrogen and ammonia.

N applied x % N volatilized as NH_3 x 17 g /14 g = NH_3 emissions

e. Sample Calculations

Allocation of Fertilizer Quantities from Unknown Counties

From the 2007 Commercial Fertilizers report, Colorado reported 4,774,000 kg of ammonium nitrate from unknown counties for January through June of 2007. This quantity was distributed to counties based on the percent of cropland in the state located in each county. For example, Colorado has 11,484,000 acres of cropland. Adams County, Colorado has 547,000 acres of cropland.

Percent of cropland in CO located in Adams County = (547,000 / 11,484,000) x 100 = 4.76

Ammonium nitrate allocated to Adams County = 4,774,000 kg x .0476 = 227,240 kg

Growing the CMU Ammonia Model Input Files

After allocating fertilizer data from unknown counties for 2002 and 2007, the county-level percent difference between fertilizer quantity applied in 2002 and 2007 was used to grow the data in the activity files provided with the CMU Ammonia Model. For example, Autauga

County, Alabama applied 473,180 kg of ammonium nitrate from July 2001 through December 2001 and 516,240 kg from July 2006 through December 2006.

Percent change in ammonium nitrate applied = (516,240 kg / 473,180 kg) x 100 = 109

The quantity of nitrogen, in the form of ammonium nitrate, applied per month from July through December 2002 in Autauga County was extracted from the CMU Ammonia Model activity files and multiplied by the percent change.

July: 3,250 kg x 1.09 = 3,543 kg N

August: 3,210 kg x 1.09 = 3,499 kg N

September: 9,640 kg x 1.09 = 10,508 kg N

October: 6,320 kg x 1.09 = 6,889 kg N

November: 2,600 kg x 1.09 = 2,834 kg N

December: 1,380 kg x 1.09 = 1,504 kg N

Calculation of Nitrogen Content in a Fertilizer Group

The sum of all nitrogen applied in the form of ammonium nitrate from the CMU Ammonia Model ammonium nitrate activity file was 508,000,000 kg. From the 2002 Commercial Fertilizers report, the total quantity of ammonium nitrate applied in 2002 was 1,420,000,000 kg.

N content of ammonium nitrate = (508,000,000 kg / 1,420,000,000 kg) x 100 = 36 %

County Where Fertilizer was Applied in 2007, but not in 2002

In Meade County, Kentucky, there was no ammonium nitrate applied from January to June of 2002, but there were 356,705 kg applied from January to June of 2007. To convert to kg of nitrogen, the quantity of ammonium nitrate applied in 2007 was multiplied by the nitrogen content of ammonium nitrate.

N applied = 356,705 kg x 0.36 = 128,414 kg

The quantity of nitrogen was then allocated temporally by month from January to June based on the state-level distribution of nitrogen applied in the form of ammonium nitrate from the CMU Ammonia Model ammonium nitrate activity file. Total nitrogen in the form of ammonium nitrate

applied in Kentucky from January through June of 2002 was 17,000,000 kg. The total for January was 289,000 kg. The total for February was 745,000 kg.

January: (289,000 kg / 17,000,000 kg) x 128,414 kg = 2,183 kg N applied in Meade County

February: (745,000 kg / 17,000,000 kg) x 128,414 kg = 5,600 kg N applied in Meade County

March – June: calculated same as above.

f. References

1. Cliff Davidson, Peter Adams, Ross Strader, Rob Pinder, Natalie Anderson, Marian Goebes, and Josh Ayers. The Environmental Institute, Carnegie Mellon University, *CMU Ammonia Model v.3.6.*, 2004, at http://www.cmu.edu/ammonia/, accessed 25 April 2009.

2. Association of American Plant Food Control Officials in partnership with The Fertilizer Institute, *Commercial Fertilizers 2002* and *Commercial Fertilizers 2007*, at http://www.aapfco.org/aapfcopubs.html, accessed 2 May 2009.

3. U.S. Department of Agriculture, *2002 Census of Agriculture*, at http://www.agcensus.usda.gov/, accessed 30 April 2009.

4. 4. U.S. Department of Agriculture, *2007 Census of Agriculture*, at http://www.agcensus.usda.gov/, accessed 30 April 2009.

Table 1. Fertilizers Assigned to Fertilizer Groups

CMU Ammonia Model Fertilizer Group	Commercial Fertilizers Report - Fertilizer Code	Description 1	Description 2
Ammonium Nitrate	10	Ammonium Nitrate	Ammoniumnitrate
Ammonium Sulfate	24	Ammonium Sulfate	Ammoniumsulfate
Ammonium Thiosulfate	31	Ammonium Thiosulfate	Ammoniumthiosul
Anhydrous Ammonia	2	Anhydrous Ammonia	Anhy Ammonia
Aqueous Ammonia	6	Aqua Ammonia	Aqua Ammonia
Calcium Ammonium Nitrate	35	Calcium Ammonium Nit	Calcium Amm Nit
Diammonium Phosphate	203	Diammonium Phosphate	DAP

CMU Ammonia Model Fertilizer Group	Commercial Fertilizers Report - Fertilizer Code	Description 1	Description 2
Liquid Ammonium Polyphosphate	249	Liquid Ammonium Poly	Liq Amm Poly
Miscellaneous	12	Ammonium Nitrate Sol	Amm Nit Solution
	13	Ammonium Nitrate-Lim	Amm Nit Lime Mix
	16	Ammonium Nitrate-Sul	Ammoniumnit-Sul
	20	Ammonium Polysulfide	Ammoniumpolysulf
	25	Ammonium Sulfate Sol	Amm Sul Solution
	27	Ammonium Sulfate-Nit	Ammoniumsul-Nit
	29	Ammonium Sulfate-Ure	Ammoniumsul-Urea
	46	Calcium Nitrate-Urea	Calcium Nit-Urea
	52	Magnesium Nitrate	Magnesium Nit
	54	Nitric Acid	Nitric Acid
	62	Sodium Nitrate	Sodium Nitrate
	64	Sulfur Coated Urea	Sul Ctd Urea
	67	Urea Solution	Urea Solution
	68	Urea-Formaldehyde	Urea-Form
	97	Nitrogen Product - C	Nitrogen No Code
	98	Nitrogen Product - C	Nitrogen No Id
	201	Ammonium Metaphospha	Ammoniummetaphos
	202	Ammonium Phosphate	Ammoniumphos
	204	Ammonium Polyphospha	Ammoniumpoly
	206	Ammonium Phosphate N	Amm Phosnitrate
	207	Ammonium Phosphate S	Amm Phossulfate
	241	Nitric Phosphate	Nitric Phos
	413	Manure Salts	Manure Salts
	458	Potassium-Sodium Nit	Pot-Sod Nitrate
	617	Fish Scrap	Fish Scrap
	629	Guano	Guano
	649	Manure	Manure
	652	Peat	Peat
	661	Sewage Sludge, Activ	Act Sew Sludge
	663	Sewage Sludge, Diges	Dig Sew Sludge
	665	Sewage Sludge, Heat	Ht Driedsew Slge
	667	Sewage Sludge, Other	Oth Sew Sludge
	671	Soybean Meal	Soybean Meal
	673	Tankage, Animal	Animal Tankage
	675	Tankage, Process	Process Tankage
	697	Natural Organic Prod	Nat Org No Code
	698	Nat Organic Product	Nat Org No Id
	764	Soil Amendment	Soil Amendmnt
	766	Soil Conditioner	Soil Cond

CMU Ammonia Model Fertilizer Group	Commercial Fertilizers Report - Fertilizer Code	Description 1	Description 2
	767	Potting Soil	Potting Soil
	797	Sec./Micronut. - Cod	Sec/Mic No Code
	798	Sec./Micronut. - Cod	Sec/Mic No Id
	978	Fertilizer Product -	Fert No Id
	988	Single Nutrient - Co	Sgle-Nu No Id
Mix	0	Identified By Grade	Ident. By Grade
	998	Multiple Nutrient -	Mult-Nut No Grade
Monoammonium Phosphate	209	Monoammonium Phosphate	Monoamm Phos
Nitrogen Solutions	56	Nitrogen Solution <28%	Nitrogensol <28%
	58	Nitrogen Solution 28%	Nitrogensol 28%
	59	Nitrogen Solution 30%	Nitrogensol 30%
	60	Nitrogen Solution 32%	Nitrogensol 32%
	61	Nitrogen Solution >32%	Nitrogensol >32%
Potassium Nitrate	453	Potassium Nitrate	Pot Nitrate
Urea	66	Urea	Urea

Table 2. Fertilizer Nitrogen Content

Fertilizer	Nitrogen Content (percent)
Ammonium Nitrate	36
Ammonium Sulfate	22
Ammonium Thiosulfate	12
Anhydrous Ammonia	82
Aqueous Ammonia	21
Calcium Ammonium Nitrate	17
Diammonium Phosphate	18
Liquid Ammonium Polyphosphate	10
Miscellaneous	8
Mix	12
Monoammonium Phosphate	11
Nitrogen Solutions	29
Potassium Nitrate	14
Urea	46

Table 3. Fertilizer Emission Factors

Fertilizer Description	Pollutant Code	Emission Factor (varies by county for some fertilizers)			Emission Factor Unit	Emission Factor Reference
		Min	Max	Average		
Ammonium Nitrate	NH3	1.0	3.0	1.91	% N volatilized as NH3	1
Ammonium Sulfate	NH3	5.0	15.0	9.53	% N volatilized as NH3	1
Ammonium Thiosulfate	NH3	2.5	2.5	2.5	% N volatilized as NH3	1
Anhydrous Ammonia	NH3	4.0	4.0	4.0	% N volatilized as NH3	1
Aqueous Ammonia	NH3	4.0	4.0	4.0	% N volatilized as NH3	1
Calcium Ammonium Nitrate	NH3	1.0	3.0	1.91	% N volatilized as NH3	1
Diammonium Phosphate	NH3	5.0	5.0	5.0	% N volatilized as NH3	1
Liquid Ammonium Polyphosphate	NH3	5.0	5.0	5.0	% N volatilized as NH3	1
Miscellaneous Fertilizers	NH3	6.0	8.0	6.59	% N volatilized as NH3	1
Monoammonium Phosphate	NH3	5.0	5.0	5.0	% N volatilized as NH3	1
Nitrogen Solutions	NH3	8.0	8.0	8.0	% N volatilized as NH3	1
N-P-K (multi-grade nutrient fertilizers)	NH3	1.0	3.0	1.91	% N volatilized as NH3	1
Potassium Nitrate	NH3	2.0	2.0	2.0	% N volatilized as NH3	1
Urea	NH3	15.0	20.0	15.8	% N volatilized as NH3	1

3.2.3.21 Publicly Owned Treatment Works

a. Source Category Description

Publicly Owned Treatment Works (POTW) means a treatment works that is owned by a state, municipality, city, town, special sewer district, or other publicly owned and financed entity as opposed to a privately (industrial) owned treatment facility. The definition includes intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment. The wastewater treated by these POTWs is generated by industrial, commercial, and domestic sources.[1]

The general approach to calculating emissions for POTWs is to estimate the 2008 national POTW flow rate using methods described below and then multiply the estimated flow rate by the emission factors for VOCs, ammonia, and 53 HAPs. The emissions are allocated to the county level using methods described below.

b. Activity Data

A nationwide projected flow rate in 2010 of 39,780 million gallons per day (MMGD) was available from an EPA report.[2] Of this, POTWs account for 98.5 percent of the flow rate or 39,180 MMGD, with privately owned treatment works accounting for the rest. The EPA Clean Watersheds Needs Survey reports the existing flow rate in 2004 for POTWs as 34,370 MMGD.[3] The interpolated 2008 nationwide flow rate (using a linear regression) was calculated at 37,580 MMGD, or 13,754,280 million gallons annually. The nationwide flow rate includes Puerto Rico and the U.S. Virgin Islands.

c. Emission Factors

The ammonia emission factor was obtained from a report to EPA[4], while the VOC emission factor was based on a TriTAC study.[5] Emission factors for the 53 HAPs were derived using 1996 area source emissions estimates that were provided by ESD[6] and the 1996 nationwide flow rate.[7] These HAP emission factors were then multiplied by the 2008 to 2002 VOC emission factor ratio (0.85/9.9) to obtain the final HAP emission factors applied in the 2008 inventory. The emission factors, pollutant codes, and pollutant descriptions are reported in Table 1.

d. Emissions

Emissions were allocated to the county-level by the county proportion of the U.S. population.[8]

It is important to note that the emission estimates for this category represent total emissions. It may be necessary to determine whether there are point source emissions in SCCs 50100701 through 50100781 and 50100791 through 50182599 that need to be subtracted to yield the nonpoint source emission estimates for this category.

Though there are two point source facilities in Missouri that are POTW's, their emissions were not subtracted from the area source category due to time constraints and small level of emissions compared to the area source category.

e. Sample Calculations:

The 1996 flow rate per day was 32,175 MMGD. (1996 was a leap year.) Annually, this computes to:

32,175 MMGD treated * 366 days = 11,776,050 million gallons treated

Benzene emissions in 1996 for area source POTWs were estimated to be 461.44 tons per year. The derived benzene emission factor is calculated as follows:

Benzene emission factor = ((461.44 tons * 2000 lb/ton) / (11,776,050 million gallons treated)) * (0.85/9.9)

Benzene emission factor = 0.0067287 lb/million gallons treated

Benzene emissions for 2008 for area source POTWs are calculated as follows:

2008 Benzene emissions = (37,580 MMGD * 366 days) * (0.0067287 lb/million gallons treated)

2008 Benzene emissions = 92,548 pounds / 2,000 pounds = 46.27 tons/year

Total national 2008 benzene emissions from area source POTWs are allocated to county-level by the county proportion of the U.S. population. The total U.S. population in 2008 is 308,123,578. Benzene emissions for Autauga County, Alabama (2008 population of 50,364) are calculated as follows:

2008 emissions = 46.27 tons/year * 50,364/308,123,578 = 0.0076 tons/year

f. References

1. U.S. Environmental Protection Agency, 64FR57572, National Emission Standards for Publicly Owned Treatment Works, Final Rule, 40 CFR Part 63, 26 October 1999.

2. U.S. Environmental Protection Agency, "Wastewater Flow Projections for POTWs and Privately and Federally Owned Treatment Works in 2000, 2005, and 2010," Table A-8 in *Biosolids Generation, Use, and Disposal in the United States*, EPA530-R-99-009, September 1999.

3. U.S. Environmental Protection Agency, Clean Watersheds Needs Survey, Ask WATERS Online Database Query Tool, at http://iaspub.epa.gov/waters10/query_tool.criteria?srept_no=165&branding=15, accessed 19 May 2009.

4. Stephen M. Roe, Melissa D. Spivey, Holly C. Lindquist, Kirstin B. Thesing, and Randy P. Strait, E.H. Pechan & Associates, Inc., *Estimating Ammonia Emissions from Anthropogenic Nonagricultural Sources – Draft Final Report*, prepared for U.S. Environmental Protection Agency, Emission Inventory Improvement Program, April 2004.

5. Prakasam Tata, Jay Witherspoon, Cecil Lue-Hing (eds.), VOC Emissions from Wastewater Treatment Plants: Characterization, Control, and Compliance, Lewis Publishers, 2003, p. 261.

6. Memorandum from Bob Lucas, U.S Environmental Protection Agency to Greg Nizich, U.S. Environmental Protection Agency, "Review of Baseline Emissions Inventory," 16 October 1998.

7. U.S. Environmental Protection Agency, "Facilities Database (Needs Survey) - Frequently Asked Questions," at http://www.epa.gov/owm/mtb/cwns/1996rtc/faqwfd.htm, accessed 22 May 2009.

8. U.S. Census Bureau, "Population Estimates," at http://www.census.gov/popest/estimates.html, released 14 May 2009 with population estimates as of 1 July 2008. Note: The U.S. Census Bureau estimate does not include the U.S. Virgin Islands, so the Census Bureau estimate was supplemented with Virgin Island population data from U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Demographic Baseline Report of U.S. Territories and Counties Adjacent to Coral Reef Habitats*, June 2008, at http://coris.noaa.gov/activities/coral_demographics, accessed 9 June 2009.

Table 1. Criteria and HAP Emission Factors for Publicly Owned Treatment Works (SCC 2630020000): Not Adjusted for Point Source Emissions

Pollutant Description	NIF 3.0 Pollutant Codes	Emission Factor (lb/MMGAL)	Emission Factor Reference(s)
1,1,2,2-TETRACHLOROETHANE	79345	1.75E-06	6, 7
1,1,2-TRICHLOROETHANE	79005	1.17E-06	6, 7
1,2,4-TRICHLOROBENZENE	120821	8.67E-05	6, 7
1,3-BUTADIENE	106990	2.51E-05	6, 7
1,4-DICHLOROBENZENE	106467	2.16E-04	6, 7
1-CHLORO-2,3-EPOXYPROPANE	106898	4.52E-06	6, 7

Pollutant Description	NIF 3.0 Pollutant Codes	Emission Factor (lb/MMGAL)	Emission Factor Reference(s)
2,4-DINITROTOLUENE	121142	4.81E-05	6, 7
2-NITROPROPANE	79469	2.92E-07	6, 7
ACETALDEHYDE	75070	3.10E-04	6, 7
ACETONITRILE	75058	3.45E-04	6, 7
ACROLEIN	107028	3.84E-04	6, 7
ACRYLONITRILE	107131	3.86E-04	6, 7
ALLYL CHLORIDE	107051	1.94E-05	6, 7
AMMONIA	NH3	1.69E-01	4
BENZENE	71432	6.73E-03	6, 7
BENZYL CHLORIDE	100447	8.17E-06	6, 7
BIPHENYL	92524	7.52E-05	6, 7
CARBON DISULFIDE	75150	4.32E-03	6, 7
CARBON TETRACHLORIDE	56235	1.12E-03	6, 7
CHLOROBENZENE	108907	4.83E-04	6, 7
CHLOROFORM	67663	6.44E-03	6, 7
CHLOROPRENE	126998	2.38E-05	6, 7
CRESOLS (INCLUDES O, M, & P)/CRESYLIC ACIDS	331	1.61E-06	6, 7
DIMETHYL SULFATE	77781	1.31E-06	6, 7
ETHYL ACRYLATE	140885	1.75E-06	6, 7
ETHYL BENZENE	100414	7.66E-03	6, 7
ETHYLENE OXIDE	75218	2.22E-04	6, 7
FORMALDEHYDE	50000	1.97E-05	6, 7
GLYCOL ETHERS	171	1.15E-02	6, 7
HEXACHLOROBUTADIENE	87683	7.29E-07	6, 7
HEXACHLOROCYCLOPENTADIENE	77474	5.83E-07	6, 7
METHANOL	67561	1.14E-02	6, 7
METHYL CHLOROFORM	71556	5.63E-04	6, 7
METHYL ETHYL KETONE	78933	2.84E-03	6, 7
METHYL ISOBUTYL KETONE	108101	2.69E-03	6, 7
METHYL METHACRYLATE	80626	3.11E-04	6, 7
METHYL TERT-BUTYL ETHER	1634044	6.37E-05	6, 7
METHYLENE CHLORIDE	75092	9.10E-03	6, 7
N,N-DIMETHYLANILINE	121697	3.22E-04	6, 7
NAPHTHALENE	91203	1.31E-03	6, 7
NITROBENZENE	98953	6.56E-06	6, 7
O-TOLUIDINE	95534	1.75E-06	6, 7
P-DIOXANE	123911	1.79E-05	6, 7

Pollutant Description	NIF 3.0 Pollutant Codes	Emission Factor (lb/MMGAL)	Emission Factor Reference(s)
PROPIONALDEHYDE	123386	3.50E-06	6, 7
PROPYLENE DICHLORIDE	78875	1.15E-05	6, 7
PROPYLENE OXIDE	75569	7.32E-04	6, 7
STYRENE	100425	2.73E-03	6, 7
TETRACHLOROETHYLENE	127184	4.27E-03	6, 7
TOLUENE	108883	1.23E-02	6, 7
TRICHLOROETHYLENE	79016	3.06E-04	6, 7
VINYL ACETATE	108054	7.66E-05	6, 7
VINYL CHLORIDE	75014	6.71E-06	6, 7
VINYLIDENE CHLORIDE	75354	4.23E-04	6, 7
VOLATILE ORGANIC COMPOUNDS	VOC	8.50E-01	5
XYLENES (MIXTURE OF O, M, AND P ISOMERS)	1330207	5.98E-02	6, 7

3.2.3.22 Solvent Utilization

a. Source Category Description

Solvent Utilization describes a wide range of activities where the primary pollutants released are volatile organic compounds (VOCs). Some examples would be surface coating operations (where a paint or finish is applied to a manufactured product), or consumer and commercial cleaning product application. The list of SCCs is included in Table 1.

b. Activity Data

The three types of activity data collected are population, road miles (used for traffic markings), and employment data. Table 1 shows the type of activity data used for each category and provides the SCC. Employment data is listed by the North American Industrial Classification Standard (NAICS) code(s) that were used to determine county-level employment for the category.

Population data was collected from the U.S. Census Bureau's population estimates for July 1, 2008.

For traffic paints, the Federal Highway Administration provides county-level road miles as a part of their HPMS data. The most recent data set available at the time of compilation was 2006.

Employment data was allocated to each county using *County Business Patterns* (CBP) employment data for 2006 (the most recent data available at the time of compilation). One of the limitations of *County Business Patterns* is the fact that data can be withheld if certain conditions are present so that confidential business data is not revealed. Divita 2009 describes how this limitation is overcome by applying a procedure to estimate the number of employees in a withheld county. For SCCs with multiple NAICS associated with them, this allocation procedure is performed for each individual NAICS.

Point source subtraction is completed by determining the number of employees per county in each of the associated NAICS codes and subtracting them from the CBP county total prior to calculating emissions. Table 2 lists the solvent categories and their point source subtraction results. In some cases, the entire county area source emission estimate becomes zero because all of the CBP employees are accounted for in the point source category.

c. Control Factors

For several categories, air pollution regulations exist that regulate the solvent content of products which can be sold. These solvent content limits have been taken into account where appropriate by modifying emission factors rather than developing control efficiency information.

d. Emission Factors

Emission factors were developed and reviewed by an ERTAC advisory panel composed of state and EPA personnel. Table 3 lists the SCC, pollutant, and emission factors that were developed for categories with the same factor throughout the country. As mentioned in the control factors section above, there were several categories where the emission factor was adjusted to account for rules that limit solvent content. Table 4 lists the categories with their uncontrolled and controlled emission factors while Table 5 lists the states for which controlled emission factors were applied.

e. Sample Calculations

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = A_x \times EF_{x,p}$$

where:

$E_{x,p}$ = annual emissions for category x and pollutant p
A_x = Population or employment data associated with category x
$EF_{x,p}$ = emission factor for category x and pollutant p

Example:

Using architectural coatings in Allegheny County, PA as an example:

According to the U.S. Census Bureau, population on July 1, 2008 is 1,215,103
The emission factor for VOC is 2.41 lb/person

$$E_{VOC} = 1{,}215{,}103 \text{ people} \times 2.41 \text{ lb VOC/ person}$$

$$= 2{,}928{,}398 \text{ lb VOC or } 1{,}464.2 \text{ ton VOC}$$

f. References

Divita, 2009: Divita, Frank, E.H. Pechan & Associates, Inc., memorandum to Roy Huntley, U.S. Environmental Protection Agency, "County Business Patterns Allocations," June 30, 2009.

DOC, 2008: U.S. Department of Commerce, Bureau of the Census, 2006 *County Business Patterns*, Washington, DC. Address: http://www.census.gov/epcd/cbp/download/06_data/index.html accessed November 2008.

Table 1. Activity Data Sources Used for Each SCC

Category Name	SCC	NAICS	Comments
Architectural Coatings	2401001000	N/A	Population based Category
Automobile Refinishing	2401005000	81112	
		4411	
		4412	
Traffic Paints	2401008000	N/A	Road Miles coming from 2006 HPMS Data
Wood and Composition Flat Stock	2401015000	321	
Wood Furniture and Fixtures	2401020000	337110	
		337121	
		337122	
		337127	50% to this and 50% to metal furniture
		337129	
		337211	
		337212	
		337215	50% to this and 50% to metal furniture
		339111	50% to this and 50% to metal furniture
Metal Furniture	2401025000	337124	
		337127	50% to this and 50% to wood furniture
		337214	
		337215	50% to this and 50% to wood furniture
		339111	50% to this and 50% to wood furniture
Paper, Film and Foil	2401030000	322221	
		322222	
		322223	
		322225	
		322226	
Metal Cans	2401040000	33243	
Metal Sheet, Strip and Coils	2401045000	332812	
		339911	
		339912	
		339914	
Misc. Finished Metals	2401050000		Consolidated with Miscellaneous Manufacturing
Machinery and Equipment	2401055000	3331	
		3332	
		3333	
		33341	
Appliances	2401060000	3352	
Electronic and Other Electrical Coatings	2401065000	331319	
		331422	
		331491	
		335921	
		335929	
		335311	
Motor Vehicles	2401070000	3361	
		3362	
		3363	

Category Name	SCC	NAICS	Comments
Aircraft	2401075000	3364	
Railroads	2401085000	3365	
Marine coatings	2401080000	3366	
		488390	
Misc. Manufacturing	2401090000	339	
		3369	
Industrial Maintenance Coatings	2401100000	N/A	Population based Category
Other Special Purpose Coatings	2401200000	N/A	Population based Category
Cleaning Products: Industrial and Institutional	2415000000	331	
		332	
		333	
		334	
		335	
		336	
		337	
		339	
		441	
		483	
		484	
		485	
		488	
		8111	
		8112	
Dry Cleaning	2420000000	81231	
		81232	
		81233	
Graphic Arts	2425000000	32311	Category Calculated using either population or employment
		322211	
		322212	
		322213	
		322214	
		322215	
		322221	
		322222	
		322223	
		322224	
		322225	
		322226	
		322231	
		322232	
		322233	
		322291	
		322299	
Personal Care Products (Cosmetics and Toiletries)	2460100000	N/A	Population based Category
Cleaning Products: Household	2460200000	N/A	Population based Category
Automotive Aftermarket (Transportation: Motor Vehicles)	2460400000	N/A	Population based Category
Coatings and Related Products	2460500000	N/A	Population based Category

Category Name	SCC	NAICS	Comments
Adhesives and Sealants	2460600000	N/A	Population based Category
FIFRA Regulated Products	2460800000	N/A	Population based Category
Misc. Products	2460900000	N/A	Population based Category

Table 2 - Nonpoint Solvent Categories and Point Source Subtraction

Category Name	SCC	Missouri Point Subtraction	
Architectural Coatings	2401001000	Population based, no point contribution	
Automobile Refinishing	2401005000	No point facilities in Missouri	
Appliances	2401060000	No point facilities in Missouri	
Traffic Paints	2401008000	Road mile based, no point contribution	
Industrial Maintenance Coatings	2401100000	Population based, no point subtraction	
Other Special Purpose Coatings	2401200000	Population based, no point subtraction	
Dry Cleaning	2420000000	No point facilities in Missouri	
Personal Care Products (Cosmetics and Toiletries)	2460100000	Population based, no point subtraction	
Cleaning Products: Household	2460200000	Population based, no point subtraction	
Automotive Aftermarket (Transportation: Motor Vehicles)	2460400000	Population based, no point subtraction	
Coatings and Related Products	2460500000	Population based, no point subtraction	
Adhesives and Sealants	2460600000	Population based, no point subtraction	
FIFRA Regulated Products	2460800000	Population based, no point subtraction	
Misc. Products	2460900000	Population based, no point subtraction	
Wood and Composition Flat Stock	2401015000	*County*	*Employees removed*
		53	32
		91	515
		105	200
		107	85
		186	210
		201	290
		203	20
		207	839
Wood Furniture and Fixtures	2401020000	*County*	*Employees removed*
		145	800
		187	40
		189	55

Category Name	SCC	Missouri Point Subtraction	
		215	105
Metal Furniture	2401025000	*County*	*Employees removed*
		189	55
Paper, Film and Foil	2401030000	*County*	*Employees removed*
		189	160
		510	250
Metal Cans	2401040000	*County:*	*Employees removed:*
		21	205
		77	120
		95	147
		99	174
		159	650
		189	54
Metal Sheet, Strip and Coils	2401045000	*County:*	*Number of Employees removed:*
		189	*10*
		510	*125*
Machinery and Equipment	2401055000	*County:*	*Number of Employees removed:*
		21	850
		23	825
		29	165
		53	375
		97	50
		99	175
		183	950
		201	60
Electronic and Other Electrical Coatings	2401065000	*County:*	*Number of Employees removed:*
		27	550
		159	229
Motor Vehicles	2401070000	*County:*	*Number of Employees removed:*
		19	152
		47	5950
		51	534
		71	728
		77	325
		79	125
		91	325

Category Name	SCC	Missouri Point Subtraction	
		95	875
		97	251
		117	125
		157	1200
		159	650
		175	100
		183	2600
		189	1635
		201	95
		225	115
		229	170
Aircraft	2401075000	*County:*	*Number of Employees removed:*
		145	160
		183	945
		189	14555
Railroads	2401085000	*County:*	*Number of Employees removed:*
		99	316
Marine coatings	2401080000	*County:*	*Number of Employees removed:*
		83	195
		105	971
		155	520
		167	188
Misc. Manufacturing	2401090000	*County*	*Number of Employees Subtracted*
		165	900
		510	630
Cleaning Products: Industrial and Institutional	2415000000	*County*	*Number of Employees Subtracted*
		7	27
		9	2331
		19	402
		21	1233
		23	2225
		27	550
		29	165
		47	5950
		51	534
		53	375

Category Name	SCC	Missouri Point Subtraction	
		61	142
		71	1684
		77	1199
		79	125
		83	195
		87	85
		91	325
		93	299
		95	3687
		97	1716
		99	1253
		101	1300
		105	1461
		109	35
		113	590
		117	125
		131	556
		143	1150
		145	1285
		147	1150
		151	400
		155	695
		157	1212
		159	1848
		165	1500
		167	188
		175	100
		183	5480
		187	798
		189	18679
		201	155
		205	178
		215	105
		219	309
		225	115
		229	170

Category Name	SCC	Missouri Point Subtraction	
		510	900
Graphic Arts	2425000000	*County:*	*Employees Removed:*
		21	130
		31	1599
		47	270
		51	725
		71	545
		73	450
		77	309
		83	163
		95	4590
		115	375
		165	101
		189	375
		219	48
		510	107

Table 3. National Emission Factors

SCC	Description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator	Calculation Material Code	Material Description
2401005000	SC: Automobile Refinishing	107211	0.1424	LB	EACH	992	Employee
2401005000	SC: Automobile Refinishing	171	0.84817	LB	EACH	992	Employee
2401005000	SC: Automobile Refinishing	78933	10.591	LB	EACH	992	Employee
2401005000	SC: Automobile Refinishing	108101	2.848	LB	EACH	992	Employee
2401005000	SC: Automobile Refinishing	108883	1.602	LB	EACH	992	Employee
2401005000	SC: Automobile Refinishing	1330207	1.78	LB	EACH	992	Employee
2401005000	SC: Automobile Refinishing	VOC	89	LB	EACH	992	Employee
2401008000	SC: Traffic Paint	71556	2.2155	LB	ROAD MILE	225	Paint
2401008000	SC: Traffic Paint	78933	1.3504	LB	ROAD MILE	225	Paint
2401008000	SC: Traffic Paint	108101	1.5403	LB	ROAD MILE	225	Paint
2401008000	SC: Traffic Paint	108883	0.18568	LB	ROAD MILE	225	Paint
2401008000	SC: Traffic Paint	VOC	22.1	LB	ROAD MILE	225	Paint
2401015000	SC: Wood and Composition Flat Stock	107211	0.1935	LB	EACH	992	Employee
2401015000	SC: Wood and Composition Flat Stock	171	0.59426	LB	EACH	992	Employee
2401015000	SC: Wood and Composition Flat Stock	78933	1.548	LB	EACH	992	Employee
2401015000	SC: Wood and Composition Flat Stock	108101	3.569	LB	EACH	992	Employee
2401015000	SC: Wood and Composition Flat Stock	71556	0.344	LB	EACH	992	Employee
2401015000	SC: Wood and Composition Flat Stock	108883	1.118	LB	EACH	992	Employee
2401015000	SC: Wood and Composition Flat Stock	1330207	0.946	LB	EACH	992	Employee
2401015000	SC: Wood and Composition Flat Stock	VOC	43	LB	EACH	992	Employee
2401020000	SC: Wood Furniture and Fixtures	VOC	244	LB	EACH	992	Employee
2401025000	SC: Metal Furniture	107211	3.474	LB	EACH	992	Employee
2401025000	SC: Metal Furniture	171	10.66904	LB	EACH	992	Employee
2401025000	SC: Metal Furniture	78933	27.792	LB	EACH	992	Employee
2401025000	SC: Metal Furniture	108101	64.076	LB	EACH	992	Employee
2401025000	SC: Metal Furniture	71556	6.176	LB	EACH	992	Employee
2401025000	SC: Metal Furniture	108883	20.072	LB	EACH	992	Employee
2401025000	SC: Metal Furniture	1330207	16.984	LB	EACH	992	Employee
2401025000	SC: Metal Furniture	VOC	772	LB	EACH	992	Employee
2401030000	SC: Paper, Film and Foil	107211	3.3075	LB	EACH	992	Employee
2401030000	SC: Paper, Film and Foil	171	10.1577	LB	EACH	992	Employee
2401030000	SC: Paper, Film and Foil	78933	26.46	LB	EACH	992	Employee
2401030000	SC: Paper, Film and Foil	108101	61.005	LB	EACH	992	Employee
2401030000	SC: Paper, Film and Foil	71556	5.88	LB	EACH	992	Employee
2401030000	SC: Paper, Film and Foil	108883	19.11	LB	EACH	992	Employee

SCC	Description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator	Calculation Material Code	Material Description
2401030000	SC: Paper, Film and Foil	1330207	16.17	LB	EACH	992	Employee
2401030000	SC: Paper, Film and Foil	VOC	735	LB	EACH	992	Employee
2401040000	SC: Metal Cans	107211	10.467	LB	EACH	992	Employee
2401040000	SC: Metal Cans	171	32.14532	LB	EACH	992	Employee
2401040000	SC: Metal Cans	78933	83.736	LB	EACH	992	Employee
2401040000	SC: Metal Cans	108101	193.058	LB	EACH	992	Employee
2401040000	SC: Metal Cans	71556	18.608	LB	EACH	992	Employee
2401040000	SC: Metal Cans	108883	60.476	LB	EACH	992	Employee
2401040000	SC: Metal Cans	1330207	51.172	LB	EACH	992	Employee
2401040000	SC: Metal Cans	VOC	2,326	LB	EACH	992	Employee
2401045000	SC: Metal Sheet, Strip and Coils	VOC	2,877	LB	EACH	992	Employee
2401055000	SC: Machinery and Equipment	107211	0.4905	LB	EACH	992	Employee
2401055000	SC: Machinery and Equipment	171	1.50638	LB	EACH	992	Employee
2401055000	SC: Machinery and Equipment	78933	3.924	LB	EACH	992	Employee
2401055000	SC: Machinery and Equipment	108101	9.047	LB	EACH	992	Employee
2401055000	SC: Machinery and Equipment	71556	0.872	LB	EACH	992	Employee
2401055000	SC: Machinery and Equipment	108883	2.834	LB	EACH	992	Employee
2401055000	SC: Machinery and Equipment	1330207	2.398	LB	EACH	992	Employee
2401055000	SC: Machinery and Equipment	VOC	109	LB	EACH	992	Employee
2401060000	SC: Appliances	107211	1.1205	LB	EACH	992	Employee
2401060000	SC: Appliances	171	3.44118	LB	EACH	992	Employee
2401060000	SC: Appliances	78933	8.964	LB	EACH	992	Employee
2401060000	SC: Appliances	108101	20.667	LB	EACH	992	Employee
2401060000	SC: Appliances	71556	1.992	LB	EACH	992	Employee
2401060000	SC: Appliances	108883	6.474	LB	EACH	992	Employee
2401060000	SC: Appliances	1330207	5.478	LB	EACH	992	Employee
2401060000	SC: Appliances	VOC	249	LB	EACH	992	Employee
2401065000	SC: Electronic and Other Electrical Coatings	107211	0.11115	LB	EACH	992	Employee
2401065000	SC: Electronic and Other Electrical Coatings	171	0.341354	LB	EACH	992	Employee
2401065000	SC: Electronic and Other Electrical Coatings	78933	0.8892	LB	EACH	992	Employee
2401065000	SC: Electronic and Other Electrical Coatings	108101	2.0501	LB	EACH	992	Employee
2401065000	SC: Electronic and Other Electrical Coatings	71556	0.1976	LB	EACH	992	Employee
2401065000	SC: Electronic and Other Electrical Coatings	108883	0.6422	LB	EACH	992	Employee
2401065000	SC: Electronic and Other Electrical Coatings	1330207	0.5434	LB	EACH	992	Employee

SCC	Description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator	Calculation Material Code	Material Description
2401065000	SC: Electronic and Other Electrical Coatings	VOC	24.7	LB	EACH	992	Employee
2401070000	SC: Motor Vehicles (including motor vehicle parts)	107211	0.738	LB	EACH	992	Employee
2401070000	SC: Motor Vehicles (including motor vehicle parts)	171	2.26648	LB	EACH	992	Employee
2401070000	SC: Motor Vehicles (including motor vehicle parts)	78933	5.904	LB	EACH	992	Employee
2401070000	SC: Motor Vehicles (including motor vehicle parts)	108101	13.612	LB	EACH	992	Employee
2401070000	SC: Motor Vehicles (including motor vehicle parts)	71556	1.312	LB	EACH	992	Employee
2401070000	SC: Motor Vehicles (including motor vehicle parts)	108883	4.264	LB	EACH	992	Employee
2401070000	SC: Motor Vehicles (including motor vehicle parts)	1330207	3.608	LB	EACH	992	Employee
2401070000	SC: Motor Vehicles (including motor vehicle parts)	VOC	164	LB	EACH	992	Employee
2401075000	SC: Aircraft	107211	0.0675	LB	EACH	992	Employee
2401075000	SC: Aircraft	171	0.2073	LB	EACH	992	Employee
2401075000	SC: Aircraft	78933	0.54	LB	EACH	992	Employee
2401075000	SC: Aircraft	108101	1.245	LB	EACH	992	Employee
2401075000	SC: Aircraft	71556	0.12	LB	EACH	992	Employee
2401075000	SC: Aircraft	108883	0.39	LB	EACH	992	Employee
2401075000	SC: Aircraft	1330207	0.33	LB	EACH	992	Employee
2401075000	SC: Aircraft	VOC	15	LB	EACH	992	Employee
2401080000	SC: Marine	107211	0.891	LB	EACH	992	Employee
2401080000	SC: Marine	171	2.73636	LB	EACH	992	Employee
2401080000	SC: Marine	78933	7.128	LB	EACH	992	Employee
2401080000	SC: Marine	108101	16.434	LB	EACH	992	Employee
2401080000	SC: Marine	71556	1.584	LB	EACH	992	Employee
2401080000	SC: Marine	108883	5.148	LB	EACH	992	Employee
2401080000	SC: Marine	1330207	4.356	LB	EACH	992	Employee
2401080000	SC: Marine	VOC	198	LB	EACH	992	Employee
2401085000	SC: Railroads	107211	0.999	LB	EACH	992	Employee
2401085000	SC: Railroads	171	3.06804	LB	EACH	992	Employee
2401085000	SC: Railroads	78933	7.992	LB	EACH	992	Employee
2401085000	SC: Railroads	108101	18.426	LB	EACH	992	Employee
2401085000	SC: Railroads	71556	1.776	LB	EACH	992	Employee
2401085000	SC: Railroads	108883	5.772	LB	EACH	992	Employee
2401085000	SC: Railroads	1330207	4.884	LB	EACH	992	Employee
2401085000	SC: Railroads	VOC	222	LB	EACH	992	Employee
2401090000	SC: Misc. Manufacturing	107211	0.612	LB	EACH	992	Employee
2401090000	SC: Misc. Manufacturing	171	1.87952	LB	EACH	992	Employee
2401090000	SC: Misc. Manufacturing	78933	4.896	LB	EACH	992	Employee
2401090000	SC: Misc. Manufacturing	108101	11.288	LB	EACH	992	Employee
2401090000	SC: Misc. Manufacturing	71556	1.088	LB	EACH	992	Employee

SCC	Description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator	Calculation Material Code	Material Description
2401090000	SC: Misc. Manufacturing	108883	3.536	LB	EACH	992	Employee
2401090000	SC: Misc. Manufacturing	1330207	2.992	LB	EACH	992	Employee
2401090000	SC: Misc. Manufacturing	VOC	136	LB	EACH	992	Employee
2401200000	SC: Other Special Purpose Coatings	107211	0.0000315	LB	EACH	762	Person
2401200000	SC: Other Special Purpose Coatings	171	0.0000967	LB	EACH	762	Person
2401200000	SC: Other Special Purpose Coatings	78933	0.000252	LB	EACH	762	Person
2401200000	SC: Other Special Purpose Coatings	108101	0.000581	LB	EACH	762	Person
2401200000	SC: Other Special Purpose Coatings	71556	0.000056	LB	EACH	762	Person
2401200000	SC: Other Special Purpose Coatings	108883	0.000182	LB	EACH	762	Person
2401200000	SC: Other Special Purpose Coatings	1330207	0.000154	LB	EACH	762	Person
2401200000	SC: Other Special Purpose Coatings	VOC	0.007	LB	EACH	762	Person
2415000000	Cleaning Products: Industrial and Institutional	79016	0.2092418	LB	EACH	992	Employee
2415000000	Cleaning Products: Industrial and Institutional	VOC	30.5	LB	EACH	992	Employee
2420000000	Dry Cleaning	VOC	467	LB	EACH	992	Employee
2425000000	Graphic Arts	107211	0.0163326	LB	EACH	762	Person
2425000000	Graphic Arts	67561	0.1633260	LB	EACH	762	Person
2425000000	Graphic Arts	78933	0.0391982	LB	EACH	762	Person
2425000000	Graphic Arts	108101	0.0097996	LB	EACH	762	Person
2425000000	Graphic Arts	108883	0.1665924	LB	EACH	762	Person
2425000000	Graphic Arts	1330207	0.0424647	LB	EACH	762	Person
2425000000	Graphic Arts	VOC	4.4	LB	EACH	762	Person
2425000000	Graphic Arts	107211	5.5011136	LB	EACH	992	Employee
2425000000	Graphic Arts	67561	55.011136	LB	EACH	992	Employee
2425000000	Graphic Arts	78933	13.202673	LB	EACH	992	Employee
2425000000	Graphic Arts	108101	3.3006682	LB	EACH	992	Employee
2425000000	Graphic Arts	108883	56.111359	LB	EACH	992	Employee
2425000000	Graphic Arts	1330207	14.302895	LB	EACH	992	Employee
2425000000	Graphic Arts	VOC	1,482	LB	EACH	992	Employee
2460100000	Personal Care Products (Cosmetics and Toiletries)	67561	0.255436	LB	EACH	762	Person
2460100000	Personal Care Products (Cosmetics and Toiletries)	108883	0.005092	LB	EACH	762	Person
2460100000	Personal Care Products (Cosmetics and Toiletries)	VOC	1.9	LB	EACH	762	Person
2460200000	Cleaning Products: Household	67561	0.241992	LB	EACH	762	Person
2460200000	Cleaning Products: Household	108883	0.004824	LB	EACH	762	Person
2460200000	Cleaning Products: Household	VOC	1.8	LB	EACH	762	Person
2460400000	Automotive Aftermarket (Transportation: Motor Vehicles)	67561	0.1828384	LB	EACH	762	Person

SCC	Description	Pollutant Code	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator	Calculation Material Code	Material Description
2460400000	Automotive Aftermarket (Transportation: Motor Vehicles)	108883	0.0036448	LB	EACH	762	Person
2460400000	Automotive Aftermarket (Transportation: Motor Vehicles)	VOC	1.36	LB	EACH	762	Person
2460500000	Coatings and Related Products	67561	0.127718	LB	EACH	762	Person
2460500000	Coatings and Related Products	108883	0.002546	LB	EACH	762	Person
2460500000	Coatings and Related Products	VOC	0.95	LB	EACH	762	Person
2460600000	Adhesives and Sealants	67561	0.0766308	LB	EACH	762	Person
2460600000	Adhesives and Sealants	108883	0.0015276	LB	EACH	762	Person
2460600000	Adhesives and Sealants	VOC	0.57	LB	EACH	762	Person
2460800000	FIFRA Regulated Products	67561	0.2393032	LB	EACH	762	Person
2460800000	FIFRA Regulated Products	108883	0.0047704	LB	EACH	762	Person
2460800000	FIFRA Regulated Products	VOC	1.78	LB	EACH	762	Person
2460900000	Miscellaneous Products	67561	0.0094108	LB	EACH	762	Person
2460900000	Miscellaneous Products	108883	0.0001876	LB	EACH	762	Person
2460900000	Miscellaneous Products	VOC	0.07	LB	EACH	762	Person

Table 4. Emission Factors Which Vary Based on Presence of Controls

SCC	Pollutant Code	Factor Numeric Value Uncontrolled	Factor Numeric Value Controlled	Factor Unit Numerator	Factor Unit Denominator	Calculation Material Code	Material Description
2401001000	123911	6.18E-05	4.82E-05	LB	EACH	762	Person
2401001000	584849	6.18E-05	4.82E-05	LB	EACH	762	Person
2401001000	101688	0.000433	0.000337	LB	EACH	762	Person
2401001000	75070	0.000309	0.000241	LB	EACH	762	Person
2401001000	117817	9.27E-05	7.23E-05	LB	EACH	762	Person
2401001000	98828	0.001174	0.000916	LB	EACH	762	Person
2401001000	84742	6.18E-05	4.82E-05	LB	EACH	762	Person
2401001000	131113	3.09E-05	2.41E-05	LB	EACH	762	Person
2401001000	100414	0.007663	0.005977	LB	EACH	762	Person
2401001000	107211	0.156014	0.121681	LB	EACH	762	Person
2401001000	50000	6.18E-05	4.82E-05	LB	EACH	762	Person
2401001000	171	0.063809	0.049767	LB	EACH	762	Person
2401001000	110543	0.000464	0.000362	LB	EACH	762	Person
2401001000	67561	0.031147	0.024293	LB	EACH	762	Person
2401001000	80626	0.000371	0.000289	LB	EACH	762	Person
2401001000	71556	0.02883	0.022485	LB	EACH	762	Person
2401001000	108101	0.009301	0.007254	LB	EACH	762	Person
2401001000	78933	0.041684	0.032511	LB	EACH	762	Person
2401001000	75092	0.018447	0.014388	LB	EACH	762	Person
2401001000	91203	0.001421	0.001109	LB	EACH	762	Person
2401001000	100425	0.003152	0.002458	LB	EACH	762	Person
2401001000	127184	0.000185	0.000145	LB	EACH	762	Person
2401001000	108883	0.072059	0.056201	LB	EACH	762	Person
2401001000	121448	0.000185	0.000145	LB	EACH	762	Person
2401001000	108054	0.000371	0.000289	LB	EACH	762	Person

SCC	Pollutant Code	Factor Numeric Value Uncontrolled	Factor Numeric Value Controlled	Factor Unit Numerator	Factor Unit Denominator	Calculation Material Code	Material Description
2401001000	1330207	0.088096	0.068709	LB	EACH	762	Person
2401001000	VOC	3.09	2.41	LB	EACH	762	Person
2401100000	107211	0.00495	0.000675	LB	EACH	762	Person
2401100000	171	0.015202	0.002073	LB	EACH	762	Person
2401100000	71556	0.0088	0.0012	LB	EACH	762	Person
2401100000	108101	0.0913	0.01245	LB	EACH	762	Person
2401100000	78933	0.0396	0.0054	LB	EACH	762	Person
2401100000	108883	0.0286	0.0039	LB	EACH	762	Person
2401100000	1330207	0.0242	0.0033	LB	EACH	762	Person
2401100000	VOC	1.1	0.15	LB	EACH	762	Person

Table 5. States to Which Controlled Emission Factors are Applied

State FIPS	Abbreviation
04	AZ
06	CA
09	CT
10	DE
11	DC
23	ME
24	MD
25	MA
33	NH
34	NJ
36	NY
42	PA
44	RI
48	TX
50	VT
51	VA

3.2.3.23 Gasoline Distribution Stage I

a. Source Category Description

Stage I gasoline distribution includes the following gasoline emission points: 1) bulk terminals; 2) pipeline facilities; 3) bulk plants; 4) tank trucks; and 5) service stations. Emissions from Stage I gasoline distribution occur as gasoline vapors are released into the atmosphere. These Stage I processes are subject to EPA's maximum available control technology (MACT) standards for gasoline distribution.[1]

Emissions from gasoline distribution at bulk terminals and bulk plants take place when gasoline is loaded into a storage tank or tank truck, from working losses (for fixed roof tanks), and from working losses and roof seals (for floating roof tanks). Working losses consist of both breathing and emptying losses. Breathing losses are the expulsion of vapor from a tank vapor space that has expanded or contracted because of daily changes in temperature and barometric pressure; these emissions occur in the absence of any liquid level change in the tank. Emptying losses occur when the air that is drawn into the tank during liquid removal saturates with hydrocarbon vapor and expands, thus exceeding the fixed capacity of the vapor space and overflowing through the pressure vacuum valve.[2]

Emissions from tank trucks in transit occur when gasoline vapor evaporates from (1) loaded tank trucks during transportation of gasoline from bulk terminals/plants to service stations, and (2) empty tank trucks returning from service stations to bulk terminals/plants.[3] Pipeline emissions result from the valves and pumps found at pipeline pumping stations and from the valves, pumps, and storage tanks at pipeline breakout stations. Stage I gasoline distribution emissions also occur when gasoline vapors are displaced from storage tanks during unloading of gasoline from tank trucks at service stations (Gasoline Service Station Unloading) and from gasoline vapors evaporating from service station storage tanks and from the lines going to the pumps (Underground Storage Tank Breathing and Emptying).

The following SCCs are included in Stage I Gasoline Distribution:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2501050120	Storage and Transport	Petroleum and Petroleum Product Storage	Bulk Terminals: All Evaporative Losses	Gasoline
2501055120	Storage and Transport	Petroleum and Petroleum Product Storage	Bulk Plants: All Evaporative Losses	Gasoline
2501060051	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Stage 1: Submerged Filling
2501060052	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Stage 1: Splash Filling

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2501060053	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Stage 1: Balanced Submerged Filling
2501060201	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Underground Tank: Breathing and Emptying
2505030120	Storage and Transport	Petroleum and Petroleum Product Transport	Truck	Gasoline
2505040120	Storage and Transport	Petroleum and Petroleum Product Transport	Pipeline	Gasoline

b. Bulk Terminals and Pipelines

There are no generally accepted activity-based VOC emission factors for the pipelines and bulk terminals sectors because they are generally treated as point sources whose emissions are estimated using site-specific information. For example, emission estimates for bulk terminal storage tanks are typically derived from tank specific parameters that are input into the TANKS program.[4] Therefore, for bulk terminals and pipelines, EPA estimated 2008 national VOC emissions by multiplying 1998 national estimates developed in support of the Gasoline Distribution MACT standard[5] by the 2008 to 1998 ratio of the national volume of wholesale gasoline supplied (see Table 1). The gasoline supply information was obtained from Table 2 in Volume I of Petroleum Supply Annual 2008.[6]

Table 1. Estimation of National 2008 VOC Emissions for Pipelines and Bulk Terminals

Category	1998 Post-MACT Control Emissions (Mg)	Mg to Ton Conversion Factor	1998 Emissions (tons)	Ratio of 2008 to 1998 Gasoline Supplied	2008 Emissions (tons)
Pipelines	79,830	1.1023	87,997	(8,989 thousand barrels per day / 8,253 thousand barrels per day) = 1.089	95,844
Bulk Terminals	137,555	1.1023	151,627		165,149

To estimate HAP emissions, EPA applied national average speciation profiles to the VOC emission estimates.[7] Table 2 presents these speciation profiles and the national bulk terminal and pipeline HAP emission estimates (note that unless otherwise noted, all emission values reported in this section exclude estimates for Puerto Rico and the U.S. Virgin Islands). EPA used total VOC emission estimates, so emissions represent total emissions. Where necessary, States should perform point source subtractions to obtain nonpoint emissions. The following describes how total national VOC estimates were allocated to counties.

Table 2. HAP Speciation Profiles and 2008 Bulk Terminal and Pipeline Emissions

HAP	Pollutant Code	Percentage of VOC Emissions	Reference	2008 National Emissions (tons)	
				Bulk Terminals	Pipelines
Benzene	71432	0.27	7	4.46E+02	2.59E+02
2,2,4-Trimethylpentane	540841	0.75	7	1.24E+03	7.19E+02
Cumene	98828	0.012	7	1.98E+01	1.15E+01
Ethyl Benzene	100414	0.053	7	8.75E+01	5.08E+01
n-Hexane	110543	1.8	7	2.97E+03	1.73E+03
Naphthalene	91203	0.00027	7	4.46E-01	2.59E-01
Toluene	108883	1.4	7	2.31E+03	1.34E+03
Xylenes	1330207	0.56	7	9.25E+02	5.37E+02

For both categories, EPA allocated national VOC and HAP emissions for these categories in a two-step manner. First, EPA allocated emissions based on 2008 gasoline supply data reported by the U.S. Department of Energy (DOE). Next, EPA allocated emissions based on employment data reported in the 2007 County Business Patterns.[8]

For pipelines, EPA allocated emissions to Petroleum Administration for Defense (PAD) Districts based on the total amount of finished motor gasoline moved by pipeline in each PAD in year 2008. There are five PAD Districts across the United States: PAD District 1 comprises seventeen states plus the District of Columbia along the Atlantic Coast; PAD District 2 comprises fifteen states in the Midwest; PAD District 3 comprises six states in South Central U.S.; PAD District 4 comprises five states in the Rocky Mountains; and PAD District 5 comprises seven states along the West Coast. These data, which are displayed below in Table 3, are reported in Table 35 of Volume 1 of Petroleum Supply Annual 2008.[9] Next, EPA allocated pipeline emissions in each PAD District to counties based on County Business Patterns employment data. Because employment data for NAICS code 48691 (Pipeline Transportation of Refined Petroleum Products) are often withheld due to confidentiality reasons, EPA used the number of employees in NAICS code 42471 (Petroleum Bulk Stations and Terminals) for this allocation. To better account for the location of refined petroleum pipelines, however, EPA did not allocate any activity to States which had employees in this NAICS code, but did not have employees in NAICS code 48691 (i.e., District of Columbia, Idaho, Maine, New Hampshire, Vermont, and West Virginia).

Table 3. Movement of Finished Motor Gasoline by Pipeline Between PAD Districts, 2008

	From I	From II	From III	From IV	From V
To I	n/a	393	333,462	0	0
To II	70,895	n/a	99,167	7,442	0
To III	0	9,193	n/a	0	0
To IV	0	8,680	5,778	n/a	0
To V	0	0	25,453	9,287	n/a

For bulk terminals, EPA first allocated national emissions to States based on the 2008 refinery, bulk terminal, and natural gas plant stocks of motor gasoline reported for each State in Table 33 of Volume 1 of DOE's Petroleum Supply Annual 2008 (see Table 4).[9] Next, EPA allocated emissions in each State to counties based on the number of NAICS code 42471 (Petroleum Bulk Stations and Terminals) employees reported in the 2007 County Business Patterns.[8]

Table 4. Refinery, Bulk Terminal, and Natural Gas Plant Stocks of Motor Gasoline, 2008

State	Motor Gasoline (Thousand Barrels)	State	Motor Gasoline (Thousand Barrels)
Alabama	1,090	Montana	872
Alaska	616	Nebraska	658
Arizona	470	Nevada	102
Arkansas	819	New Hampshire	0
California	460	New Jersey	2,956
Colorado	748	New Mexico	350
Connecticut	0	New York	1,469
Delaware	105	North Carolina	1,724
District of Columbia	0	North Dakota	291
Florida	1,877	Ohio	2,724
Georgia	1,724	Oklahoma	1,245
Hawaii	12	Oregon	525
Idaho	181	Pennsylvania	3,595
Illinois	1,940	Rhode Island	0
Indiana	2,464	South Carolina	720
Iowa	1,090	South Dakota	283
Kansas	2,347	Tennessee	923
Kentucky	1,045	Texas	9,530
Louisiana	5,209	Utah	793
Maine	374	Vermont	31
Maryland	31	Virginia	1,285
Massachusetts	0	Washington	1,902
Michigan	1,772	West Virginia	183
Minnesota	1,305	Wisconsin	704
Mississippi	1,580	Wyoming	910
Missouri	491		

It is important to reiterate that the above discussion addresses the calculation of total VOC emissions. The 2008 point source NEI reports VOC emissions related to bulk terminal and pipeline processes. To obtain nonpoint emissions, States should subtract the 2008 point source VOC emission estimates from the total VOC emission estimates reported here. The relevant point source SCCs are listed in Tables 5 and 6 below.

Table 5. Pipeline Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40600501	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Pipeline Petroleum Transport - General - All Products	Pipeline Leaks
40600502	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Pipeline Petroleum Transport - General - All Products	Pipeline Venting
40600503	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Pipeline Petroleum Transport - General - All Products	Pump Station
40600504	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Pipeline Petroleum Transport - General - All Products	Pump Station Leaks

Table 6. Bulk Terminal Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400101	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Breathing Loss (67000 Bbl Capacity) - Fixed Roof Tank
40400102	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Breathing Loss (67000 Bbl Capacity) - Fixed Roof Tank
40400103	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Breathing Loss (67000 Bbl. Capacity) - Fixed Roof Tank
40400104	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Breathing Loss (250000 Bbl Capacity)-Fixed Roof Tank
40400105	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Breathing Loss (250000 Bbl Capacity)-Fixed Roof Tank
40400106	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Breathing Loss (250000 Bbl Capacity) - Fixed Roof Tank
40400107	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Working Loss (Diam. Independent) - Fixed Roof Tank

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400108	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Working Loss (Diameter Independent) - Fixed Roof Tank
40400109	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Working Loss (Diameter Independent) - Fixed Roof Tank
40400110	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Standing Loss (67000 Bbl Capacity)-Floating Roof Tank
40400111	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Standing Loss (67000 Bbl Capacity)-Floating Roof Tank
40400112	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Standing Loss (67000 Bbl Capacity)- Floating Roof Tank
40400113	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Standing Loss (250000 Bbl Cap.) - Floating Roof Tank
40400114	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Standing Loss (250000 Bbl Cap.) - Floating Roof Tank
40400115	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Standing Loss (250000 Bbl Cap.) - Floating Roof Tank
40400116	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13/10/7: Withdrawal Loss (67000 Bbl Cap.) - Float Rf Tnk
40400117	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13/10/7: Withdrawal Loss (250000 Bbl Cap.) - Float Rf Tnk
40400118	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Filling Loss (10500 Bbl Cap.) - Variable Vapor Space

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400119	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Filling Loss (10500 Bbl Cap.) - Variable Vapor Space
40400120	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Filling Loss (10500 Bbl Cap.) - Variable Vapor Space
40400131	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Standing Loss - Ext. Floating Roof w/ Primary Seal
40400132	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Standing Loss - Ext. Floating Roof w/ Primary Seal
40400133	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Standing Loss - External Floating Roof w/ Primary Seal
40400141	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Standing Loss - Ext. Floating Roof w/ Secondary Seal
40400142	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Standing Loss - Ext. Floating Roof w/ Secondary Seal
40400143	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Standing Loss - Ext. Floating Roof w/ Secondary Seal
40400148	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13/10/7: Withdrawal Loss - Ext. Float Roof (Pri/Sec Seal)
40400150	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Miscellaneous Losses/Leaks: Loading Racks
40400151	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Valves, Flanges, and Pumps
40400152	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Vapor Collection Losses
40400153	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Vapor Control Unit Losses

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400161	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Standing Loss - Int. Floating Roof w/ Primary Seal
40400162	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Standing Loss - Int. Floating Roof w/ Primary Seal
40400163	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Standing Loss - Internal Floating Roof w/ Primary Seal
40400171	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13: Standing Loss - Int. Floating Roof w/ Secondary Seal
40400172	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 10: Standing Loss - Int. Floating Roof w/ Secondary Seal
40400173	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 7: Standing Loss - Int. Floating Roof w/ Secondary Seal
40400178	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Gasoline RVP 13/10/7: Withdrawal Loss - Int. Float Roof (Pri/Sec Seal)

c. Bulk Plants

EPA calculated VOC emissions from bulk plants by developing an average emission factor from the bulk plant motor gasoline VOC emissions and throughput data developed in support of the Gasoline Distribution MACT standards.[2,5] To estimate 2008 national VOC emissions, the VOC emission factor (8.62 pounds of VOC per 1,000 gallons) was applied to the estimated national volume of gasoline passing through bulk plants in 2008. The volume of bulk plant gasoline throughput was assumed to be 9 percent of total gasoline consumption.[10] Total gasoline consumption for 2008 was assumed to be the same as the volume of finished motor gasoline supplied as reported on the U.S. Energy Information Administration's Petroleum Navigator website.[11] The resulting national VOC emission estimate was then allocated to counties based on employment data for NAICS code 42471 (Petroleum Bulk Stations and Terminals). To estimate benzene emissions from bulk plants, EPA multiplied VOC emission estimates by county-level speciation profiles calculated from the annual onroad refueling (Stage 2) emissions from the 2008 NEI NMIM results.[12] All other HAPs were estimated by multiplying VOC emissions by the national average speciation profiles displayed in Table 7.

Table 7. Bulk Plant HAP Speciation Profiles and Total Emission Estimates

Pollutant	Pollutant Code	Emission Factor	Reference	National Emissions (tpy)
VOC	VOC	8.62 lb./1,000 gallons	2 and 5	5.35E+04
2,2,4-Trimethylpentane	540841	0.75% of VOC	7	4.01E+02
Cumene	98828	0.012% of VOC	7	6.41E+00
Ethyl Benzene	100414	0.053% of VOC	7	2.83E+01
n-Hexane	110543	1.8% of VOC	7	9.62E+02
Naphthalene	91203	0.00027% of VOC	7	1.44E-01
Toluene	108883	1.4% of VOC	7	7.48E+02
Xylenes	1330207	0.56% of VOC	7	2.99E+02
Benzene	71432	county-specific % of VOC	12	3.94E+02

It is important to reiterate that the above discussion addresses the calculation of total VOC emissions. The 2008 point source NEI reports VOC emissions related to bulk plants. To obtain nonpoint emissions, States should subtract the 2008 point source VOC emission estimates from the total VOC emission estimates reported here. The relevant point source SCCs are listed in Table 8 below.

Table 8. Bulk Plant Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400201	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13: Breathing Loss (67000 Bbl Capacity) - Fixed Roof Tank
40400202	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10: Breathing Loss (67000 Bbl Capacity) - Fixed Roof Tank
40400203	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 7: Breathing Loss (67000 Bbl. Capacity) - Fixed Roof Tank
40400204	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13: Working Loss (67000 Bbl. Capacity) - Fixed Roof Tank

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400205	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10: Working Loss (67000 Bbl. Capacity) - Fixed Roof Tank
40400206	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 7: Working Loss (67000 Bbl. Capacity) - Fixed Roof Tank
40400207	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13: Standing Loss (67000 Bbl Cap.) - Floating Roof Tank
40400208	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10: Standing Loss (67000 Bbl Cap.) - Floating Roof Tank
40400209	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 7: Standing Loss (67000 Bbl Cap.) - Floating Roof Tank
40400210	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13/10/7: Withdrawal Loss (67000 Bbl Cap.) - Float Rf Tnk
40400211	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13: Filling Loss (10500 Bbl Cap.) - Variable Vapor Space
40400212	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10: Filling Loss (10500 Bbl Cap.) - Variable Vapor Space
40400213	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 7: Filling Loss (10500 Bbl Cap.) - Variable Vapor Space
40400231	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13: Standing Loss - Ext. Floating Roof w/ Primary Seal
40400232	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10: Standing Loss - Ext. Floating Roof w/ Primary Seal
40400233	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 7: Standing Loss - External Floating Roof w/ Primary Seal

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400241	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13: Standing Loss - Ext. Floating Roof w/ Secondary Seal
40400242	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10: Standing Loss - Ext. Floating Roof w/ Secondary Seal
40400243	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 7: Standing Loss - Ext. Floating Roof w/ Secondary Seal
40400248	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10/13/7: Withdrawal Loss - Ext. Float Roof (Pri/Sec Seal)
40400250	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Loading Racks
40400251	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Valves, Flanges, and Pumps
40400252	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Miscellaneous Losses/Leaks: Vapor Collection Losses
40400253	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Miscellaneous Losses/Leaks: Vapor Control Unit Losses
40400261	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13: Standing Loss - Int. Floating Roof w/ Primary Seal
40400262	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10: Standing Loss - Int. Floating Roof w/ Primary Seal
40400263	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 7: Standing Loss - Internal Floating Roof w/ Primary Seal
40400271	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 13: Standing Loss - Int. Floating Roof w/ Secondary Seal
40400272	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10: Standing Loss - Int. Floating Roof w/ Secondary Seal

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400273	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 7: Standing Loss - Int. Floating Roof w/ Secondary Seal
40400278	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Gasoline RVP 10/13/7: Withdrawal Loss - Int. Float Roof (Pri/Sec Seal)
40400401	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Petroleum Products - Underground Tanks	Gasoline RVP 13: Breathing Loss
40400402	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Petroleum Products - Underground Tanks	Gasoline RVP 13: Working Loss
40400403	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Petroleum Products - Underground Tanks	Gasoline RVP 10: Breathing Loss
40400404	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Petroleum Products - Underground Tanks	Gasoline RVP 10: Working Loss
40400405	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Petroleum Products - Underground Tanks	Gasoline RVP 7: Breathing Loss
40400406	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Petroleum Products - Underground Tanks	Gasoline RVP 7: Working Loss
40600101	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Splash Loading **
40600126	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Submerged Loading **
40600131	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Submerged Loading (Normal Service)
40600136	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Splash Loading (Normal Service)
40600141	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Submerged Loading (Balanced Service)
40600144	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Splash Loading (Balanced Service)
40600147	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Submerged Loading (Clean Tanks)

d. Tank Trucks in Transit

The EPA calculated VOC emissions from Tank Trucks in Transit by multiplying county-level tank truck gasoline throughput by a 0.06 lb of VOC per 1,000 gallon emission factor. As noted in Table 9, this emission factor is the sum of the individual emission factors reported in the Gasoline Distribution EIIP guidance document for gasoline-filled trucks (traveling to service station/bulk plant for delivery) and vapor-filled trucks (traveling to bulk terminal/plant for reloading).[3] County-level gasoline consumption was estimated by summing county-level onroad and nonroad estimates. County-level onroad consumption was estimated by subtracting the NMIM-derived national nonroad consumption from the EIA's estimate of finished motor gasoline supplied and then allocating to counties using NMIM-derived onroad county-level CO_2 emissions.[11,13] County-level nonroad consumption was estimated by allocating NMIM-derived state/SCC-level nonroad gasoline consumption to the county-level based on nonroad county/SCC-level CO_2 emissions.[13] Gasoline throughput for tank trucks was computed by multiplying the county-level gasoline consumption estimates by a factor of 1.09 to account for gasoline that is transported more than once in a given area (i.e., transported from bulk terminal to bulk plant and then from bulk plant to service station).[10] Benzene emission estimates were calculated by multiplying county-level NMIM speciation profiles by the VOC emission estimates.[12] Emissions for the remaining HAPs were calculated by multiplying VOC emissions by the national speciation profiles presented in Table 10.

Table 9. Tank Trucks in Transit VOC Emission Factors

VOC Emission Factor	
Vapor-Filled Trucks	0.055 lb/1,000 gallons
Gasoline Filled Trucks	0.005 lb/1,000 gallons
Total	**0.06 lb/1,000 gallons**

Table 10. Tank Trucks in Transit HAP Speciation Profiles and Total Emission Estimates

Pollutant	Pollutant Code	Emission Factor	Reference	National Emissions (tpy)
VOC	VOC	0.06 lb./1,000 gallons	3	4.51E+03
2,2,4-Trimethylpentane	540841	0.75% of VOC	7	3.38E+01
Cumene	98828	0.012% of VOC	7	5.41E-01
Ethyl Benzene	100414	0.053% of VOC	7	2.39E+00
n-Hexane	110543	1.8% of VOC	7	8.11E+01
Naphthalene	91203	0.00027% of VOC	7	1.22E-02
Toluene	108883	1.4% of VOC	7	6.31E+01
Xylenes	1330207	0.56% of VOC	7	2.52E+01
Benzene	71432	county-specific % of VOC	12	3.13E+01

It is important to reiterate that the above discussion addresses the calculation of total VOC emissions. The 2008 point source NEI reports VOC emissions related to tank trucks in transit. To obtain nonpoint emissions, States should subtract the 2008 point source VOC emission estimates from the total VOC emission estimates reported here. The relevant point source SCCs are listed in Table 11 below.

Table 11. Tank Trucks in Transit Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40400154	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Terminals	Tank Truck Vapor Leaks
40400254	Petroleum and Solvent Evaporation	Petroleum Liquids Storage (non-Refinery)	Bulk Plants	Tank Truck Vapor Losses
40600162	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Loaded with Fuel (Transit Losses)
40600163	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Tank Cars and Trucks	Gasoline: Return with Vapor (Transit Losses)

e. Underground Storage Tank (UST) Breathing and Emptying

The EPA calculated VOC emissions from UST breathing and emptying by multiplying county-level total gasoline consumption, calculated as described above in the Tank Trucks in Transit section, by the 1 lb/1,000 gallons emission factor recommended by the Gasoline Distribution EIIP guidance document.[3] With the exception of benzene, HAP emissions were estimated by multiplying VOC emissions by the national HAP speciation profiles listed in Table 12. To estimate benzene emissions, EPA multiplied VOC emissions by county-level speciation profiles from NMIM.[12]

Table 12. Underground Storage Tank (UST) Breathing and Emptying Emissions

Pollutant	Pollutant Code	Emission Factor	Reference	National Emissions (tpy)
VOC	VOC	1 lb./1,000 gallons	3	6.89E+04
2,2,4-Trimethylpentane	540841	0.75% of VOC	7	5.17E+02
Cumene	98828	0.012% of VOC	7	8.27E+00
Ethyl Benzene	100414	0.053% of VOC	7	3.65E+01
n-Hexane	110543	1.8% of VOC	7	1.24E+03
Naphthalene	91203	0.00027% of VOC	7	1.86E-01
Toluene	108883	1.4% of VOC	7	9.65E+02
Xylenes	1330207	0.56% of VOC	7	3.86E+02
Benzene	71432	county-specific % of VOC	12	4.78E+02

It is important to reiterate that the above discussion addresses the calculation of total VOC emissions. The 2008 point source NEI reports VOC emissions related to UST breathing and emptying. To obtain nonpoint emissions, States should subtract the 2008 point source VOC emission estimates from the total VOC emission estimates reported here. The relevant point source SCCs are listed in Table 13 below.

Table 13. UST Breathing and Emptying Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40600307	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Gasoline Retail Operations - Stage I	Underground Tank Breathing and Emptying
40600707	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Consumer (Corporate) Fleet Refueling - Stage I	Underground Tank Breathing and Emptying

f. Gasoline Service Station Unloading

The EPA estimated uncontrolled VOC emissions from unloading of gasoline into service station tanks from county-level total gasoline consumption estimates, calculated as described above in the Tank Trucks in Transit section, and the following AP-42 equation:

$$L = (12.46 \times S \times P \times M)/T$$

where:

L = uncontrolled loading loss of liquid loaded (in lb/1,000 gallons)
S = saturation factor;
P = true vapor pressure of liquid loaded (pounds per square inch absolute);
M = molecular weight of vapors (lbs per lb/mole); and
T = temperature of liquid loaded (Rankine).[14]

This equation requires geographic-specific information. This information includes the saturation factor, which differs by method of loading (e.g., submerged filling), Reid vapor pressure (RVP), temperature, and true vapor pressure of gasoline.

Gasoline RVP values were obtained from the NMIM 2008 database. Because NMIM is a county-level database that reports RVP values by month, EPA developed county-level monthly gasoline consumption estimates by multiplying annual county gasoline consumption by monthly allocation factors. State-level monthly allocation factors were developed from monthly gasoline sales data reported in the Federal Highway Administration's Highway Statistics 2008.[15] Geographic-specific information on the temperature of gasoline and the method of loading were obtained from a Stage I and II gasoline emission inventory study prepared for the EIIP.[16]

The true vapor pressure of gasoline was estimated for each county/month using the following equation:

where:

P = Stock true vapor pressure, in pounds per square inch absolute.
T = Stock temperature, in degrees Fahrenheit.
RVP = Reid vapor pressure, in pounds per square inch.
S = Slope of the ASTM distillation curve at 10 percent evaporated, in degrees Fahrenheit per percent (assumed that S = 3.0 for gasoline per Figure 7.1-14a of AP-42).[17]

This equation was used to calculate monthly county-level true vapor pressure estimates. In cases where more than one filling method was assumed to apply in a county (e.g., due to vapor balancing requirement applying to a portion of a county's total gasoline throughput due to a throughput exemption), EPA developed two sets of calculations for each month, one for each filling method.

The EIIP study regional stock temperature information was used to estimate the temperature of gasoline in each county in each month (see Table 14).[16]

Table 14. Temperature Data Used in Estimating True Vapor Pressure (ºF)

Region	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
1 (Northeast)	46	44	44	48	57	64	70	73	70	64	60	51
2 (Southeast)	66	67	69	74	78	81	80	81	80	77	69	60
3 (Southwest)	60	61	62	66	73	78	81	84	82	78	71	62
4 (Midwest)	33	35	40	47	55	62	71	73	68	65	64	63
5 (West)	50	52	62	66	73	76	80	83	86	84	73	60
6 (Northwest)	49	50	50	52	57	62	67	72	68	60	49	42

Region 1: Alaska, Connecticut, Delaware, DC, Illinois, Indiana, Kentucky, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Virginia, West Virginia, Wisconsin
Region 2: Alabama, Arkansas, Florida, Georgia, Hawaii, Louisiana, Mississippi, N. Carolina, S. Carolina, Tennessee
Region 3: Arizona, New Mexico, Oklahoma, Texas
Region 4: Colorado, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, N. Dakota, S. Dakota, Wyoming
Region 5: California, Nevada, Utah
Region 6: Idaho, Oregon, Washington

The EPA incorporated the effect of Stage I Gasoline Service Station vapor balancing controls based on the county-level control efficiency values (either 90 or 95 percent) that were compiled for the EIIP study.[16] Table 15 presents the HAP speciation profiles and total VOC and HAP emission estimates calculated using these procedures.

Emissions are reported by SCC based on the filling methods used in each county as determined from the EIIP study: SCC 2501060051 (Submerged Filling); SCC 2501060052 (Splash Filling); and SCC 2501060053 (Balanced Submerged Filling).

Table 15. Stage I Service Station Unloading HAP Speciation Profiles and Total Emission Estimates

Pollutant	Pollutant Code	Emission Factor	Reference	National Emissions (tpy)
VOC	VOC	Equation 1	14	3.82E+05
2,2,4-Trimethylpentane	540841	0.75% of VOC	7	2.86E+03
Cumene	98828	0.012% of VOC	7	4.58E+01
Ethyl Benzene	100414	0.053% of VOC	7	2.02E+02
n-Hexane	110543	1.8% of VOC	7	6.87E+03
Naphthalene	91203	0.00027% of VOC	7	1.03E+00
Toluene	108883	1.4% of VOC	7	5.35E+03
Xylenes	1330207	0.56% of VOC	7	2.14E+03
Benzene	71432	county-specific % of VOC	12	2.97E+03

It is important to reiterate that the above discussion addresses the calculation of total VOC emissions. The 2008 point source NEI reports VOC emissions related to service station unloading. To obtain nonpoint emissions, States should subtract the 2008 point source VOC emission estimates from the total VOC emission estimates reported here. The relevant point source SCCs are listed in Tables 16, 17, and 18 below.

Table 16. Service Station Unloading: Submerged Fill Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40600302	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Gasoline Retail Operations - Stage I	Submerged Filling w/o Controls
40600702	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Consumer (Corporate) Fleet Refueling - Stage I	Submerged Filling w/o Controls

Table 17. Service Station Unloading: Splash Fill Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40600301	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Gasoline Retail Operations - Stage I	Splash Filling
40600701	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Consumer (Corporate) Fleet Refueling - Stage I	Splash Filling

Table 18. Service Station Unloading: Balanced Submerged Fill Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40600305	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Gasoline Retail Operations - Stage I	Unloading **
40600306	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Gasoline Retail Operations - Stage I	Balanced Submerged Filling
40600706	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Consumer (Corporate) Fleet Refueling - Stage I	Balanced Submerged Filling

Unloading emissions might also be reported in the point source inventory under SCC 40600399 (Gasoline Retail Operations – Stage I, Not Classified).

g. Example Emission Calculations

Bulk Terminals

2008 national benzene emissions = VOC emissions x HAP speciation factor
1.65E+05 tons x 0.0027
4.46E+02 tons

Pipelines

2008 national cumene emissions = VOC emissions x HAP speciation factor
9.58E+04 tons x 0.00012
1.15E+01 tons

Bulk Plants
2008 national VOC emissions
= national gasoline consumption x proportion passing through bulk plants x VOC emission factor
= 137,801,370 thousand gallons x 0.09 x 8.62 lbs. VOC/thousand gallons
= 1.07E+08 lbs. / 2000 lbs.
= 5.35E+04 tons

Tank Trucks in Transit
2008 Alamance County, North Carolina VOC emissions
= total county gasoline consumption x (1+proportion of gasoline transported twice) x VOC emission factor
= 61,446 thousand gallons x (1+0.09) x 0.06 lbs. VOC/thousand gallons
= 4.02E+03 lbs. / 2000 lbs.
= 2.01E+00 tons

UST Breathing and Emptying
2008 Alamance County, North Carolina VOC emissions
= total county gasoline consumption x VOC emission factor
= 61,466 thousand gallons x 1 lb. VOC/thousand gallons
= 6.15E+04 lbs. / 2000 lbs.
= 30.73E+00 tons

Stage I Gasoline Service Station Unloading - uncontrolled VOC emissions in July for balanced submerged fill unloading in Alamance County, NC
= annual county consumption x proportion of annual gasoline sold in July x VOC emission factor
= 61,466 thousand gallons x 0.1087 x VOC emission factor
= 6,681 thousand gallons x ((12.46 x saturation factor x true vapor pressure x vapor molecular weight) / temperature))
= 6,681 thousand gallons x ((12.46 x 1.0 x 6.309 x 67.811) / 540)
= 65,950 lbs

Incorporate effect of control (vapor balancing requirement)
= Uncontrolled emissions x ((100-CE)/100)
= 65,950 lbs x ((100-90)/100)
= 6,595 lbs / 2,000 lbs
= 3.30E+00 tons

h. References

1. U.S. Environmental Protection Agency, "National Emission Standards for Source Categories: Gasoline Distribution (Stage I), 40 CFR Part 63." Office of Air Quality Planning and Standards, February 28, 1997. Pages 9087-9093.

2. U.S. Environmental Protection Agency, "Gasoline Distribution Industry (Stage I)-Background Information for Proposed Standards," EPA-453/R94-002a, Office of Air Quality Planning and Standards, January 1994.

3. Eastern Research Group, Inc., "Volume III: Chapter 11, Gasoline Marketing (Stage I and Stage II), Revised Final," prepared for the Emission Inventory Improvement Program, January 2001.

4. U.S. Environmental Protection Agency, "TANKS Emission Estimation Software," Office of Air Quality Planning and Standards, Emission Inventory Group, available from http://www.epa.gov/ttn/chief/software/tanks/index.html, last updated October 29, 2004.

5. U.S. Environmental Protection Agency, "Gasoline Distribution Industry (Stage I)-Background Information for Promulgated Standards," EPA-453/R94-002b, Office of Air Quality Planning and Standards, November 1994.

6. U.S. Department of Energy, Energy Information Administration, "U.S. Daily Average Supply and Distribution of Crude Oil and Petroleum Products," Table 2 in *Petroleum Supply Annual 2008, Volume 1*, retrieved from http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html, released June 2009.

7. Hester, Charles, MACTEC, Inc. Memorandum from Charles Hester, MACTEC, Inc., to Stephen Shedd, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Standards Division, "Review of Data on HAP Content in Gasoline," May 18, 2006.

8. U.S. Department of Commerce, Bureau of the Census, County Business Patterns 2007, retrieved from http://www.census.gov/econ/cbp/index.html, released July 2009.

9. U.S. Department of Energy, Energy Information Administration, "Refinery, Bulk Terminal, and Natural Gas Plant Stocks of Selected Petroleum Products by PAD District and State, 2008" and "Movements of Crude Oil and Petroleum Products by Pipeline Between PAD Districts, 2008," Tables 33 and 35 in *Petroleum Supply Annual 2008, Volume 1*, retrieved from http://www.eia.doe.gov/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/psa_volume1.html, released June 2009.

10. Cavalier, Julia, MACTEC, Inc., personal communication, "RE: Percentage of Gasoline Transported Twice By Truck," with Stephen Shedd, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Standards Division, July 6, 2004.

11. U.S. Department of Energy, Energy Information Administration, Petroleum Navigator – Product Supplied, available from http://tonto.eia.doe.gov/dnav/pet/pet_cons_psup_dc_nus_mbblpd_a.htm, accessed January 2010.

12. Benzene speciation profiles calculated by Jonathan Dorn, E.H. Pechan and Associates, Inc. from county-level VOC and benzene emissions developed from a 2008 NMIM run. The NMIM run was performed by John Van Bruggen, E.H. Pechan and Associates, Inc., January 2010.

13. 2008 NMIM runs performed by John Van Bruggen and Melissa Spivey, E.H. Pechan and Associates, Inc., January 2010.

14. U.S. Environmental Protection Agency, "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Section 5.2 Transportation and Marketing of Petroleum Liquids," Office of Air Quality Planning and Standards, January 1995.

15. Federal Highway Administration, "Monthly Gasoline/Gasohol Reported by States," Table MF-33GA in *Highway Statistics 2008*, Office of Highway Policy Information, available from http://www.fhwa.dot.gov/policyinformation/statistics/2008/, accessed January 2010.

16. Pacific Environmental Services, Inc., "Draft Summary of the Analysis of the Emissions Reported in the 1999 NEI for Stage I and Stage II Operations at Gasoline Service Stations," prepared for the U.S. Environmental Protection Agency and the Emission Inventory Improvement Program, September 2002.

17. U.S. Environmental Protection Agency, "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Chapter 7: Liquid Storage Tanks," Office of Air Quality Planning and Standards, Emission Inventory Group, September 1997.

3.2.3.24 Gasoline Distribution – Stage II

a. Source Category Description

Stage II gasoline distribution emissions are the refueling emissions that occur during the transfer of gasoline from storage tanks at service stations to vehicle fuel tanks.

Stage II emissions are reported under the following nonpoint SCC:

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
2501060100	Storage and Transport	Petroleum and Petroleum Product Storage	Gasoline Service Stations	Stage 2: Total

This SCC is only used in the NEI to report emissions for onroad gasoline vehicle refueling. (Estimates for Stage II nonroad equipment gasoline refueling are included in the nonroad source inventory.)

b. Emissions Calculations

The VOC emission estimates for Stage II gasoline distribution in 2008 were generated via MOVES 2010a. The refueling vapor-loss and refueling spillage emission categories are defined in MOVES 2010a as emission processes 18 and 19. The MOVES runs performed as discussed in the on-road mobile source emission calculation section of this document included these two emission processes, but the emissions from these two emission processes were separated from the on-road mobile source emissions during the post-model emissions analysis. The 2008 annual Stage II gasoline distribution emissions for both vapor loss and spillage for each county in the Missouri portion of the St. Louis Ozone nonattainment area, as calculated with MOVES 2010a, are reported in Table 1 below.

MOVES 2010a includes a default table for each county in the country called "countyyear". The "countyyear" table establishes values for the stage II control efficiencies in each county. The MOVES default control efficiencies for Stage II vapor loss and Stage II spillage emissions in the St. Louis Ozone nonattainment area are 95% and 50%, respectively. These default values were used when running the MOVES model for 2008.

Table 1 Annual Refueling VOC Emissions

County	Annual Refueling VOC Emissions (tons/year)
Franklin County	18.34
Jefferson County	22.09
St. Charles County	32.9
St. Louis County	144.01
St. Louis City	41.88
Total	**259.21**

It is important to note that the above discussion addresses the calculation of total onroad VOC emissions from refueling. The 2008 point source NEI reports VOC emissions related to service station refueling. To obtain nonpoint emissions, States should subtract the 2008 point source VOC emission estimates from the total VOC emission estimates reported here. The relevant point source SCCs are listed in Table 2 below.

Table 2 Gasoline Vehicle Refueling Point Source SCCs

SCC	SCC Level 1	SCC Level 2	SCC Level 3	SCC Level 4
40600401	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Filling Vehicle Gas Tanks - Stage II	Vapor Loss w/o Controls
40600402	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Filling Vehicle Gas Tanks - Stage II	Liquid Spill Loss w/o Controls
40600499	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Filling Vehicle Gas Tanks - Stage II	Not Classified **
40600601	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Consumer (Corporate) Fleet Refueling - Stage II	Vapor Loss w/o Controls
40600602	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Consumer (Corporate) Fleet Refueling - Stage II	Liquid Spill Loss w/o Controls
40600603	Petroleum and Solvent Evaporation	Transportation and Marketing of Petroleum Products	Consumer (Corporate) Fleet Refueling - Stage II	Vapor Loss w/controls

c. References

1. 2008 NMIM runs performed by John Van Bruggen and Melissa Spivey, E.H. Pechan and Associates, Inc., January 2010.

2. Hester, Charles, MACTEC, Inc. Memorandum from Charles Hester, MACTEC, Inc., to Stephen Shedd, U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Standards Division, "Review of Data on HAP Content in Gasoline," May 18, 2006.

3. Benzene speciation profiles calculated by Jonathan Dorn, E.H. Pechan and Associates, Inc. from county-level VOC and benzene emissions developed from a 2008 NMIM run. The NMIM run was performed by John Van Bruggen, E.H. Pechan and Associates, Inc., January 2010.

3.2.3.25 Fuel Combustion – Industrial and Commercial/Institutional (ICI)

The Central States Regional Planning Association (CENRAP) contracted with Pechan to provide an updated methodology to calculate ICI fuel combustion emissions for 2002, and make the methodology updatable for future inventory projects. Appendix E-3 is documentation of the ICI methodology and describes how it is applied to a revised 2002 inventory.

Statewide emissions are calculated using the fuel activity and emission factors, then statewide point source emission contributions are subtracted, and finally the emissions are allocated to counties. The Energy Information Administration's (EIA's) State Energy Data System (SEDS) provides total energy consumption by sector, but the values have to be adjusted by energy not used for combustion and nonroad equipment use. EIA's *2002 Manufacturing Energy Consumption Survey* (MECS) was used to get regional sectoral energy consumption that is not used for combustion. A run of the NONROAD model for 2006 provided the diesel and LPG quantity to subtract for commercial sector nonroad equipment. Emission factors from Roy Huntley of the EPA, the Emission Inventory improvement Plan (EIIP), and AP-42 cover the various fuel types for criteria pollutants. Emissions from coal combustion require the use of Missouri-specific coal sulfur content from the Energy Information Administration Quarterly Coal Report. Statewide point source emission contributions are subtracted by compiling the sector's CO emissions by Source Classification Code (SCC), which is fuel specific, back-calculating using AP-42 emission factors to a fuel throughput, and subtracting that fuel throughput from the statewide total. Before allocating the remaining nonpoint emissions to Missouri counties, an energy-intensity adjustment is done to account for the variation of energy used per employee for each industrial manufacturing NAICS code. *County Business Patterns* (CBP) published annually by the US Census Bureau outlines employment by NAICS codes and the energy-intensity per employee by NAICS code derived from EIA's 2002 Annual Energy Outlook. Emissions are then allocated to individual counties based on commercial/institutional employment by county and based on energy intensity and employment for the industrial sector.

Appendix E-3 outlines the activity data used, emission factors, and the calculation template spreadsheets for the categories below.

SCC	SCC Description
2102001000	Stationary Source Fuel Combustion; Industrial; Anthracite Coal; Total: All Boiler Types
2102002000	Stationary Source Fuel Combustion; Industrial; Bituminous/Subbituminous Coal; Total: All Boiler Types
2102004000	Stationary Source Fuel Combustion; Industrial; Distillate Oil; Total: Boilers and IC Engines
2102005000	Stationary Source Fuel Combustion; Industrial; Residual Oil; Total: All Boiler Types
2102006000	Stationary Source Fuel Combustion; Industrial; Natural Gas; Total: Boilers and IC Engines
2102007000	Stationary Source Fuel Combustion; Industrial; Liquid Petroleum Gas; Total: All Boiler Types
2102008000	Stationary Source Fuel Combustion; Industrial; Wood; Total: All Boiler Types
2102011000	Stationary Source Fuel Combustion; Industrial; Kerosene; Total: All Boiler Types
2103001000	Stationary Source Fuel Combustion; Commercial/Institutional; Anthracite Coal; Total: All Boiler Types
2103002000	Stationary Source Fuel Combustion; Commercial/Institutional; Bituminous/Subbituminous Coal; Total: All Boiler Types
2103004000	Stationary Source Fuel Combustion; Commercial/Institutional; Distillate Oil; Total: Boilers and IC Engines
2103005000	Stationary Source Fuel Combustion; Commercial/Institutional; Residual Oil; Total: All Boiler Types
2103006000	Stationary Source Fuel Combustion; Commercial/Institutional; Natural Gas; Total: Boilers and IC Engines
2103007000	Stationary Source Fuel Combustion; Commercial/Institutional; Liquid Petroleum Gas; Total: All Combustor Types
2103008000	Stationary Source Fuel Combustion; Commercial/Institutional; Wood; Total: All Boiler Types
2103011000	Stationary Source Fuel Combustion; Commercial/Institutional; Kerosene; Total: All Combustor Types

3.2.3.26 Fossil Fuel Combustion – Residential – Liquified Petroleum Gas (LPG)

a. Source Category Description

Residential LPG Combustion is liquefied propane gas that is burned in residential housing. Common uses of energy associated with this sector include space heating, water heating, and cooking.

The general approach to calculating emissions for this SCC is to take State LPG Consumption from the EIA and allocate it to the county level using methods described below. County level LPG consumption is multiplied by the emission factors to calculate emissions.

For this source category, the following SCC was assigned:

SCC	**Descriptor 1**	**Descriptor 3**	**Descriptor 6**	**Descriptor 8**
2104007000	Stationary Source Fuel Combustion	Residential	Liquefied Petroleum Gas (LPG)	Total: All Combustion Types

b. Activity Data

Residential liquefied petroleum gas (LPG) combustion emissions were calculated using the volume of LPG consumed in the United States. State-level LPG consumption by sector is available from the Energy Information Administration (EIA).[1] Year 2006 consumption data were used as a surrogate for 2008 emissions because these were the latest data available when this inventory was prepared.

State-level LPG consumption was allocated to each county using the US Census Bureau's 2000 Census Detailed Housing Information.[2] These data include the number of housing units using a specific type of fuel for residential heating. State LPG consumption was allocated to each county using the ratio of the number of houses burning LPG in each county to the total number of houses burning LPG in the State.

c. Control Factors

No control measures are assumed for this category.

d. Emission Factors

Pollutant emission factors for residential LPG are based on the residential natural gas emission factors.[3,4,5] For all counties in the United States, the natural gas consumed by residential combustion is assumed to have a heating value of 1,020 Btu per cubic foot and a sulfur content of 2,000 grains per million cubic feet.[3] Those natural gas emission factors originally presented in the units "pounds per million cubic feet" were converted to energy-based units using the 1,020 Btu/cubic foot conversion factor. Once all the natural gas emission factors were converted to energy-based units, the natural gas emission

factors were converted to LPG emission factors by multiplying by 96,750 Btu/gallon. Some emission factors were revised based on recommendations by an ERTAC advisory panel composed of state and EPA personnel.

e. Sample Calculations

Emissions are calculated for each county using emission factors and activity as:

$$E_{x,p} = FC_x \times EF_{x,p}$$

where:

$E_{x,p}$ = annual emissions for fuel type x and pollutant p,
FC_x = annual fuel consumption for fuel type x,
$EF_{x,p}$ = emission factor for fuel type x and pollutant p,

And $FC_x = A_{State}$ x (H_{county} / H_{State})

where :

A_{State} = State activity data from EIA
H_{County} = number of houses in the county using LPG as the primary heating fuel
H_{State} = number of houses in the state using LPG as the primary heating fuel.

Example:
Using Allegheny County, PA as an example:

The State of Pennsylvania had a reported use of 4,743 thousand barrels of LPG in the residential sector in 2006. Allegheny County, PA had 4,317 houses out of the state total of 145,254 that use LPG as the primary heating fuel. This equates to a share of 2.97% of the LPG used for residential heating in the state. From Table 1, CO emission factor is 159.6 lb/thousand barrels.

E_{CO} = 4,743 thousand barrels × (4,317 houses / 145,254 houses)
× 159.6 lb/thousand barrels

= 22,498 lb CO or 11.25 tons CO

f. References

1. U.S. Department of Energy, Energy Information Administration (EIA). State Energy Data 2006 Consumption. Washington, DC 2008. Internet address: http://www.eia.doe.gov/emeu/states/sep_use/total/csv/use_all_phy.csv, accessed November 2008.

2. U.S. Census Bureau. "Table H40. House Heating Fuel Type", Census 2000: Summary File 3. Internet address:

http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=DEC&_submenuId=&_lang=en&_ts=, accessed July 2009.

3. U.S. Environmental Protection Agency. Compilation of Air Pollutant Emission Factors, 5th Edition, AP-42, Volume I: Stationary Point and Area Sources. Research Triangle Park, North Carolina. 1996.

4. U.S. Environmental Protection Agency, Emission Factors and Inventory Group. "Documentation for the 1999 Base Year Nonpoint Area Source National Emission Inventory for Hazardous Air Pollutants." Prepared by Eastern Research Group, Inc. Morrisville, NC. September 2002.

5. U.S. Environmental Protection Agency. Emission Factor and Inventory Group. Final Summary of the Development and Results of a Methodology for Calculating Area Source Emissions from Residential Fuel Combustion. Prepared by Pacific Environmental Services, Inc. Research Triangle Park, NC. September 2002. Internet address: http://www.epa.gov/ttn/chief/eiip/techreport/volume03/draft1999_residfuel_inven_apr2003.zip accessed, November 2004.

Table 1. National Criteria Pollutant and HAP Emission Factors for Residential LPG Combustion

Pollutant Code	Pollutant Code Description	Factor Numeric Value	Factor Unit Numerator	Factor Unit Denominator
129000	Pyrene	2.09151E-05	LB	E3BBL
206440	Fluoranthene	1.2549E-05	LB	E3BBL
50000	Formaldehyde	0.313726103	LB	E3BBL
71432	Benzene	0.008784331	LB	E3BBL
75070	Acetaldehyde	5.43792E-05	LB	E3BBL
85018	Phenanthrene	7.11113E-05	LB	E3BBL
86737	Fluorene	1.17124E-05	LB	E3BBL
91203	Naphthalene	0.002551639	LB	E3BBL
CO	CO	159.6	LB	E3BBL
NH3	Ammonia	1.95	LB	E3BBL
NOX	NOX	562.8	LB	E3BBL
PM10-FIL	PM10-FIL	0.796764706	LB	E3BBL
PM25-FIL	PM25-FIL	0.438220588	LB	E3BBL
PM-CON	PM-CON	1.274823529	LB	E3BBL
SO2	SO2	2.390294118	LB	E3BBL
VOC	VOC	21.91102941	LB	E3BBL

3.2.3.27 Fuel Combustion – Residential- Wood

EPA created the Residential Wood Combustion tool to assist states with compiling the 2005 NEI, and has updated the tool with new SCCs to reflect new equipment (certified/ non-certified inserts, outdoor hydronic heaters, wood pellet stoves), revised equipment population based on regional surveys and American Housing Survey (US Census) data, and wood use ratios.

The tool is a Microsoft Access database with data input tables for appliance types and population, fuel inputs, burn temporal profiles, and emission factors. Missouri had no state-specific updates to input files, so the EPA defaults for Missouri were used to calculate emissions. A specific query is ran that performs the calculation and outputs the emission table for the state or counties of interest.

3.2.4 Nonpoint Source Emission Summary

Table 11 STLNA Nonpoint Emissions (tons per year)

County Name	CO	NH_3	NO_X	PM_{10}-Pri	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1,965.60	1,300.09	283.00	18,160.54	2,315.04	991.12	1,604.16
Jefferson County	3,892.87	165.26	383.49	27,912.02	3,428.01	904.61	3,116.32
St. Charles County	2,362.84	883.43	463.05	15,712.83	2,331.71	895.42	5,744.68
St. Louis County	7,352.19	1,036.69	2,219.83	28,858.70	4,584.76	5,445.70	20,110.91
St. Louis City	2,744.11	129.50	1,033.57	7,935.13	1,374.12	3,273.63	7,639.28
Totals	**18,317.61**	**3,514.98**	**4,382.94**	**98,579.22**	**14,033.64**	**11,510.48**	**38,215.34**

3.3 Mobile Source Emissions

3.3.1 Nonroad Mobile Sources

Nonroad categories include recreational marine and land-based vehicles, farm and construction machinery, industrial, commercial, logging, and lawn and garden equipment, and railway maintenance equipment. These equipment are powered by compression-ignition engines which are typically diesel-fueled, as well as spark-ignition (gasoline-fueled) engines. Compressed natural gas (CNG) and liquefied petroleum gas (LPG) engines may also power certain types of nonroad equipment.

3.3.1.1 Procedures and Methodologies

For nonroad gasoline, diesel, LPG and CNG sources, EPA's National Mobile Inventory Model (NMIM), incorporating the NONROAD2008 model, was used to calculate nonroad emissions. Using the fuel and meteorological data from the NCD, the NONROAD model was ran and created annual emissions for 2008. The Air Program followed the nonroad modeling protocol, which was submitted by EPA Region 7, except the oxygen weight percent was changed to 3.5% and the market share for ethanol was changed to 100%. This nonroad modeling protocol can be found in Appendix E-2 of this document. The data generated by the NONROAD model for Missouri counties in the St. Louis PM2.5 nonattainment area are summarized in Table .

For aircraft, EPA ran the Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) using Bureau of Transportation Statistics (BTS) T-100 Landing and Takeoff (LTO) and Terminal Area Forecast (TAF) data. The state of Missouri did not provide alternate emissions or input data, so EPA calculations were accepted.

For commercial marine vehicles, EPA's Office of Transportation and Air Quality (OTAQ) provided emission estimates based on grown 2002 emissions and 2008 Locomotive and Marine federal rule making. Again, EPA emission estimates were accepted.

For locomotives, the Eastern Regional Technical Advisory Committee (ERTAC Rail) provided emission estimates based on fuel use data from the American Association of Railroads (AAR), Surface Transportation Board (STB) Annual Reports, and railroad provided fleet and activity information. These estimates were accepted by Missouri.

EPA generates emissions data for aircraft, commercial marine, and locomotive sources using a emission factor calculation method. In the NEI, aircraft emissions are listed as point sources while commercial marine and locomotive emissions are listed as nonpoint emissions. Therefore, 2008 NEI data for aircraft, commercial marine, and locomotive

emissions, which are listed as point and nonpoint emissions in the NEI data, need to be added to the nonroad mobile source category. See Section 3.3.1.3 for emission totals.

3.3.1.2 Source Category Documentation

The full documentation for nonroad categories follows in Appendix E-2.

3.3.1.3 Nonroad Source Emission Summary

Table 12 STLNA Nonroad Emissions by County (tons per year, excluding Aircraft, Marine, and Rail Emissions)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1.20	1,873.72	100.89	24.15	974.70
Jefferson County	0.96	979.85	79.01	16.95	903.31
St. Charles County	2.33	2,512.83	186.81	47.30	1,902.51
St. Louis County	6.87	7,448.64	564.57	213.81	6,305.86
St. Louis City	1.53	2,460.82	102.45	55.38	1,074.08
Totals	**12.89**	**15,275.86**	**1,033.73**	**357.59**	**11,160.46**

Table 13 STLNA Marine and Rail Emissions by County (tons per year)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	0.61	1,182.86	37.22	12.37	61.51
Jefferson County	0.12	219.44	6.81	2.34	11.45
St. Charles County	0.46	453.21	15.60	5.66	30.55
St. Louis County	0.88	1,895.82	53.63	116.11	207.31
St. Louis City	0.42	1,004.10	28.97	9.37	59.28
Totals	**2.48**	**4,755.43**	**142.23**	**145.85**	**370.10**

Table 14 STLNA Aircraft Takeoff and Launch Emissions by County (tons per year)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	0.06	0.86	0.19	0.18	1.64
Jefferson County	0.02	0.28	0.06	0.06	0.53
St. Charles County	0.24	3.53	0.73	0.72	6.45
St. Louis County	0.42	906.49	22.47	105.81	156.92
St. Louis City	0.00	0.41	0.03	0.07	0.41
Totals	**0.75**	**911.58**	**23.48**	**106.83**	**165.95**

Table 15 STLNA Total Nonroad Mobile Source Emissions by County (tons per year)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	1.81	3,056.59	138.11	36.52	1,036.21
Jefferson County	1.08	1,199.29	85.82	19.29	914.76
St. Charles County	2.82	3,043.73	205.09	57.55	1,934.74
St. Louis County	7.75	9,344.46	618.20	329.93	6,513.17
St. Louis City	2.22	4,078.51	152.60	101.01	1,146.65
Totals	**15.68**	**20,722.57**	**1,199.82**	**544.30**	**11,545.53**

3.3.2 Onroad Mobile Sources

Onroad emission sources are also known as highway sources. They include vehicles used on roads for transportation of passengers or freight. The emissions from internal combustion engines in these vehicles are included in this category. Emissions of particulates entrained by the motion of the vehicle or road contact are included in the nonpoint category.

3.3.2.1 Mobile Model Choice

EPA released the Mobile Vehicle Emission System (MOVES) in December of 2010, and MOVES is now the official model to use for mobile emissions modeling. MOVES was chosen because it is the official model for future inventories and to ensure that grown 2022 emissions and budgets will be calculated consistently. 2008 mobile emissions were initially created using Mobile6.2 via NMIM for the St. Louis nonattainment area for the purpose of submitting state wide emissions data for EPA's 2008 National Emissions Inventory (NEI). The NMIM NCD input data was updated with Missouri specific information. Local VMT data, vehicle registration distributions, and meteorology data from the updated NCD were converted to MOVES formatting using EPA provided conversion workbooks.

MOVES is a completely redesigned model, not just an updated version of the previous Mobile model. The way MOVES calculates emissions has changed to reflect EPA's more current understanding of the emissions produced by vehicles and the various factors that affect the emissions. NO_X emissions were found to be higher because of the larger portion extended idling of heavy duty vehicles contributes to the emissions total. $PM_{2.5}$ emissions were also higher because of a better understanding of the effect of stop and go traffic, which has a significant impact on emissions in highly urban areas, such as the St. Louis nonattainment area. As a result of these changes to the model, MOVES produced higher emissions estimates for both 2008 and 2022 than were originally created with NMIM.

3.3.2.2 Mobile Model Inputs

Local VMT data was gathered from East-West Gateway at the county level. This data is listed in Table 16.

The road type distribution in the baseyearvmt table from the NCD was used to distribute the county level VMT to road type. EPA's VMT converter workbook was then used to produce MOVES input tables.

An age distribution for light duty vehicles was created from a list of Vehicle Identification Numbers (VINs) contained in vehicle registration records from the Missouri Department of Revenue. The VINs were decoded into model year and MOBILE6 vehicle classes by ESP Data Solutions, Inc, a private contractor. A specific

registration distribution was created for the five county Missouri portion of the St. Louis Nonattainment area. This data updated the BaseYearVMT Table and the CountyYear Table. The vehicle distribution was converted to MOVES age distribution table using EPA's VMT converter workbook. The registration data was also used to create the MOVES vehicle population input tables. Vehicle counts were converted from Mobile 6.2 vehicle classes to MOVES source types using the source type fractions from the Source Type Pop Fractions table in EPA's VMT converter workbook. The vehicle distribution is listed in

Table 17.

MOVES base data was used for all other inputs, after reviewing the data to ensure accuracy. The base fuel supply tables in MOVES were used for the runs, as they already took into account the reformulated gasoline used in the St. Louis nonattainment area. A separate input database was created for each county, using county specific data where possible. The MOVES input tables, other than default EPA templates, are included in Table 18 through 38.

Table 16 2008 Vehicle Miles Traveled by County

County	2008 Annual VMT
Franklin	1,636,760,381
Jefferson	1,884,745,023
St. Charles	2,728,058,895
St. Louis	11,924,864,323
St. Louis City	3,450,450,085
Total	**21,624,878,706**

Table 17 Missouri Registration Distribution

Vehicle Class	Vehicle Model Year Population Percentage Per Vehicle Classification												
	2008	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**	**2001**	**2000**	**1999**	**1998**	**1997**	**1996**
LDV	0.0248	0.0564	0.0666	0.0649	0.0653	0.0632	0.0633	0.0679	0.0675	0.0652	0.0604	0.0501	0.0488
LDT1	0.0130	0.0345	0.0103	0.0666	0.0759	0.0255	0.0713	0.0780	0.0859	0.0487	0.0474	0.0398	0.0379
LDT2	0.0179	0.0593	0.0700	0.0750	0.0840	0.0759	0.0728	0.0808	0.0671	0.0640	0.0563	0.0522	0.0427
LDT3	0.0161	0.0734	0.0630	0.0760	0.0785	0.0842	0.0838	0.0728	0.0624	0.0539	0.0561	0.0365	0.0328
LDT4	0.0153	0.0843	0.1358	0.0771	0.0953	0.1119	0.0736	0.0461	0.0564	0.0549	0.0715	0.0395	0.0342
HDV2b	0.0078	0.0468	0.0483	0.0729	0.0660	0.0808	0.0871	0.0713	0.0773	0.0671	0.0642	0.0310	0.0519
HDV3	0.0066	0.0628	0.0602	0.0961	0.0876	0.0681	0.0715	0.0613	0.0774	0.0669	0.0734	0.0272	0.0331
HDV4	0.0040	0.0200	0.0638	0.0404	0.0338	0.0366	0.0385	0.0413	0.0653	0.0781	0.0821	0.0383	0.0630
HDV5	0.0187	0.1207	0.0664	0.0804	0.0535	0.0639	0.0560	0.0450	0.0578	0.0951	0.0899	0.0465	0.0572
HDV6	0.0311	0.0355	0.1005	0.0865	0.0529	0.0268	0.0212	0.0199	0.0840	0.0765	0.0685	0.0572	0.0591
HDV7	0.0182	0.0324	0.1250	0.1080	0.1033	0.0772	0.0847	0.0669	0.0285	0.0427	0.0285	0.0253	0.0281
HDV8a	0.0136	0.0110	0.0524	0.0497	0.0565	0.0513	0.0420	0.0301	0.0426	0.0791	0.0570	0.0386	0.0354
HDV8b	0.0189	0.0726	0.2263	0.0348	0.0639	0.0957	0.0899	0.0552	0.0522	0.1363	0.0697	0.0305	0.0203
HDBS	0.0343	0.0556	0.0925	0.0556	0.1004	0.0587	0.0623	0.0351	0.0489	0.0657	0.0669	0.0678	0.0426
HDBT	0.0060	0.0045	0.0132	0.0144	0.0138	0.0291	0.0378	0.0258	0.0249	0.0390	0.0351	0.0309	0.0351
MC	0.0190	0.0646	0.1035	0.1096	0.1172	0.0874	0.0922	0.0713	0.0610	0.0435	0.0360	0.0255	0.0208
	1995	**1994**	**1993**	**1992**	**1991**	**1990**	**1989**	**1988**	**1987**	**1986**	**1985**	**1984**	
LDV	0.0390	0.0420	0.0313	0.0274	0.0213	0.0184	0.0138	0.0121	0.0083	0.0065	0.0049	0.0106	
LDT1	0.0443	0.0211	0.0168	0.0210	0.0189	0.0193	0.0184	0.0363	0.0582	0.0433	0.0250	0.0426	
LDT2	0.0292	0.0287	0.0266	0.0215	0.0157	0.0149	0.0096	0.0096	0.0076	0.0054	0.0042	0.0090	
LDT3	0.0322	0.0423	0.0338	0.0207	0.0181	0.0106	0.0112	0.0104	0.0070	0.0067	0.0058	0.0117	
LDT4	0.0201	0.0158	0.0145	0.0101	0.0074	0.0055	0.0052	0.0063	0.0074	0.0045	0.0014	0.0059	
HDV2b	0.0350	0.0393	0.0244	0.0196	0.0151	0.0122	0.0124	0.0154	0.0097	0.0062	0.0102	0.0280	
HDV3	0.0266	0.0340	0.0223	0.0165	0.0122	0.0126	0.0134	0.0118	0.0126	0.0096	0.0098	0.0264	
HDV4	0.0504	0.0723	0.0647	0.0308	0.0247	0.0243	0.0238	0.0270	0.0198	0.0121	0.0128	0.0321	
HDV5	0.0517	0.0217	0.0147	0.0083	0.0067	0.0110	0.0113	0.0125	0.0080	0.0012	0.0000	0.0018	
HDV6	0.0557	0.0389	0.0134	0.0152	0.0093	0.0162	0.0292	0.0196	0.0184	0.0240	0.0062	0.0342	
HDV7	0.0253	0.0321	0.0174	0.0202	0.0158	0.0166	0.0139	0.0226	0.0162	0.0178	0.0103	0.0230	
HDV8a	0.0333	0.0786	0.0447	0.0381	0.0239	0.0228	0.0291	0.0360	0.0277	0.0261	0.0163	0.0641	
HDV8b	0.0087	0.0015	0.0015	0.0029	0.0044	0.0044	0.0029	0.0044	0.0000	0.0000	0.0015	0.0015	
HDBS	0.0489	0.0327	0.0185	0.0146	0.0106	0.0095	0.0114	0.0173	0.0024	0.0035	0.0032	0.0410	
HDBT	0.0830	0.0836	0.0492	0.0441	0.0267	0.0399	0.0609	0.0333	0.0558	0.0540	0.0351	0.1248	
MC	0.0189	0.0171	0.0122	0.0119	0.0073	0.0063	0.0063	0.0064	0.0054	0.0068	0.0097	0.0401	

Table 18 2008 Source Type Population

			Source Type Population by County				
YearID	**SourceTypeName**	**SourceTypeID**	**Franklin**	**Jefferson**	**St Charles**	**St Louis County**	**St Louis City**
2008	Motorcycle	11	6,067	13,018	11,151	19,243	3104
2008	Passenger Car	21	46,568	98,009	144,441	527,148	125,776
2008	Passenger Truck	31	45,890	82,509	110,386	303,296	59,406
2008	Light Commercial Truck	32	16,769	28,421	35,913	97,845	20,194
2008	Refuse Truck	41	8	41	36	94	70
2008	Single Unit Short-haul Truck	42	25	123	106	280	208
2008	Single Unit Long-haul Truck	43	302	541	549	2,709	661
2008	Motor Home	51	22	19	19	50	16
2008	School Bus	52	814	901	1,020	3,624	1,249
2008	Transit Bus	53	61	67	76	270	93
2008	Intercity Bus	54	44	71	82	379	143
2008	Combination Short-haul Truck	61	370	324	328	791	248
2008	Combination Long-haul Truck	62	307	257	258	545	160

Table 19 2008 Annual VMT by HPMS Vehicle Type, County, and Year

			HPMSBaseYearVMT by County				
HPMSVtypeID	**HPMSVtypeName**	**YearID**	**Franklin**	**Jefferson**	**St. Charles**	**St. Louis**	**St. Louis City**
10	Motorcycles	2008	11,619,323	13,841,651	20,770,584	91,989,970	26,665,063
20	Passenger Cars	2008	707,169,172	811,173,607	1,171,243,667	5,115,865,231	1,477,495,621
30	Other 2 axle-4 tire vehicles	2008	799,130,600	924,394,839	1,342,595,411	5,875,722,138	1,702,465,533
40	Buses	2008	4,781,820	5,578,789	8,183,119	35,928,481	10,469,862
50	Single Unit Trucks	2008	29,351,955	33,386,793	47,634,481	207,228,073	59,856,119
60	Combination Trucks	2008	84,673,330	96,333,716	137,528,782	598,448,609	173,536,046

Table 20 Age Distribution by Source Type

	Source Type ID												
AgeID	**11**	**21**	**31**	**32**	**41**	**42**	**43**	**51**	**52**	**53**	**54**	**61**	**62**
0	0.019	0.0248	0.016038	0.015215	0.006	0.006	0.03372	0.019407	0.022549	0.022677	0.024421	0.018826	0.017834
1	0.0646	0.0564	0.059034	0.058508	0.0045	0.0045	0.054157	0.048521	0.039325	0.03937	0.032671	0.049995	0.052613
2	0.1035	0.0666	0.063189	0.062229	0.0132	0.0132	0.092687	0.158149	0.129508	0.130555	0.106219	0.16227	0.169835
3	0.1096	0.0649	0.073971	0.073529	0.0144	0.0144	0.057163	0.057986	0.082002	0.084645	0.091592	0.052692	0.04403
4	0.1172	0.0653	0.081725	0.079405	0.0138	0.0138	0.098055	0.068814	0.07432	0.076743	0.07138	0.066656	0.063479
5	0.0874	0.0632	0.072225	0.07206	0.0291	0.0291	0.05743	0.075516	0.060754	0.062113	0.04642	0.077218	0.080584
6	0.0922	0.0633	0.075227	0.075017	0.0378	0.0378	0.060728	0.071294	0.059753	0.061551	0.046468	0.072242	0.074392
7	0.0713	0.0679	0.075731	0.074101	0.0258	0.0258	0.034794	0.048222	0.045101	0.04668	0.038418	0.04791	0.047775
8	0.061	0.0675	0.069095	0.069315	0.0249	0.0249	0.049567	0.050551	0.053801	0.053336	0.05744	0.050259	0.049622
9	0.0435	0.0652	0.059343	0.060606	0.039	0.039	0.065329	0.101607	0.075238	0.074281	0.059218	0.106403	0.114631
10	0.036	0.0604	0.056546	0.058019	0.0351	0.0351	0.065952	0.060365	0.052757	0.052173	0.04901	0.061907	0.064481
11	0.0255	0.0501	0.045379	0.044021	0.0309	0.0309	0.066337	0.035034	0.038694	0.038608	0.041544	0.03448	0.033479
12	0.0208	0.0488	0.040069	0.041299	0.0351	0.0351	0.042714	0.030037	0.038252	0.038379	0.043733	0.028628	0.026173
13	0.0189	0.039	0.031719	0.032547	0.083	0.083	0.048635	0.022609	0.033622	0.033505	0.041779	0.020871	0.017769
14	0.0171	0.042	0.029341	0.030746	0.0836	0.0836	0.033323	0.026945	0.032499	0.031744	0.038573	0.026434	0.025331
15	0.0122	0.0313	0.025132	0.025766	0.0492	0.0492	0.018302	0.014853	0.01522	0.015277	0.015313	0.014766	0.014626
16	0.0119	0.0274	0.020261	0.020238	0.0441	0.0441	0.01489	0.014543	0.016624	0.016485	0.018482	0.014281	0.013778
17	0.0073	0.0213	0.01591	0.015912	0.0267	0.0267	0.010657	0.011093	0.012019	0.01218	0.012215	0.010861	0.010491
18	0.0063	0.0184	0.014002	0.013972	0.0399	0.0399	0.009968	0.011696	0.014667	0.014636	0.016859	0.011229	0.010394
19	0.0063	0.0138	0.011117	0.011398	0.0609	0.0609	0.012691	0.012448	0.018417	0.017168	0.026192	0.012123	0.011221
20	0.0064	0.0121	0.014109	0.014268	0.0333	0.0333	0.018084	0.014903	0.019136	0.018141	0.024946	0.014734	0.014172
21	0.0054	0.0083	0.015761	0.015219	0.0558	0.0558	0.00363	0.01022	0.014831	0.014247	0.019752	0.009773	0.008829
22	0.0068	0.0065	0.011686	0.011205	0.054	0.054	0.00501	0.010636	0.017272	0.016478	0.024234	0.009966	0.008574
23	0.0097	0.0049	0.00791	0.008124	0.0351	0.0351	0.003627	0.006385	0.007661	0.00744	0.00919	0.006293	0.006072
24	0.013837	0.003694	0.00582	0.006825	0.022815	0.022815	0.003017	0.003218	0.003631	0.003569	0.004095	0.003185	0.003108
25	0.019738	0.002785	0.004029	0.004856	0.01483	0.01483	0.002668	0.001864	0.001955	0.001889	0.002204	0.001885	0.001903
26	0.006525	0.002099	0.002201	0.002308	0.009639	0.009639	0.002379	0.001137	0.001109	0.001082	0.001162	0.001156	0.001183
27	0	0.001582	0.001069	0.001073	0.006266	0.006266	0.00214	0.00071	0.000645	0.000647	0.000595	0.000721	0.000739
28	0	0.00044	0.000253	0.000245	0.004073	0.004073	0.001953	0.000417	0.000378	0.000362	0.000398	0.000432	0.000454
29	0	0	0.000147	0.000139	0.002647	0.002647	0.001784	0.00024	0.000223	0.000197	0.000282	0.000256	0.000278
30	0	0	0.001957	0.001836	0.064531	0.064531	0.028609	0.010581	0.018036	0.013841	0.035194	0.011546	0.012147

Table 21 Inspection and Maintenance Data for 2008

Pol Process ID	State ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspect Freq.	Test Standards ID	Beg Model Year ID	End Model Year ID	Use IM Y/N	Compliance Factor
101	29	2008	21	1	1	1	11	1971	1995	N	93.12
101	29	2008	21	1	10	2	51	1996	2006	Y	97.94
101	29	2008	31	1	1	1	11	1971	1995	N	93.12
101	29	2008	31	1	10	2	51	1996	2006	Y	92.06
101	29	2008	32	1	1	1	11	1971	1995	N	93.12
101	29	2008	32	1	10	2	51	1996	2006	Y	86.18
102	29	2008	21	1	1	1	11	1971	1995	N	93.12
102	29	2008	21	1	10	2	51	1996	2006	Y	97.94
102	29	2008	31	1	1	1	11	1971	1995	N	93.12
102	29	2008	31	1	10	2	51	1996	2006	Y	92.06
102	29	2008	32	1	1	1	11	1971	1995	N	93.12
102	29	2008	32	1	10	2	51	1996	2006	Y	86.18
112	29	2008	21	1	7	1	41	1971	1995	N	93.12
112	29	2008	21	1	8	2	43	1996	2006	Y	97.94
112	29	2008	31	1	7	1	41	1971	1995	N	93.12
112	29	2008	31	1	8	2	43	1996	2006	Y	92.06
112	29	2008	32	1	7	1	41	1971	1995	N	93.12
112	29	2008	32	1	8	2	43	1996	2006	Y	86.18
113	29	2008	21	1	7	1	41	1971	1995	N	93.12
113	29	2008	21	1	8	2	43	1996	2006	Y	97.94
113	29	2008	31	1	7	1	41	1971	1995	N	93.12
113	29	2008	31	1	8	2	43	1996	2006	Y	92.06
113	29	2008	32	1	7	1	41	1971	1995	N	93.12
113	29	2008	32	1	8	2	43	1996	2006	Y	86.18
201	29	2008	21	1	1	1	11	1971	1995	N	93.12
201	29	2008	21	1	10	2	51	1996	2006	Y	97.94
201	29	2008	31	1	1	1	11	1971	1995	N	93.12
201	29	2008	31	1	10	2	51	1996	2006	Y	92.06

Pol Process ID	State ID	Year ID	Source Type ID	Fuel Type ID	IM Program ID	Inspect Freq.	Test Standards ID	Beg Model Year ID	End Model Year ID	Use IM Y/N	Compliance Factor
201	29	2008	32	1	1	1	11	1971	1995	N	93.12
201	29	2008	32	1	10	2	51	1996	2006	Y	86.18
202	29	2008	21	1	1	1	11	1971	1995	N	93.12
202	29	2008	21	1	10	2	51	1996	2006	Y	97.94
202	29	2008	31	1	1	1	11	1971	1995	N	93.12
202	29	2008	31	1	10	2	51	1996	2006	Y	92.06
202	29	2008	32	1	1	1	11	1971	1995	N	93.12
202	29	2008	32	1	10	2	51	1996	2006	Y	86.18
301	29	2008	21	1	10	2	51	1996	2006	Y	97.94
301	29	2008	31	1	10	2	51	1996	2006	Y	92.06
301	29	2008	32	1	10	2	51	1996	2006	Y	86.18
302	29	2008	21	1	10	2	51	1996	2006	Y	97.94
302	29	2008	31	1	10	2	51	1996	2006	Y	92.06
302	29	2008	32	1	10	2	51	1996	2006	Y	86.18

Table 22 Fuel Formulation for 2008

Fuel FormulationID	Fuel SubtypeID	FuelSubtypeDesc	RVP	Sulfur Level	ETOH Volume	MTBE Volume	ETBE Volume	TAME Volume	Aromatic Content	Olefin Content
2302	12	Gasohol (E10)	11.2917	43.0622	10	0	0	0	20.2606	8.39154
2303	12	Gasohol (E10)	8.75115	46.6452	10	0	0	0	18.9623	8.14345
2304	12	Gasohol (E10)	6.84571	49.3325	10	0	0	0	17.9886	7.95739
2305	12	Gasohol (E10)	13.1972	40.375	10	0	0	0	21.2343	8.57759
20043	20	Conventional Diesel	0	43	0	0	0	0	0	0

Fuel FormulationID	Fuel SubtypeID	fuelSubtypeDesc	Benzene Content	e200	e300	biodiesel EsterVolume	cetaneIndex	PAHContent
2302	12	Gasohol (E10)	0.848747	56.4983	84.16	0	0	0
2303	12	Gasohol (E10)	0.763743	53.3414	85.1429	0	0	0
2304	12	Gasohol (E10)	0.69999	50.9738	85.88	0	0	0
2305	12	Gasohol (E10)	0.9125	58.8659	83.4229	0	0	0
20043	20	Conventional Diesel	0	0	0	0	0	0

Table 23 2008 Fuel Supply

FuelYearID	Month GroupID	Fuel FormulationID	Market Share	Market ShareCV
2008	1	2305	1	0.5
2008	1	20043	1	0.5
2008	2	20043	1	0.5
2008	2	2302	1	0.5
2008	3	2302	1	0.5
2008	3	20043	1	0.5
2008	4	20043	1	0.5
2008	4	2303	1	0.5
2008	5	2303	1	0.5
2008	5	20043	1	0.5
2008	6	20043	1	0.5
2008	6	2304	1	0.5
2008	7	2304	1	0.5
2008	7	20043	1	0.5
2008	8	20043	1	0.5
2008	8	2304	1	0.5
2008	9	2304	1	0.5
2008	9	20043	1	0.5
2008	10	20043	1	0.5
2008	10	2303	1	0.5
2008	11	2302	1	0.5
2008	11	20043	1	0.5
2008	12	20043	1	0.5
2008	12	2302	1	0.5

Table 24 Franklin County Road Type Distribution for 2008

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0.090246
11	3	0.553444
11	4	0.087268
11	5	0.269042
21	1	0
21	2	0.084309
21	3	0.591423
21	4	0.079558
21	5	0.24471
31	1	0
31	2	0.08262
31	3	0.588941
31	4	0.083327
31	5	0.245112
32	1	0
32	2	0.082331
32	3	0.589795
32	4	0.082902
32	5	0.244973
41	1	0
41	2	0.091642
41	3	0.578893
41	4	0.092985
41	5	0.23648
42	1	0
42	2	0.091642
42	3	0.578893
42	4	0.092985
42	5	0.23648
43	1	0
43	2	0.090795
43	3	0.580059
43	4	0.092167
43	5	0.236979

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0.083482
51	3	0.602647
51	4	0.081432
51	5	0.232438
52	1	0
52	2	0.079374
52	3	0.604049
52	4	0.077497
52	5	0.23908
53	1	0
53	2	0.079998
53	3	0.603836
53	4	0.078094
53	5	0.238072
54	1	0
54	2	0.077187
54	3	0.604795
54	4	0.075403
54	5	0.242615
61	1	0
61	2	0.084046
61	3	0.602455
61	4	0.081972
61	5	0.231527
62	1	0
62	2	0.084887
62	3	0.602168
62	4	0.082778
62	5	0.230167

Table 25 Jefferson County Road Type Distribution for 2008

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0.027299
11	3	0.327775
11	4	0.296743
11	5	0.348182
21	1	0
21	2	0.026499
21	3	0.363795
21	4	0.280746
21	5	0.32896
31	1	0
31	2	0.025738
31	3	0.359148
31	4	0.288448
31	5	0.326666
32	1	0
32	2	0.02567
32	3	0.359993
32	4	0.287549
32	5	0.326787
41	1	0
41	2	0.028299
41	3	0.349837
41	4	0.3093
41	5	0.312563
42	1	0
42	2	0.028299
42	3	0.349837
42	4	0.3093
42	5	0.312563
43	1	0
43	2	0.028073
43	3	0.351082
43	4	0.307413
43	5	0.313432

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0.026449
51	3	0.373764
51	4	0.284734
51	5	0.315052
52	1	0
52	2	0.025151
52	3	0.3747
52	4	0.27602
52	5	0.32413
53	1	0
53	2	0.025348
53	3	0.374558
53	4	0.277343
53	5	0.322751
54	1	0
54	2	0.02446
54	3	0.375196
54	4	0.271382
54	5	0.328963
61	1	0
61	2	0.026628
61	3	0.373636
61	4	0.28593
61	5	0.313806
62	1	0
62	2	0.026894
62	3	0.373444
62	4	0.287715
62	5	0.311948

Table 26 St. Charles County Road Type Distribution for 2008

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0.008501
11	3	0.083985
11	4	0.423865
11	5	0.483649
21	1	0
21	2	0.011445
21	3	0.096868
21	4	0.416825
21	5	0.474863
31	1	0
31	2	0.010109
31	3	0.095047
31	4	0.426164
31	5	0.46868
32	1	0
32	2	0.010244
32	3	0.09535
32	4	0.425148
32	5	0.469258
41	1	0
41	2	0.011811
41	3	0.091364
41	4	0.453393
41	5	0.443432
42	1	0
42	2	0.011811
42	3	0.091364
42	4	0.453393
42	5	0.443432
43	1	0
43	2	0.009959
43	3	0.092097
43	4	0.451928
43	5	0.446017

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0.010872
51	3	0.100661
51	4	0.428451
51	5	0.460016
52	1	0
52	2	0.010809
52	3	0.100965
52	4	0.41471
52	5	0.473516
53	1	0
53	2	0.010819
53	3	0.100919
53	4	0.416797
53	5	0.471465
54	1	0
54	2	0.010769
54	3	0.101128
54	4	0.407389
54	5	0.480715
61	1	0
61	2	0.010881
61	3	0.10062
61	4	0.430335
61	5	0.458165
62	1	0
62	2	0.010893
62	3	0.100557
62	4	0.433146
62	5	0.455404

Table 27 St. Louis County Road Type Distribution for 2008

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0.00113
11	3	0.011837
11	4	0.460448
11	5	0.526585
21	1	0
21	2	0.001544
21	3	0.015158
21	4	0.459076
21	5	0.524222
31	1	0
31	2	0.001361
31	3	0.01387
31	4	0.46841
31	5	0.516359
32	1	0
32	2	0.001379
32	3	0.014014
32	4	0.467447
32	5	0.51716
41	1	0
41	2	0.001583
41	3	0.015108
41	4	0.496442
41	5	0.486867
42	1	0
42	2	0.001583
42	3	0.015108
42	4	0.496442
42	5	0.486867
43	1	0
43	2	0.001336
43	3	0.013582
43	4	0.495108
43	5	0.489975

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0.001472
51	3	0.015096
51	4	0.473646
51	5	0.509786
52	1	0
52	2	0.001464
52	3	0.015054
52	4	0.458621
52	5	0.524861
53	1	0
53	2	0.001465
53	3	0.015061
53	4	0.460904
53	5	0.52257
54	1	0
54	2	0.001459
54	3	0.015026
54	4	0.450614
54	5	0.532901
61	1	0
61	2	0.001473
61	3	0.015102
61	4	0.475707
61	5	0.507719
62	1	0
62	2	0.001475
62	3	0.01511
62	4	0.47878
62	5	0.504636

Table 28 St. Louis City Road Type Distribution for 2008

Source Type ID	Road Type ID	Road Type VMT Fraction
11	1	0
11	2	0
11	3	0
11	4	0.408066
11	5	0.591934
21	1	0
21	2	0
21	3	0
21	4	0.408529
21	5	0.591471
31	1	0
31	2	0
31	3	0
31	4	0.419349
31	5	0.580651
32	1	0
32	2	0
32	3	0
32	4	0.41824
32	5	0.58176
41	1	0
41	2	0
41	3	0
41	4	0.455165
41	5	0.544835
42	1	0
42	2	0
42	3	0
42	4	0.455165
42	5	0.544835
43	1	0
43	2	0
43	3	0
43	4	0.452405
43	5	0.547595

Source Type ID	Road Type ID	Road Type VMT Fraction
51	1	0
51	2	0
51	3	0
51	4	0.426701
51	5	0.573299
52	1	0
52	2	0
52	3	0
52	4	0.40783
52	5	0.59217
53	1	0
53	2	0
53	3	0
53	4	0.410705
53	5	0.589295
54	1	0
54	2	0
54	3	0
54	4	0.397721
54	5	0.602279
61	1	0
61	2	0
61	3	0
61	4	0.429279
61	5	0.570721
62	1	0
62	2	0
62	3	0
62	4	0.433119
62	5	0.566881

Table 29 Average Monthly Temperatures by Hour of the Day for Franklin County in Fahrenheit

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	25.8	29	39.1	48.4	55.9	68.2	70.9	67.1	60.6	49	38.4	24.7
2	24.8	27.4	37	46.4	54.7	67.1	69.6	66.2	60.8	47.9	38.4	24.7
3	23.8	26.3	35.8	45	53.6	66	68.8	65.4	60	47.1	37.5	24
4	22.8	25.3	34.5	44.1	52.6	65	68.1	64.8	59.1	46.5	36.8	23.5
5	22	24.9	33.5	43.2	51.7	64.1	67.5	63.9	58.6	45.7	36	23
6	21.4	24.2	32.6	42.7	51.1	63.5	66.8	63.4	58.2	45.1	35.3	22.5
7	21.2	23.8	32.1	42.7	52.6	65.7	68.2	63.9	57.9	44.6	34.7	22.8
8	21	23.4	32.4	45.3	56.2	69.3	71.4	67.6	60	45.9	34.2	22.3
9	22.2	24.9	36.4	48.9	59.6	72.9	75.2	71.7	63.8	50.9	37.1	23.8
10	26.6	27.8	40.5	52.5	63.2	76.2	78.5	75.7	67.8	56	41.5	27.4
11	31.2	31.1	44.7	55.7	66.4	79	81.3	78.9	71.4	60.5	45.6	31.7
12	36	34.3	48.5	58.5	68.8	81.3	83.6	81.2	74.4	63.9	49.3	36.1
13	39.6	37.2	51.7	61.5	70.6	83	85.6	82.9	76.5	66.1	51.9	39.7
14	42.4	39.5	53.9	63.3	72.1	84.3	87	84.1	77.9	67.5	54	42.2
15	44	41	55.6	64.9	73.6	85.1	88	84.9	78.7	68.4	55.1	43.9
16	44.4	41.6	56.3	65.8	74.3	85.5	88.1	85.1	78.7	68.5	55.1	44.1
17	43.2	41.4	56.1	65.6	74.3	85.2	87.7	84.7	77.9	67.4	53.7	42.2
18	39.4	39.9	54.8	64.6	73.3	84.1	86.7	83.3	75.8	64.2	50.1	37.8
19	35.2	37	51.7	62.1	71.3	82.3	84.6	80.4	71.3	58.9	46.8	34.4
20	32.8	34.9	47.9	58.2	67.3	79	81	75.9	67	55.9	44.8	32
21	31	33.6	45.7	55.6	63.2	74.6	76.9	72.5	65.1	54.1	43.1	30.1
22	29.6	32.2	43.9	53.4	60.7	72.2	75	70.6	63.8	52.7	41.9	28.4
23	28.2	30.9	42.3	51.5	58.9	70.7	73.4	69.2	62.5	51.3	40.7	27.1
24	27.2	29.9	40.5	50	57.2	69.3	72.1	68.1	61.4	50.2	39.5	25.7

Table 30 Average Monthly Percent Relative Humidity by Hour of the Day for Franklin County

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	68.3	76	71.8	70.6	77	78.3	83.9	86.1	88.2	77	68.9	69.9
2	69	77.2	72.8	72.9	77.2	80.2	84.4	86.9	88.5	78.7	70.3	71.8
3	70.1	78	73.9	74.5	78.2	81.6	85.3	87.5	89.2	79.8	71.7	72.9
4	70.9	78.3	75.3	75.3	79.3	82.4	86.1	88.1	90.1	80.4	72.8	73.8
5	71.8	78.3	76.8	76.1	80.5	83.8	86.4	89.3	90.4	81.6	73.9	75.1
6	72.3	78.9	77.6	77	81.1	84.4	87.3	89.6	90.4	82.5	75	75.7
7	72	78.8	78.2	77.6	80.3	83	85.8	89	90.4	83.4	75.9	76.1
8	72	78.8	78.3	74.5	76.2	77.9	81.4	84.9	89.5	83.2	76.5	76
9	71.2	77.6	74.8	69.8	71.5	72.4	74.9	77.5	84.7	76.8	74.3	75.2
10	66.9	74.3	69.7	64.8	65.8	66.9	69.3	70.2	77.2	67.7	68.4	72.4
11	62	70.4	63.5	61.1	61.1	62.1	64.5	64.2	70.5	59.4	62.1	68.4
12	56.8	67	58.7	58.2	58.1	58.2	60.9	60	64.6	53.3	56.5	64.8
13	53	63.8	54.8	55	56.3	55.4	57.9	57.2	60.9	49.9	52.7	62.1
14	50.2	61.5	52.6	53	55.1	53.7	55.8	55.4	58.3	47.7	49.4	60.2
15	48.4	60	51	51.1	53.1	52.2	54.6	54.2	56.8	46.3	47.6	58.7
16	47.3	59.4	50.7	49.7	52.5	51.5	54.4	54	56.6	46	47.1	58
17	47.9	59.8	50.7	49.1	51.7	51.5	55.1	54.9	58.1	47.2	48.4	59.2
18	51.2	61.6	52.5	49.9	52.1	52.8	56.7	57.6	62.8	52.3	52.9	62.9
19	55.5	65.4	56.2	52.8	54.6	55.5	61.1	63.5	72.5	61.5	57.2	65.6
20	58.3	68.2	61	57.5	60.3	61.6	68.4	72.7	80.5	66.9	60	67
21	60.6	70.1	63.9	60.8	66.3	68.8	75.3	78.4	83.9	69.6	62.5	67.6
22	62.8	72	66.3	63.9	70.3	72.8	78.3	81.9	85.3	71.9	64.4	68.3
23	64.5	73.7	68.2	66.4	73.1	75	80.7	83.8	86.4	73.7	65.9	68.7
24	66.1	75.1	70.3	68.3	75.4	77	82.3	85.2	87.6	75.6	67.6	69.1

Table 31 Average Monthly Temperatures by Hour of the Day for Jefferson County in Fahrenheit

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	25.6	28.3	38.5	47.4	55	68.3	70.1	67	60.2	48.6	37.5	24.2
2	24.7	26.8	36.3	45.5	53.8	67.3	68.8	66.1	60.4	47.7	37.3	24.2
3	23.7	25.7	35.2	44.3	52.8	66.3	68.1	65.3	59.5	46.9	36.4	23.2
4	22.5	24.8	34.2	43.3	51.8	65.2	67.5	64.6	58.9	46.3	35.8	22.8
5	22	24.2	33.3	42.6	50.9	64.5	66.8	63.9	58.2	45.4	35	22.3
6	21.2	23.5	32.3	42.3	50.5	63.8	66.2	63.4	57.9	44.8	34.3	21.8
7	20.8	23.1	31.8	42.3	52.1	66	67.6	63.9	57.6	44.3	33.7	22.1
8	20.8	22.9	32	44.9	55.7	69.6	70.8	67.6	59.9	45.6	33.5	21.6
9	22	24.2	35.7	48.4	58.9	73	74.5	71.6	63.7	50.7	36.6	23.2
10	26.2	27	39.5	51.7	62.4	76.3	77.6	75.6	67.6	55.8	41	27
11	30.7	30	43.6	54.7	65.5	78.9	80.3	78.7	71.3	60.2	45	31
12	35	33.2	47.1	57.1	67.7	81.1	82.5	80.8	74.2	63.7	48.6	35.2
13	38.3	35.7	50.1	59.7	69.3	82.8	84.3	82.5	76.4	65.8	51.1	38.8
14	41.2	37.9	52.3	61.6	70.4	83.9	85.6	83.7	77.7	67.2	53.2	41.1
15	42.9	39.2	53.7	62.9	71.7	84.6	86.6	84.4	78.5	68.1	54.3	42.8
16	43.3	40	54.5	63.8	72.6	84.9	86.9	84.4	78.6	68.1	54.3	43
17	42.1	39.8	54.3	63.5	72.6	84.6	86.5	84.2	77.8	67.1	52.9	41.1
18	38.5	38.3	53	62.6	71.6	83.6	85.4	82.7	75.6	63.9	49.1	36.9
19	34.4	35.7	50	60.1	69.7	81.8	83.4	79.9	71	58.7	45.7	33.8
20	32	33.6	46.8	56.8	65.8	78.6	79.9	75.6	66.7	55.6	43.7	31.5
21	30.3	32.1	44.6	54.1	62	74.4	76.1	72.3	64.7	53.7	41.9	29.8
22	29.1	31.2	42.7	52.2	59.7	72.2	74.1	70.4	63.3	52.3	40.7	27.9
23	28	29.9	41.4	50.3	57.6	70.7	72.6	69	62.1	50.9	39.5	26.8
24	27	29.1	39.7	48.9	56.2	69.4	71.3	68.1	61.1	49.7	38.4	25.1

Table 32 Average Monthly Percent Relative Humidity by Hour of the Day for Jefferson County

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	67.9	75.6	72.4	70.8	76.6	76.7	83	85.5	87.6	77.2	68.8	69.6
2	69	77.1	73	73.1	76.8	78.3	83.8	86.6	87.6	78.3	70.2	71.1
3	70.1	78	74.1	74.4	77.6	79.9	84.6	86.9	88.5	80.1	71.3	72.5
4	71.2	78.2	75.2	75.5	78.7	81.2	85.2	87.8	88.8	80.7	72.1	73.1
5	71.8	78.2	76.1	76.1	79.5	82.3	85.8	88.4	89.4	81.9	73.2	74.4
6	72.3	78.8	77.6	76.9	80.1	83.2	86.3	88.7	89.4	82.8	74.3	75
7	72.6	78.8	78.2	77.3	79.3	81.3	85.2	88.4	89.4	83.4	75.2	75.3
8	72.3	78.4	78.5	73.9	75	76	80.5	84	88.2	83.2	75.5	75.6
9	71.1	77.2	75.4	69	70.7	70.4	73.8	76.7	83.2	77.1	73.4	74.8
10	67.1	74.2	70.2	64.4	65	64.8	68.5	69.4	76.1	67.5	67.5	71.7
11	62.2	70.5	64.4	60.9	60.3	60.1	63.7	63.8	69.5	58.9	61.3	68
12	57.2	67.1	59.9	58.5	57.6	56.1	60	59.5	63.9	52.9	56.2	64.6
13	53.7	64.7	56.4	55.6	56.1	53	57.4	56.9	60	49.3	52.6	62
14	50.9	62.1	54.1	53.4	54.8	51.8	55	55.1	57.9	46.8	49.5	59.8
15	48.8	60.8	53	51.6	53.4	50.2	53.7	54.1	56.4	45.5	47.7	58.3
16	47.7	59.9	52.5	50.1	52.4	49.5	53.5	54.1	56	45.4	47	57.9
17	48.1	60.1	52.7	49.7	52	49.5	53.9	54.8	57.5	46.4	48.3	59
18	51.3	61.6	54.4	50.7	52.1	50.5	55.6	57.6	62.3	51.7	52.9	62.7
19	55.6	65.2	58.2	54	54.5	53.5	59.7	63.5	71.7	61	57.3	65.3
20	58.2	68.3	62.5	58.4	60.3	59.2	67.1	71.6	79.3	66.7	59.9	66.6
21	60.5	70.2	65.3	61.8	66.2	66.5	73.7	77.6	82.9	69.6	62.9	67.3
22	62.5	71.9	67.5	64.5	70	70.6	77.2	81	84.6	71.8	64.5	68.2
23	64.2	73.6	69.5	67.3	73.2	72.7	79.5	83.2	85.8	73.7	66.3	68.4
24	65.8	74.7	71.3	68.7	75.3	74.9	81.1	84.3	86.7	75.8	67.8	69.1

Table 33 Average Monthly Temperatures by Hour of the Day for St. Charles County in Fahrenheit

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	24.3	26.9	37.9	47.5	54.9	68.8	70.2	67.6	60.6	49.2	37.6	23.3
2	23.3	25.3	36.1	45.7	53.7	67.8	69	66.8	60.7	48.1	37.5	23.5
3	22.2	24.1	34.9	44.4	52.6	66.7	68.3	65.9	59.9	47.6	36.6	22.8
4	21.2	23.2	33.8	43.5	51.5	65.7	67.9	65.1	59.2	46.8	35.9	22
5	20.7	22.9	32.8	42.7	50.8	64.8	67.2	64.5	58.6	46	35	21.5
6	20.3	22.4	31.7	42.4	50.2	64.3	66.7	63.9	58.1	45.4	34.2	21.3
7	20.1	21.8	31.2	42.4	51.9	66.4	68	64.5	58	44.8	33.8	21
8	20.1	21.5	31.5	45	55.3	69.8	71	68	60.1	46.1	33.5	20.5
9	21.4	23.1	35.2	48.4	58.2	73	74.4	71.9	63.7	50.8	36.5	22.3
10	25.8	25.6	38.9	51.4	61.8	75.9	77.5	75.7	67.6	55.4	40.5	26
11	30.3	28.6	42.7	54.3	64.7	78.4	79.9	78.7	71.3	59.7	44.2	30.3
12	34.4	31.7	46.2	56.7	66.7	80.8	82.2	80.7	74.1	63.1	47.9	34.8
13	38	34.1	48.9	59.3	68	82.3	84.1	82.2	76.2	65	50.5	38.3
14	40.7	36.2	51	61.1	69.4	83.3	85.4	83.5	77.6	66.4	52.6	40.3
15	42	37.6	52.4	62.5	70.8	84	86.4	84.1	78.3	67.3	53.8	41.8
16	42	38.1	52.9	63.4	71.7	84.4	86.5	84.3	78.4	67.4	53.8	42.1
17	41.1	37.8	52.7	63.3	71.8	84.3	86	84	77.8	66.3	52.5	40.6
18	37.5	36.4	51.6	62.4	71	83.3	85	82.7	75.7	63.3	48.9	36.3
19	33.3	33.6	48.8	60.1	69.1	81.8	83	79.8	71	58.4	45.8	33.3
20	30.9	31.9	45.4	56.5	65.3	78.6	79.7	75.8	66.8	55.4	43.9	31
21	29	30.5	43.5	54	61.5	74.6	76	72.5	65	53.9	42.5	29.3
22	27.8	29.5	41.9	52.3	59.1	72.5	74	70.7	63.4	52.6	41.4	27.3
23	26.5	28.2	40.8	50.5	57.4	71.1	72.7	69.4	62.4	51.4	40	25.8
24	25.4	27.7	39	49.1	56	69.8	71.3	68.5	61.2	50.3	38.8	24.3

Table 34 Average Monthly Percent Relative Humidity by Hour of the Day for St. Charles County

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	67.5	75.8	71.7	70.5	76.6	77.3	83.3	85.5	87.9	76.1	68.8	69.8
2	68.2	77	72.1	72.8	76.5	78.9	84.1	86.4	88.2	77.8	70.2	71.3
3	69.6	77.5	73.5	74.4	77.9	80.5	84.9	86.9	88.8	78.9	71.6	72.5
4	70.7	78.1	74.9	75.3	79.3	82.1	85.2	88.1	89.4	79.5	72.4	73.4
5	71.6	78.1	76.4	75.8	79.8	82.9	86.4	88.4	90.1	81	73.8	74.9
6	71.9	78	77.5	76.3	81	84.1	86.7	89	90.4	81.9	75.3	75.6
7	71.6	78.7	78.2	77	79.9	81.9	85.2	88.1	90	83.1	76.2	76.5
8	71.6	78.3	78.2	73	75.5	76.3	80.2	84	88.8	82.6	76.4	76.2
9	70.5	76.7	74.7	67.9	71.4	70.6	73.8	76.5	83.8	76.8	73.9	75
10	66.2	73.8	69.8	63.9	64.7	65.5	68.2	69	76.3	67.9	68.3	72.2
11	61.3	70.1	63.8	60.2	59.8	60.5	63.5	62.9	69.2	59.8	62.4	68.5
12	56.4	66.7	58.8	57.5	57	55.9	59.5	58.5	63.9	53.4	56.9	65.4
13	52.5	64	55.1	54.7	55.9	53.1	56.6	55.9	59.8	49.9	53.2	62.7
14	49.9	61.3	53	52.7	54.3	51.7	54.4	54	57.3	47.6	49.8	61.2
15	48.1	59.5	51.6	50.9	52.7	50.1	53.1	52.9	56	46.3	47.8	59.6
16	47.1	58.9	51.4	49.5	51.7	49.2	52.9	53	55.6	46	47.1	59.2
17	47.3	59.5	51.8	49.1	50.8	49.2	53.8	53.9	57.1	47	48.6	60.2
18	50.9	61.1	53.5	50.3	50.7	50.3	55.5	56.4	61.6	52.2	53.3	64
19	55.7	65.2	57.5	53.3	53.1	53.2	60	62.4	71.9	61	57.6	66.6
20	58.6	68.1	62.3	58.2	59	59.3	66.8	71.2	80.5	66.9	60.4	67.7
21	61.1	70.6	64.9	61.5	65.4	66.9	74	77.6	83.5	69.3	62.2	67.8
22	62.6	72.3	67.1	63.7	70.2	71.1	77.4	81.3	85.6	71.1	63.9	68.1
23	64	73.7	68.6	66.6	72.9	73.5	79.2	83.3	86.1	72.9	65.5	68.5
24	65.6	74.9	70.7	68.2	75	76	81.1	84.7	87.6	74.7	67.3	69.3

Table 35 Average Monthly Temperatures by Hour of the Day for St. Louis County in Fahrenheit

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	25.5	28.1	39	48.2	56.2	70.2	71.8	68.8	62.4	50.7	38.8	24.4
2	24.5	26.6	37.3	46.2	55	69.1	70.6	68.1	62.5	49.8	38.6	24.6
3	23.6	25.2	36.1	45.1	53.8	68	69.9	67.2	61.6	49.1	37.8	23.9
4	22.7	24.5	35.1	44.3	52.8	67	69.6	66.5	60.9	48.4	37	23.2
5	21.9	23.9	34.2	43.6	52.1	66.1	68.9	65.9	60.4	47.6	36.3	22.5
6	21.4	23.4	33.1	43.3	51.6	65.6	68.4	65.3	59.9	47.1	35.6	22.5
7	21.2	23.1	32.6	43.3	53.2	67.7	69.7	65.8	59.8	46.6	35	22.5
8	21.2	22.7	32.9	45.7	56.5	70.9	72.5	69.4	61.9	47.9	34.9	22
9	22.5	24.1	36.4	48.9	59.4	73.9	75.7	72.8	65.2	52.2	37.8	23.9
10	26.6	26.7	39.8	51.8	62.5	76.8	78.5	76.6	68.7	56.7	41.5	27.2
11	30.8	29.5	43.3	54.6	65.2	79.3	81	79.5	72.2	60.7	45.1	31.1
12	34.9	32.5	46.7	56.8	67.1	81.6	83.1	81.4	74.8	63.9	48.4	35.1
13	38.2	35	49.4	59.3	68.4	83.1	84.8	83	76.8	65.8	50.9	38.7
14	41	37.1	51.3	61	69.4	84	86.2	84.1	78.3	67.2	52.8	40.8
15	42.5	38.5	52.7	62.4	70.8	84.8	87.2	84.8	79	67.9	54	42
16	42.5	39	53	63.2	71.6	85	87.3	84.9	79	68.1	54.1	42.5
17	41.6	38.6	53	63.1	71.9	84.9	86.8	84.6	78.4	67	52.8	40.8
18	38.1	37.2	51.7	62.4	70.9	84	85.9	83.2	76.3	64.2	49.5	37
19	34.2	34.6	49.1	60.1	69.3	82.5	83.9	80.5	72.3	59.9	46.6	34.4
20	31.8	32.9	46.3	56.8	65.6	79.5	80.7	76.8	68.5	57.1	44.8	32.3
21	30.1	31.6	44.4	54.4	62.5	76	77.4	73.9	66.6	55.5	43.4	30.6
22	29.2	30.8	42.6	52.8	60.2	73.9	75.8	72.1	65.2	54.1	42.2	28.4
23	27.9	29.5	41.7	51	58.4	72.4	74.4	70.8	64.1	52.9	41.1	27
24	26.8	28.8	40	49.6	57.2	71.2	73	69.8	63.1	51.7	39.9	25.3

Table 36 Average Monthly Percent Relative Humidity by Hour of the Day for St. Louis County

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	67.3	75.9	71.8	70	75.9	75.8	82.3	85	87.4	75.9	68.9	70.2
2	68.1	77.1	72.2	72.6	76	78.1	83.3	85.8	87.7	77.6	70.3	71.8
3	69.5	78.3	73.3	74.2	77.4	80	84.2	86.7	88.6	79.1	71.7	72.9
4	70.3	78.5	74.4	74.7	78.5	81.3	84.7	87	89.5	79.6	72.5	73.8
5	71.5	78.5	75.9	75.6	79.3	82.4	85.9	87.9	89.8	81.1	73.6	75.7
6	72	78.8	77.7	76.1	80.5	83.3	86.2	88.4	90.1	82	75.4	76.4
7	71.7	79.1	78	76.4	79.4	81.1	84.7	88.2	90.1	82.9	76.3	76.7
8	71.4	78.4	78.6	72.5	75	75.6	79.8	83.2	88.6	82.4	76.6	76.6
9	70.3	77.2	74.8	67.9	71	70	73.4	76.3	83.3	76.7	74.1	75.2
10	66	74.2	69.9	63.7	65	64.7	67.9	68.6	76.2	67.6	68.2	72.7
11	61.4	70.5	64.6	60.2	60	60	63.2	62.8	69.1	59.4	62.3	68.9
12	56.7	67.1	59.6	57.8	57.5	55.2	59.2	58.4	63.5	53.1	57.5	66
13	52.8	64.6	56	54.9	56.4	52.3	56.3	55.8	59.6	49.5	53.4	63.2
14	49.8	62	53.9	53.1	55.1	51.3	54.2	53.9	57	47.2	50.4	61.2
15	47.8	59.9	52.4	51.3	53.5	49.5	52.5	52.9	55.5	45.9	48.4	59.9
16	46.8	59	52.7	49.9	52.7	48.6	52.5	52.9	55.3	45.5	47.5	59.2
17	47.2	59.7	52.9	49.6	51.4	48.6	53.2	53.9	56.8	46.6	48.8	60.5
18	50.6	61.2	54.8	50.5	51.4	49.7	54.7	56.4	61.5	51.4	53.2	64.1
19	55.1	65.1	58.5	54	53.5	52.4	58.9	62	70.6	59.1	57.2	66.5
20	58.2	68.2	62.5	58.2	59	57.9	65.8	69.8	78.6	65.1	60	67.9
21	60.2	70.4	65.3	61.4	64.5	64.3	72.3	76.1	82.2	68.2	62.1	68.3
22	61.9	72.1	67.7	63.6	69.2	69	75.5	80	84.2	70.4	64	68.6
23	63.7	73.8	69.3	66.6	72.5	71.6	77.7	82.2	85.3	72.5	65.7	69
24	65.2	75	71.1	68.3	74.6	74.3	80.1	83.9	86.5	74.6	67.4	69.7

Table 37 Average Monthly Temperatures by Hour of the Day for St. Louis City in Fahrenheit

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	25.9	28.9	40.2	48.1	56	70.1	72.4	69.2	62.7	51.5	39.4	25.9
2	25	27.5	38.4	46.2	54.9	69.1	71.2	68.5	62.9	50.7	39.2	25.9
3	24	26.3	37.4	45.3	53.8	68	70.6	67.7	62.2	49.9	38.3	25
4	22.9	25.4	36.3	44.3	52.9	67	70.1	67	61.5	49.4	37.8	24.6
5	22.4	24.9	35.6	43.7	52.2	66.2	69.6	66.3	61	48.6	37.1	23.9
6	21.7	24.4	34.5	43.4	51.8	65.6	69.1	65.9	60.6	47.9	36.4	23.9
7	21.5	23.8	33.9	43.7	53.6	67.9	70.6	66.5	60.5	47.5	35.8	23.9
8	21.3	23.5	34.2	46	57	71.2	73.5	70.2	62.6	48.8	35.8	23.2
9	22.8	24.9	37.7	49.2	59.8	74.4	76.5	73.7	66	53.3	38.7	25.2
10	27	27.5	41	52.1	62.9	77.4	79.2	77.5	69.5	57.8	42.5	28.4
11	31	30.3	44.3	54.8	65.6	79.9	81.6	80.3	72.9	61.8	45.9	32
12	35	33	47.4	57	67.7	82.1	83.6	82.3	75.4	64.8	49.3	35.9
13	38.1	35.5	50.1	59.3	68.7	83.8	85.2	83.7	77.3	66.8	51.7	39.3
14	41.1	37.4	51.8	61	69.7	84.5	86.7	84.9	78.7	68.1	53.5	41.5
15	42.7	38.8	53.3	62.4	71.1	85.3	87.6	85.5	79.4	68.8	54.6	42.9
16	42.5	39.3	53.6	63.2	71.7	85.4	87.8	85.5	79.5	68.8	54.6	42.9
17	41.6	39.1	53.4	62.9	72	85.4	87.5	85.3	78.7	67.9	53.3	41.5
18	38.1	37.7	52.2	62.1	71.2	84.4	86.4	83.8	76.8	65.1	50	37.7
19	34.3	35.1	49.5	60.1	69.4	82.9	84.5	81.2	72.5	60.7	47.2	35
20	32.1	33.4	47	56.7	65.8	79.8	81.4	77.2	68.5	57.8	45.2	33.4
21	30.4	32.2	45	54.5	62.5	76	77.9	74.3	66.8	56.2	43.8	31.6
22	29.5	31.3	43.5	52.8	60.2	73.6	76.2	72.3	65.5	54.9	42.7	29.8
23	28.3	30.1	42.6	51	58.3	72.2	74.8	71.2	64.3	53.6	41.6	28.4
24	27.2	29.6	41.1	49.5	57.1	71	73.6	70.3	63.4	52.4	40.6	26.8

Table 38 Average Monthly Percent Relative Humidity by Hour of the Day for St. Louis City

	MonthID											
HourID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	68	76.6	72.6	71.4	77	76.6	83.4	85.9	87.7	76.9	69.3	69.8
2	69	78.1	73.2	73.8	76.9	78.7	84.2	86.5	87.7	78	71	71.3
3	69.8	79	74	74.8	78	80.8	85.4	87	88	79.7	72.1	72.7
4	70.9	79	75.2	75.9	79.1	81.9	85.6	87.6	88.9	80.3	72.3	73.6
5	72.1	78.9	76.3	76.5	79.9	82.7	86.5	88.5	89.5	81.5	73.4	75.2
6	72.4	79.2	78.4	77.4	80.5	83.9	86.8	88.5	89.8	82.7	75.2	75.8
7	72.7	79.5	79	77.1	79.4	81.7	85.1	88.2	89.5	83.3	76.3	76.2
8	72.3	79.1	79.4	73.4	75.1	75.9	80.1	83.3	88.3	83.1	76.3	76.4
9	70.9	77.9	75.6	68.3	71	70	74	76.4	83	77	73.6	75
10	66.7	74.9	70.6	64.2	64.8	64.5	68.4	68.9	75.7	67.4	68	72.5
11	61.9	71.5	65.5	60.7	60.1	59.6	63.7	63.1	68.9	59.1	62.4	69
12	57.4	68.3	60.7	58.5	57.1	55.3	59.7	58.7	63.6	52.8	57.2	66.1
13	53.7	65.5	57	55.7	56.4	52	57.1	56.3	59.7	48.9	53.8	63.1
14	50.6	63.3	55.1	53.7	55.1	51.2	54.6	54.2	57	46.4	50.7	61.1
15	48.4	61.4	53.4	51.7	53.7	49.5	53.1	53.5	55.5	45.5	48.5	59.5
16	47.8	60.3	53.4	50.4	52.9	48.9	52.7	53.5	55.1	45.3	47.8	59.1
17	48	60.7	53.8	50.2	51.8	48.9	53.4	54.2	56.8	46.4	48.9	60.1
18	51.2	62.1	55.8	51.4	51.4	49.9	55.2	57.1	61.6	51.3	53.3	63.6
19	55.9	66	59.7	54.8	53.9	52.4	59.2	62.6	71.1	59.4	57.3	66.2
20	58.7	69.2	63.6	59.6	59.7	58.2	66.3	71.1	79.7	65.7	60.6	67.5
21	60.8	71.1	66.4	62.1	65.5	65	73.6	77.5	83.4	68.8	62.6	68.4
22	62.5	73.1	68.7	64.8	70	70.2	76.8	81.4	84.8	71	64.5	68.7
23	64.3	74.8	70.2	67.7	73.6	72.8	79.1	83.1	86.2	73.1	66.3	68.9
24	66.1	75.7	71.8	69.4	75.7	75.3	81	84.8	87.1	75.5	67.8	69.6

3.3.2.4 On-road Source Emissions Summary

The MOVES model runs were set up selecting all available gasoline and diesel fuel vehicle type combinations, all months, days, hours, and all road types. A separate run was set-up for each pollutant. The emissions were post-aggregated to the year level using MOVES.

Table 39 summarizes the 2008 annual on-road emissions by county as calculated using MOVES for the Missouri counties located in the St. Louis Nonattainment area.

Table 39 STLNA On-road Mobile Emissions Summary by county (tons per year)

County Name	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Franklin County	77.75	4,187.90	142.46	30.12	1,555.66
Jefferson County	90.68	5,313.80	183.94	36.32	2,522.89
St. Charles County	133.29	7,788.01	284.16	54.30	3,613.71
St. Louis County	585.26	32,363.41	1,215.47	237.05	12,865.54
St. Louis City	169.20	9,166.46	353.26	68.87	3,236.00
Totals	**1,056.17**	**58,819.58**	**2,179.28**	**426.65**	**23,793.80**

3.4 Biogenic Emissions

The biogenic emissions for the Missouri portion of the St. Louis PM2.5 nonattainment area are listed below in Table 39. These emissions were developed by EPA for the purposes of developing the 2008 National Emissions Inventory. The State of Missouri did not make any changes to the figures developed by EPA for this category.

Table 40 2008 Biogenic Emissions for the Missouri Side of the Nonattainment Area

County	NO_X Emissions (tons/year)	VOC Emissions (tons/year)
Franklin	265.2	15,127.2
Jefferson	124.2	12,624.7
St. Charles	257.4	7,715.3
St. Louis County	159.6	7,137.8
St. Louis City	31.2	1,296.7
Totals	**837.6**	**43,901.7**

4.0. Quality Assurance/Quality Control

4.1 Point Source QA/QC and Results

Prioritization

The EI Unit prioritizes review of those facilities that have the largest bulk emissions, specifically facilities with a Part 70 or Intermediate operating permit. While every data element collected helps to characterize the emission estimate, in evaluating the data, those fields most directly tied to the emissions calculation are given the highest priority. The MoEIS database system itself was quality assured to provide smooth data transfer from the state inventory to the NEI.

Methods

The EI Unit's general QA procedures utilize any and all of the techniques outlined in the EPA's Emission Inventory Improvement Program (EIIP) Technical Report Series Volume 6: Quality Assurance Procedures. The unit groups these techniques into two basic categories: Phase I, or Bottom-Up QA procedures, and Phase II, or Top-Down QA procedures. Top-Down Procedures analyze groups of emissions data that share a common trait and look for outliers, in keeping with the 'Reality Check' technique. Bottom-Up Procedures evaluate individual EIQs that are believed to be erroneous, whether due to a top-down analysis, errors found when entering the EIQ into the database, or inconsistencies brought to the attention of the EI Unit by a third party. These bottom-up procedures utilize the 'Peer Review', the 'Sample Calculations', or the 'Independent Audit' techniques. Note that any of these techniques could be found in either category; they have simply been mentioned in reference to the category in which they are most often found.

Quality checks are completed using computerized checks in the MoEIS automated system, exploiting its utility in ensuring that the necessary data is reported, and in providing an acceptable numeric range for certain fields. It streamlines the process of ensuring that all data fields required for the EPA's EIS system are present, are compatible with, and meet the needs of the EPA system. For example, emission release point records that were missing fields were corrected with the input of emission modelers and facility staff. Outdated Source Classification Codes (SCC), units of measure, and control device codes were removed, and required data fields for stack emission release points were added.

Phase I reviews address individual EIQs to reconcile discrepancies with emission data. Phase I reviews are generally done only on hardcopy submitted EIQs, but may also be done based on priority. Examples of EIQ issues that were encountered include throughputs and emission factors with inconsistent units of measure, emission unit identifiers that are different from previous EIQs, and MoEIS-calculated emissions that differ from the emissions on the hardcopy forms. Technical staff conducting these reviews worked with the companies to make corrections to their EIQs and place written

documentation of all changes in the hardcopy EIQ files stored in the fileroom. In addition, all changes made to EIQs are tracked in an electronic log file.

Phase II reviews take a top-down look at the emissions data. This phase involves running Access queries to identify potential issues to investigate further. The Phase II QA queries included ensuring condensable particulate emissions were reported, ensuring correct application of sulfur/ash content in emission factors, and reviewing emission trends by facility and industry type to identify any anomalies. In addition, point source data from other databases incorporated by the EPA into the EIS, such as the Toxics Release Inventory (TRI) and the Clean Air Markets Division (CAMD), will be reviewed and compared to MoEIS data. Prioritization of the largest sources, largest changes, and largest anomalies is a top consideration, as is realizing a meaningful emission difference within a reasonable amount of time. Any changes made to EIQs during the Phase II QA process will be done with input from the companies, and written documentation of all changes will be placed in the EIQ files stored in the fileroom and in electronic files.

Results

CAMD Data Comparison: Several emission units in Missouri are subject the Acid Rain Program or the NO_x Budget Trading Program, and these units report SO_x and NO_x emissions directly to EPA's Clean Air Markets Division (CAMD). These units were reviewed to ensure the same emission quantities were reported to EPA and to the APCP in their annual emissions report. Over 70% of all EIQ-reported SO_x and NO_x emissions were quality assured with the help of the CAMD database. Since the naming of the units between the two databases is not always identical, and not all units reported to the APCP are required to report to CAMD in either individual or grouped format, some manual analysis was done to compare emissions reported to the two databases.

The largest difference noted between the two databases was an underreporting of almost 270 tons to MoEIS compared to CAMD. Contact with the facility showed that the cause was a transcription error, and the MoEIS data was corrected. Due to prioritization, the six other facilities that showed reporting differences were not addressed, and their total difference was not more than the single NO_x correction that was completed.

Condensable PM Reporting: Missouri facilities were not required to report condensable emissions prior to emission year 2008, but they were reminded to report condensable starting with emission year 2008 in email or postcard form and in the EIQ packet. The inclusion of condensable PM data in the 2008 emission reporting year is important because it is an EPA triennial inventory year where data will be extensively quality assured for use in detailed air quality analyses and planning. Missouri is required to report condensable PM emissions in 2009 by EPA's Air Emissions Reporting Rule (AERR), 40 CFR Part 51.15, and data collection systems for separate condensable and filterable PM reporting in 2009 are in place. Quality assurance of the 2008 emissions data began with Part 70 and Intermediate operating permit holders who use Source Classification Codes (SCCs) that have condensable emission factors in the webFIRE emission factor database.

Identifying facilities: There are many fuel combustion processes that produce condensable emissions. For the vast majority of fuel combustion processes, the condensable emissions are accounted for in the total PM_{10} and $PM_{2.5}$ emission factors already in use. This is especially true for natural gas, diesel, and fuel oil combustion sources. Coal combustion sources, on the other hand, required additional analysis to determine if condensable emissions were included in the report. Six facilities correctly included condensable in their initial emission report and were contacted to verify those emissions. Seven facilities were identified that may not have included condensable emissions, but the omission did not amount to over 10 ton underreporting. Seventeen facilities that did not report condensable emissions were the highest priority and were contacted from August to October 2009 to correct their emission reports.

Emission Results: Condensable PM emissions added to those seventeen facilities account for over 3,700 tons of PM_{10} emissions statewide.

Point Source QA - Condensable Additions

	Initial Inventory	Condensable Addition	17 Facility Total PM_{10} Inventory
17 facilities	3,049 tons PM_{10}	3,746 Tons PM_{10}	6,795 Tons PM_{10}

Ash/Sulfur Changes: The method of calculating emissions in MoEIS was changed from 2007 to the 2008 emission year. The previous equation used the throughput, emission factor, ash or sulfur content, and control efficiency to calculate emissions. The ash or sulfur term was added to the equation to assist facilities whose emission factor is an equation from AP-42 in the form [EF * A/S]. While the calculation method worked well for a limited number of facilities, it became a source of confusion for the larger group, and misinterpretation of the emission factor term by Air Program users necessitated a change to the calculation to remove the ash or sulfur term from the calculation. Communication of the change to facilities was done via the EIQ mailout and notations in the MoEIS online system. A review of submitted EIQs to ensure all affected facilities had accounted for the new calculation method showed only one facility that did not adjust the emission factor to account for the change. They were contacted to make the correction and it resulted in an over 4,000 ton increase in SO_x emissions compared to their initial report.

Interannual Variability- Facilities that reported over 20 tons of chargeable emissions were examined to find sources with large interannual variability. A list of 20 facilities was generated where plantwide chargeable emissions changed by more than 20%, and each of these facilities were contacted to verify the source of the increase or decrease. Four facilities reported an emission change due to emission factor or control device changes, and the other 16 facilities reported throughput changes were the cause of the emission differences. Since the cause of the emission variability has been documented, there is no cause for changes to the emissions report for these twenty facilities.

Local Agency QA – Four facilities in St. Louis City were selected for a detailed audit based on their level of emissions and variation from past year reporting. At the four facilities, over 20 emission units were audited to confirm throughput, appropriate emission factor use, appropriate control efficiency application, permitted equipment limits, and number of pollutants. Six emission units were found to be incorrectly reported in the 2008 emission report, with one facility having overreported almost 10 tons of PM_{10}, and another underreported 40 tons facility-wide. Phase 1 quality assurance steps were used on 14 facilities in Springfield, 7 facilities in St. Louis County, and twenty facilities in Kansas City. Throughputs, emission factors, incorrect calculations, and HAP reporting were reviewed for these sites.

Stack Parameters – In preparation for point source data submission to the NEI, the required data elements for stack emission release points were queried to ensure the data submittal could occur without errors. Of the over 2,600 stack release points associated with point source emission reports that are submitted to the 2008 NEI, almost 50% required quality assurance before they could be submitted. Three main quality assurance steps were taken to correct the stack data: missing data elements were filled in as possible, data elements that were out of range were quality assured, and previously submitted NEI data elements were compared to current Missouri emission report data to identify discrepancies. Filling in missing data elements took the most time because it required review of modeling files, contact with local agency staff, or contact with the facility. Out of range data elements were a much smaller portion of the quality assurance, but these were also corrected via modeling files and contact with the facility. Discrepancies between the EIS and 2008 Missouri EIQ data were reconciled by accepting the Missouri data instead of EIS data.

4.2 Nonpoint Source QA/QC

EI Unit staff has documented the following information for each nonpoint source category: source of data for activity, emission factors, allocation methodologies, nonpoint source SCCs covered, pollutants covered, and point source subtraction in Table . Much of the documentation for EPA categories appears at the NEI website: http://www.epa.gov/ttn/chief/net/2008inventory.html

Emission inventory staff participated in the ERTAC workgroup that developed many of the updated emission factors and methodologies used for 2008 emission estimates, and the resulting emission factors were checked against those used in EPA templates for accuracy. All nonpoint source categories in the 2008 NEI will be reviewed, including those for which EPA is developing emissions estimates. The emission estimates were compared to the 2005 NEI to identify outlying or missing categories.

Quality checks of the EPA excel worksheets showed that three worksheets had incorrect emission factors when compared to the ERTAC summary emission factor page, and these were corrected before emissions were submitted. Several categories had spreadsheet templates that omitted HAP calculations, and these were amended prior to completing the

categories. Spot checks were also done on the calculation pages to ensure formulas were followed, and no problems were found.

Quality assurance of the data included checks against 2002 NEI data submissions, and completeness checks for the number of counties, number of pollutants, order of magnitude, and correct units of measure. The priority data checks showed no errors, but there are a few source categories included in the 2002 NEI that were not included in the 2008 NEI due to time constraints (see section 3.2).

There are also a few categories that show large differences (>50%) between the 2002 NEI and the 2008 NEI, and virtually all are due to changes in emission factors, activity data, controls, covered categories, or calculation methods. The largest differences between the 2002 and 2008 NEI come in the graphic arts, degreasing, industrial surface coating, miscellaneous non-industrial solvents, and gas stations. The methods and source data for the graphic arts category have changed significantly between 2002 and 2008, and the source of activity data for 2002 did not cover all categories because of restricted release census bureau data. The emission factor for degreasing decreased by 50% from 2002 to 2008 after EPA and ERTAC reviewed the data. The industrial surface coating category was assumed zero in 2002 but is non-zero in 2008. The miscellaneous non-industrial category did not have emissions for portable residential and commercial gas cans in 2002, but that category is included in 2008. Gas stations show a decrease in emissions from 2002 to 2008 that can be attributed to additional controls in the interim years. None of the large differences between 2002 and 2008 can be attributed to errors in the 2008 inventory that need correction.

4.3 Mobile Source QA/QC

4.3.1 Nonroad Source QA/QC

Per Appendix E-2, quality control and quality assurance were conducted throughout the nonroad modeling process. Data collected from various data sources were verified and correctly entered or transcribed into the model. In some instances, input values, i.e., temperatures and fuel values were double and/or triple checked for accuracy to insure they corresponded to Missouri DNR data. In addition, a spot-checking of the modeling results, including rerunning the model for those results in question, was performed to ensure reliability.

4.3.2 Onroad Source QA/QC

The data used for the modeling was originally collected for creating the 2008 NEI. Missouri DNR has conducted extensive quality assurance on the model inputs and the inputs have been reviewed by EPA. The inputs were converted to MOVES formatting using EPA conversion tools. The MOVES converted data was double and/or triple checked to ensure accuracy. In addition, a spot-checking of the modeling results, including rerunning the model for those results in question, was performed to ensure reliability.

Appendix E-1

List of Missouri Statewide Point Source Emissions by Facility

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Facility Site Name	State And County FIPS Code	Facility Site Identifier	NAICS Code	NAICS Description	NH_3	NO_X	$PM_{2.5}$-PRI	SO_2	VOC
3M Company-Nevada - Commercial Graphics	29217	0004	326121	Unlaminated Plastics Profile Shape Manufacturing		24.50		0.15	226.23
3M Company-Springfield ITSD/TMD	29077	0051	32552	Adhesive Manufacturing	0.23	7.14	0.54	0.04	29.50
A B Chance Co-Allen Street Complex	29019	0039	335313	Switchgear and Switchboard Apparatus Manufacturing		6.79	0.46	0.05	19.30
A C Riley Cotton Company-New Madrid Gin	29143	0046	115111	Cotton Ginning					
A P Green Industries Inc-Fulton Plant	29027	0010	327124	Clay Refractory Manufacturing		9.27	17.83	20.47	0.63
Aarons Automotive Products Inc-Westgate Ave Facility	29077	0010	336211	Motor Vehicle Body Manufacturing		7.05		0.59	32.93
ABB Inc-Jefferson City Plant	29027	0019	335311	Power, Distribution, and Specialty Transformer Manufacturing		6.20		0.04	61.96
Able Manufacturing & Assembly L L C - Schifferdecker	29097	0089	336211	Motor Vehicle Body Manufacturing					58.85
Able Manufacturing Corporation-7th Street	29097	0095	326121	Unlaminated Plastics Profile Shape Manufacturing					123.82
ADM Gromark River Systems-St Louis	29510	0031	311211	Flour Milling		0.00	0.90	-	-
ADM Milling Company-Carthage Flour Mill	29097	0011	311211	Flour Milling	0.00	0.08	0.01	0.00	0.00
ADM/TPC Milling Co-Pillsbury Company	29510	0159	311211	Flour Milling	-	-	15.60	-	6.96
Aero Metal Finishing-Aero Metal Finishing	29099	0114	332813	Electroplating, Plating, Polishing, Anodizing, and Coloring		2.16		0.30	3.10
Aero Transportation Products Inc-Independence Plant	29095	0191	336211	Motor Vehicle Body Manufacturing					98.58
Aerofil Technology Inc-Aerofil Technology Inc	29071	0151	311942	Spice and Extract Manufacturing		1.95	2.77	0.01	50.17

Ag Processing Inc-St Joseph - Lower Lake Road	29021	0060	311222	Soybean Processing		1.83	19.18	0.01	494.30
AG PROCESSING-ST. JOSEPH BIODIESEL	29021	0118	325199	All Other Basic Organic Chemical Manufacturing					4.50
Agriservices Of Brunswick Llc-Brunswick West	29033	0013	42451	Grain and Field Bean Merchant Wholesalers	-	-	0.99	-	-
Albaugh Inc-Albaugh Inc	29021	0037	32532	Pesticide and Other Agricultural Chemical Manufacturing					34.11
Alcan Cable-Div Of Alcan Products Corporation	29159	0022	331319	Other Aluminum Rolling and Drawing	0.09	2.69	0.20	0.02	5.76
Alliant Llc-Lake City Army Ammunition Plant	29095	0046	332992	Small Arms Ammunition Manufacturing	1.24	49.94	2.89	1.50	115.50
Allied Health Care Products-Allied Health Care Products	29510	1460	332919	Other Metal Valve and Pipe Fitting Manufacturing		-	-	-	3.63
Allied Waste Industries Sanitary Landfil-Kansas City Landfill	29095	2101	562212	Solid Waste Landfill		3.56	1.51	1.25	2.30
Altec Industries Inc-Altec Industries Inc	29021	0078	33312	Construction Machinery Manufacturing	0.07	2.33	0.31	0.03	5.42
Alumax Foils Inc-Alcoa Foil Products/Alumax Foils Inc	29510	0118	322225	Laminated Aluminum Foil Manufacturing for Flexible Packaging Uses	0.01	22.94	46.99	0.68	488.67
Ameren Energy Generating Company-Columbia Energy Center	29019	0105	221112	Fossil Fuel Electric Power Generation		0.13		0.01	0.11
Amerenue-Callaway Nuclear Power Plant	29027	0026	221113	Nuclear Electric Power Generation		18.99		5.51	0.69
Amerenue-Fairgrounds Combustion Turbine	29051	0049	221112	Fossil Fuel Electric Power Generation		3.64		5.27	0.09
Amerenue-Kirksville Combustion Turbine	29001	0006	221112	Fossil Fuel Electric Power Generation		0.19		0.00	0.01
Amerenue-Labadie Plant	29071	0003	221112	Fossil Fuel Electric Power Generation	2.82	9,170.39	1,446.08	57,944.63	299.61
Amerenue-Meramec Plant	29189	0010	221112	Fossil Fuel Electric Power Generation	1.30	5,331.86	461.34	20,826.77	109.35
Amerenue-Mexico	29007	0012	221112	Fossil Fuel Electric Power		1.63		2.36	0.04

Combustion Turbine				Generation					
Amerenue-Moberly Combustion Turbine	29175	0010	221112	Fossil Fuel Electric Power Generation		1.87		2.70	0.05
Amerenue-Moreau Combustion Turbine	29051	0008	221112	Fossil Fuel Electric Power Generation		1.85		2.67	0.05
Amerenue-Peno Creek Energy Center	29163	0047	221112	Fossil Fuel Electric Power Generation		35.74		0.31	3.64
Amerenue-Rush Island Plant	29099	0016	221112	Fossil Fuel Electric Power Generation	1.51	4,195.26	662.52	29,592.97	159.93
Amerenue-Sioux Plant	29183	0001	221112	Fossil Fuel Electric Power Generation	0.86	7,336.12	308.71	48,147.62	168.11
American Airlines-Mci Maintenance And Engineering Base	29165	0005	336411	Aircraft Manufacturing		-	-	-	12.77
Ames True Temper Inc-Bernie North Plant	29207	0007	321999	All Other Miscellaneous Wood Product Manufacturing		0.76	2.07	0.04	0.71
Anheuser-Busch Inc-St Louis	29510	0003	312120	Breweries	24.25	668.29	24.38	5,431.34	250.30
Anr Pipeline Company-Maitland Compressor Station	29147	0024	486210	Pipeline Transportation of Natural Gas		989.77	19.16	0.24	39.99
Aqualon Div Of Hercules Inc-Missouri Chemical Works	29163	0002	32511	Petrochemical Manufacturing	15.58	912.16	19.69	5,586.16	115.70
Aquila Inc-Greenwood Energy Center	29095	0139	221112	Fossil Fuel Electric Power Generation		47.23	0.87	2.14	0.36
Aquila Inc-Lake Road Plant	29021	0004	221112	Fossil Fuel Electric Power Generation		3,193.59	12.09	3,671.51	28.35
Aquila Inc-Nevada Gas Turbine	29217	0034	221112	Fossil Fuel Electric Power Generation		1.68	0.01	0.01	0.00
Aquila Inc-Ralph Green Generating Plant	29037	0003	221112	Fossil Fuel Electric Power Generation		4.89	0.08	0.01	0.04
Aquila Inc-Sibley Generating Station	29095	0031	221112	Fossil Fuel Electric Power Generation		7,726.32	8.78	9,181.02	81.54
Archer Daniels Midland Co-ADM Milling Co	29047	0009	311211	Flour Milling	0.02	0.70	1.27	0.00	0.04
Archer Daniels Midland Co-	29007	0002	311222	Soybean Processing		23.56	22.12	0.14	164.64

Mexico Plant									
ARCHITECTURAL SYSTEMS INC-MONETT	29009	0062	332321	Metal Window and Door Manufacturing		13.67			22.91
Aries Power Plant-Pleasant Hill	29037	0056	221112	Fossil Fuel Electric Power Generation	22.80	59.27	17.27	2.91	3.30
Ashland Distribution Company-St Louis Plant	29510	1423	311942	Spice and Extract Manufacturing					8.44
Associated Electric Cooperative Inc-New Madrid Power Plant	29143	0004	221112	Fossil Fuel Electric Power Generation	5.63	11,794.89	346.33	14,986.52	242.47
Associated Electric Cooperative Inc-St Francis Power Plant	29069	0066	221112	Fossil Fuel Electric Power Generation	23.56	47.67	0.26	1.63	5.37
Associated Electric Cooperative Inc-Thomas Hill Energy Center-Power Division	29175	0001	221112	Fossil Fuel Electric Power Generation	1.59	12,117.61	438.74	15,099.61	169.42
Associated Electric Cooperative Inc-Unionville Power Station	29171	0015	221112	Fossil Fuel Electric Power Generation		1.50	0.02	0.26	0.20
Astaris Llc-Carondelet Plant	29510	0070	211112	Natural Gas Liquid Extraction	0.55	8.36	1.31	0.33	1.31
Audrain Generating Station	29007	0053	221112	Fossil Fuel Electric Power Generation		18.15		0.12	0.37
AYERS OIL CO-CANTON	29111	0019	424710	Petroleum Bulk Stations and Terminals					44.80
Ball Metal Beverage Container Co -Kansas City	29095	0175	332431	Metal Can Manufacturing		8.00		0.05	52.91
Banta Publications-Kansas City	29047	0122	336211	Motor Vehicle Body Manufacturing		1.79		0.01	25.44
Baptist Medical Center-Baptist Medical Center	29095	2087	62211	General Medical and Surgical Hospitals	0.01	3.52	0.19	0.02	0.08
Barber & Sons Aggregates-Barber & Sons Aggregates	29095	0076	212312	Crushed and Broken Limestone Mining and Quarrying		18.94	2.92	0.44	0.46
Bartlett Grain Company Lp-St Joseph	29021	0056	42451	Grain and Field Bean Merchant Wholesalers			0.97		
Bartlett Grain Company Lp-	29107	0050	42451	Grain and Field Bean		0.02	1.10	0.00	0.00

Waverly				Merchant Wholesalers					
Bartlett Grain Company-Birmingham	29047	0025	42451	Grain and Field Bean Merchant Wholesalers			0.25		
Base Rock Minerals Inc-Bonne Terre Plant	29187	0072	212312	Crushed and Broken Limestone Mining and Quarrying		6.11	3.48	2.57	1.21
BASF Agri Chemicals-Hannibal Plant	29127	0001	32532	Pesticide and Other Agricultural Chemical Manufacturing	0.12	553.83	142.19	2,437.52	30.85
Bayer Cropscience-Kansas City	29095	0011	32532	Pesticide and Other Agricultural Chemical Manufacturing	0.85	47.64	2.01	0.35	28.92
Bcp Ingredients-Verona Plant	29109	0004	325411	Medicinal and Botanical Manufacturing		6.39		0.03	47.45
Belt Service Corp-Earth City	29189	1012	326220	Rubber and Plastics Hoses and Belting Manufacturing	0.02	0.56	0.01	0.00	42.47
BFI Missouri Pass Landfill-Maryland Heights	29189	0281	562212	Solid Waste Landfill		9.17	0.65	2.92	5.25
BFI Waste Systems Of North America Inc-Lamar Landfill & Prairie View Reg Waste	29011	0039	562212	Solid Waste Landfill		6.69	3.99	2.34	4.36
Biltbest Windows Corp-Ste Genevieve	29186	0003	321911	Wood Window and Door Manufacturing	0.05	0.58	0.47	0.00	9.63
Biokyowa Inc-Nash Road Site	29031	0064	325411	Medicinal and Botanical Manufacturing	4.96	11.11	1.79	1.96	11.13
Bjc Health System-Pavillion	29510	0204	62211	General Medical and Surgical Hospitals		6.56		0.40	0.32
Black Oak Recycling & Disposal Facility-Div Waste Corporation Of America	29229	0022	562212	Solid Waste Landfill		1.89	2.06	0.66	15.05
Blue River Treatment Plant-Blue River Treatment Plant	29095	0039	562211	Hazardous Waste Treatment and Disposal	0.01	16.45	1.36	0.55	3.28
Blue Valley Station	29095	0050	221112	Fossil Fuel Electric Power Generation	0.19	1,213.61	577.49	10,658.32	7.00
Bootheel Cotton Company Inc-Matthews	29143	0047	115111	Cotton Ginning		-	0.17	-	-
Bp Products North America	29095	0002	32411	Petroleum Refineries		0.43			28.84

Inc-Sugar Creek Terminal									
Brenntag Mid-South Inc-Brenntag Mid-South Inc	29510	1093	42392	Toy and Hobby Goods and Supplies Merchant Wholesalers		0.00		-	0.22
Bridgeton Landfill Authority-Bridgeton	29189	0312	562212	Solid Waste Landfill		13.03	5.54	4.56	8.42
Briggs & Stratton Corp-Poplar Bluff	29023	0038	333618	Other Engine Equipment Manufacturing	0.04	7.59	0.38	0.35	68.40
Bristol Manufacturing Corp-Bristol Manufacturing Corp	29077	0008	311513	Cheese Manufacturing	0.03	2.03	0.08	0.01	30.83
Bruce Hardwood Floors-Bruce Hardwood Floors	29091	0046	321113	Sawmills		3.92		1.90	58.44
Buckhorn Rubber Products Inc-Buckhorn Rubber Company Inc	29173	0037	32622	Rubber and Plastics Hoses and Belting Manufacturing	-	-	9.46	-	8.69
Buckman Laboratories Inc-Cadet	29221	0018	311942	Spice and Extract Manufacturing	0.09	2.92	0.22	0.02	0.37
Bull Moose Tube Company-Bull Moose Tube Company	29071	0087	33121	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel		0.55	0.06	0.00	18.70
Bunge North America Inc-Caruthersville Plant	29155	0063	42451	Grain and Field Bean Merchant Wholesalers	-	-	0.49	-	-
Bunge North America Inc-Linda Elevator	29143	0062	42451	Grain and Field Bean Merchant Wholesalers	0.00	0.12	1.39	0.26	0.00
Bunge North America Inc-Louisiana Plant	29163	0025	49313	Farm Product Warehousing and Storage	0.00	0.13	0.54	0.00	0.01
Bussen Quarries Inc-Antire Quarry	29099	0103	212312	Crushed and Broken Limestone Mining and Quarrying			0.09		-
Bussen Quarries Inc-Bussen Road	29189	0275	212312	Crushed and Broken Limestone Mining and Quarrying			0.51		
Butler County Sanitary Landfill-Allied Waste Industries	29023	0058	562212	Solid Waste Landfill		2.69	1.58	0.94	1.73
Butler Municipal Power Plant-Butler	29013	0029	221112	Fossil Fuel Electric Power Generation		1.07	0.01	0.31	0.01
Camie-Campbell Inc-	29189	0327	325520	Adhesive Manufacturing					5.13

Watson Industrial Park									
Campbell Earl Mfg Co-Campbell Earl Mfg Co	29047	0079	32551	Paint and Coating Manufacturing					0.48
Campbell Municipal Power Plant	29069	0064	221112	Fossil Fuel Electric Power Generation	0.01	0.74	0.01	0.01	0.02
Canam Steel Corp-Canam Steel Corp	29071	0014	332312	Fabricated Structural Metal Manufacturing		2.54		0.03	57.77
Cardwell Cooperative Inc-Cardwell Cooperative Inc	29069	0029	115111	Cotton Ginning					0.00
Cargill Inc-Chouteau Elevator	29047	0027	42451	Grain and Field Bean Merchant Wholesalers		0.06		0.00	0.00
Cargill Inc-Kansas City	29095	2001	311222	Soybean Processing	0.07	2.16	26.82	0.01	296.66
Cargill Inc-New Madrid	29143	0027	325314	Fertilizer (Mixing Only) Manufacturing			0.51		
Carlisle Power Transmission Products Inc-Springfield	29077	0004	326220	Rubber and Plastics Hoses and Belting Manufacturing	0.52	30.31	4.46	79.89	110.72
Carondelet Corporation-Carondelet Corporation	29099	0111	331513	Steel Foundries (except Investment)	0.07	6.48	0.16	0.25	67.10
Carrollton Municipal Utilities	29033	0022	221112	Fossil Fuel Electric Power Generation	0.02	3.61	0.07	0.18	5.06
Carthage Water & Electric	29097	0110	221112	Fossil Fuel Electric Power Generation	0.41	39.55	0.42	0.87	1.96
Cascades Plastics Inc-Warrenton	29219	0038	32614	Polystyrene Foam Product Manufacturing					143.42
Caterpillar Inc-Caterpillar Inc	29053	0019	326291	Rubber Product Manufacturing for Mechanical Use		2.14	2.56	0.01	5.71
Centerpoint Energy-Poplar Bluff Compressor Station	29023	0042	48621	Pipeline Transportation of Natural Gas		128.51	1.82	0.04	6.12
Centerpoint Energy-Ste Genevieve Compressor Station	29186	0024	48621	Pipeline Transportation of Natural Gas	0.00	86.95	0.80	0.01	7.38
Centerpoint Energy-Twelve Mile Compressor Station	29123	0018	48621	Pipeline Transportation of Natural Gas		324.94	0.96	0.03	19.66
Central Electric Power Cooperative-Chamois Plant	29151	0002	221112	Fossil Fuel Electric Power Generation	0.10	2,409.01	247.69	5,038.04	15.53
Central Missouri State University-Physical Plant	29101	0002	61131	Colleges, Universities, and Professional Schools		6.66		0.04	2.47

Ceramo Co Inc-Jackson	29031	0012	327112	Vitreous China, Fine Earthenware, and Other Pottery Product Manufacturing		3.89		1.64	31.46
Cerro Copper Casting Company-Cerro Copper Casting Company	29007	0047	331525	Copper Foundries (except Die-Casting)	0.02	3.37	17.42	1.52	5.02
Cerro Copper Tube Company-Cerro Copper Tube Company	29205	0010	331421	Copper Rolling, Drawing, and Extruding		2.65		0.02	23.58
Chemical Lime Company-Ste Genevieve	29186	0035	32741	Lime Manufacturing		1,427.69	60.42	128.61	8.61
Chemisphere Corporation-Chemisphere	29510	0808	32511	Petrochemical Manufacturing					3.20
Chillicothe Municipal Utilities	29117	0002	221112	Fossil Fuel Electric Power Generation		1.83	0.02	0.04	0.02
Christian Health Systems-Boone Hospital Center	29019	0045	62211	General Medical and Surgical Hospitals	0.01	2.02	0.15	0.01	0.11
Christy Minerals Co-High Hill	29139	0008	212324	Kaolin and Ball Clay Mining		170.16	25.04	578.44	0.00
Chrysler Assembly Plant 1-Fenton	29189	0002	336111	Automobile Manufacturing	0.83	25.86	3.38	0.16	203.84
Chrysler Corp-North Plant	29189	0231	336111	Automobile Manufacturing	1.69	61.69	5.53	0.47	468.58
CITY UTILITIES OF SPRINGFIELD MISSOURI-NOBLE HILL LANDFILL RENEW ENGY CTR	29077	0170	221119	Other Electric Power Generation		21.19	5.51	2.16	-
City Utilities Of Springfield-Fulbright Treatment Plant	29077	0163	92613	Regulation and Administration of Communications, Electric, Gas, and Other Utilities		0.28	0.01	0.03	0.02
City Utilities Of Springfield-Main Avenue Gas Turbine	29077	0145	221112	Fossil Fuel Electric Power Generation		0.19	0.01	0.19	0.00
Clariant Life Science Molecules-Clariant Life Science Molecules	29077	0017	325411	Medicinal and Botanical Manufacturing	0.16	7.19	2.42	0.09	3.61
Clay & Bailey Mfg Co-Clay & Bailey Mfg Co	29095	0012	331511	Iron Foundries		0.25		0.01	1.55

College Of The Ozarks-Branson	29213	0048	61131	Colleges, Universities, and Professional Schools	2.79	7.60	0.76	2.05	1.01
Color Art Inc-Crestwood	29189	0282	323110	Commercial Lithographic Printing	0.04	1.20	0.02	0.01	24.04
Columbia Municipal Power Plant-Columbia	29019	0002	221112	Fossil Fuel Electric Power Generation	0.01	375.72	27.30	1,078.52	1.56
Columbia Sanitary Landfill-Columbia Sanitary Landfill	29019	0091	562212	Solid Waste Landfill		8.62	0.91	1.83	8.51
Command Web Offset Missouri Inc-Jefferson City	29051	0043	323110	Commercial Lithographic Printing		5.37	0.41	0.03	24.22
Conagra Foods-Marshall Plant	29195	0004	311412	Frozen Specialty Food Manufacturing	0.16	5.96	0.37	0.03	1.20
Connector Castings-Connector Castings	29510	1556	331314	Secondary Smelting and Alloying of Aluminum	0.01	0.12	0.58	0.01	0.91
ConocoPhillips Co-Mount Vernon Products Terminal	29109	0036	42471	Petroleum Bulk Stations and Terminals		6.78			55.41
Consolidated Grain And Barge Co-Cape Girardeau	29031	0081	42451	Grain and Field Bean Merchant Wholesalers					
CONSOLIDATED GRAIN AND BARGE CO-CONSOLIDATED GRAIN AND BARGE CO	29201	8001	424510	Grain and Field Bean Merchant Wholesalers		1.10	0.20	0.01	0.06
Consolidated Grain And Barge Co-Dorena Facility	29133	0016	49313	Farm Product Warehousing and Storage		-	0.28		-
CONSTRUCTION TRAILER SPECIALISTS INC-SIKESTON	29201	0110	336212	Truck Trailer Manufacturing					14.10
Consumers Oil And Supply Company-Braymer Plant	29025	0008	42451	Grain and Field Bean Merchant Wholesalers			0.15		-
Consumers Oil Co Inc-Maryville Plant	29147	0027	42451	Grain and Field Bean Merchant Wholesalers					2.15
Continental Cement Company Inc-Ilasco Plant	29173	0001	32731	Cement Manufacturing		2,413.44	22.79	135.46	19.76
CONTINENTAL COAL INC-COTTONWOOD CREEK MINE	29013	0036	212111	Bituminous Coal and Lignite Surface Mining		6.99	0.72	0.46	0.57
Cook Brothers Insulation Inc-Cook Brothers Insulation Inc	29095	2058	32614	Polystyrene Foam Product Manufacturing					0.01

Cook Composites And Polymers Co-North Kansas City	29047	0012	325510	Paint and Coating Manufacturing	0.15	6.82	0.38	0.04	4.41
Courtney Ridge Landfill Llc-Courtney Ridge Landfill Llc	29095	0267	562212	Solid Waste Landfill		6.90	3.75	2.42	4.53
Crowder Gin Company Inc-Sikeston	29201	0073	115111	Cotton Ginning		0.24	0.19	0.00	0.01
Crown Center Redevelopment Corporation-Kansas City	29095	2007	72111	Hotels (except Casino Hotels) and Motels	0.34	11.71	0.87	0.12	0.65
Dairiconcepts-El Dorado Springs	29039	0003	311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing	0.21	6.55	33.42	0.06	0.54
Dairy Farmers Of America Inc-Cabool	29215	0026	311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing		9.16		0.05	0.50
Dairy Farmers Of America Inc-Springfield	29077	0036	311514	Dry, Condensed, and Evaporated Dairy Product Manufacturing	0.30	9.31	0.71	0.06	0.96
Dana Corporation-Perfect Circle Division	29189	0025	336311	Carburetor, Piston, Piston Ring, and Valve Manufacturing	0.01	1.04	0.02	0.01	1.73
Davis Paint Co-Davis Paint Co	29047	0040	32551	Paint and Coating Manufacturing		-		-	13.35
Delta Asphalt Inc-Cape Girardeau	29031	0002	324121	Asphalt Paving Mixture and Block Manufacturing	-	11.13	0.20	4.08	1.97
Depaul Health Center-Bridgeton	29189	1029	62211	General Medical and Surgical Hospitals	0.04	7.20	0.55	0.04	0.40
Detroit Tool & Engineering-Lebanon	29105	0013	332212	Hand and Edge Tool Manufacturing		-			1.38
Dial Corp-Dial Corp	29510	0063	325611	Soap and Other Detergent Manufacturing		9.99	24.47	0.06	1.95
Doe Run Company-Buick Mill	29093	0005	212231	Lead Ore and Zinc Ore Mining		-	1.91	-	2.00
Doe Run Company-Buick Smelter	29093	0009	331419	Primary Smelting and Refining of Nonferrous Metal (except Copper and Aluminum)		63.61	19.22	2,518.78	1.74

Doe Run Company-Bunker (Fletcher Mine)	29179	0006	212231	Lead Ore and Zinc Ore Mining		-	1.61	-	2.00
Doe Run Company-Glover Smelter	29093	0008	331419	Primary Smelting and Refining of Nonferrous Metal (except Copper and Aluminum)		0.03	38.85	0.00	0.13
Doe Run Company-Herculaneum Smelter	29099	0003	331419	Primary Smelting and Refining of Nonferrous Metal (except Copper and Aluminum)	0.38	12.32	10.83	35,997.75	2.20
Donaldson Co Inc-Donaldson Co Inc	29117	0012	336211	Motor Vehicle Body Manufacturing	0.04	1.38	0.10	0.01	2.88
Dow Chemical Company The-Riverside Plant	29099	0014	325211	Plastics Material and Resin Manufacturing	0.04	1.32	0.10	0.01	1.42
DYNAMIC FINISHES - JOPLIN	29097	0154	333131	Mining Machinery and Equipment Manufacturing					6.74
Dyno Nobel Inc-Carthage Plant	29097	0007	32592	Explosives Manufacturing	2.00	12.33	0.35	4.39	0.60
Dyno Nobel Inc-Lomo Plant	29163	0031	325311	Nitrogenous Fertilizer Manufacturing	25.20	928.73	57.23		
E F Marsh Engineering Company-Mt Vernon	29109	0051	333922	Conveyor and Conveying Equipment Manufacturing					11.81
Eagle Ridge Landfill-Bowling Green	29163	0040	562212	Solid Waste Landfill			0.24		2.68
Eagle-Picher Technologies Llc-Federal Systems	29097	0117	335911	Storage Battery Manufacturing		0.88		0.01	3.67
Edwards Fiberglass Inc-Sedalia	29159	0056	326191	Plastics Plumbing Fixture Manufacturing					45.10
EDWARDS FRP REPAIR-WINGATE	29159	0059	325211	Plastics Material and Resin Manufacturing					4.73
Efco Corporation-Efco Corporation	29009	0003	332321	Metal Window and Door Manufacturing	0.93	5.17	0.39	0.03	407.39
Elementis Specialties Inc-Elementis Specialties Inc	29510	0066	325131	Inorganic Dye and Pigment Manufacturing	0.26	8.07	0.38	0.05	56.32
Empire District Electric Co-Asbury Plant	29097	0001	221112	Fossil Fuel Electric Power Generation	4.74	4,829.82	465.26	10,755.97	27.20
Empire District Electric Co-Empire Energy Center	29097	0062	221112	Fossil Fuel Electric Power Generation		40.82	3.38	0.40	1.07

Empire District Electric Co-State Line Facility	29097	0104	221112	Fossil Fuel Electric Power Generation	70.52	114.00	52.37	4.80	63.50
Energy Center (The)-St Louis Univ Health Sciences Center	29510	1505	621111	Offices of Physicians (except Mental Health Specialists)		11.64	0.39	0.92	0.70
Energy Petroleum Company-Kienlen	29189	0141	42471	Petroleum Bulk Stations and Terminals					7.19
Engineered Coil Company-D B A Marlo Coil	29099	0052	336611	Ship Building and Repairing		0.12		0.00	9.47
ENNIS PAINT INC-SAVERTON	29173	0021	325510	Paint and Coating Manufacturing					5.91
Essex Power Plant	29207	0064	221112	Fossil Fuel Electric Power Generation		0.55	0.07	0.01	0.02
Eveready Battery Co Inc-Maryville Plant	29147	0008	335912	Primary Battery Manufacturing	0.07	2.26	0.17	0.01	25.97
Exide Technologies-Canon Hollow	29087	0001	331314	Secondary Smelting and Alloying of Aluminum	0.13	7.35	19.74	117.24	103.95
F & S Real Eastate Inc-St Louis	29189	1520	323112	Commercial Flexographic Printing					61.13
FACILITY OPERATION SERVICES LLC-NW 112TH	29165	2424	221330	Steam and Air-Conditioning Supply		44.05	1.27	0.18	0.86
Fag Bearings Corporation-Joplin	29145	0007	332991	Ball and Roller Bearing Manufacturing	0.11	3.34	0.25	0.02	21.15
Falcon Foam-Falcon Foam	29157	0020	326121	Unlaminated Plastics Profile Shape Manufacturing		2.51		25.07	87.53
Farmers Elevator & Supply Co-Hawk Point	29113	0042	42491	Farm Supplies Merchant Wholesalers		0.02	0.16	0.00	0.00
Farmers Union Gin-Farmers Union Gin	29069	0018	115111	Cotton Ginning			0.96		
FARMINGTON LIGHT & POWER-FARMINGTON	29187	0075	221112	Fossil Fuel Electric Power Generation	0.01	0.68	0.00	0.31	0.02
Fasco Industries Inc-Cassville Plant	29009	0037	335312	Motor and Generator Manufacturing	1.10	6.13	0.53	0.04	1.48
Fasco Industries Inc-Eldon Plant	29131	0032	335312	Motor and Generator Manufacturing	0.00	0.08	0.13	0.00	25.23
Flat River Glass Co-Park Hills	29187	0017	327211	Flat Glass Manufacturing	3.40	323.34	15.13	18.15	6.32
Flex-O-Lite Inc-Fenton	29189	0315	327215	Glass Product		-		-	24.34

				Manufacturing Made of Purchased Glass					
Folgers Coffee Co-Folgers Coffee Co	29095	0017	31192	Coffee and Tea Manufacturing		42.39		13.99	70.37
Ford Motor Co-Kansas City Assembly Plant	29047	0019	336111	Automobile Manufacturing	2.17	67.96	40.81	0.41	1,300.08
Four Way Gin Company-Four Way Gin Company	29069	0027	115111	Cotton Ginning			0.37		
Fred Weber Inc Sanitary Landfill-St Louis County	29189	0308	562212	Solid Waste Landfill		6.94	3.30	2.43	8.12
Fred Weber Inc-Asphalt Plant	29510	0047	324121	Asphalt Paving Mixture and Block Manufacturing	0.00	1.75		0.11	0.22
Fred Weber Inc-North Asphalt B & G	29189	1250	324121	Asphalt Paving Mixture and Block Manufacturing		2.34		0.43	0.77
Fred Weber Inc-North Asphalt H & B	29189	1249	324121	Asphalt Paving Mixture and Block Manufacturing		9.19	0.62	0.88	1.64
Fred Weber Inc-North Stone	29189	0017	324121	Asphalt Paving Mixture and Block Manufacturing			4.96		
Fred Weber Inc-O'Fallon Asphalt Plant	29183	0004	324121	Asphalt Paving Mixture and Block Manufacturing	0.04	2.06	0.12	0.17	0.36
Fred Weber Inc-O'Fallon Stone Plant	29183	0007	212312	Crushed and Broken Limestone Mining and Quarrying			0.01		
Fred Weber Inc-South Asphalt	29189	1248	324121	Asphalt Paving Mixture and Block Manufacturing		3.98	0.01	0.28	0.52
Fred Weber Inc-South Stone	29189	0019	324121	Asphalt Paving Mixture and Block Manufacturing			0.02		
Fulton Power Plant-Fulton	29027	0007	221112	Fossil Fuel Electric Power Generation	0.28	5.30	0.19	0.09	0.15
Fulton State Hospital-Fulton	29027	0021	62221	Psychiatric and Substance Abuse Hospitals	0.03	6.56	0.50	0.04	0.36
G3 Boats-Lebanon	29105	0038	336612	Boat Building				0.01	48.62
Gardner Denver Inc-Sedalia Plant	29159	0039	333912	Air and Gas Compressor Manufacturing		-	0.06	-	4.11
Garnett Wood Products-Charcoal Plant	29091	0038	325191	Gum and Wood Chemical Manufacturing		58.11	-		380.14
Gates Rubber Company-Gates Rubber Company	29133	0014	32622	Rubber and Plastics Hoses and Belting Manufacturing		1.10		0.01	0.22

Gates Rubber Company-Poplar Bluff Division	29023	0032	32622	Rubber and Plastics Hoses and Belting Manufacturing		4.18		0.03	13.36
GDX Automotive - Danny Scott Drive-New Haven	29071	0173	31332	Fabric Coating Mills		0.00		-	23.67
General Electric-Springfield	29077	0056	335312	Motor and Generator Manufacturing	0.02	1.02	0.04	0.04	24.13
General Motors-Wentzville Center	29183	0076	336111	Automobile Manufacturing	0.34	274.20	1.54	447.12	550.70
GEORGE'S INC-POULTRY FEED MILL	29009	0066	311119	Other Animal Food Manufacturing	0.01	0.25	0.85	0.00	0.13
Gkn Aerospace Services Inc-Berkeley	29189	1489	336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	0.44	7.23	13.36	0.17	51.28
Golden Triangle Energy-Craig	29087	0016	32511	Petrochemical Manufacturing	0.84	9.49	3.91	0.33	50.22
Goodwin Printing Co -St Louis	29510	1055	323110	Commercial Lithographic Printing					8.86
Graves Kennett Gin-Kennett	29069	0014	115111	Cotton Ginning		0.16	0.20	0.00	0.01
Greif Inc-Wright City	29219	0036	322214	Fiber Can, Tube, Drum, and Similar Products Manufacturing	0.00	0.11		0.00	12.35
H & G Marine Service Inc-Perryville	29157	0022	332439	Other Metal Container Manufacturing					13.84
Hallmark Cards Inc-Distribution Center	29047	0059	323110	Commercial Lithographic Printing		1.92		0.01	0.57
Hallmark Cards-Hallmark Cards	29095	0114	323110	Commercial Lithographic Printing	0.11	7.98	0.29	0.04	18.42
Harbison-Walker Refractories-Harbison-Walker Refractories	29027	0001	327124	Clay Refractory Manufacturing		7.09	0.75	16.72	0.16
Harbison-Walker Refractories-Vandalia Plant	29007	0003	327124	Clay Refractory Manufacturing		8.53	4.76	14.46	0.82
Harley Davidson Motor Company-Kansas City Plant	29165	2415	336991	Motorcycle, Bicycle, and Parts Manufacturing	1.29	9.57	0.82	0.06	22.48
Havco Wood Products Inc-Havco Wood Products Inc	29201	0021	321113	Sawmills	-	21.26	8.22	2.42	1.61
Hawker Energy Products	29101	0023	335912	Primary Battery		3.23	0.30	0.21	53.03

Inc-Warrensburg				Manufacturing					
Hawthorn Station	29095	0022	221112	Fossil Fuel Electric Power Generation	5.46	1,465.46	90.88	1,725.44	14.68
Hayes Lemmerz International Inc-Sedalia	29159	0027	336211	Motor Vehicle Body Manufacturing		5.90		0.04	76.33
Heartland Regional Medical Center East-St Joseph	29021	0063	62211	General Medical and Surgical Hospitals	0.02	5.05	0.38	0.03	0.28
Henry Wurst Inc-North Kansas City	29047	0032	323110	Commercial Lithographic Printing		1.99		0.00	26.28
Hermann Oak Leather Co-Hermann Oak Leather Co	29510	0391	31611	Leather and Hide Tanning and Finishing		-		-	6.70
Higginsville Municipal Power Facility	29107	0038	221112	Fossil Fuel Electric Power Generation	0.04	1.56	0.04	0.03	0.04
Holcim (Us) Inc-Clarksville	29163	0001	32731	Cement Manufacturing	4.18	5,367.52	209.56	7,835.95	564.31
Holden Power Plant	29101	0051	221112	Fossil Fuel Electric Power Generation		13.39	1.71	1.64	1.16
Holland Usa-Warrenton Facility	29219	0013	332117	Powder Metallurgy Part Manufacturing					11.76
Horner Charcoal Co Inc-Horner Charcoal Co Inc	29213	0002	325191	Gum and Wood Chemical Manufacturing		6.82	0.17		0.77
Hutchens Industries-Mansfield Steel Div	29229	0001	336212	Truck Trailer Manufacturing	0.10	1.15	0.04	0.01	13.06
Hydro Aluminum Wells-Monett	29009	0005	331421	Copper Rolling, Drawing, and Extruding	0.54	17.41	3.66	0.73	77.82
ICI Explosives Environmental Co-Joplin	29097	0138	562211	Hazardous Waste Treatment and Disposal		19.75		0.29	0.34
IESI CORPORATION-TIMBER RIDGE LANDFILL	29221	0031	562212	Solid Waste Landfill					1.02
Independence Power And Light-Missouri City Station	29047	0096	221112	Fossil Fuel Electric Power Generation	0.06	531.30	159.52	2,591.78	0.70
Independence Power And Light-Sub Station H	29095	0223	221112	Fossil Fuel Electric Power Generation		2.13		0.00	0.01
Independence Power And Light-Sub Station I	29095	0222	221112	Fossil Fuel Electric Power Generation		1.28		0.07	0.02
Independence Power And Light-Sub Station J	29095	0224	221112	Fossil Fuel Electric Power Generation		0.61		0.04	0.01
Independence Regional Health Center-	29095	0066	62211	General Medical and Surgical Hospitals	0.04	1.17	0.09	0.01	0.06

Independence									
Independent Stave Co Inc-Lebanon Plant	29105	0001	321920	Wood Container and Pallet Manufacturing	1.38	32.70	6.35	1.62	1.13
Integram - St Louis Seating-Pacific	29071	0144	33636	Motor Vehicle Seating and Interior Trim Manufacturing		0.58	0.04	0.00	18.61
International Paper Company-International Paper Company	29095	2177	322211	Corrugated and Solid Fiber Box Manufacturing	0.02	3.12	0.24	0.02	0.20
Interstate Brands Corp-Interstate Brands Corp	29510	0938	311812	Commercial Bakeries	0.05	2.12	0.11	0.01	43.55
Interstate Brands Corporation-Butternut Bread	29077	0011	311812	Commercial Bakeries	0.03	0.90	0.37	0.01	10.73
Italgrani Elevator-Italgrani Elevator	29510	0179	42451	Grain and Field Bean Merchant Wholesalers	0.12	3.84	0.93	0.02	0.62
J P Ross Cotton Co Inc-J P Ross Cotton Co Inc	29207	0008	115111	Cotton Ginning		0.36	0.30	-	0.01
J S Alberici Construction-J S Alberici Construction	29510	1642	236220	Commercial and Institutional Building Construction		-		-	24.79
Jackson Municipal Utilities-Jackson Municipal Utilities	29031	0061	221112	Fossil Fuel Electric Power Generation		0.44	0.01	0.00	0.01
James River Power Plant	29077	0005	221112	Fossil Fuel Electric Power Generation		2,706.52	83.21	5,288.40	34.88
Jefferson City Landfill-Laidlaw Waste Systems	29051	0058	562212	Solid Waste Landfill		3.76	1.75	1.32	2.44
Jefferson Smurfit Corp-Pacific	29071	0031	322212	Folding Paperboard Box Manufacturing	-	-	-		29.68
Jesco Resources Inc-Jesco Resources Inc	29047	0052	324191	Petroleum Lubricating Oil and Grease Manufacturing		0.60		0.00	0.04
John J Pershing Va Medical Center-Poplar Bluff	29023	0027	62211	General Medical and Surgical Hospitals	0.11	4.21	0.12	1.16	0.09
Johnson Controls Hoover Auto-Johnson Controls Hoover Auto	29051	0037	32614	Polystyrene Foam Product Manufacturing		-	0.14	-	85.81
Justin Boot Company-Carthage (Plant 417)	29097	0058	316219	Other Footwear Manufacturing					12.12
Justin Boot Company-	29009	0052	316213	Men's Footwear (except		0.17	0.01	0.00	17.35

Cassville (Plant 414)				Athletic) Manufacturing					
Kansas City Power & Light Co-Iatan Generating Station	29165	0007	221112	Fossil Fuel Electric Power Generation	0.80	6,922.12	294.70	15,076.71	75.42
Kansas City Power & Light Co-Northeast Station	29095	0023	221112	Fossil Fuel Electric Power Generation		24.76	0.28	3.98	1.01
Kawasaki Motors Mfg Corp-Kawasaki Motors Mfg Corp	29147	0023	333618	Other Engine Equipment Manufacturing		19.50	4.67	0.18	150.47
KCI Airport - KCMO Aviation Dept	29165	2404	488111	Air Traffic Control	0.03	5.45	0.40	0.16	4.85
KCP&L GMO-SOUTH HARPER PEAKING FACILITY	29037	0063	221112	Fossil Fuel Electric Power Generation		48.11	2.73	2.32	1.44
Keller Construction Company-Keller Construction Company	29003	P011	324121	Asphalt Paving Mixture and Block Manufacturing		0.54	0.12	0.10	0.18
Kennett Generating Plant	29069	0063	221112	Fossil Fuel Electric Power Generation		6.09	0.09	0.18	0.49
Kingsford Manufacturing Co-Briquetting Plant	29125	0001	325191	Gum and Wood Chemical Manufacturing		112.17		15.75	54.77
Koch Materials Company-Koch Materials Company	29095	0064	324121	Asphalt Paving Mixture and Block Manufacturing	0.14	4.44	0.34	0.03	0.24
Kraft Foods North America Inc-Kraft Foods North America Inc	29077	0026	311513	Cheese Manufacturing	0.36	11.11	0.84	0.07	5.81
Kv Pharmaceutical Company-Brentwood	29189	1015	325412	Pharmaceutical Preparation Manufacturing	-	-	0.11	-	58.93
Kv Pharmaceutical Company-Schuetz Rd	29189	1047	325412	Pharmaceutical Preparation Manufacturing	0.05	1.45	0.77	0.01	6.40
KV PHARMACEUTICAL-BRIDGETON	29189	1538	325412	Pharmaceutical Preparation Manufacturing	-	-	0.00	-	18.49
L Berry Gin Company-L Berry Gin Company	29155	0021	115111	Cotton Ginning		0.11	0.42	0.00	0.01
Laclede Tower Associates Llc-Laclede Gas Building	29510	2378	22121	Natural Gas Distribution	0.00	207.44	0.87	0.05	2.71
Lafarge North America Inc - Sedalia Quarry & Asphalt	29159	0002	212312	Crushed and Broken Limestone Mining and Quarrying		2.73	0.23	2.05	0.55
LAFARGE NORTH AMERICA INC-COURTNEY RIDGE	29095	0321	212312	Crushed and Broken Limestone Mining and			0.02		

QUARRY				Quarrying					
Lafarge North America Inc-Independence Plant	29095	0030	32731	Cement Manufacturing	4.05	1,455.87	63.05	286.07	77.05
Lamar City Electrical Generation-Lamar	29011	0031	221112	Fossil Fuel Electric Power Generation		1.98	0.01	0.00	0.03
Landmark Mfg Corp-Landmark Mfg Corp	29061	0010	332313	Plate Work Manufacturing		6.21	0.49	0.41	1.17
Lange-Stegmann Co-Lange-Stegmann Co	29510	0468	42491	Farm Supplies Merchant Wholesalers		0.00		-	0.00
La-Z-Boy Chair Company-La-Z-Boy Midwest	29145	0005	337121	Upholstered Household Furniture Manufacturing	0.02	0.96	0.05	0.01	10.82
Lead Belt Materials Co Inc-Park Hills	29187	0001	212312	Crushed and Broken Limestone Mining and Quarrying	-	0.86	0.89	0.02	1.06
Lee'S Summit Sanitary Landfill-Lee'S Summit Sanitary Landfill	29095	0272	562212	Solid Waste Landfill		2.02	1.00	0.71	1.39
Leggett & Platt-Wire Mill - Carthage Central Ave	29097	0143	331222	Steel Wire Drawing		15.08		0.09	2.13
Lemons Sanitary Landfill-Lemons Sanitary Landfill	29207	0062	562212	Solid Waste Landfill		3.62	2.05	1.41	2.33
Life Line Foods-St Joseph	29021	0016	311211	Flour Milling		36.40	2.97	32.42	6.25
Lone Star Industries Inc-Cape Girardeau	29031	0021	32731	Cement Manufacturing	16.89	1,163.76	180.15	13.43	21.62
Lowe Boats-Omc Aluminum Boat Group	29105	0006	336612	Boat Building		1.18			64.69
Loxcreen Company Inc-Hayti	29155	0045	331316	Aluminum Extruded Product Manufacturing		4.21		0.03	4.99
MACON MUNICIPAL UTILITIES-KELLOGG AVE	29121	0035	221112	Fossil Fuel Electric Power Generation		1.16	0.03	0.08	0.10
MACON MUNICIPAL UTILITIES-NEMO GENERATING STATION	29121	0033	221112	Fossil Fuel Electric Power Generation		17.63	3.25	0.29	1.03
MACON MUNICIPAL UTILITIES-NOLL DRIVE	29121	0036	221112	Fossil Fuel Electric Power Generation		0.55	0.01	0.04	0.04
Magellan Pipeline Company Llc-Columbia Station	29019	0005	48691	Pipeline Transportation of Refined Petroleum Products		3.70			38.60
Magellan Pipeline Company	29063	0009	48691	Pipeline Transportation of		9.26			0.71

Llc-Osborn Station				Refined Petroleum Products					
Magellan Pipeline Company Llc-Palmyra Station	29127	0002	48691	Pipeline Transportation of Refined Petroleum Products		1.22			9.88
Magellan Pipeline Company Llc-Ridgeway Station	29081	0010	48691	Pipeline Transportation of Refined Petroleum Products		47.03			3.47
Magellan Pipeline Company Llc-Springfield Terminal	29077	0116	48691	Pipeline Transportation of Refined Petroleum Products		7.18			46.64
Magellan Pipeline Company-Carthage Terminal	29097	0079	48691	Pipeline Transportation of Refined Petroleum Products		0.97		-	13.62
Magnet Llc-Washington	29071	0153	33995	Sign Manufacturing					9.73
Mahan Gin Co-Mahan Gin Co	29143	0012	115111	Cotton Ginning		0.16		0.00	0.01
Mallinckrodt Inc - Mallinckrodt Inc	29510	0017	32511	Petrochemical Manufacturing	4.13	107.11	23.96	273.50	43.76
Manac Trailers Usa Inc-Oran	29201	0102	333294	Food Product Machinery Manufacturing		0.09			1.77
Manchester Packaging Company-Manchester Packaging Company	29161	0039	326121	Unlaminated Plastics Profile Shape Manufacturing		0.03		0.00	50.55
Manscen And Fort Leonard Wood-Manscen And Fort Leonard Wood	29169	0004	928110	National Security	9.01	40.45	0.76	29.79	21.70
Marathon Electric Mfg Corp-Lebanon Plant	29105	0033	335312	Motor and Generator Manufacturing		2.05	0.31	0.00	28.56
Marble Decor Inc-Marble Decor Inc	29071	0154	326121	Unlaminated Plastics Profile Shape Manufacturing		-		-	0.45
Marquette Tool & Die-Marquette Tool & Die	29510	0162	314999	All Other Miscellaneous Textile Product Mills					7.40
Marshall Municipal Utilities	29195	0010	221112	Fossil Fuel Electric Power Generation	0.20	617.32	149.09	3,146.86	4.17
Martin Marietta Materials Inc-Perryville Quarry #366	29157	P023	212312	Crushed and Broken Limestone Mining and Quarrying			0.50		
Martin Marietta Materials-Appleton Quarry #368	29031	0008	212312	Crushed and Broken Limestone Mining and Quarrying		-	0.02	-	-
Martin Marietta Materials-	29157	0032	324121	Asphalt Paving Mixture and		0.92	0.01	0.69	0.52

Carolina Asphalt Company				Block Manufacturing					
Martin Marietta-Greenwood Quarry #527	29037	0001	212312	Crushed and Broken Limestone Mining and Quarrying			0.08		
Martin Marietta-Peculiar Quarry #528	29037	0002	212312	Crushed and Broken Limestone Mining and Quarrying			0.05		
Martinsburg Farmers Elevator-Martinsburg	29007	0033	42451	Grain and Field Bean Merchant Wholesalers			0.19		
Master Marble Inc-Holden	29101	0054	326121	Unlaminated Plastics Profile Shape Manufacturing		-	-		3.15
Mccord Gin Company-Gideon	29143	0023	115111	Cotton Ginning		-	0.35	-	-
McDonnell Douglas Corp /Boeing Company-Lindbergh Plant	29189	0230	336411	Aircraft Manufacturing	0.77	22.32	0.66	0.35	69.39
McDonnell Douglas Corp-Boeing Company	29183	0010	334413	Semiconductor and Related Device Manufacturing	0.08	2.56	0.05	0.02	14.85
Memc Electronic Materials Inc-St Peters Plant	29183	0027	334416	Electronic Coil, Transformer, and Other Inductor Manufacturing	5.11	23.58	4.47	0.14	15.08
Meramec Industries Inc-Ramsey St Plant	29071	0068	326121	Unlaminated Plastics Profile Shape Manufacturing		0.31		0.00	37.84
Metal Container Corporation-Arnold	29099	0044	332431	Metal Can Manufacturing		11.26	2.79	0.07	111.91
Metropolitan St Louis Sewer District-Bissel Plant	29510	0053	92411	Administration of Air and Water Resource and Solid Waste Management Programs	534.96	89.34	3.62	10.93	43.21
Metropolitan St Louis Sewer District-Coldwater Creek Sewage Treatment Plant	29189	1210	22132	Sewage Treatment Facilities	105.85	69.15	0.38	2.02	3.32
Metropolitan St Louis Sewer District-Lemay Waste Water Treatment Plant	29189	0217	22132	Sewage Treatment Facilities	505.36	51.79	1.86	2.07	18.63
Metropolitan St Louis	29189	1205	22132	Sewage Treatment Facilities	101.19	91.27	0.27	1.41	11.15

Sewer District-Mo River Wasterwater Treatment Plant									
Mexico Plastic Company-Mexico	29007	0051	326111	Plastics Bag and Pouch Manufacturing		0.37		0.00	138.47
Midland Lithography Co-North Kansas City	29047	0033	323110	Commercial Lithographic Printing		-	-	-	13.86
MID-MISSOURI ENERGY INC-MALTA BEND	29195	0046	325193	Ethyl Alcohol Manufacturing		36.27	8.42	0.41	31.96
Mid-West Industrial Chemical-Mid-West Industrial Chemical	29510	1077	32552	Adhesive Manufacturing		-	-	-	6.24
Mississippi Lime Company-Mississippi Lime Co	29186	0001	32741	Lime Manufacturing	0.01	3,731.60	1.84	4,304.35	34.34
Missouri Dept Of Corrections-Boonville Correctional Center	29053	0027	92214	Correctional Institutions	0.11	1.08	0.25	1.10	0.18
Missouri Hardwood Flooring Co-Missouri Hardwood Flooring Co	29203	0005	321113	Sawmills		15.96	0.58	0.81	0.55
Missouri Pressed Metals Inc-Sedalia	29159	0041	332117	Powder Metallurgy Part Manufacturing	0.00	0.03	0.00	0.00	8.96
Mo Rehabilitation Center-Mo Rehabilitation Center	29109	0008	62211	General Medical and Surgical Hospitals	0.01	0.11	0.10	0.01	0.07
Modine Manufacturing Co-Modine Manufacturing Co	29029	0009	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing	0.01	2.80		0.00	13.08
Modine Manufacturing Company-Jefferson City	29051	0032	336211	Motor Vehicle Body Manufacturing	0.08	2.50	5.51	0.02	11.58
Modine Manufacturing Company-Joplin	29097	0065	332313	Plate Work Manufacturing		0.71		0.00	0.76
Modine Manufacturing Company-Trenton	29079	0004	336211	Motor Vehicle Body Manufacturing	0.13	4.02	0.38	0.00	51.76
Monroe City Power Plant-Monroe City	29137	0028	221112	Fossil Fuel Electric Power Generation		0.18		0.01	0.01
Monsanto World	29189	0020	54171	Research and Development	0.39	12.29	0.23	0.07	0.68

Headquarters-Lindbergh Blvd				in the Physical, Engineering, and Life Sciences					
Montrose Generating Station	29083	0001	221112	Fossil Fuel Electric Power Generation	0.98	6,419.69	245.89	12,123.91	61.91
Most Inc-Troy	29113	0046	331314	Secondary Smelting and Alloying of Aluminum		2.62	5.12	0.22	1.34
Multiplex Display Fixture-Fenton	29189	0242	337127	Institutional Furniture Manufacturing		0.59	0.04	0.00	1.11
N L McCartney Dist Generation	29077	0164	221112	Fossil Fuel Electric Power Generation		29.65	0.95	0.12	0.61
National Geospatial-Intelligence Agency-National Geospatial-Intelligence Agency	29510	1370	92811	National Security	0.05	1.92	0.13	0.03	0.11
National Starch & Chemical Co-National Starch & Chemical Co	29047	0002	311221	Wet Corn Milling		34.20	0.06	84.71	74.57
Natural Gas Pipeline Company-Marble Hill Plant	29017	0019	48621	Pipeline Transportation of Natural Gas	2.36	2,497.11	27.15	0.33	67.43
Nesco Container Corp-Fenton	29189	0226	332439	Other Metal Container Manufacturing	0.04	2.36	0.02	0.01	93.66
Nestle Purina Petcare Company-Bloomfield	29207	0014	212324	Kaolin and Ball Clay Mining		67.86	17.72	0.31	2.84
New Surface Llc-East 12th	29095	2224	327991	Cut Stone and Stone Product Manufacturing		0.00			1.02
NEW SURFACE-ODESSA	29107	0063	326121	Unlaminated Plastics Profile Shape Manufacturing		0.01			0.54
New World Pasta- Marceau Facility-New World Pasta	29510	2433	311823	Dry Pasta Manufacturing	0.17	5.46	0.98	0.03	0.30
Nodaway Plant	29147	0032	221112	Fossil Fuel Electric Power Generation		0.56	0.05	0.01	0.02
Noranda Aluminum Inc-Noranda Aluminum Inc	29143	0008	331312	Primary Aluminum Production	1.15	36.24	257.04	4,688.14	239.37
Nordenia U S A Inc-Neely'S Landing	29031	0072	31213	Wineries		-	0.57	-	93.84
Nordyne Inc-Boonville Plant	29053	0021	333414	Heating Equipment (except Warm Air Furnaces) Manufacturing		0.89		0.01	55.21

Nordyne-Poplar Bluff	29023	0062	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing		0.02		0.00	55.09
Northeast Missouri Grain Llc-Macon	29121	0028	32511	Petrochemical Manufacturing		33.64	0.02	0.20	58.50
Northwest Missouri State University-Maryville	29147	0005	61131	Colleges, Universities, and Professional Schools	-	25.24	2.22	0.87	1.62
O Fallon Casting Llc-O Fallon	29183	0077	331512	Steel Investment Foundries	1.59	1.85	0.60	0.01	89.98
OFFICE OF ADMINISTRATION FMDC-MOBERLY CORRECTIONAL CENTER	29175	0034	922140	Correctional Institutions	0.03	7.08	0.52	0.05	19.95
Old Monroe Elevator & Supplies-Old Monroe	29113	0003	311119	Other Animal Food Manufacturing		0.04	0.11	0.00	0.00
Omnium Llc-St Joseph	29021	0045	32532	Pesticide and Other Agricultural Chemical Manufacturing		-		-	-
Onyx Oak Ridge Landfill Inc-(West County)	29189	0310	562212	Solid Waste Landfill		2.39	1.14	0.84	4.14
P D George Co (The)-P D George Co (The)	29510	0096	32551	Paint and Coating Manufacturing	0.30	4.66	1.43	0.03	38.27
Pace Construction Co-Poplar Bluff Plant	29023	0021	324121	Asphalt Paving Mixture and Block Manufacturing		0.01		2.25	0.27
Package Service Co Llc-Package Service Co Llc	29165	0021	323112	Commercial Flexographic Printing	-	-	-	-	33.76
Pan-Glo St Louis-Trenton Avenue	29189	1192	811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance					4.82
Panhandle Eastern Pipe Line Co-Houstonia	29159	0047	48621	Pipeline Transportation of Natural Gas		1,811.33	36.21	0.44	95.38
Panhandle Eastern Pipeline-Centralia Compressor Station	29019	0077	48621	Pipeline Transportation of Natural Gas		1,932.37	23.94	0.89	76.65

Paramount Metalizing Co-Sullivan	29055	0043	32622	Rubber and Plastics Hoses and Belting Manufacturing					36.04
Pechiney Plastic Packaging Inc-Joplin Plant	29097	0132	323112	Commercial Flexographic Printing	0.04	2.48	0.19	0.01	157.45
Permacel St Louis Inc-Permacel St Louis Inc	29510	1519	326299	All Other Rubber Product Manufacturing	0.03	1.73	0.08	0.01	0.75
Peterson Mfg Co-Grandview	29095	0075	336321	Vehicular Lighting Equipment Manufacturing		0.61	0.04	0.02	1.15
Pharmacia-Chesterfield Village	29189	0032	32511	Petrochemical Manufacturing	0.44	15.36	0.27	0.36	20.66
Phillips Pipeline Company-Jefferson City Terminal	29051	0042	42471	Petroleum Bulk Stations and Terminals		18.28			39.13
Pittsburgh-Corning Corp-Pittsburgh-Corning Corp	29159	0009	327993	Mineral Wool Manufacturing		199.61	3.15	150.50	3.24
Plastene Supply Company-Div Siegel-Robert Inc	29143	0015	326121	Unlaminated Plastics Profile Shape Manufacturing	0.07	4.44	0.06	0.02	74.68
Playpower Lt Farmington Inc-Iron Mountain Forge Corp	29187	0041	337121	Upholstered Household Furniture Manufacturing	0.10	3.18	2.36	0.02	8.46
Plaze Incorporated-Plaze Incorporated	29071	0157	311942	Spice and Extract Manufacturing		1.67		0.01	44.87
POET BIOREFINING-LADDONIA PLANT	29007	0054	325193	Ethyl Alcohol Manufacturing		36.18		1.29	65.53
Poly One Corporation-St Louis	29510	0161	32551	Paint and Coating Manufacturing					3.34
Poplar Bluff Municipal Utilities-Generating Plant	29023	0050	221112	Fossil Fuel Electric Power Generation	0.11	6.89	0.15	0.09	0.75
Portageville Farmers Gin Inc-Portageville Farmers Gin Inc	29143	0013	115111	Cotton Ginning			0.19		
PQ Corporation (The)-St Louis	29510	0809	211112	Natural Gas Liquid Extraction	0.53	113.75	66.57	0.18	5.19
PRAIRIE PRIDE INC-EVE	29217	0043	311222	Soybean Processing		12.94	2.79	0.08	53.66
Precoat Metals-Precoat Metals	29510	0027	332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers		6.07		0.04	29.21
Premier Turbines-Neosho	29145	0044	336412	Aircraft Engine and Engine		15.53		0.94	27.69

Plant				Parts Manufacturing					
Printpack Inc-Hazelwood Plant	29189	0208	322221	Coated and Laminated Packaging Paper Manufacturing	0.13	4.11	0.08	0.02	233.46
Procter & Gamble Paper Products Co-Neely'S Landing	29031	0053	322291	Sanitary Paper Product Manufacturing	1.73	160.77	4.11	0.97	206.93
Procter & Gamble-Procter & Gamble	29510	0057	325611	Soap and Other Detergent Manufacturing	0.38	11.91	47.35	0.73	0.65
Pro-Tect Mfg Inc-Ferguson Ave	29189	0317	32614	Polystyrene Foam Product Manufacturing					19.25
Purcell Tire-Purcell Tire	29221	0022	443112	Radio, Television, and Other Electronics Stores		2.50	0.49	0.02	11.60
Quaker Window Products Company-Quaker Window Products Company	29151	0050	332321	Metal Window and Door Manufacturing		0.98	0.00	0.00	39.95
Ray-Carroll County Grain Growers Inc-Carrollton Facility	29033	0023	42451	Grain and Field Bean Merchant Wholesalers		0.35	0.02	0.00	0.08
Razorback Pipeline Company-Transmontaigne Product Services Inc	29109	0002	49311	General Warehousing and Storage		0.12			8.03
Rc Cement Company Inc-River Cement Co - Selma Plant	29099	0002	32731	Cement Manufacturing	5.70	2,608.15	197.39	2,758.03	195.65
Red Wing Shoe Company Inc-Potosi	29221	0008	316214	Women's Footwear (except Athletic) Manufacturing					5.33
Reichhold Chemicals Inc-Valley Park	29189	1097	325211	Plastics Material and Resin Manufacturing	0.17	5.24	0.18	0.03	33.03
Research Medical Center-Research Medical Center	29095	2054	62211	General Medical and Surgical Hospitals	0.33	9.63	0.13	0.07	0.20
Rockwood Pigments Na Inc-E Hoffmeister	29189	0035	325131	Inorganic Dye and Pigment Manufacturing	0.37	12.09	0.24	3.53	0.71
Rolla Municipal Utilities-Multiple Peaking Plants	29161	0054	221112	Fossil Fuel Electric Power Generation		0.44	0.01	0.01	0.02
Royal Oak Enterprises Inc-Salem Briquet Plant	29065	0038	325191	Gum and Wood Chemical Manufacturing	-	32.20	17.58	1.59	5.00
Royal Oak Enterprises-	29213	0007	325191	Gum and Wood Chemical		9.56	5.95	1.09	7.83

Royal Oak Enterprises				Manufacturing					
RR Donnelley-Owensville	29073	0008	323110	Commercial Lithographic Printing	0.06	1.88	0.14	0.01	145.12
Rumble Recycling And Disposal-Sanitary Landfill Rumble 1 & 2	29095	0273	562212	Solid Waste Landfill		1.24	0.53	0.43	0.35
Ruprecht Quarry-Paule Rd	29189	0276	212312	Crushed and Broken Limestone Mining and Quarrying					
S & K Industries Inc-S & K Industries Inc B #1	29107	0004	337122	Nonupholstered Wood Household Furniture Manufacturing		0.22	0.46	0.01	9.06
S & K Industries Inc-S & K Industries Inc B #2	29107	0029	321912	Cut Stock, Resawing Lumber, and Planing					12.50
Saint-Gobain Containers Llc-Pevely	29099	0068	327213	Glass Container Manufacturing	1.27	177.56	69.26	219.84	31.69
Salisbury Station Platte Pipe Line Co-Salisbury	29041	0013	42472	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)					5.13
Schreiber Foods Inc-Packaging Converting Plant	29083	0033	322221	Coated and Laminated Packaging Paper Manufacturing		0.65	0.05	0.00	66.13
SCHREIBER FOODS INC-SCHREIBER FOODS INC - MONETT	29009	0021	311513	Cheese Manufacturing	0.17	16.93	0.40	15.04	0.64
Sensient Colors Inc-Baldwin Plant	29510	0269	31192	Coffee and Tea Manufacturing	0.09	2.90	0.23	0.09	0.20
Sericol Inc-Sericol Inc	29047	0141	32591	Printing Ink Manufacturing		0.32		0.00	33.15
Shelbina Power Plant	29205	0011	221112	Fossil Fuel Electric Power Generation	-	0.05	0.00	0.00	0.01
SHOW ME ETHANOL LLC-CARROLLTON	29033	0036	325193	Ethyl Alcohol Manufacturing		-	0.00	-	-
Show-Me Regional Landfill-Show-Me Regional Landfill	29101	0046	562212	Solid Waste Landfill		2.48	1.49	0.87	1.61
Sigma - Aldrich Co-Sigma - Aldrich Co	29510	0697	325199	All Other Basic Organic Chemical Manufacturing		2.91		0.02	4.05
Sigma - Aldrich Co-Sigma	29510	1396	325414	Biological Product (except		5.86		0.04	9.47

Chemical Company				Diagnostic) Manufacturing					
Sikeston Power Station-Sikeston Power Station	29201	0017	221112	Fossil Fuel Electric Power Generation		2,232.69	108.63	6,527.85	5.30
Silgan Containers Corp-Silgan Containers	29021	0064	332431	Metal Can Manufacturing		6.45	0.49	0.04	15.65
Simmons Foods Inc-Southwest City	29119	0017	311615	Poultry Processing	10.79	38.65	23.93	0.38	3.45
Simpson Construction Materials Llc-Valley Park	29189	1226	324121	Asphalt Paving Mixture and Block Manufacturing		6.05	0.66	4.44	1.56
Simpson Construction Materials Llc-West Lake Quarry & Material Co	29189	0111	212312	Crushed and Broken Limestone Mining and Quarrying		4.71	0.08	3.46	0.32
Sinclair Oil Corp-Carrollton Station	29033	0001	48691	Pipeline Transportation of Refined Petroleum Products		1.28			82.01
Smith Flooring Company-Mountain View	29091	0005	321918	Other Millwork (including Flooring)		24.64	6.03	1.26	0.85
Southeast Missouri State University-Facilities Management	29031	0010	61131	Colleges, Universities, and Professional Schools		42.63	1.25	428.43	0.32
Southern Metal Processing-Southern Metal Processing	29510	1407	333414	Heating Equipment (except Warm Air Furnaces) Manufacturing		6.93	0.45	6.49	1.26
Southern Star Central Gas Pipeline-Peculiar Compressor Station	29037	0048	48621	Pipeline Transportation of Natural Gas	0.00	50.00	0.74	-	1.82
Southern Star Central Gas Pipeline-Saginaw Compressor Station	29145	0049	48621	Pipeline Transportation of Natural Gas		63.82	0.98	0.00	2.42
Southwest Mo State Univ-Physical Plant	29077	0047	61131	Colleges, Universities, and Professional Schools	0.07	8.22	0.64	7.23	0.41
Southwest Power Plant	29077	0039	221112	Fossil Fuel Electric Power Generation		2,035.83	37.24	3,301.30	18.52
Southwestern Bell Telephone Company-Southwestern Bell Telephone Company	29510	2545	517110	Wired Telecommunications Carriers	0.11	14.06	0.50	0.72	0.60
Sporlan Valve Company-Plant #2 - West Main	29071	0132	332911	Industrial Valve Manufacturing					43.42

Sporlan Valve Company-Plant #3 - Lange Drive	29071	0178	332919	Other Metal Valve and Pipe Fitting Manufacturing					16.46
Springfield Sanitary Landfill-Willard	29077	0161	562212	Solid Waste Landfill		4.84	1.99	1.69	2.39
S-R Products-Farmington	29187	0048	336991	Motorcycle, Bicycle, and Parts Manufacturing	14.08	3.52		0.02	29.67
St Alexius Hospital-St Louis	29510	0200	62211	General Medical and Surgical Hospitals		1.33	-	0.01	0.03
St Francis Medical Center-Cape Girardeau	29031	0058	62211	General Medical and Surgical Hospitals	0.03	4.98	0.39	0.06	0.27
St John'S Regional Health Center-Springfield	29077	0028	62211	General Medical and Surgical Hospitals	0.62	11.69	1.48	0.12	1.07
St John'S Regional Medical Center-St John'S Regional Medical Center	29097	0021	62211	General Medical and Surgical Hospitals	-	5.49	-	0.23	0.29
St Joseph Health Center-St Joseph Health Center	29183	0019	62211	General Medical and Surgical Hospitals	0.03	4.67	0.35	0.14	0.28
St Joseph Hospital-Kirkwood	29189	1156	62211	General Medical and Surgical Hospitals	0.02	3.56	0.07	0.06	2.25
St Joseph Landfill-St Joseph Landfill	29021	0105	562212	Solid Waste Landfill		0.80	0.96	0.28	14.26
St Louis Airport Authority-Lambert International Blvd	29189	0065	336212	Truck Trailer Manufacturing	0.32	14.92	0.28	3.09	11.67
St Louis Lithographing Company-Heege Avenue	29189	0238	323110	Commercial Lithographic Printing					17.91
St Louis Metallizing-St Louis	29510	0175	332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers		0.33		0.00	4.38
St Louis Post Dispatch-St Louis Post Dispatch	29510	1280	51111	Newspaper Publishers	0.00	0.53	0.01	0.00	1.92
St Louis Post-Dispatch-Dunlap Ind Dr	29189	0057	51111	Newspaper Publishers	0.00	0.19	0.00	0.00	19.15
St Louis University-Facilities Svcs	29510	2711	323110	Commercial Lithographic Printing	0.06	11.55	0.88	0.07	0.64
St Luke'S Hospital-Woods Mill Road	29189	1101	62211	General Medical and Surgical Hospitals	0.04	6.34	0.13	0.58	0.34
St Marys Health Center-	29189	0318	62211	General Medical and	0.05	8.23	0.15	0.15	0.49

Richmond Heights				Surgical Hospitals					
Stahl Specialty Co-Kingsville Plant	29101	0003	331524	Aluminum Foundries (except Die-Casting)	0.39	12.10	-	1.74	0.67
Steel Processors-Steel Processors	29225	0026	336212	Truck Trailer Manufacturing	0.06	0.80	0.07	0.00	7.04
Steelweld Equipment Co-St Clair	29071	0020	336211	Motor Vehicle Body Manufacturing		0.20		0.00	15.94
Still Gin & Grain Inc-Steele	29155	0024	115111	Cotton Ginning		-	0.19	-	-
Stoddard County Cotton Co-Bernie	29207	0018	115111	Cotton Ginning		0.27	0.53	0.00	0.01
Stokes Mayberry Gin Company-Stokes Mayberry Gin Company	29069	0032	115111	Cotton Ginning		-	0.15	-	-
Sullivan Precision Metal Finishing Inc-Sullivan Precision Metal Finishing Inc	29071	0131	332813	Electroplating, Plating, Polishing, Anodizing, and Coloring		-	-	-	18.58
SUN CHEMICAL-KANSAS CITY	29095	2431	325910	Printing Ink Manufacturing			0.01		0.44
Sunnen Products Company-Maplewood	29189	0064	333512	Machine Tool (Metal Cutting Types) Manufacturing	0.04	1.21	0.02	0.01	5.77
Superior Home Products Inc-Superior Home Products Inc	29183	0131	326121	Unlaminated Plastics Profile Shape Manufacturing		-		-	10.79
Superior Maple Hill Landfill-Macon	29121	0027	562212	Solid Waste Landfill		2.22	0.94	0.78	1.43
Superior Solvent & Chemical-St Louis	29510	2300	49311	General Warehousing and Storage					2.94
Superior Solvents & Chemicals-Superior Solvents & Chemicals	29077	0228	42469	Other Chemical and Allied Products Merchant Wholesalers					1.67
Sweetheart Cup-Sweetheart Cup	29077	0021	322215	Nonfolding Sanitary Food Container Manufacturing	0.68	3.11	0.19	0.02	3.38
Systems & Electronics Inc-West Plains	29091	0011	336212	Truck Trailer Manufacturing	0.13	0.74	0.02	0.02	46.22
Table Rock Asphalt Constr Co Inc-Hwy 248 Quarry	29213	0003	212312	Crushed and Broken Limestone Mining and Quarrying		1.71		4.20	0.60

Table Rock Asphalt Constr Co Inc-Quarry #3 & Concrete Plant	29209	0007	212312	Crushed and Broken Limestone Mining and Quarrying					
Tamko Roofing Products Inc-High St Plant	29097	0013	324122	Asphalt Shingle and Coating Materials Manufacturing	-	4.32	7.64	1.60	59.16
Tamko Roofing Products Inc-Rangeline Plant	29097	0094	324122	Asphalt Shingle and Coating Materials Manufacturing		41.01	0.23	59.19	38.00
TEPPCO-Cape Girardeau Terminal	29201	0018	48691	Pipeline Transportation of Refined Petroleum Products					29.84
Tetra Pak Materials-Sikeston	29201	0003	32213	Paperboard Mills	-	-	-	-	27.12
Teva Pharmaceuticals Usa Inc-Mexico	29007	0040	325412	Pharmaceutical Preparation Manufacturing	1.93	4.06	0.33	0.02	23.73
Texas Eastern Transmission Corporation-Oran Facility	29201	0099	48621	Pipeline Transportation of Natural Gas		666.00	3.34	0.10	10.86
Tg Missouri-Perryville	29157	0019	336211	Motor Vehicle Body Manufacturing	0.01	6.57	0.23	0.04	199.52
Tiffany Marble Inc-Lee'S Summit	29095	0244	326121	Unlaminated Plastics Profile Shape Manufacturing	-	-	-	-	0.86
Tnemec Company Inc-Tnemec Company Inc	29047	0075	32551	Paint and Coating Manufacturing					14.34
Tnt Plastics Inc-Perryville	29157	0027	326113	Unlaminated Plastics Film and Sheet (except Packaging) Manufacturing		-	-	-	129.40
Torque Traction Integration Technologies-Columbia	29019	0066	336211	Motor Vehicle Body Manufacturing	0.01	0.41	0.03	0.00	5.21
Tower Rock Stone Co-Ste Genevieve	29186	0022	212312	Crushed and Broken Limestone Mining and Quarrying			0.05		-
Toyota Motor Corporate Services-Bodine Aluminum Inc	29113	0029	331524	Aluminum Foundries (except Die-Casting)		37.23	-	0.06	79.04
Tracker Marine-Bolivar Plant	29167	0028	336612	Boat Building		-	-	-	36.65
Tracker Marine-Clinton Plant	29083	0031	336612	Boat Building		-		-	114.35
Tracker Marine-Lebanon Plant	29105	0046	336612	Boat Building		1.35	0.04	0.00	28.72

Trautman Quarry-Pevely	29099	0012	212312	Crushed and Broken Limestone Mining and Quarrying			-		-
Trenton Municipal Utilities-Trenton Peaking Plant	29079	0027	221112	Fossil Fuel Electric Power Generation	-	1.37	0.02	0.43	0.06
Trigen Energy Corporation-Grand Avenue Station	29095	0021	221112	Fossil Fuel Electric Power Generation	4.41	1,126.55	336.49	6,294.70	3.51
Trigen-St Louis Energy Corp-Ashley Street Station	29510	0038	221112	Fossil Fuel Electric Power Generation	2.13	37.02	5.60	1.18	3.32
Trinity Industries Inc-Trinity Industries Inc	29077	0200	48711	Scenic and Sightseeing Transportation, Land		-		-	5.39
Trinity Marine Products Inc-Caruthersville - Plant #75	29155	0030	336611	Ship Building and Repairing		2.50	0.10	0.02	69.90
Trinity Marine Products Inc-Caruthersville Plant #73	29155	0049	326121	Unlaminated Plastics Profile Shape Manufacturing		0.60		0.00	51.92
True Manufacturing Co-O'Fallon	29183	0184	333415	Air-Conditioning and Warm Air Heating Equipment and Commercial and Industrial Refrigeration Equipment Manufacturing		4.29	0.36	0.03	37.09
Truman Medical Center - East-Truman Medical Center - East	29095	2154	62211	General Medical and Surgical Hospitals	0.00	0.16	0.01	0.04	0.01
Tyson Foods Inc-Sedalia Processing Plant	29159	0037	311615	Poultry Processing	9.76	38.44	1.96	0.23	2.76
U S Dept Of Energy-Kansas City Plant (Alliedsignal)	29095	0005	33422	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	0.97	16.02	0.63	0.22	9.16
U S Ringbinder Corp-Loose Leaf Metals	29510	1123	323116	Manifold Business Forms Printing					2.99
U S Silica Company-Pacific	29189	0021	212322	Industrial Sand Mining	0.13	4.18	2.96	0.03	0.23
U S Paint Div Of Grow Group-U S Paint Div Of Grow Group	29510	0097	32551	Paint and Coating Manufacturing					33.00
Unilever Bestfoods North America-Unilever Bestfoods North America	29095	0178	311421	Fruit and Vegetable Canning	0.23	10.40	0.79	0.06	0.71

Unilever Hpc Usa-Jefferson City Plant	29051	0009	325611	Soap and Other Detergent Manufacturing		3.82	0.29	0.02	0.65
Union Pacific Railroad Co-Desoto Car Shop	29099	0011	336510	Railroad Rolling Stock Manufacturing		1.77	2.52	0.01	17.56
United Cooperative Inc-Osborn Elevator	29063	0013	42451	Grain and Field Bean Merchant Wholesalers		-	-	-	0.60
United Cooperative Inc-Plattsburg Elevator	29049	0016	42472	Petroleum and Petroleum Products Merchant Wholesalers (except Bulk Stations and Terminals)		-	0.02	-	1.68
University Of Missouri - Columbia-Main Campus Sources	29019	0047	62211	General Medical and Surgical Hospitals	-	-	-	-	2.68
University Of Missouri - Columbia-Power Plant	29019	0004	221112	Fossil Fuel Electric Power Generation	51.75	823.97	90.73	8,884.75	4.78
University Of Mo - Rolla-Rolla Power Plant	29161	0006	61131	Colleges, Universities, and Professional Schools	2.46	43.78	0.49	460.67	0.29
Vance Brothers Inc-Vance Brothers Inc	29095	0037	324121	Asphalt Paving Mixture and Block Manufacturing	0.15	6.97	0.68	0.32	6.69
VANDALIA POWER PLANT-VANDALIA	29007	0041	221112	Fossil Fuel Electric Power Generation		0.39		0.03	0.04
Varco-Pruden Buildings-St Joseph	29021	0095	332311	Prefabricated Metal Building and Component Manufacturing		-			141.49
Versa-Tech Inc-Fredericktown	29123	0022	32614	Polystyrene Foam Product Manufacturing	-	-	-	-	55.27
Vertex Plastics Inc-Kearney	29047	0175	326191	Plastics Plumbing Fixture Manufacturing					1.39
Vessell Mineral Products-Vessell Mineral Products	29187	0002	327124	Clay Refractory Manufacturing		66.25	5.51	4.63	-
Veterans Admin Medical Center-Jefferson Barracks Drive	29189	1052	62211	General Medical and Surgical Hospitals	-	-	-	-	0.89
Von Hoffman Press Inc-Jefferson City	29051	0028	323117	Books Printing					38.88
W R Meadows Inc-Boonville	29053	0003	321219	Reconstituted Wood Product Manufacturing		25.84		2.93	2.01
W W Wood Products-	29207	0019	321113	Sawmills		3.77	0.11	0.02	256.71

Dudley									
Walsworth Publishing Company-Marceline	29115	0001	323110	Commercial Lithographic Printing	0.02	0.21	0.02	0.00	55.68
Warrenton Copper Llc-Warrenton	29219	0028	331314	Secondary Smelting and Alloying of Aluminum	0.77	10.13	0.86	0.06	3.64
Washington Univ Medical School-Boiler Plant	29510	0040	62211	General Medical and Surgical Hospitals	0.18	38.06	2.86	1.58	2.00
WASHINGTON UNIVERSITY-HILLTOP CAMPUS	29510	2833	611310	Colleges, Universities, and Professional Schools	0.01	1.26	0.10	0.01	0.07
Washington University-Millbrook Blvd	29189	0042	61131	Colleges, Universities, and Professional Schools	0.70	22.45	0.45	0.25	1.24
Water Supply Division-Kansas City	29047	2227	22131	Water Supply and Irrigation Systems	0.06	2.31	0.14	0.01	0.12
Waterloo Industries Inc-Waterloo Industries Inc	29159	0012	332117	Powder Metallurgy Part Manufacturing		7.13		0.03	51.32
Wayne B Smith Inc-Wayne B Smith Inc	29163	0008	212312	Crushed and Broken Limestone Mining and Quarrying		0.29	0.29	0.00	0.37
WEST CENTRAL CONCRETE LLC-SNOW RD	29159	0058	327320	Ready-Mix Concrete Manufacturing		-	-	-	-
West Plains City Power Station	29091	0068	221112	Fossil Fuel Electric Power Generation	0.00	0.01	0.00	0.00	0.00
Weyerhaeuser-St Joseph	29021	0046	322211	Corrugated and Solid Fiber Box Manufacturing	0.71	5.06	2.35	0.03	2.32
White Oak Gin Company Inc-White Oak Gin Company Inc	29069	0010	115111	Cotton Ginning		1.22	0.27	0.00	0.06
Whiteman Air Force Base-Whiteman	29101	0009	92811	National Security	0.10	28.25	0.17	3.46	8.55
Whitmire Microgen Research Laboratory-Kirkwood	29189	1204	32532	Pesticide and Other Agricultural Chemical Manufacturing					5.91
Williamsville Materials-Poplar Bluff	29023	0003	212321	Construction Sand and Gravel Mining			0.03		-
Wilson Trailer Sales Inc-Moberly	29175	0061	336212	Truck Trailer Manufacturing	0.01	0.25	0.35	0.00	14.18
Wincup-Higginsville Plant	29107	0010	325211	Plastics Material and Resin Manufacturing	0.21	6.42		0.04	66.83

Wolcott & Lincoln Jackson Llc-Kansas City	29095	0026	42451	Grain and Field Bean Merchant Wholesalers					
Woodbridge Corporation-Kansas City Foam Div	29165	0028	32614	Polystyrene Foam Product Manufacturing	0.01	1.44	0.11	0.01	83.66
Woodbridge Corporation-St Peters	29183	0129	32614	Polystyrene Foam Product Manufacturing	-	-	-		49.74
Woodpro Cabinetry Inc-Cabool	29215	0060	33711	Wood Kitchen Cabinet and Countertop Manufacturing		1.09			36.26
Missouri Total					**1,655.45**	**129,952.55**	**8,997.41**	**367,370.10**	**17,432.49**

Appendix E-2

Nonroad 2008 Inventory Documentation

- Documentation of the EPA Region 7 NonRoad Emissions Modeling Protocol
- Documentation of the Commercial Marine Vessel Component of the National Emissions Inventory Methodology
- Documentation of the Locomotive Component of the National Emissions Inventory Methodology
- Documentation of the Aircraft Component of the National Emissions Inventory Methodology

Ozone and PM2.5 Maintenance Plan Work Share
St. Louis, Missouri-Five County Area
Nonroad modeling for inventory development

For this modeling exercise, the EPA Region 7 utilized the NONROAD2008a model to calculate an ozone and PM2.5 nonroad inventory in five counties in the St. Louis nonattainment area for the 1997 PM2.5 annual and 1997 Ozone NAAQS. The NONROAD2008a model provides the emissions for all nonroad source categories except aircraft, commercial marine vessel, and railroad locomotive.

In running the NONROAD model, the user must specify a modeling scenario by the inventory year, geographic area (nation, state, county), period (annual, seasonal, monthly, daily), and the equipment categories. For all other required variables, the NONROAD model provides default input values. For the following modeling exercises, fuel parameters (Reid Vapor Pressure (RVP), oxygen weight, sulfur content, ethanol volume and market percentage) and temperatures for each geographical area were provided by MDNR in lieu of the modeling default settings for more accurate results (see attachment).

Ozone Precursor Emissions

Ozone Methodology/Input Data
Nonroad mobile source emissions for the years of 2008 and 2022 are calculated using the EPA approved model, NONROAD2008a, and included Franklin County, Jefferson County, St. Charles County, St. Louis County and St. Louis City in St. Louis, Missouri.
For modeling ozone precursor pollutants, temperatures and fuel characteristics representative of each county during an ozone summer weekday, were entered into NONROAD2a and modeled to calculate an ozone season weekday emissions for nonroad sources. Minimum, maximum, and average temperatures for a typical summer season were provided by MDNR (see attachment). Modeling input parameters are as follows:

Table B-38
NONROAD Model Temperature & Fuel Characteristic Input Values by County

County	Oxygen Weight %	RVP psi	Gasoline Sulfur %	Diesel Sulfur	Marine Diesel Sulfur %	CNG / LPG Sulfur %	Temperatures		
							Min.	Max.	Avg.
Franklin	0.35	7	0.0049	0.0355	0.0402	0.003	61.8	90	75.96
Jefferson	0.35	7	0.0049	0.0355	0.0402	0.003	61	88.6	75.16
St. Charles	0.35	7	0.0049	0.0355	0.0402	0.003	62.2	89.2	76.15
St. Louis	0.35	7	0.0049	0.0355	0.0402	0.003	64.1	89.5	77.1
St. Louis City	0.35	7	0.0049	0.0355	0.0402	0.003	65.1	89.8	77.72

Direct $PM_{2.5}$ / $PM_{2.5}$ Precursor Emissions

Methodology/Input Data

Nonroad mobile source emissions for the years of 2008 and 2022 were calculated using the EPA approved model, NONROAD2008a, and included Franklin County, Jefferson County, St. Charles County, St. Louis County and St. Louis City in St. Louis, Missouri.

For modeling $PM_{2.5}$ and $PM_{2.5}$ precursor pollutants, temperatures and fuel characteristics representative of each county for each of the four seasons (winter, spring, summer, and fall) were entered into the NONROAD2008a model as input parameters. The highest temperature and lowest temperature from each three month period (December-February, March-May, June-August, and September-November) were averaged to create a seasonal average temperature. Those seasonal average temperatures, seasonal minimum and seasonal maximum temperatures were then utilized in the model, including the fuel parameters, to calculate the total emissions for each county and season. Summing the emissions of all four seasons for each county gave the total annual emissions. The temperatures and fuel characteristics representative of each county were provided by MDNR. Modeling input parameters are as follows:

Table B-39
NONROAD Model Temperature & Fuel Characteristic Input Values by County & Season

County	Season	Oxygen Weight %	RVP psi	Gasoline Sulfur %	Diesel Sulfur	Marine Diesel Sulfur %	CNG / LPG Sulfur %	Temperatures		
								Min.	Max.	Avg.
Franklin	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	19.7	47	33.4
Franklin	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	33.5	76.9	55.2
Franklin	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	61.8	90	75.9
Franklin	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	34.3	80.9	57.6
Jefferson	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	18.6	45.6	32.1
Jefferson	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	32.4	75.8	54.1
Jefferson	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	61	88.6	74.8
Jefferson	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	33.6	79.8	56.7
St. Charles	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	18.7	43.9	31.3
St. Charles	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	32.3	75.8	54.1
St. Charles	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	62.2	89.2	75.7
St. Charles	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	34.8	80.3	57.6
St. Louis	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	19.8	44.2	32
St. Louis	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	34.5	76.1	55.3
St. Louis	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	64.1	89.5	76.8
St. Louis	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	35.5	80.2	57.9
St. Louis City	Winter	0.35	11.5	0.0043	0.0355	0.0402	0.003	20.7	45.5	32.6
St. Louis City	Spring	0.35	9	0.0046	0.0355	0.0402	0.003	35.7	76.4	56
St. Louis City	Summer	0.35	7	0.0049	0.0355	0.0402	0.003	65.1	89.8	77.5
St. Louis City	Autumn	0.35	9	0.0046	0.0355	0.0402	0.003	36.6	80.4	58.5

QA/QC
Quality control and quality assurance were conducted throughout this nonroad modeling process. Data collected from various data sources were verified and correctly entered or transcribed into the model. In some instances, input values, i.e., temperatures and fuel values were double and/or triple checked for accuracy to insure they corresponded to the data supplied by MDNR. In addition, a spot-checking of the modeling results, including rerunning the model for those results in question, was performed to insure reliability.

Nonroad Modeling Results Summary Tables

Table B-40

Ozone Typical Summer Day Emissions Tons / Day						
County	**NO_X**		**VOC**		**CO**	
	2008	**2022**	**2008**	**2022**	**2008**	**2022**
Franklin	2.93	1.81	3.59	1.55	23.56	19.76
Jefferson	2.89	1.27	3.64	2.06	38.72	34.77
St. Charles	7.61	3.33	7.49	3.95	85.2	73.93
St. Louis CO	20.55	9.08	27.22	17.85	424.3	388.64
St. Louis City	2.86	1.19	3.97	2.2	65.9	56.28
Total	36.84	16.68	45.91	27.61	637.7	573.38

Table B-41

Direct PM2.5 and PM2.5 Precursor Pollutant County Totals (Tons per Year)										
County	**$PM_{2.5}$**		**PM_{10}**		**SO_2**		**NO_X**		**VOC**	
	2008	**2022**	**2008**	**2022**	**2008**	**2022**	**2008**	**2022**	**2008**	**2022**
Franklin	64.73	39.04	67.91	34.72	11.8	10.75	665.82	233.09	945.16	386.31
Jefferson	73.6	52.26	77.19	55.05	14.6	15.33	726.68	319.36	929.83	544.67
St. Charles	171.98	120.7	179.8	126.8	37.1	39.01	1893.6	827.95	1948.52	1031.57
St. Louis	530.64	444.8	558.1	471.3	99.3	106.99	5354.4	2323.2	6470.16	4457.23
St. Louis City	53.25	46.35	55.98	49.02	9.74	10.93	794.9	341.3	1066	628.57

Modeling File Naming Convention
Ozone: pollutant-county-year
PM2.5: pollutant-county-year-season

OZONE Modeling Files Example: 03Frnk08 = **(Ozone Franklin County 2008)**
O3 = Ozone
08 = 2008
22 = 2022
Frnk = Franklin County
Jeff = Jefferson County
StCh = St. Charles County
StLC = St. Louis County
StCi = St. Louis City

<u>PM2.5 Modeling Files</u> Example: PMFr22wi = **(PM2.5 Franklin County 2022 winter)**
PM = PM2.5
08 = 2008
wi = winter
sp = spring
su = summer
au = autumn
Fr = Franklin County
Je = Jefferson County
Ch = St. Charles County
SL = St. Louis County
SC = St. Louis City

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Documentation for Aircraft Component of the National Emissions Inventory Methodology

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1.0 INTRODUCTION

1.1 What is the National Emission Inventory?

The National Emission Inventory (NEI) is a comprehensive inventory covering all anthropogenic sources of criteria pollutants and hazardous air pollutants (HAPs) for all areas of the United States. The NEI was created by the U.S. Environmental Protection Agency's Emission Inventory and Analysis Group (EIAG) in Research Triangle Park, North Carolina. The NEI will be used to support air quality modeling and other activities. To this end, the EPA established a goal to compile comprehensive emissions data in the NEI for criteria and HAPs for mobile, point, and nonpoint sources. This report presents an overview of how emission estimates for the aircraft component of the NEI were compiled.

1.2 Why Did the EPA Create the NEI?

The Clean Air Act (CAA), as amended in 1990, includes mandates for the EPA related to criteria and hazardous air pollutants. The CAA defines criteria pollutants as being one of the following air pollutants:

- Carbon monoxide (CO);
- Sulfur oxides (SO_x);
- Nitrogen oxides (NO_x);
- Ozone; and
- Particulate matter (PM).

Hazardous air pollutants are also delineated in the CAA, see *http://www.epa.gov/ttn/atw/188polls.html* for a complete list of regulated pollutants and their chemical abstract service [CAS] numbers.

The CAA requires the EPA to identify emission sources of these pollutants, quantify emissions, develop regulations for the identified source categories, and assess the public health and environmental impacts after the regulations are put into effect. The NEI is a tool that EPA can use to meet the CAA mandates. In this report, criteria and HAP emission estimates are discussed for aircraft sources.

1.3 How is the EPA Going to Use This Version of the NEI?

It is anticipated that the emission inventory developed from this effort will have multiple end uses. The data have been formatted according to protocols established for the EPA's NEI submittals. The common data structure on which the NEI platform is based will allow the NEI emission data to be transferred to multiple end-users for a variety of purposes.

The criteria and HAP emission estimates developed for the NEI will be used to evaluate air pollution trends, air quality modeling analysis, and impacts of potential regulations.

1.4 Report Organization

Following this introduction, Section 2.0 provides information on how the national aircraft emission estimates were developed. This inventory effort was coordinated by the EPA's Office of Transportation and Air Quality (OTAQ) and EIAG. The appendixes were created to provide the supporting references from OTAQ.

2.0 DEVELOPMENT OF THE AIRCRAFT COMPONENT FOR THE NEI

2.1 How does this aircraft study fit into the NEI?

The NEI was developed to include all point, nonpoint (sometimes referenced as “area”), and mobile sources. The approaches used in the point and nonpoint source categories are documented in other reports. Table 2-1 summarizes the approaches used to estimate emissions from all nonroad sources included in the NEI program. Those source categories and years that are included in this report are noted in bold.

The scope of this inventory component of the NEI was to compile criteria and HAP emissions data for aircraft operating in United States air space. In this effort, national emission estimates were often developed as point sources for each airport. The methodologies used to estimate emissions are discussed in this report.

The target inventory area includes every state in the United States and every county within a state, including Washington, DC, Puerto Rico, and US Virgin Islands. There are no boundary limitations pertaining to traditional criteria pollutant nonattainment areas or to designated urban areas. The pollutants inventoried included all criteria pollutants (and the 188 HAPs identified in Section 112(b) of the CAA).

In addition to numerous specific chemical compounds, the list of 188 HAPs includes several compound groups [e.g., individual metals and their compounds, polycyclic organic matter (POM)]; the NEI includes emission estimates for the individual compounds wherever possible. Many of the uses of the NEI depend upon data (e.g., toxicity) for individual compounds within these groups rather than aggregated data on each group as a whole.

The intent in presenting the following emission inventory approach is to provide sufficient and transparent documentation such that states and local agencies can use these approaches, in conjunction with their specific local activity data to develop more accurate and comparable emission estimates in future submittals.

This documentation is not meant to provide an exhaustive analysis on the derivation of all the inputs. For example, an emission factor used for a national estimate may be given in the appendix, but the source test data that were evaluated to obtain this factor may not be presented or discussed. The goal of the documentation provided is to show in a brief and concise manner how a given estimate was derived.

Table 2-1a. Methods Used to Develop Emission Estimates for Onroad Vehicle Sources
(Years addressed in this report are noted in bold print)

Base Year(s)	Pollutant(s)	Geographic Area	Emission Estimation Method
2008	All Criteria, HAPs	US, Puerto Rico, Virgin Islands	Emission estimates for all pollutants were developed using EPA's National Mobile Inventory Model (NMIM), which uses MOBILE6 (specifically, M6203ChcOxFixNMIM.exe) to calculate onroad emission factors. Where States provided alternate onroad MOBILE6 inputs or VMT, these data replaced EPA default inputs. Default VMT is based on FHWA 2008 data and 2008 Census population estimates.
2005	All Criteria, HAPs	US, Puerto Rico, Virgin Islands	Emission estimates for all pollutants were developed using EPA's NMIM, which uses MOBILE6 to calculate onroad emission factors. Where States provided alternate onroad MOBILE6 inputs or VMT, these data replaced EPA default inputs. Default VMT is based on FHWA 2005 data and 2005 Census population estimates.
2002	All Criteria, HAPs	US, Puerto Rico, Virgin Islands	Emission estimates for all pollutants were developed using EPA's NMIM, which uses MOBILE6 to calculate onroad emission factors. Where States provided alternate onroad MOBILE6 inputs or VMT, these data replaced EPA default inputs. California-supplied emissions data which replaced default EPA emission estimates for this state. Default VMT is based on FHWA 2002 data and population data from 2000 Census.
2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	California	Emissions and VMT provided by California at county/vehicle type level; State-provided emissions expanded to county/SCC level by EPA.
2001	NH_3	California	Calculated at State/county/SCC level by month using MOBILE6 emission factors with State-provided VMT data.
2001	All Criteria	AL; CO; ME; MA; MS; OR; UT; VA; WV; Maricopa County, AZ; Hamilton County, TN	State-provided VMT grown to 2001; emissions calculated by EPA using MOBILE6 emission factors.
2001	All Criteria	Rest of US	Calculated at State/county/SCC level by month using MOBILE6 and FHWA-based VMT.
1999	All Criteria	AL; ME; MA; MS; UT; VA; WV; Maricopa County, AZ; Hamilton County, TN	Calculated at State/county/SCC level by month using MOBILE6; State-provided VMT data used.
1999	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	California	Emissions and VMT provided by California at county/vehicle type level; State-provided emissions expanded to county/SCC level by EPA.
1999	NH_3	California	Calculated at State/county/SCC level by month using MOBILE6 emission factors with State-provided VMT data.
1999	PM_{10} Exhaust	Colorado	PM_{10} emissions and VMT provided by State.

Table 2-1a. Methods Used to Develop Emission Estimates for Onroad Vehicle Sources
(Years addressed in this report are noted in bold print)

Base Year(s)	Pollutant(s)	Geographic Area	Emission Estimation Method
1999	VOC, NO_x, CO, SO_2, PM_{10} brake and tire wear, $PM_{2.5}$, NH_3	Colorado	Calculated at State/county/SCC level by month using MOBILE6; State-provided VMT data used.
1999	All Criteria	Oregon	Emissions and VMT provided by Oregon at county/vehicle type level; State-provided emissions expanded to county/SCC level by EPA.
1999	All Criteria	Rest of US, Puerto Rico, and US Virgin Islands	Calculated at State/county/SCC level by month using MOBILE6 and FHWA-based VMT.
1999	HAPs	California	HAP emissions and VMT provided by California at county/vehicle type level; emissions allocated to SCC level by EPA.
1999	HAPs	Rest of US, Puerto Rico, and US Virgin Islands	MOBILE6 emission factors calculated at State/county/SCC level by season; applied to FHWA-based VMT.
1997-1998	All Criteria	US	2-step linear interpolation at State/count/SCC level based on 1996 and 1999 State/count/SCC level data.
1990, 1996	HAPs	US	MOBILE6 emission factors calculated at State/county/SCC level by season; applied to Federal Highway Administration (FHWA)-based vehicle miles traveled (VMT).
1991-1995	All Criteria	US	Linear interpolation at State/count/SCC level based on 1990 and 1996 State/count/SCC level data.
1988-1989	All Criteria	US	Linear interpolation at State/count/SCC level based on 1987 and 1990 State/count/SCC level data.
1979-1986	All Criteria	US	Linear interpolation at State/count/SCC level based on 1978 and 1987 State/count/SCC level data.
1978, 1987, 1990, 1996, 2000	All Criteria	US	Calculated at State/county/source classification code (SCC) level by month using MOBILE6, no State data incorporated.
1970, 1975	All Criteria	US	Linear extrapolation at national vehicle type level based on 1978 and 1987 national data.

Table 2-1b. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
NONROAD Categories			
Nonroad Gasoline, Diesel, LPG, CNG	2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3, & HAPs	Emission estimates for NONROAD model engines were developed using EPA's National Mobile Inventory Model (NMIM), which incorporates NONROAD2008. Where states provided alternate NMIM nonroad inputs, these data replaced EPA default inputs.
	2005	VOC, NO_x, CO, SO_2, , PM_{10}, $PM_{2.5}$, NH_3, & HAPs	Emission estimates for NONROAD model engines were developed using EPA's NMIM, which incorporates NONROAD2005. Where States provided alternate nonroad inputs, these data replaced EPA default inputs.
	2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3, & HAPs	Emission estimates for NONROAD model engines were developed using EPA's NMIM, which incorporates NONROAD2004. Where states provided alternate nonroad inputs, these data replaced EPA default inputs. State-supplied emissions data also replaced default EPA emission estimates.
	1999	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) an updated 1999 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. Replaced State-submitted data for California for all NONROAD model categories; Pennsylvania for recreational marine and aircraft ground support equipment, and Texas for select equipment categories.
	1996, 1997, 1998, 2000 & 2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated year-specific national and California inventories, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios and California county-to-state ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. California results replace the diesel equipment emissions generated from prior application of county-to-national ratios.

Table 2-1b. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Nonroad Gasoline, Diesel, LPG, and CNG (Continued)	1991-1995	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3	Using 1990 and 1996 county-level emissions inventories, estimated emissions using linear interpolation of national emissions between 1990 and 1996. From these emissions, calculated the average annual growth rate for each pollutant/SCC combination for each year, and then applied the growth factors to 1990 county-level emissions to estimate 1991-1995 emissions.
	1990	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated 1990 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model.
	1986, 1988, & 1989	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3	Using 1985 and 1990 county-level emissions inventories, estimated emissions using linear interpolation of national emissions between 1985 and 1990. From these emissions, calculated the average annual growth rate for each pollutant/SCC combination for each year, and then applied the growth factors to 1985 county-level emissions to estimate 1986-1989 emissions.
	1987	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using EPA's draft Lockdown C NONROAD model (dated May 2002), developed updated national emissions for 1987 by running 4 seasonal NONROAD model runs to estimate annual criteria pollutant emissions. Also performed national NONROAD model runs to estimate typical summer weekday emissions.
	1985	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated 1985 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model.
	1970, 1975, 1978, & 1980	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using EPA's draft Lockdown C NONROAD model (dated May 2002), developed updated national emissions for all years by running 4 seasonal NONROAD model runs to estimate annual criteria pollutant emissions. Also performed national NONROAD model runs to estimate typical summer weekday emissions.

Table 2-1b. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Nonroad Gasoline, Diesel, LPG, and CNG (Continued)	1996, 1997, 1998, 1999, 2000, & 2001	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD. NH_3 emissions for California were also recalculated using updated diesel fuel consumption values generated for California-specific runs, and assuming the 1996 county-level distribution.
	1985 & 1990	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD.
	1987	NH_3	Obtaining 1987 national fuel consumption estimates from Lockdown C NONROAD model and multiplying by NH_3 emission factors.
	1970, 1975, 1978, & 1980	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model and multiplying by NH_3 emission factors.
	1990, 1996, & 1999	HAPs	Speciation profiles applied to county VOC and PM estimates. Metal HAPs were calculated using fuel and activity-based emission factors. Some state data were provided and replaced national estimates. (2003)
Aircraft			
Commercial Aircraft	**2008**	**Criteria and HAPs**	**Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) - Version 5.1.was run using BTS T-100 LTO data. (2009)**
	2002 and 2005	Criteria and HAPs	Federal Aviation Administration (FAA) Emissions and Dispersion and Modeling System (EDMS) was run for criteria pollutants, VOC and PM emissions were speciated into HAP components. (2004)
	1990, 1996, 1999, 2000, 2001	VOC, NO_x, CO, SO_x	Input landing and take-off (LTO) data into FAA EDMS. National emissions were assigned to airports based on airport specific LTO data and BTS GIS data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999	HAPs	Speciation profiles were applied to VOC estimates to get national HAP estimates. State data replaced national estimates. (2003)
General Aviation, Air Taxis	**2008**	**Criteria and HAPs**	**Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) - Version 5.1.was run using BTS T-100 LTO for aircraft identified as Air taxis. (2010)** **Used FAA LTO data from TAF and OTAQ provided activity data for smaller airports derived from FAA 5010 master plans. EPA approved generic emission factors for criteria estimates. Speciation profiles were applied to VOC and PM estimates to get national HAP estimates. (2010)**

Table 2-1b. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
General Aviation, Air Taxis (Continued)	2005	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2002 emissions for approximately 4,000 largest airports were calculated via EDMS and SIP guidance and included in the 2005 NEI as point sources. Only airports in FAA's T100 and TAF databases were included. State point source submittals were incorporated.
	1978, 1987, 1990, 1996, 1999, 2000, 2001, & 2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data and EPA approved emission factors for criteria estimates. Speciation profiles were applied to VOC estimates to get national HAP estimates. State data replaced national estimates. (2004)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999, & 2002	HAPs	Used FAA LTO data and EPA approved emission factors for criteria estimates. Speciation profiles were applied to VOC estimates to develop national HAP estimates. (2004)
	1990, 1996, 1999, & 2002	Pb	Used Department of Energy (DOE) aviation gasoline usage data with lead concentration of aviation gasoline. (2004)
	1996	NH_3	Applied NH_3 emissions factors to 1996 national jet fuel and aviation gasoline consumption estimates.
Military Aircraft	**2008**	**VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$**	**Used FAA LTO data as reported in TAF and EPA approved emission factors for criteria estimates. Representative HAP profiles were not readily available, therefore HAP estimates were not developed. (2010)**
	2005	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2002 emissions were included in the 2005 NEI as point sources similar to other TAF reported data.
	1978, 1987, 1990, 1996, 1999, 2000, 2001, 2002, 2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data as reported in TAF and EPA approved emission factors for criteria estimates. Representative HAP profiles were not readily available, therefore HAP estimates were not developed.
	1970-1998	VOC, NO_x, CO, SO_X, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
Auxiliary Power Units and Ground Support Equipment	**2008**	**VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, HAPs**	**Federal Aviation Administration (FAA) Emissions and Dispersion and Modeling System (EDMS) - Version 5.1.was run using BTS T-100 LTO data. (2009)**
	2002 and 2005	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, HAPs	Computed via NONROAD2005 model runs.
	1985-2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Grew 1996 emissions to each year using LTO operations data from the FAA. Estimation methods prior to 1996 reported in EPA, 1998.

Table 2-1b. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Unpaved Airstrips[1]	1985-2001	PM_{10}, $PM_{2.5}$	Grew 1996 emissions to each year using SIC 45-Air Transportation growth factors, consistent with the current draft version of EGAS. Estimation methods prior to 1996 reported in EPA, 1998.
Aircraft Refueling[1]	1985-2001	VOC	Grew 1996 emissions to each year using SIC 45-Air Transportation growth factors, consistent with the current draft version of EGAS. Estimation methods prior to 1996 reported in EPA, 1998.
Commercial Marine Vessel (CMV)			
All CMV Categories	2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	OTAQ provided CAP emission estimates for all CMV categories. Note that the SCCs for this category have changed such that the Diesel category refers to smaller vessels (Category 1 and 2) using distillate fuels and the Residual category refers to larger (Category 3) vessels using a blend of residual fuels. Emissions were allocated to segments using GIS shapefiles and adjusted based on limited state data (2010)
	2008	HAPs	OTAQ's 2008 estimates were speciated into HAP components using SEPA profiles (2009)
CMV Diesel	2002 and 2005	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2001 Estimates carried over. Used state data when provided. (2004)
		HAPs	1999 Estimates carried over. Used state data when provided. (2004)
	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$	Used criteria emission estimates in the background document for marine diesel regulations for 2000. Adjusted 2000 criteria emission estimates for other used based on fuel usage. Emissions were disaggregated into port traffic and underway activities. Port emissions were assigned to specific ports based on amount of cargo handled. Underway emissions were allocated based on Army Corp of Engineering waterway data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999	HAPs	VOC and PM emission estimates were speciated into HAP components. State data replaced national estimates. (2003)
	1996	NH_3	Applied NH_3 emissions factors to 1996 distillate and residual fuel oil estimates (i.e., as reported in EIA, 1996).
	1990-1995	NH_3	Estimation methods reported in EPA, 1998.

Table 2-1b. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
CMV Steam Powered	2005	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$, HAPs	2002 estimates grown to 2005 (2008).
	2002	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$, HAPs	2002 based estimates were developed for port and underway category 3 (C3) vessels as part of a rulemaking effort. Emissions were developed separately for near port and underway emissions. For near port emissions, inventories for 2002 were developed for 89 deep water and 28 Great Lake ports in the U.S. The Waterway Network Ship Traffic, Energy, and Environmental Model (STEEM) was used to provide emissions from ships traveling in shipping lanes between and near individual ports (2008)
	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$	Calculated criteria emissions based on EPA SIP guidance. Emissions were disaggregated into port traffic and under way activities. Port emissions were assigned to specific ports based on amount of cargo handled. Underway emissions were allocated based on Army Corp of Engineering waterway data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, & 1999	HAPs	VOC and PM emission estimates were speciated into HAP components. State data replaced national estimates. (2003)
Military Marine	1997-2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Applied EGAS growth factors to 1996 emissions estimates for this category.
CMV Coal,[2] CMV, Steam powered, CMV Gasoline[2]	1997-1998	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Applied EGAS growth factors to 1996 emissions estimates for this category.
CM Coal, CMV, Steam powered, CMV Gasoline, Military Marine	1991-1995	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Estimation methods reported in EPA, 1998.
Locomotives			
Class I, II, III and Yard operations	2008	VOC, NO_x, CO, PM_{10}, $PM_{2.5}$, SO_x & HAPs	Criteria emission estimates were provided to EPA by ERTAC. These data were assigned to individual railway segments using DOT shapefiles and guidance from ERTAC. HAP emissions were calculated by applying speciation profiles to VOC and PM estimates. (2010)

Table 2-1b. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Class I, Class II, Commuter, Passenger, and Yard Locomotives	1978, 1987, 1990, 1996, 1999, 2000, 2000, 2002, & 2005	VOC, NO_x, CO, PM_{10}, $PM_{2.5}$	Criteria pollutants were estimated by using locomotive fuel use data from DOE EIA and available emission factors. County-level estimates were obtained by scaling the national estimates with the rail GIS data from DOT. State data replaced national estimates. (2004)
	1978, 1987, 1990, 1996, 1999, 2000, 2001, 2002, & 2005	SO_2	SO_x emissions were calculated by using locomotive fuel use and fuel sulfur concentration data from EIA. County-level estimates were obtained by scaling the national estimates with the county level rail activity data from DOT. State data replaced national estimates. (2004)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999, & 2002	HAPs	HAP emissions were calculated by applying speciation profiles to VOC and PM estimates. County-level estimates were obtained by scaling the national estimates with the county level rail activity from DOT. State data replaced national estimates. (2004)
	1997-1998	NH_3	Grew 1996 base year emissions using EGAS growth indicators.
	1996	NH_3	Applied NH_3 emissions factors to diesel consumption estimates for 1996.
	1990-1995	NH_3	Estimation methods reported in EPA, 1998.

Notes:

* Dates included at the end of Estimation Method represent the year that the section was revised.

1 Emission estimates for unpaved airstrips and aircraft refueling are included in the area source NEI, since they represent non-engine emissions.

2 National Emission estimates for CMV Coal and CMV Gasoline were not developed though states and local agencies may have submitted estimates for these source categories.

EPA, 1998. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Factors and Inventory Group, National Air Pollutant Emission Trends, Procedures Document, 1900–1996, EPA-454/R-98-008. May 1998.

2.2 What are Aircraft Sources?

The aircraft source category includes all aircraft types used for public, private, and military purposes. This includes four types of aircraft (EPA, 1992): 1) Commercial; 2) Air Taxis; 3) General Aviation; and 4) Military.

Commercial aircraft include those used for transporting passengers, freight, or both. Commercial aircraft tend to be larger aircraft powered with jet engines. Air Taxis (AT) carry passengers, freight, or both, but usually are smaller aircraft and operate on a more limited basis than the commercial carriers. General Aviation (GA) includes most other aircraft used for recreational flying and personal transportation. Aircraft that support business travel, usually on an unscheduled basis, are included in the category of general aviation.

The national AT and GA fleet includes both jet and piston-powered aircraft. Most of the AT and GA fleet are made up of piston powered aircraft, though smaller business jets can also be found in these categories. According to a 2008 Federal Aviation Administration GA and AT Activity Survey, 66% of all GA and AT activity are powered by piston-powered aircraft and 34% are jet (or turbine) driven. EPA has used this estimate as a national-scale default value in recently published studies investigating lead emissions from aviation sources (EPA, 2008). The piston powered aircraft tend to have higher VOC, PM, and CO emissions and lower NO_X emissions than larger jet-powered aircraft (EPA, 1992). Military aircraft cover a wide range of aircraft types such as training aircraft, fighter jets, helicopters, and jet- and a small number of piston powered planes of varying sizes.

It should be noted that this inventory effort also includes criteria and Hazardous Air Pollutants (HAP) emission estimates for aircraft Auxiliary Power Units (APU) and aircraft Ground Support Equipment (GSE) typically found at airports, such as aircraft refueling vehicles, baggage handling vehicles, and equipment, aircraft towing vehicles, and passenger buses.

2.3 What Pollutants are Included in the National Emission Estimates for Aircraft?

Emissions estimates were developed for all criteria pollutants including volatile organic compounds (VOC), nitrogen oxides (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$) and hazardous air pollutants (HAP) (Cook, 1997; Cook, 1998; EPA/FAA, 2009). The HAPs that are included in the national aircraft inventory are shown in Table 2-2 and are based on available test data and accepted emission estimation procedures.

Table 2-2. Aircraft Pollutant List

1,3-Butadiene	Carbon Dioxide	Naphthalene
1-Methylnaphthalene*	Carbon Monoxide	Nitrogen Oxides
2,2,4-Trimethylpentane	Chrysene*	O-xylene*
2-Methylnaphthalene*	Cumene*	Phenanthrene*
Acenaphthene*	Dibenzo[a,h]Anthracene*	Phenol
Acenaphthylene*	Ethyl Benzene	PM_{10} Primary
Acetaldehyde	Fluoranthene*	$PM_{2.5}$ Primary
Acrolein	Fluorene*	Propionaldehyde
Anthracene*	Formaldehyde	Pyrene*
Benz[a]Anthracene*	Hexane*	Styrene
Benzene	Indeno[1,2,3-c,d]Pyrene*	Sulfur Dioxide
Benzo[a]Pyrene*	Lead	Toluene
Benzo[b]Fluoranthene*	Methane*	VOCs
Benzo[g,h,i,]Perylene*	Methanol*	Xylene
Benzo[k]Fluoranthene*	M-xylene*	

* Added to 2008 Inventory

2.4 How Were the Aircraft Emissions Estimated?

EPA has developed guidance for inventorying aircraft emissions associated with an aircraft's landing and takeoff (LTO) cycle. The cycle begins when the aircraft approaches the airport on its descent from cruising altitude, lands, taxis to the gate, and idles during passenger deplaning. It continues as the aircraft idles during passenger boarding, taxis back out onto the runway for subsequent takeoff, and ascent (climbout) to cruising altitude. Thus, the five specific operating modes in an LTO are (EPA, 1992): 1) Approach; 2) Taxi/idle-in; 3) Taxi/idle-out; 4) Takeoff; and 5) Climbout.

The LTO cycle provides a basis for calculating aircraft emissions. During each mode of operation, an aircraft engine operates at a fairly standard power setting for a given aircraft category. Emissions for one complete cycle are calculated using emission factors for each operating mode for each specific aircraft engine combined with the typical period of time the aircraft is in the operating mode.

On March 20, 2009, the EPA posted preliminary LTO data intended to be will use to calculate emissions for review prior to developing the aircraft inventory. State and local agencies were encouraged to review the materials posted at ftp://ftp.epa.gov/EmisInventory/2008_nei/ and provide comments on any necessary corrections to:

- Airport names and locations for approximately 20,000 airports to be included in the Emission Inventory System (EIS) facility inventory;

- Landing and Takeoff (LTO) information that will be used to estimate emissions for each airport;

- Aircraft/engine combinations to link to FAA LTO data including default assumptions and AircraftEngineCodeTypes for EIS submittals; and

- Lead estimates and lead estimation methodology.

This preliminary review by state, local, and tribal groups provided information that EPA used to improve EPA's work. EPA received comments from four states (i.e., Minnesota Pollution Control Agency - Environmental Analysis and Outcomes Division; New Jersey Department of Environmental Protection; Bureau of Air Management, Connecticut Department of Environmental Protection; and Wisconsin Department of Natural Resources (specifically related to Volk Field Air National Guard Base (VOK) in Juneau County Wittman Regional Airport (OSH)) and three local agencies (i.e., Mecklenburg County North Carolina; Ventura County California Air Pollution Control District (Specifically related to Oxnard (OXR), Camarillo (CMA) and Santa Paula (SZP); and - Regional Air Pollution Control Agency (Dayton and Montgomery County Ohio)).

Criteria emission estimates are presented here for four different aircraft types: commercial air carrier, air taxis, general aviation, and military. HAP emission estimates were developed for all aircraft types.

Emissions for commercial air carriers for which detailed aircraft-specific activity data were available, were calculated differently than the other three aircraft categories (See Figure 2-1). Criteria and HAP emissions were estimated for commercial aircraft by applying aircraft make and model (e.g., Boeing 747-200 series) specific LTO activity data from *FAA's Form 41, Schedules T100 and T100(f) Air Carrier Data to the FAA's Emissions and Dispersion Modeling System (EDMS), Version 5.1* (DOT, 2008). It should be noted that due to the reporting requirements of T-100, only commercial activities are included in the dataset, and therefore does not include activity data for non-air carrier applications such as general aviation and military. This distinction lead to a revision to EPA's original aircraft crosswalk table, also known as the aircraft engine type code, used to match aircraft to EDMS aircraft and to account for double counting between the T-100 data and the TAF data. In the revised crosswalk, aircraft that were previously considered general aviation and military based on aircraft model were changed to air taxi and commercial air carrier aircraft types based on the definition of air taxis (i.e., any aircraft that was not considered an air taxi was classified as an air carrier aircraft). The FAA reviewed the cross walk tables and made additional changes that moved some of the larger air taxis to the commercial air carrier category and some of the smaller commercial air carriers to the air taxi category. The revised crosswalk table is provided in an electronic file as supporting data for this study.

Emissions were calculated for each airport individually using airport specific mixing height. The national-scale default values for taxi in and out are seven and nineteen minutes, respectfully. It should be noted that EDMS incorporates the latest aircraft engine emission factors from the International Civil Aviation Organization Engine Exhaust Emissions Data Bank. The EDMS output includes organic HAPs, but not metals.

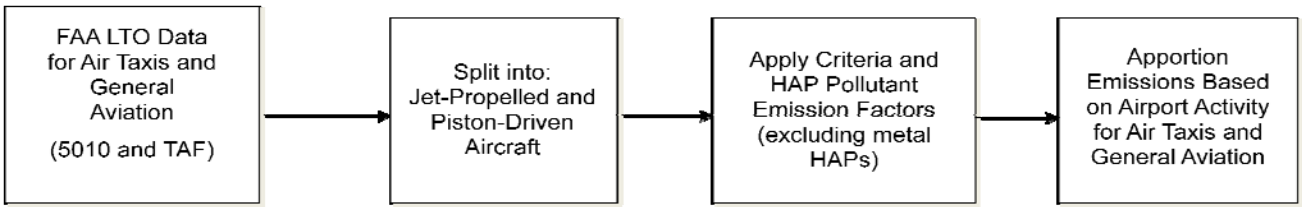

Figure 2-1. Procedures for Estimating Emissions from Commercial Air Carriers

Emissions for GSE and APU associated with commercial air carriers and air taxis for which T-100 data were available were estimated by EDMS, using the assumptions and defaults incorporated in the model. This is significant change from previous NEI year's emissions where GSE estimates came from the NONROAD model and APUs were not included in EPA's estimates. With EDMS, GSE that are assigned to an aircraft are given times (minutes per arrival, minutes per departure) based upon the type of service. For example, a fuel truck servicing a large commercial aircraft will have a different operating time than the same fuel truck servicing a commuter aircraft. All EDMS defaults for GSE duration and type (e.g., fuel truck, cabin service truck, baggage belt loader) were used. GSE emission factors used by EDMS are derived from EPA's NONROAD2005 model and are based on the following variables: fuel, brake horsepower and load factor. GSE engines burn gasoline, diesel, compressed natural gas (CNG), and liquefied petroleum gas (LPG). EPA has used a national-scale value to characterize engines type. The GSE engine distribution is shown below in Table 2-3. Like GSE, APU emissions are the product of operating time. The purpose of an aircraft APU is to provide power to start the main engines and run the heating, cooling, and ventilation systems prior to starting the main engines.

Table 2-3. National-Scale GSE Engine Distribution

GSE Engines Type	Percent of Total
Gasoline Fired, 4-Stroke	16.9
Liquefied Petroleum Gas (LPG) Fired	1.65
Compressed Natural Gas (CNG) Fired	1.25
Diesel Fired	80.2

Emissions of criteria pollutants for air taxis, general aviation, and military aircraft were calculated by combining aircraft operations data from FAA's *Terminal Area Forecasts (TAF) and 5010 Forms.* To avoid double counting between the T-100 data set and the TAF/5010 data,

LTOs by airport and aircraft type were summed in the T-100 data and compared with data in the TAF/5010 data. If the TAF/5010 LTO estimates were larger than the T-100 estimates for a specified aircraft type then the T-100 values were subtracted from the TAF/5010 values. If the T-100 values were larger than the TAF values, then the TAF values were set to zero. A data set of adjusted TAF/5010 LTOs were provided to OTAQ where additional adjustments were made to address older data in the TAF and 5010 datasets and to incorporate other insights provided by FAA reviewers.

The TAF/5010 LTO data were dividing into jet and piston powered fractions based on the national observation that 66 percent of all general aviation and air taxi activities are associated with piston powered aircraft and the remaining 34 percent of general aviation and air taxi activities are associated with jet powered aircraft. The adjusted and split TAF/5010 activity data were applied to emission factors as appropriate (See Figure 2-2). It should be noted that EDMS calculates organic HAP emissions in the model (metal HAPs are currently not included in the EDMS output). HAP emission estimates for air taxis, general aviation, and military aircraft were estimated by applying speciation profiles to VOC or PM_{10} emissions estimates. The following equation was used (emission factor are included as Appendix A).

$$E_{ixj} = LTO_i \times FR_{pro\text{-}i} \times EF_{ij}$$

Where:

E_{ixj} = Emission estimate for aircraft type i equipped with engine type x and pollutant j (lbs/year)
LTO_i = Annual count of LTO cycles for aircraft type i
FR_x = Fraction of LTOs equipped with engine type x
EF_{ij} = Generic emission factor for aircraft type i equipped with engine type x and pollutant j (lbs/LTO)
i = Aircraft type (i.e., air taxi, general aviation, and military)
x = Engine type (i.e., jet or turboprop, and piston engine)
j = Criteria pollutant j

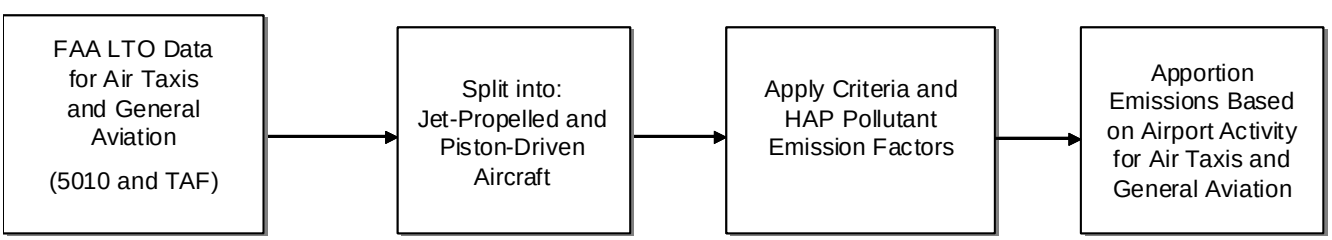

Figure 2-2. Procedures for Estimating Emissions from Commercial Air Taxis and General Aviation

Lead emission estimates were handled differently. Lead emissions are associated with leaded aviation fuel used in piston driven aircraft associated with general aviation. Lead emissions per LTO are calculated using the following equation:

$$Pb(tons) = (piston\text{-}engine\ LTO)\ (7.34\ g\ Pb/LTO)\ (0.95) / 907{,}180\ (g/ton)$$

Where the lead content of aviation gasoline is assumed to be 0.56 grams per liter or 2.12 grams per gallon.

In flight lead emissions were calculate based on national aviation gasoline consumption and similar assumptions noted above about lead fuel content and retention rates. Lead emissions associated with airport LTO activities were subtracted from the national fuel based lead emissions to approximate in flight lead emissions which were allocated to individual counties and noted with the code 777.

For additional details on EPA lead emission calculation procedures see Calculating Piston-Engine Aircraft Airport Inventories for Lead for the 2008 National Emissions Inventory (included in Appendix B).

HAP Emission Estimates

As noted earlier, EDMS calculates organic HAP emissions for aircraft activity reported in the T-100 dataset. Representative HAP speciation profiles were used to estimate the individual chemical species for each aircraft type included in the TAF/5010 dataset. Profiles are used to split (or speciate) organic gases, hydrocarbons, and particulate matter emissions estimates into more individual HAP compounds using the following equation:

$$E_{ixj} = LTO_{ix} \times SP_{ixj}$$

Where:

E_{ixj}	= Emission estimate for aircraft type i equipped with engine type x and pollutant j (tons/year)
LTO_{ix}	= Annual count of LTO cycles for aircraft type i and engine type x
SP_{ixj}	= Generic speciation profiles for aircraft type i equipped with engine type x and pollutant j (tons/LTO)
i	= Aircraft type (i.e., air taxi, general aviation, and military)
x	= Engine type (i.e., jet or turboprop, and piston engine)
j	= Pollutant j

Appendix A contains the HAP profiles converted to emissions factors used for this 2008 inventory. In this version of the NEI aircraft emissions inventory the following corrections to the HAP emission estimates were made:

- Acenpthylene was removed from this inventory for SCC 2275050012.

- To avoid double counting total xylene emissions were removed if speciated xylene factors were also available.

2.5 How Were Emissions Allocated?

For the 2008 inventory, emissions were individually estimated for each airport. A GIS database obtained from the Bureau of Transportation Statistics (BTS) contained airport level data with latitude and longitude coordinates.

2.6 QA/QC

Given the significant methodological changes over previous inventory efforts, several quality checks were implemented to ensure that these data were developed and allocated in a clear and reproducible manner. Some of the quality checks implemented include the following:

Emissions allocations and estimations

- All original data importations and transcriptions into the database were double-checked for errors.
- All calculation methods and approaches were evaluated for technical soundness.
- All unit conversions and equations used to generate results were double-checked for errors.
- All sources of original data are referenced in the spreadsheet.
- Emission factors were compiled from a variety of sources. Each emission factor development methodologies were evaluated to identify the most accurate emission factor for use in this inventory effort.
- Emission sums were evaluated across activity types (e.g., Aircraft, APU, and GSE) to ensure they consistently mirror LTO activity levels.
- 2008 pollutants and emissions were checked against the 2005 inventory to identify any missing pollutants or major changes compared to previous inventories. Discrepancies were investigated and revisions were made as needed.
- The validity of SCC codes, FIP county codes, and pollutant codes were confirmed.
- The validity of Airport and plane identification codes were confirmed.

2.7 What are the Results?

Table 2-4 summarizes the emission estimates for Aircraft, ground support equipment and APUs for criteria pollutants. Table 2-5 summarizes the emission estimates for individual HAPs. Both tables aggregate the data for all states, including the District of Columbia. Note that the 2008 estimates do not include state submitted emissions data.

Table 2-4. Aircraft Criteria Emission Estimates 2008 (tons per year)

Pollutant	2008										
	Military (2275001000)	Commercial (2275020000)	GA, Piston (2275050011)	GA, Turbine (2275050012)	AT, Piston (2275060011)	AT, Turbine (2275060012)	GSE, Gas (2265008005)	GSE, LPG (2267008005)	GSE, CNG (2268008005)	GSE, Diesel (2270008005)	APU (2275070000)
CO	33,161.20	75,463.61	192,510.69	56,532.07	19,116.38	10,180.90	18,005.13	1,768.69	1,398.67	85,607.61	4,072.84
NO_X	284.92	102,561.46	1,041.55	1,911.11	465.64	2,274.10	1,927.90	189.38	149.76	9,166.44	2,841.72
PM_{10}-PRI	709.12	1,782.43	3,792.85	1,397.21	242.12	797.03	55.87	5.49	4.34	265.62	457.11
$PM_{2.5}$-PRI	92.60	1,776.37	493.07	181.64	44.81	103.65	53.63	5.27	4.17	254.97	457.11
SO_2	27.32	10,179.67	160.24	434.33	53.76	439.43	53.21	5.23	4.13	252.99	443.04
VOC	1,652.02	13,608.67	2,399.79	3,223.93	310.48	2,610.94	615.80	60.49	47.84	2,927.89	313.72

Table 2-5. Aircraft HAP Emission Estimates 2008 (tons per year)

Pollutant	2008										
	Military (2275001000)	Commercial (2275020000)	GA, Piston (2275050011)	GA, Turbine (2275050012)	AT, Piston (2275060011)	AT, Turbine (2275060012)	GSE, Gas (2265008005)	GSE, LPG (2267008005)	GSE, CNG (2268008005)	GSE, Diesel (2270008005)	APU (2275070000)
1,3-Butadiene	0.87	184.14	29.75	61.04	5.01	44.44					5.32
1-Methylnaphthalene	0.13	26.96		8.94	0.23	6.20					0.78
2,2,4-Trimethylpentane		0.69	1.09	1.55	0.03	0.51	8.95	0.88	0.69	42.54	
2-methylnaphthalene	0.11	22.48		7.45	0.20	5.17					0.65
Acenaphthene			0.36		0.17						
Acenaphthylene			2.03		0.93						
Acetaldehyde	2.21	466.29	18.82	154.57	11.97	113.00	2.43	0.24	0.19	11.57	13.47
Acrolein	0.02	37.70	1.82	88.61	0.04	32.72					
Anthracene			0.42	6.16E-04	0.19	3.52E-04					
Benz[a]Anthracene		6.09E-04	0.05	9.33E-05	0.02	5.32E-05					
Benzene	0.87	183.48	122.97	60.82	7.58	44.59	10.44	1.03	0.81	49.62	5.30
Benzo[a]Pyrene		4.52E-04	0.05	5.11E-05	0.02	2.91E-05					
Benzo[b]Fluoranthene		8.89E-04	0.06		0.03						
Benzo[g,h,i,]Perylene		8.11E-06	0.13	8.47E-06	0.06	4.83E-06					
Benzo[k]Fluoranthene		8.89E-04	0.06		0.03						
Chrysene		6.17E-04	0.05	8.69E-05	0.02	4.96E-05					

Table 2-5. Aircraft HAP Emission Estimates 2008 (tons per year) (Continued)

Pollutant	2008										
	Military (2275001000)	Commercial (2275020000)	GA, Piston (2275050011)	GA, Turbine (2275050012)	AT, Piston (2275060011)	AT, Turbine (2275060012)	GSE, Gas (2265008005)	GSE, LPG (2267008005)	GSE, CNG (2268008005)	GSE, Diesel (2270008005)	APU (2275070000)
Cumene	2.68E-05	0.05		0.11		0.04					
Ethyl Benzene	1.55E-03	2.68	44.63	6.30	1.05	2.32					
Fluoranthene		1.17E-03	0.45	1.29E-03	0.21	7.35E-04					
Fluorene			0.74		0.34						
Formaldehyde	6.36	1,343.45	81.67	445.41	38.06	327.87	7.20	0.71	0.56	34.23	38.82
Hexane			21.25		0.50						
Indeno[1,2,3-c,d]Pyrene		0.00	0.04		0.02						
Lead **			245.48		8.97						
Methane	0.01				18.96	14.79	14.61	1.44	1.14	69.47	
Methanol	0.02	27.78		65.31		24.11					
m-Xylene	0.14	26.44	0.36	1.58E-04	0.88	3.66	11.09	1.09	0.86	52.74	0.89
Naphthalene	0.28	54.17	21.11	20.42	5.05	13.86					1.71
O-xylene	0.08	15.56	2.03	9.30E-05	1.40	2.19	5.43	0.53	0.42	25.80	0.52
Phenanthrene		0.01	1.25	0.01	0.58	3.27E-03					
Phenol	0.01	11.17		26.27		9.70					
Propionaldehyde	0.38	79.35	1.82	26.30	2.29	19.45	1.48	0.15	0.11	7.04	2.29
Pyrene		1.42E-03	0.61	1.58E-03	0.28	8.99E-04					
Styrene	0.16	33.73	10.32	11.18	1.18	8.25					0.97
Toluene	0.33	70.07	315.76	23.23	8.87	16.77	17.77	1.75	1.38	84.50	2.02
Xylenes (Mixed Isomers)		4.85	177.92	19.04	4.18	6.21					

** The lead estimated provided above represent emissions at individual airports, for 2008, there is an additional 296 tons of lead emitted associated with the combustion of leaded aviation gasoline during in flight operations which is not attributed to airports.

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Appendix A

Generic Aircraft Emission Factors/ Speciation Profiles

Commercial Aircraft Emission Factors			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
THC			2.680E-03
VOC			2.934E-03
TOG			3.276E-03
NO_x			9.288E-03
CO			1.119E-02
SO_x			8.910E-04
PM_{10}			5.385E-04
$PM_{2.5}$			5.256E-04
Acetaldehyde	75070	CAA	1.400E-04
Acetone	67641		1.025E-05
Acetylene	74862		1.290E-04
Acrolein	107028	CAA	8.023E-05
Benzaldehyde	100527	IRIS	1.540E-05
Benzene	71432	CAA	5.507E-05
Benzo(a)anthracene	56553		1.297E-09
Benzo(a)pyrene	50328		9.621E-10
Benzo(b)fluoranthene	205992		1.892E-09
Benzo(ghi)perylene	191242		1.726E-11
Benzo(k)fluoranthene	207089		1.892E-09
1,3-Butadiene	101314	CAA	5.527E-05
1-Butene	101389		5.746E-05
Butyraldehyde	123728		3.899E-06
C14-Alkane	No CAS		6.094E-06
C15-Alkane	No CAS		5.799E-06
C16 Branched Alkane	No CAS		4.783E-06
C18-Alkane	No CAS		6.552E-08
C4-Benzene + C3-Aroald	No CAS		2.149E-05
C5-Benzene+C4-Aroald	No CAS		1.061E-05
Chrysene	218019		1.313E-09
Cis-2-Butene	514181		6.880E-06
Cis-2-Pentene	627203		9.042E-06
Crotonaldehyde	4170303		3.384E-05
1-Decene	872059		6.061E-06
Dibenzo(ah)anthracene	53703		2.551E-09
Dimethylnapthalenes	28804888		2.949E-06
Ethane	74840		1.707E-05
Ethylbenzene	100414	CAA	5.701E-06
Ethylene	74851		5.065E-04
Fluoranthene	206440		2.492E-09

Commercial Aircraft Emission Factors			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
Formaldehyde	50000	CAA	4.033E-04
Glyoxal	107222		5.950E-05
Heptene	25339564		1.435E-05
Hexadecane	544763		1.605E-06
1-Hexene	592416		2.411E-05
Indeno(1,2,3-cd)pyrene	193395		2.050E-09
Isopropylbenzene	98828	CAA	9.829E-08
Isovaleraldehyde	514863		1.048E-06
Methacrolein	78853		1.405E-05
Methanol	67561	CAA	5.913E-05
Methyl Glyoxal	78988		4.924E-05
1-Methyl Naphthalene	14120		8.092E-06
2-Methyl Naphthalene	91576	IRIS	6.749E-06
3-Methyl-1-Butene	563451		3.669E-06
4-Methyl-1-Pentene	131372		4.259E-07
2-Methyl-1-Butene	563462		4.587E-06
2-Methyl-2-Butene	513359		6.061E-06
2-Methylpentane	107835		1.337E-05
2-Methyl-1-Pentene	763291		1.114E-06
M-Ethyltoluene	620144		5.045E-06
M-Tolualdehyde	620235		9.108E-06
Naphthalene (gas phase)	91203	CAA	6.084E-06
Naphthalene (solid phase)	91203	CAA	1.260E-06
Napthalene	91203	CAA	1.772E-05
N-Decane	124185		1.048E-05
N-Dodecane	112403		1.514E-05
N-Heptadecane	629787		2.949E-07
N-Heptane	142825		2.097E-06
N-Nonane	111842		2.031E-06
N-Octane	111659		2.031E-06
1-Nonene	124118		8.059E-06
N-Pentadecane	629629		5.668E-06
N-Pentane	109660		6.487E-06
N-Propylbenzene	103651		1.736E-06
N-Tetradecane	629594		1.363E-05
N-Tridecane	629505		1.753E-05
N-Undecane	1120214		1.455E-05
Octene	111660		9.042E-06
O-Ethyltoluene	611143		2.130E-06

Commercial Aircraft Emission Factors			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
O-Tolualdehyde	529204		7.535E-06
1-Pentene	109671		2.542E-05
P-Ethyltoluene	622968		2.097E-06
Phenanthrene	85018		1.112E-08
Phenol	108952	CAA	2.378E-05
Propane	74986		2.555E-06
Propionaldehyde	123386	CAA	2.382E-05
Propylene	115071		1.485E-04
P-Tolualdehyde	104870		1.573E-06
Pyrene	121400		3.028E-09
Styrene	100425	CAA	1.012E-05
Toluene	108883	CAA	2.103E-05
Trans-2-Hexene	4050457		9.829E-07
Trans-2-Pentene	646048		1.176E-05
1,2,3-Trimethylbenzene	526738		3.473E-06
1,2,4-Trimethylbenzene	95636		1.147E-05
1,3,5-Trimethylbenzene	108678		1.769E-06
2,2,4-Trimethylpentane	540841	CAA	1.466E-06
Valeraldehyde	110623		8.027E-06
Xylene	1330207	CAA	1.032E-05

Air Taxi Emission Factors - Jet			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
THC			4.37E-04
VOC			5.03E-04
TOG			5.06E-04
NO_x			3.88E-04
CO			1.81E-03
SO_x			8.12E-05
PM_{10}			3.017E-04
$PM_{2.5}$			3.922E-05
Acetaldehyde	75070	CAA	2.160E-05
Acetone	67641		1.583E-06
Acetylene	74862		1.992E-05
Acrolein	107028	CAA	1.238E-05
Anthracene	120127		1.331E-10
Benzaldehyde	100527	IRIS	2.377E-06
Benzene	71432	CAA	8.500E-06
Benzo(a)anthracene	56553		2.014E-11
Benzo(a)pyrene	50328		1.103E-11
Benzo(ghi)perylene	191242		1.829E-12
1,3-Butadiene	101314	CAA	8.531E-06
1-Butene	101389		8.869E-06
Butyraldehyde	123728		6.017E-07
C14-Alkane	No CAS		9.405E-07
C15-Alkane	No CAS		8.950E-07
C16 Branched Alkane	No CAS		7.383E-07
C18-Alkane	No CAS		1.011E-08
C4-Benzene + C3-Aroald	No CAS		3.317E-06
C5-Benzene+C4-Aroald	No CAS		1.638E-06
Chrysene	218019		1.876E-11
Cis-2-Butene	514181		1.062E-06
Cis-2-Pentene	627203		1.396E-06
Crotonaldehyde	4170303		5.224E-06
1-Decene	872059		9.355E-07
Dimethylnapthalenes	28804888		4.551E-07
Ethane	74840		2.635E-06
Ethylbenzene	100414	CAA	8.799E-07
Ethylene	74851		7.818E-05
Fluoranthene	206440		2.784E-10
Formaldehyde	50000	CAA	6.225E-05
Glyoxal	107222		9.183E-06

Air Taxi Emission Factors - Jet			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
Heptene	25339564		2.215E-06
Hexadecane	544763		2.478E-07
1-Hexene	592416		3.722E-06
Isopropylbenzene	98828	CAA	1.517E-08
Isovaleraldehyde	514863		1.618E-07
Methacrolein	78853		2.169E-06
Methanol	67561	CAA	9.127E-06
Methyl Glyoxal	78988		7.600E-06
1-Methyl Naphthalene	14120		1.249E-06
2-Methyl Naphthalene	91576	IRIS	1.042E-06
3-Methyl-1-Butene	563451		5.663E-07
4-Methyl-1-Pentene	131372		6.574E-08
2-Methyl-1-Butene	563462		7.079E-07
2-Methyl-2-Butene	513359		9.355E-07
2-Methylpentane	107835		2.063E-06
2-Methyl-1-Pentene	763291		1.719E-07
M-Ethyltoluene	620144		7.787E-07
M-Tolualdehyde	620235		1.406E-06
Napthalene	91203	CAA	2.736E-06
N-Decane	124185		1.618E-06
N-Dodecane	112403		2.336E-06
N-Heptadecane	629787		4.551E-08
N-Heptane	142825		3.236E-07
N-Nonane	111842		3.135E-07
N-Octane	111659		3.135E-07
1-Nonene	124118		1.244E-06
N-Pentadecane	629629		8.748E-07
N-Pentane	109660		1.001E-06
N-Propylbenzene	103651		2.680E-07
N-Tetradecane	629594		2.104E-06
N-Tridecane	629505		2.705E-06
N-Undecane	1120214		2.245E-06
Octene	111660		1.396E-06
O-Ethyltoluene	611143		3.287E-07
O-Tolualdehyde	529204		1.163E-06
1-Pentene	109671		3.924E-06
P-Ethyltoluene	622968		3.236E-07
Phenanthrene	85018		1.238E-09
Phenol	108952	CAA	3.671E-06

Air Taxi Emission Factors - Jet			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
Propane	74986		3.944E-07
Propionaldehyde	123386	CAA	3.676E-06
Propylene	115071		2.293E-05
P-Tolualdehyde	104870		2.427E-07
Pyrene	121400		3.401E-10
Styrene	100425	CAA	1.563E-06
Toluene	108883	CAA	3.246E-06
Trans-2-Hexene	4050457		1.517E-07
Trans-2-Pentene	646048		1.815E-06
1,2,3-Trimethylbenzene	526738		5.360E-07
1,2,4-Trimethylbenzene	95636		1.770E-06
1,3,5-Trimethylbenzene	108678		2.731E-07
2,2,4-Trimethylpentane	540841	CAA	1.915E-07
Valeraldehyde	110623		1.239E-06
Xylene	1330207	CAA	2.352E-06

Air Taxi Emission Factors - Piston			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
THC			7.750E-05
VOC			8.484E-05
TOG			9.474E-05
NO_x			7.900E-05
CO			1.407E-02
SO_x			7.500E-06
PM_{10}			3.015E-04
$PM_{2.5}$			3.920E-05
Acenaphthene	83329		2.201E-07
Acenaphthylene	208968		1.242E-06
Acetaldehyde	75070	CAA	5.874E-07
Acrolein	107028	CAA	5.684E-08
Anthracene	120127		2.563E-07
Benzene	71432	CAA	3.837E-06
Benzo(a)anthracene	56553		3.015E-08
Benzo(a)pyrene	50328		3.015E-08
Benzo(b)fluoranthene	205992		3.618E-08
Benzo(ghi)perylene	191242		7.839E-08
Benzo(k)fluoranthene	207089		3.618E-08
1,3-Butadiene	101314	CAA	9.285E-07
Chrysene	218019		3.015E-08
Ethylbenzene	100414	CAA	1.393E-06
Fluoranthene	206440		2.744E-07
Fluorene	86737		4.553E-07
Formaldehyde	50000	CAA	2.548E-06
Indeno(1,2,3-cd)pyrene	193395		2.412E-08
M-Xylene and P-Xylene	108383	CAA	2.201E-07
Naphthalene (gas phase)	91203	CAA	4.327E-07
Naphthalene (solid phase)	91203	CAA	4.432E-06
N-Hexane	110543		6.632E-07
O-Xylene	95476	CAA	1.242E-06
Phenanthrene	85018		7.658E-07
Propionaldehyde	123386	CAA	5.684E-08
Pyrene	121400		3.739E-07
Styrene	100425	CAA	3.221E-07
Toluene	108883	CAA	9.853E-06
2,2,4-Trimethylpentane	540841	CAA	3.394E-08

General Aviation Emission Factors - Jet			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
THC			3.00E-04
VOC			2.73E-04
TOG			3.06E-04
NO_x			1.62E-04
CO			4.79E-03
SO_x			3.68E-05
PM_{10}			1.184E-04
$PM_{2.5}$			1.539E-05
Acetaldehyde	75070	CAA	1.309E-05
Acetone	67641		9.593E-07
Acetylene	74862		1.207E-05
Acrolein	107028	CAA	7.506E-06
Anthracene	120127		5.221E-11
Benzaldehyde	100527	IRIS	1.440E-06
Benzene	71432	CAA	5.152E-06
Benzo(a)anthracene	56553		7.903E-12
Benzo(a)pyrene	50328		4.327E-12
Benzo(ghi)perylene	191242		7.178E-13
1,3-Butadiene	101314	CAA	5.170E-06
1-Butene	101389		5.376E-06
Butyraldehyde	123728		3.647E-07
C14-Alkane	No CAS		5.700E-07
C15-Alkane	No CAS		5.425E-07
C16 Branched Alkane	No CAS		4.475E-07
C18-Alkane	No CAS		6.130E-09
C4-Benzene + C3-Aroald	No CAS		2.010E-06
C5-Benzene+C4-Aroald	No CAS		9.930E-07
Chrysene	218019		7.359E-12
Cis-2-Butene	514181		6.436E-07
Cis-2-Pentene	627203		8.459E-07
Crotonaldehyde	4170303		3.166E-06
1-Decene	872059		5.670E-07
Dimethylnapthalenes	28804888		2.758E-07
Ethane	74840		1.597E-06
Ethylbenzene	100414	CAA	5.333E-07
Ethylene	74851		4.738E-05
Fluoranthene	206440		1.092E-10
Formaldehyde	50000	CAA	3.773E-05
Glyoxal	107222		5.566E-06

General Aviation Emission Factors - Jet			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
Heptene	25339564		1.342E-06
Hexadecane	544763		1.502E-07
1-Hexene	592416		2.256E-06
Isopropylbenzene	98828	CAA	9.194E-09
Isovaleraldehyde	514863		9.807E-08
Methacrolein	78853		1.315E-06
Methanol	67561	CAA	5.532E-06
Methyl Glyoxal	78988		4.606E-06
1-Methyl Naphthalene	14120		7.570E-07
2-Methyl Naphthalene	91576	IRIS	6.313E-07
3-Methyl-1-Butene	563451		3.433E-07
4-Methyl-1-Pentene	131372		3.984E-08
2-Methyl-1-Butene	563462		4.291E-07
2-Methyl-2-Butene	513359		5.670E-07
2-Methylpentane	107835		1.250E-06
2-Methyl-1-Pentene	763291		1.042E-07
M-Ethyltoluene	620144		4.720E-07
M-Tolualdehyde	620235		8.520E-07
Naphthalene (gas phase)	91203	CAA	1.674E-06
Naphthalene (solid phase)	91203	CAA	5.571E-08
Napthalene	91203	CAA	1.658E-06
N-Decane	124185		9.807E-07
N-Dodecane	112403		1.416E-06
N-Heptadecane	629787		2.758E-08
N-Heptane	142825		1.961E-07
N-Nonane	111842		1.900E-07
N-Octane	111659		1.900E-07
1-Nonene	124118		7.539E-07
N-Pentadecane	629629		5.302E-07
N-Pentane	109660		6.068E-07
N-Propylbenzene	103651		1.624E-07
N-Tetradecane	629594		1.275E-06
N-Tridecane	629505		1.640E-06
N-Undecane	1120214		1.361E-06
Octene	111660		8.459E-07
O-Ethyltoluene	611143		1.992E-07
O-Tolualdehyde	529204		7.049E-07
1-Pentene	109671		2.378E-06
P-Ethyltoluene	622968		1.961E-07
Phenanthrene	85018		4.858E-10

General Aviation Emission Factors - Jet			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
Phenol	108952	CAA	2.225E-06
Propane	74986		2.391E-07
Propionaldehyde	123386	CAA	2.228E-06
Propylene	115071		1.390E-05
P-Tolualdehyde	104870		1.471E-07
Pyrene	121400		1.334E-10
Styrene	100425	CAA	9.470E-07
Toluene	108883	CAA	1.968E-06
Trans-2-Hexene	4050457		9.194E-08
Trans-2-Pentene	646048		1.100E-06
1,2,3-Trimethylbenzene	526738		3.249E-07
1,2,4-Trimethylbenzene	95636		1.073E-06
1,3,5-Trimethylbenzene	108678		1.655E-07
2,2,4-Trimethylpentane	540841	CAA	1.313E-07
Valeraldehyde	110623		7.509E-07
Xylene	1330207	CAA	1.612E-06

General Aviation Emission Factors - Piston			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
THC			7.750E-05
VOC			7.524E-05
TOG			8.537E-05
NO_x			3.250E-05
CO			6.007E-03
SO_x			5.000E-06
PM_{10}			1.184E-04
$PM_{2.5}$			1.539E-05
Acenaphthene	83329		1.123E-08
Acenaphthylene	208968		6.339E-08
Acetaldehyde	75070	CAA	5.874E-07
Acrolein	107028	CAA	5.684E-08
Anthracene	120127		1.308E-08
Benzene	71432	CAA	3.837E-06
Benzo(a)anthracene	56553		1.539E-09
Benzo(a)pyrene	50328		1.539E-09
Benzo(b)fluoranthene	205992		1.846E-09
Benzo(ghi)perylene	191242		4.000E-09
Benzo(k)fluoranthene	207089		1.846E-09
1,3-Butadiene	101314	CAA	9.285E-07
Chrysene	218019		1.539E-09
Ethylbenzene	100414	CAA	1.393E-06
Fluoranthene	206440		1.400E-08
Fluorene	86737		2.323E-08
Formaldehyde	50000	CAA	2.548E-06
Indeno(1,2,3-cd)pyrene	193395		1.231E-09
M-Xylene and P-Xylene	108383	CAA	1.123E-08
Naphthalene (gas phase)	91203	CAA	4.327E-07
Naphthalene (solid phase)	91203	CAA	2.262E-07
N-Hexane	110543		6.632E-07
O-Xylene	95476	CAA	6.339E-08
Phenanthrene	85018		3.908E-08
Propionaldehyde	123386	CAA	5.684E-08
Pyrene	121400		1.908E-08
Styrene	100425	CAA	3.221E-07
Toluene	108883	CAA	9.853E-06
2,2,4-Trimethylpentane	540841	CAA	3.394E-08

Military Emission Factor			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
THC			6.170E-04
VOC			6.815E-04
TOG			7.597E-04
NO_x			7.900E-05
CO			1.407E-02
SO_x			7.500E-06
PM_{10}			3.017E-04
$PM_{2.5}$			3.922E-05
Acetaldehyde	75070	CAA	3.245E-05
Acetone	67641		2.378E-06
Acetylene	74862		2.993E-05
Acrolein	107028	CAA	1.861E-05
Benzaldehyde	100527	IRIS	3.571E-06
Benzene	71432	CAA	1.277E-05
1,3-Butadiene	101314	CAA	1.282E-05
1-Butene	101389		1.333E-05
Butyraldehyde	123728		9.041E-07
C14-Alkane	No CAS		1.413E-06
C15-Alkane	No CAS		1.345E-06
C16 Branched Alkane	No CAS		1.109E-06
C18-Alkane	No CAS		1.519E-08
C4-Benzene + C3-Aroald	No CAS		4.984E-06
C5-Benzene+C4-Aroald	No CAS		2.461E-06
Cis-2-Butene	514181		1.595E-06
Cis-2-Pentene	627203		2.097E-06
Crotonaldehyde	4170303		7.848E-06
1-Decene	872059		1.405E-06
Dimethylnapthalenes	28804888		6.837E-07
Ethane	74840		3.958E-06
Ethylbenzene	100414	CAA	1.322E-06
Ethylene	74851		1.175E-04
Formaldehyde	50000	CAA	9.352E-05
Glyoxal	107222		1.380E-05
Heptene	25339564		3.328E-06
Hexadecane	544763		3.723E-07
1-Hexene	592416		5.591E-06
Isopropylbenzene	98828	CAA	2.279E-08
Isovaleraldehyde	514863		2.431E-07
Methacrolein	78853		3.259E-06

Military Emission Factor			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
Methanol	67561	CAA	1.371E-05
Methyl Glyoxal	78988		1.142E-05
1-Methyl Naphthalene	14120		1.876E-06
2-Methyl Naphthalene	91576	IRIS	1.565E-06
3-Methyl-1-Butene	563451		8.509E-07
4-Methyl-1-Pentene	131372		9.876E-08
2-Methyl-1-Butene	563462		1.064E-06
2-Methyl-2-Butene	513359		1.405E-06
2-Methylpentane	107835		3.100E-06
2-Methyl-1-Pentene	763291		2.583E-07
M-Ethyltoluene	620144		1.170E-06
M-Tolualdehyde	620235		2.112E-06
Napthalene	91203	CAA	4.110E-06
N-Decane	124185		2.431E-06
N-Dodecane	112403		3.510E-06
N-Heptadecane	629787		6.837E-08
N-Heptane	142825		4.862E-07
N-Nonane	111842		4.710E-07
N-Octane	111659		4.710E-07
1-Nonene	124118		1.869E-06
N-Pentadecane	629629		1.314E-06
N-Pentane	109660		1.504E-06
N-Propylbenzene	103651		4.026E-07
N-Tetradecane	629594		3.160E-06
N-Tridecane	629505		4.064E-06
N-Undecane	1120214		3.373E-06
Octene	111660		2.097E-06
O-Ethyltoluene	611143		4.938E-07
O-Tolualdehyde	529204		1.747E-06
1-Pentene	109671		5.895E-06
P-Ethyltoluene	622968		4.862E-07
Phenol	108952	CAA	5.515E-06
Propane	74986		5.926E-07
Propionaldehyde	123386	CAA	5.523E-06
Propylene	115071		3.445E-05
P-Tolualdehyde	104870		3.647E-07
Styrene	100425	CAA	2.348E-06
Toluene	108883	CAA	4.877E-06
Trans-2-Hexene	4050457		2.279E-07
Trans-2-Pentene	646048		2.727E-06

Military Emission Factor			
Pollutant	**CAS No.**	**CAA "187" or IRIS HAP?**	**Emission Factors (tons/LTO)**
1,2,3-Trimethylbenzene	526738		8.053E-07
1,2,4-Trimethylbenzene	95636		2.659E-06
1,3,5-Trimethylbenzene	108678		4.102E-07
Valeraldehyde	110623		1.861E-06

Appendix B

Calculating Piston-Engine Aircraft Airport Inventories for Lead for the 2008 National Emissions Inventory

Calculating Piston-Engine Aircraft Airport Inventories for Lead for the 2008 National Emissions Inventory

December 2010

Section 1. Introduction

The main purpose of this document is to describe the methods the Environmental Protection Agency (EPA) used to calculate airport lead (Pb) inventories for the 2008 National Emissions Inventory (NEI).[1] These methods focus on the development of approaches to estimate piston-engine aircraft activity at airports in the U.S. since the activity of this fleet is reported to the Federal Aviation Administration (FAA) as general aviation (GA) or air taxi (AT) activity – categories that also include jet-engine aircraft activity. The methods described here reflect improvements to the methods used in developing the airport-specific piston-engine aircraft inventories in the 2002 NEI and the 2005 NEI.

Background information regarding the use of leaded aviation gasoline (avgas) in piston-engine powered aircraft is available in other documents.[2,3] Briefly, most piston-engine aircraft operations fall into the categories of either GA or AT. Aircraft used in GA and AT activities include a diverse set of aircraft types and engine models and are used in a wide variety of applications.[4] Lead emissions associated with GA and AT aircraft stem from the use of one hundred octane low lead (100LL) avgas. The lead is added to the fuel in the form of tetraethyl lead (TEL). This lead additive helps boost fuel octane, prevent engine knock, and prevent valve seat recession and subsequent loss of compression for engines without hardened valves. Today, 100LL is the most commonly available type of aviation gasoline in the United States.[5] Lead is not added to jet fuel that is used in commercial aircraft, most military aircraft, or other turbine-engine powered aircraft. Lead emissions from the use of leaded avgas comprised 45% of the national inventory for emissions of lead in 2002.[6]

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[1] In this document '2008 NEI' refers to 2008 NEI version 1 (January 2011), available at http://www.epa.gov/ttn/chief/net/2008inventory.html

[2] EPA (2007) Review of the National Ambient Air Quality Standards for Lead: Policy Assessment of Scientific and Technical Information. OAQPS Staff Paper. EPA-452/R-07-013 November 2007. pp 2-8 and 2-9.

[3] FAA William J. Hughes Technical Center http://www.tc.faa.gov/act4/insidethefence/2006/0609_06_AvFuels.htm

[4] Commercial aircraft include those used for scheduled service transporting passengers, freight, or both. Air taxis fly scheduled and for-hire service carrying passengers, freight or both, but they usually are smaller aircraft than those operated by commercial air carriers. General aviation includes most other aircraft (fixed and rotary wing) used for personal transportation, business, instructional flying, and aerial application.

[5] ChevronTexaco (2005) Aviation Fuels Technical Review. FTR-3. http://www.chevronglobalaviation.com/docs/aviation_tech_review.pdf

[6] U.S. Environmental Protection Agency (2008) EPA's Report on the Environment EPA/600/R-07/045F. Available at: http://www.epa.gov/roe

This document is organized into eight sections. Section 2 describes the data we use to calculate the national inventory for the amount of lead released to the air from the combustion of leaded avgas. Section 3 describes the landing and takeoff data we use to calculate airport-specific inventories for lead. Section 4 describes how we estimate landing and takeoff data for the airport facilities that do not report it to the FAA. Section 5 describes the estimate of landing and takeoff activity occurring at heliports in the U.S. Section 6 describes the methods used to calculate the airport-specific inventories for lead. Section 7 describes data that would be needed to improve the estimates of airport-specific inventories for lead and Section 8 describes the estimates of the amount of lead emitted in-flight that are in the 2008 NEI.

In this document, units of tons (i.e., U.S. short tons) are used when discussing the national and airport-specific lead inventory in order to be consistent with the manner in which the NEI reports inventories for lead and other pollutants. The unit of grams is used in describing the concentration of lead in avgas and in describing emission factors. Conversion factors are provided for clarity.

Section 2. Calculating the National Avgas Lead Inventory

Because lead is a persistent pollutant and accumulates in the environment, we include all lead emissions from piston-engine aircraft in the NEI – emissions occurring during the landing and take-off cycle at airports as well as emissions occurring at altitude.[7] To calculate the national avgas lead inventory, we use information provided by the U.S. Department of Transportation's (DOT's) Federal Aviation Administration (FAA) regarding the volume of leaded avgas consumed in the U.S. in 2008.[8] The U.S. Department of Energy's (DOE's) Energy Information Administration (EIA) provides information regarding the volume of leaded avgas produced in a given year. EPA has historically used the DOE EIA avgas fuel volume produced to calculate national lead inventories from the consumption of leaded avgas. However, since EPA uses DOT airport activity and aircraft data, we are using the DOT fuel volume data in the 2008 NEI to calculate the national lead inventory in order to use a consistent data source. In this document, when we refer to avgas fuel volume data it is data supplied by DOT, except where noted.

As demonstrated in the equation below, to calculate the annual emission of lead from the consumption of leaded avgas, we multiply the volume of avgas used by the concentration of lead in the avgas, minus the small amount of lead that is retained in the engine, engine oil and/or exhaust system. The volume of avgas used in the U.S. in 2008

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[7] U.S. EPA, 2006. Air Quality: Criteria for Lead: 2006; EPA/600/R-5/144aF; U.S. Government Printing Office, Washington, DC, October, 2006.

[8] U.S. Department of Transportation Federal Aviation Administration Aviation Policy and Plans. FAA Aerospace Forecast Fiscal Years 2010-2030. p.99. Available at: http://www.faa.gov/data_research/aviation/aerospace_forecasts/2010-2030/media/2010%20Forecast%20Doc.pdf This document provides historical data for 2000-2008 as well as forecast data.

was 248,100,000 gallons.[9] The concentration of lead in avgas ([Pb] in the equation below) can be one of four levels (ranging from 0.14 to 1.12 grams of lead per liter) as specified by the American Society for Testing and Materials (ASTM). By far the most common avgas supplied is "100 Low Lead" or 100LL.[10,11] The maximum lead concentration specified by ASTM for 100LL is 0.56 grams per liter or 2.12 grams per gallon.[12] A fraction of lead is retained in the engine, engine oil and/or exhaust system which we currently estimate at 5%.[13]

For the 2008 NEI, the national estimate of lead emissions from the consumption of avgas was 551 tons (see equation below).

$$\frac{(248{,}100{,}000\ \text{gal})(2.12\ \text{g Pb/gal})(0.95)}{907{,}180\ \text{g/ton}} = 551\ \text{tons Pb}$$

As described above, DOE's EIA also provides estimates of the annual volume of leaded avgas produced in a given year. For 2008, the volume of avgas produced in the U.S. was 5,603 thousand barrels or 235,326,000 gallons.[14] Consumption of this volume of avgas equates to a national lead emissions estimate for this source of 522 short tons.

Section 3. Landing and Takeoff Data Sources and Uses

Airport-specific inventories require information regarding landing and takeoff (LTO) activity by aircraft type.[15] According to FAA records, there are approximately 20,000 airport facilities in the U.S., the vast majority of which are expected to have activity by piston-engine aircraft that operate on leaded avgas. Of these facilities, EPA's NEI has in the past, reported emissions of lead (and other criteria pollutants and

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[9] U.S. Department of Transportation Federal Aviation Administration Aviation Policy and Plans. FAA Aerospace Forecast Fiscal Years 2010-2030. p.99. Available at: http://www.faa.gov/data_research/aviation/aerospace_forecasts/2010-2030/media/2010%20Forecast%20Doc.pdf This document provides historical data for 2000-2008 as well as forecast data.

[10] ChevronTexaco (2005) Aviation Fuels Technical Review. FTR-3.

[11] The 2008 General Aviation Statistical Databook & Industry Outlook report by General Aviation Manufactures Association (GAMA) found that over 90% of avgas is 100LL.

[12] ASTM International (2005) Annual Book of ASTM Standards Section 5: Petroleum Products, Lubricants, and Fossil Fuels Volume 05.01 Petroleum Products and Lubricants (I): D 56 – D 3230.

[13] The information used to develop this estimate is from the following references: (a) Todd L. Petersen, Petersen Aviation, Inc, *Aviation Oil Lead Content Analysis*, Report # EPA 1-2008, January 2, 2008, available at William J. Hughes Technical Center Technical Reference and Research Library at http://actlibrary.tc.faa.gov/ and (b) E-mail from Theo Rindlisbacher of Switzerland Federal Office of Civil Aviation to Bryan Manning of U.S. EPA, regarding lead retained in engine, September 28, 2007.

[14] DOE Energy Information Administration. Fuel production volume data obtained from http://tonto.eia.doe.gov/dnav/pet/hist/mgaupus1A.htm accessed November 2006.

[15] An aircraft operation is defined as any landing or takeoff event, therefore, to calculate LTOs, operations are divided by two. Most data sources from FAA report aircraft activity in numbers of operations which, for the purposes of calculating lead emissions using the method described in this document, need to be converted to LTO events.

hazardous air pollutants) at 3,410 airports.[16] While the 3,410 airport facilities are among the most active in the U.S., they comprise only a small fraction of the total airport facilities where leaded avgas is used.

FAA's Office of Air Traffic provides a complete listing of operational airport facilities in the National Airspace System Resources (NASR) database. The electronic NASR data report, referred to here as the 5010 airport data report, can be generated from the NASR database and is available for download from the FAA website.[17] This report is updated every 56 days. EPA obtains airport information (including operations) for a subset of the facilities in the NASR database from FAA's Terminal Area Forecast (TAF) database that is prepared by FAA's Office of Aviation Policy and Plans.[18] The TAF database currently includes information for airports in FAA's National Plan of Integrated Airport Systems (NPIAS), which identifies airports that are significant to national air transportation. Approximately 500 of the airports that are in the TAF database have either an FAA air traffic control tower or an FAA contract tower where controllers count operations. The operations data from the control towers is reported to The Operations Network (OPSNET)[19] which is publically available in the Air Traffic Activity System (ATADS) database.[20] The operations data for the towered airports that is reported in OPSNET and ATADS is then reported to the TAF database. The operations data for the airports in the TAF database that do not have control towers represent estimates.[21] The operations supplied in the 5010 airport data report for facilities not reported in the TAF may be self-reported by airport operators through data collection accomplished by airport inspectors who work for the State Aviation Agency, or operations data can be obtained through other means.[22]

The 5010 airport data report supplies the date that the associated operations data represents.[23] Because airports that are not in the TAF database submit data voluntarily to FAA for the 5010 data report, many of the airports have operations data that represent data for years earlier than 2008. Nationally, GA and AT piston-engine operations have decreased in recent years,[24] therefore EPA did not use operations data from years prior to 2008 as it is reported. Instead, EPA multiplied the older GA and AT piston-engine data (Section 6 describes the method EPA used to calculate the number of piston-engine

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[16] These 3,410 facilities are the facilities for which the FAA's Terminal Area Forecast (TAF) database provides information regarding aircraft activity. The TAF database is prepared by FAA's Office of Aviation Policy and Plans and includes information for the airports in FAA's National Plan of Integrated Airport Systems (NPIAS). One of the goals of the NPIAS is to identify airports that are significant to national air transportation.
[17] http://www.faa.gov/airports_airtraffic/airports/airport_safety/airportdata_5010/
[18] http://aspm.faa.gov/main/taf.asp
[19] http://aspm.faa.gov/opsnet/sys/
[20] http://aspm.faa.gov/opsnet/sys/Airport.asp
[21] FAA's Terminal Area Forecast Summary (Fiscal Years 2009 – 2030), Appendix A (page 28) http://www.faa.gov/data_research/aviation/taf_reports/media/TAF%20Summary%20Report%20FY%202009%20-%202030.pdf
[22] In the absence of updated information from States, local authorities or Tribes, we are using the LTO data provided in the FAA database.
[23] The 12-month ending date on which annual operations data in the report is based.
[24] http://www.faa.gov/data_research/aviation_data_statistics/general_aviation/

operations from total GA and AT activity data) by scaling factors that were calculated by dividing the 2008 national amount of avgas produced by the national amount of avgas produced in the year the operations data represents.[25] A table with the scaling factors is provided in Appendix A. The national volume of avgas produced data comes from the DOE, EIA website and is available for 1981 – 2009.[26] For operations data older than 1981, EPA divided the 2008 national amount of avgas produced by the average of the national amount of avgas produced from 1981 – 1989. Jet engines do not use avgas, therefore EPA did not apply scaling factors to the turbine operations for data from years prior to 2008.

EPA also obtains operations data from the T-100 segment data from the Bureau of Transportation Statistics (BTS). The aircraft in the T-100 data are matched to aircraft in the FAA's Emission and Dispersion Modeling System (EDMS) using the crosswalk table developed for earlier versions of the NEI. Generally the T-100 data covers commercial air carrier operations, but some AT activities are included in the data set that would double count with the TAF data at the same airport. To correct for possible double counting, first the AT LTOs included in the T-100 data were compiled using the aircraft type data included in the aircraft make/models crosswalk.[27] The resulting aggregated LTOs were compared with the reported TAF LTOs for airports where there were overlaps. The T-100 AT LTOs were then subtracted from the TAF AT data to ensure that double counting was minimized. Note that if the T-100 AT value was larger than the TAF value, the TAF value was set to zero to eliminate the possibility of negative LTOs in the dataset.

The 2008 draft NEI was developed using the January 15, 2009 version of the 5010 airport data report. In that version of the report there were 19,925 airport facilities in the U.S. that had submitted data to the FAA. Among these 19,925 facilities, 99 facilities were not relevant for the purposes of estimating lead emissions because they were either listed as closed (85) or they were balloonports (14).[28] Therefore, lead inventories were needed for 19,826 facilities. In the January 15, 2009 version of the 5010 airport data report there were 5,654 airport facilities for which operations data were provided (many of which are facilities in FAA's TAF database).[29] There were 14,172 facilities in the 5010 airport data report for which there were no operations data.[30] As a

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[25] The FAA General Aviation and Air Taxi (Part 135) Activity Surveys (source of national level piston-engine operations data) are only available annually, starting in 1999. Because there are airports with operations data older than 1999, EPA used avgas product supplied data as a surrogate for piston-engine operations to estimate the change in piston-engine activity over the last three decades.

[26] http://tonto.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=mgaupus1&f=A. DOT recently changed the way they estimate fuel consumption data, so while EPA used DOT data to determine the 2008 national avgas lead inventory, for the purpose of calculating these scaling factors EPA used DOE's data in order to have historical fuel data that is calculated in a consistent manner.

[27] The T-100 data does not specify that the operations data is air taxi in nature; however, in discussions with FAA, EPA determined that these flights are air taxi in nature and has assigned them in the 2008 NEI as such.

[28] Balloon craft do not use avgas

[29] Either Commuter, GA Itinerant, GA Local, or Air Taxi operations data, as these operations can be performed by piston-engine aircraft.

[30] No Commuter, GA Itinerant, GA Local, or Air Taxi operations data.

part of the review process for the draft 2008 NEI, EPA received updated airport data from states and also looked at more recent versions of the 5010 airport data report to update the status of airports, so the number of airports for which EPA estimated activity is slightly lower in the 2008 NEI than in the draft 2008 NEI. The following section of this document describes the method EPA used to estimate operations for the 14,132 airport facilities in the 2008 NEI that do not have reported activity data.

As described in Section 1, most piston-engine aircraft fall into the categories of either GA or AT. Some GA and AT activity is conducted by turboprop and turbojet aircraft which do not used leaded avgas. There are no national databases that provide airport-specific LTO activity data for piston-engine aircraft separately from turbojet and turboprop aircraft. The databases described above report total GA and AT activity conducted by both piston-engine and jet-engine aircraft. Part *(a)* in Section 6 describes how we estimate piston-engine LTOs at airports in the 2008 NEI.

Section 4. Estimating LTOs at the 14,132 Airport Facilities with No LTO Data

FAA has used regression models to estimate operations at facilities where operations data are not available.[31,32] In this work and other work, FAA identified characteristics of small towered airports for which there were statistically significant relationships with operations at these airports.[33] Regression models based on the airport characteristics were then used to estimate general aviation operations for a set of non-towered airports. The airport characteristics identified by FAA and used to estimate general aviation operations at small airports include: the number of aircraft based at a facility (termed 'based aircraft'), population in the vicinity of the airport, airport regional prominence, per capita income, region, and the presence of certificated flight schools.

In the 2000 report titled 'Model for Estimating General Aviation Operations at Non-towered Airports,' a model of GA annual activity was developed using information from small towered airports to explain GA activity at towered and non-towered airports. The model explained GA activity at the towered airports well (R^2 of 0.75) but produced higher estimates than state-supplied estimates for non-towered airports.[34]

The relevant data available in the 5010 airport data report for the purposes of estimating airport operations include: facility type (airport, balloonport, seaplane base, gliderport, heliport, stolport,[35] ultralight); number of GA aircraft based at each airport by

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[31] Federal Aviation Administration, Office of Aviation Policy and Plans, Statistics and Forecast Branch. July 2001. Model for Estimating General Aviation Operations at Non-towered Airports Using Towered and Non-towered Airport Data. Prepared by GRA, Inc.
[32] Mark Hoekstra, "Model for Estimating General Aviation Operations at Non-Towered Airports" prepared for FAA Office of Aviation Policy and Plans, April 2000.
[33] GRA, Inc. "Review of TAF Methods," Final Report, prepared for FAA Office of Aviation Policy and Plans under Work Order 45, Contract No. DTFA01-93-C-00066, February 25, 1998.
[34] The mean absolute difference between the model operations estimate and the state operations estimate was 16,940 operations.
[35] Stolport is an airport designed with STOL (Short Take-Off and Landing) operations in mind, normally having a short single runway.

type (glider, helicopter, jet engine, military, multi-engine, single engine, ultralight); operations data (air taxi, commercial, commuter, GA itinerant, GA local, military)[36]; and operations date (12-month ending date on which annual operations data is based). Census data was also merged with the 5010 airport data report to give population data for each airport's county.

Using the FAA work referenced above, we explored relationships among the airport data variables that best predicted aircraft activity (LTOs). We found that based aircraft was a highly significant and positive regressor to LTOs. Table 1 shows that for facilities that did not have LTO data in the January 15, 2009 version of the 5010 airport data report, 7,856 had based aircraft data while 6,316 did not have based aircraft data.[37, 38] Therefore, as described below, LTO estimates were derived using different methods depending on data availability.

Table 1: Contingency table describing the numbers of airport facilities that have or do not have LTO data and/or based aircraft data for airport facilities in the January 15, 2009 version of the 5010 airport data report

		HAVE LTO DATA		
		YES	**NO**	
HAVE BASED AIRCRAFT DATA	**YES**	4,872	7,856	**12,728**
	NO	782	6,316	**7,098**
		5,654	**14,172**	**19,826**

[36] As explained in footnote 15, an aircraft operation is defined as any landing or takeoff event, therefore, to calculate LTOs, operations are divided by two. The 5010 airport data report from FAA reports aircraft activity in numbers of operations which, for the purposes of calculating Pb emissions using the method described in the TSD, are converted to LTO events.

[37] As described in Section 3, the number of facilities with no LTO data changed slightly from the draft 2008 NEI to the 2008 NEI. In the 2008 NEI, of the facilities that did not have reported activity data, 7,837 facilities reported based aircraft data and 6,295 did not report based aircraft data.

[38] These numbers include data for the following types of facilities: airports, balloonports, seaplane bases, gliderports, heliports, stolports, and ultralights.

(a) Estimating LTOs at Facilities with Based Aircraft Data, but No LTO Data:

There are 6,414 facilities in the 2008 NEI (not including heliports) for which the 5010 airport data report supplies the number of based aircraft[39] but not activity data to which the regression equation (based aircraft vs. LTOs) could be applied. Using the 4,872 airports for which both LTO and aircraft data is known, the initial relationship found between based aircraft and LTOs was:

Equation 1:
LTOs = 2494 + 208*aircraft $R^2 = 0.55$

The FAA models found population to be another significant regressor. We used the population of the county in which the airport is located as the population variable. Adding county population to the model gave the following relationship:

Equation 2:
LTOs = 2204 + 194*aircraft + 0.0038*county population $R^2 = 0.56$

EPA received numerous comments to the docket on its Advance Notice of Proposed Rulemaking on Lead Emissions from Piston-Engine Aircraft Using Leaded Aviation Gasoline[40] indicating that aviation in Alaska is different than it is in the continental U.S. Commenters pointed out that in Alaska, 82% of communities are not accessible by road and rely on air transport for life sustaining goods and services.[41] Commenters also noted that Alaskans travel by air eight times more often per capita than those in the continental U.S. For those reasons, we added a dummy variable in equation 3 to identify whether or not an airport is located in Alaska. Because the relationship between based aircraft and LTOs is likely different for Alaskan airports than it is for airports that aren't in Alaska, we also added an interaction term to equation 3 (interaction of an airport being in Alaska and its sum of based aircraft).

Equation 3:
LTOs = 1937 + 205*aircraft + 0.0038*county population + 566*Alaska – 108*(AlaskaXaircraft)

$R_2 = 0.58$

After analyzing the data and plot for the data underlying equation 3, we found many airport facilities identified as commercial airports for which based aircraft was extremely low (i.e., less than 10), yet LTOs were quite high (i.e., anywhere from 100,000

[39] Based aircraft for this purpose was limited to single- and multi-engine aircraft, helicopters, and ultralights since these aircraft types can use leaded avgas.
[40] U.S. Environmental Protection Agency (2010) Advance Notice of Proposed Rulemaking on Lead Emissions From Piston-Engine Aircraft Using Leaded Aviation Gasoline. 75 FR 22440 (April 28, 2010).
[41] Comments to the docket on EPA's Advance Notice of Proposed Rulemaking on Lead Emissions from Piston-Engine Aircraft Using Leaded Aviation Gasoline from the Alaska Air Carriers Association (dated 18 June 2010; comment number OAR-2007-0294-0323.1) and Alaska Governor Parnell (dated 25 August 2010; comment number OAR-2007-0294-0403.1).

to more than 200,000 LTOs/year).[42] These facilities were removed from the regression analysis. Additionally, for reasons described below, heliports were also removed from the regression. The resulting relationship was:

Equation 4:

LTOs = 1293 + 203*aircraft + 0.0019*county population - 473*Alaska – 144*(AlaskaXaircraft) $R^2 = 0.65$

When equation 4 was applied to the 6,414 airport facilities that report based aircraft data but not LTO activity, the resulting sum of LTOs was almost 15 million. EPA estimates that the number of LTOs at the airports that do not report activity data should approximate the number of LTOs from the bottom of the distribution of the set of airports that report activity data to the 5010 airport data report but that are not in the TAF database. The average number of LTOs per year from airports in the bottom 30% of the set of airports that report activity data to the 5010 airport data report but that are not in the TAF database is ~63 LTOs/year. Multiplying 63 by the number of airports that do not report activity data equals 549,050 LTOs.[43] Therefore, EPA used equation 4 to generate the distribution of LTOs at the individual airports that report based aircraft data but not activity data and then applied a scaling factor of 0.0356 to those LTOs to obtain the LTOs that are reported in the 2008 NEI.[44] The sum of the LTOs from this set of airports plus the sum of the LTOs at the airports that do not report either based aircraft or activity data (described below in section *(b)*) sum to 549,050 LTOs. These LTOs are all assigned to the GA, piston-engine category since they are assigned to smaller general aviation airports that are assumed to have little to no air taxi or jet aircraft activity.

Equation 4 and the scaling factor were used to estimate LTO activity for the 2008 NEI at airport facilities that report based aircraft data but not activity data.

(b) Estimating LTOs at Facilities with Neither Based-Aircraft Data nor LTO Data:

There are 2,260 facilities (not including heliports) for which the 5010 airport data report supplies neither the number of based aircraft nor activity data. In the absence of data to establish a relationship to airport activity, we assign a default value of LTOs to the GA, piston-engine category for each of these facilities.

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[42] From FAA's website, "Addresses for Commercial Service Airports", available at: http://www.faa.gov/airports_airtraffic/airports/planning_capacity/passenger_allcargo_stats/addresses/media/commercial_service_airports_addresses.xls

[43] This rounded number is calculated by multiplying 63.298 LTOs/year by 8,674, which is the number of airports that don't report activity data (6,414 don't report activity data and 2,260 facilities don't report activity or based aircraft data).

[44] The scaling factor was calculated by dividing 528,710 LTOs by 14,862,767 LTOS; the 528,710 LTOs are equal to 549,050 LTOs minus 20,340 LTOs (20,340 LTOs represent the sum of LTOs assigned to the 2,260 facilities that don't report either activity data or based aircraft data - the derivation of LTO estimates for these facilities is described in Section 4 *(b)*). The 14,862,767 LTOs are the sum of LTOs that result from applying equation 4 to the 6,414 facilities with based aircraft data but no activity data.

The default value was determined by evaluating GA LTOs that are reported at the set of 2,471 facilities that report activity data to the 5010 airport data report but that are not in the TAF set of airports. The average number of LTOs reported to the bottom ten percent of these facilities (when sorted by total GA LTOs) was 9. These facilities are assumed to most closely approximate the set of 2,260 facilities that do not report any based aircraft or LTO data; therefore, we assigned 9 LTOs to the GA, piston-engine category for these airport facilities for purposes of developing inventory estimates.

Section 5. Calculating LTOs at Heliports:

There were 5,559 heliport facilities in the January 15, 2009 FAA 5010 data report that were operational. Of those, only 92 (or 2%) reported LTO data, and of those, only 31 reported both based aircraft and LTO data. Because of the limited information regarding activity at heliports, some municipalities have hired contractors to survey activity in their local area.[45, 46]

The summary statistics for LTO data provided at the 92 operational heliports is presented in Table 2. These facilities report a wide range in activity from 3 LTOs/year to more than 18,000 LTOs/year. Some facilities clearly have significant helicopter traffic (i.e., thousands of LTOs/year) which is supported by the contractor summaries of heliport activity in the Washington Metropolitan area. The little data available to us suggests that the median helicopter activity is less than 200 LTOs/year. In the absence of more information on which to base estimates of LTO activity, we assigned 141 LTOs (the median of the reported heliport LTOs) to the GA category at all of the heliports which do not report LTO data. The piston-engine fraction developed in Section 6 is applied to the 141 LTOs resulting in 51 LTOs assigned to the GA, piston-engine category and 90 assigned to the GA, turbine-engine category. This is an area of significant uncertainty in the inventory and one for which EPA is seeking information from local agencies.

Table 2: Heliport LTO Data for those Reporting LTO Data in the January 15, 2009 Version of the 5010 Airport Data Report

18,250	Maximum LTOs
3	Minimum LTOs
1,123	Average LTOs
141	Median LTOs
50	Mode LTOs

[45] Executive Summary: Regional Helicopter System Plan, Metropolitan Washington Area, prepared by Edwards and Kelcey for the Metropolitan Washington Council of Governments, 2005.
[46] Alaska Aviation Emission Inventory, prepared by Sierra Research, Inc. for Western Regional Air Partnership, 2005.

Section 6. Methodology for Estimating Airport-Specific Lead Emissions

In 2008, EPA developed a method to calculate lead emissions at airports where piston-engine powered aircraft operate. [47] This method brings lead inventories into alignment with the manner in which other criteria pollutants emitted by aircraft are calculated. This method is described here with changes that were made from previous methods (i.e., the method used to develop the 2002 inventory) and applied in developing airport lead inventories for the 2008 NEI. In this section we first present the equation used to calculate lead emitted during the LTO cycle then we describe each of the components of the input data: we describe how we calculate piston-engine LTOs from data available in FAA databases, we describe the derivation of the emission factor for the amount of lead emitted during the LTO cycle, and we describe the estimate of the amount of lead retained in the engine and oil that we do not include in the amount of lead released to the air.

Historically, where aircraft specific activity data are available (such as T-100), aircraft gaseous and particulate matter (PM) emissions have been calculated through the FAA's EDMS.[48] This modeling system was designed to develop emission inventories for the purpose of assessing potential air quality impacts of airport operations and proposed airport development projects. However, EDMS has a limited number of piston-engine aircraft in its aircraft data and is currently not set up to calculate metal emissions and thus, it is not a readily available tool for determining airport lead inventories related to aircraft operations. In developing this approach to determine piston-engine aircraft lead emissions, EPA relied upon the basic methodology employed in EDMS. This requires as input the activity of piston-engine aircraft at a facility, fuel consumption rates by these aircraft during the various modes of the LTO cycle and time in each mode (taxi/idle-out, takeoff, climb-out, approach, and taxi/idle-in), the concentration of lead in the fuel and the retention of lead in the engine and oil. The equation used to calculate airport-specific lead emissions during the LTO cycle is below, followed by a description of each of the input parameters.

$$\text{LTO Pb (tons)} = \frac{(\text{piston-engine LTO})(\text{avgas Pb g/LTO})(1\text{-Pb retention})}{907{,}180 \text{ g/ton}}$$

(a) Calculating Piston-engine LTO:

Piston-engine LTOs are used to calculate emissions of lead that are assigned to the airport facility where the aircraft operations occur. An aircraft operation is defined as any landing or takeoff event, therefore, to calculate LTOs, operations are divided by two. Most data sources from FAA report aircraft activity in numbers of operations which, for the purposes of calculating lead emissions, need to be converted to LTO events. We

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[47] U.S. EPA (2008) Lead Emissions from the Use of Leaded Aviation Gasoline in the United States, Technical Support Document. EPA420-R-08-020. Available at: www.epa.gov/otaq/aviation.htm.
[48] EDMS available from http://www.faa.gov/about/office_org/headquarters_offices/aep/models/edms_model/

describe here the method used to estimate the fraction of GA and AT LTOs at an airport that are conducted by piston-engine aircraft. These fractions are calculated separately (one fraction for GA and one for AT). These fractions are multiplied by total LTOs reported separately for GA and AT and then summed to arrive at the total LTOs conducted by piston-engine aircraft at an airport.

One use of the 2008 NEI is to identify sources of lead, including airports, that have inventories of 0.50 tons per year or more for the purposes of identifying locations where lead monitoring may be required to evaluate compliance with the National Ambient Air Quality Standard for Lead. To calculate the most airport-specific inventories for airports that may potentially exceed this inventory threshold, we used a more airport-specific surrogate for this subset of airports than the remainder of the airports where we applied national default averages described below.

We used the fraction of based aircraft at an airport that are single- or multi-engine to calculate the number of GA LTOs at an airport that were conducted by piston-engine aircraft. The data regarding the population of based aircraft at an airport is available for a subset of airports in the FAA 5010 master records data report described in Section 3. For example, if an airport reports 150 single-engine aircraft, 20 multi-engine aircraft and a total of 180 aircraft based at that facility, then the fraction of based aircraft we would use as a surrogate for piston-engine aircraft is 94% ((150+20)/180). We then multiply the total GA LTOs for that facility by 0.94 to calculate piston-engine LTOs.

We evaluated this surrogate by comparing the results of using it with piston-engine aircraft operations reported for airports that supply this information in master plans, airport layout plans, noise abatement studies and/or land use compatibility plans. We could rarely find data from the same year for comparison purposes; however, for the majority of airports, based aircraft and actual observed piston-engine aircraft activity agreed within ten percent.[49]

For the majority of airports in the 2008 NEI we used national average fractions of GA and AT LTOs conducted by piston-engine aircraft that were derived using FAA's General Aviation and Part 135[50] Activity Surveys – CY 2008 (GAATA).[51] Table 2.4 in the 2008 GAATA Survey reports that approximately sixty-six percent (66%) of all GA and AT LTOs are from piston-engine aircraft which use avgas, and about thirty-four

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[49] Documents used to evaluate the use of based aircraft include the following:
Airport Master Plan Update Prescott Municipal Airport (Ernest A Love Field) (2009) Available at: www.cityof**prescott**.net/_d/amp_tablecontents.pdf
Gillespie field Airport Layout Plan Update Narrative Report (2005) Available at: www.co.san-diego.ca.us/dpw/**airport**s/powerpoints/pdalp.pdf
Land Use Compatibility Plan for the Grand Forks International Airport (2006) Available at: www.gfk**airport**.com/authority/pdf/**land_use**.pdf
McClellan-Palomar Land Use Compatibility Plan (Amended March 4, 2010) Available at: www.ci.oceanside.ca.us/.../**McClellan-Palomar**_ALUCP_03-4-10_amendment.pdf
[50] On-demand (air taxi) and commuter operations not covered by Part 121
[51] The FAA GAATA is a database collected from surveys of pilots flying aircraft used for general aviation and air taxi activity. For more information on the 2008 GAATA, see Appendix A at http://www.faa.gov/data_research/aviation_data_statistics/general_aviation/CY2008/

percent (34%) are turboprop and turbojet powered which use jet fuel, such as Jet A. The LTO data in Table 2.4 in the 2008 GAATA Survey does not distinguish LTOs as GA or AT, and thus does not allow us derive separate piston activity fractions for GA and AT.

We are using the number of hours flown by piston versus turboprop or turbojet aircraft (reported in Table 1.4 in the 2008 GAATA Survey) to allow us to make separate estimates of the fraction of GA activity conducted by piston aircraft and the fraction of AT activity conducted by piston aircraft. We chose to use the fraction of hours flown by piston-engine aircraft as a surrogate to calculate the fraction of LTOs flown by piston aircraft since the overall (i.e., for GA and AT combined) piston percent of hours flown (66.4%) is very close to the percent of LTOs that are piston (65.7%). Table 1.4 of the 2008 GAATA presents the total hours flown by aircraft type and separates GA from AT. Seventy-three percent (73%) of all GA hours flown are by piston-engine aircraft while twenty-eight percent (28%) of all GA hours flown are by turboprop and turbojet powered aircraft.[52] Twenty-three percent (23%) of all AT hours flown are by piston-engine aircraft while seventy-seven percent (77%) of all AT hours flown are by turboprop and turbojet powered aircraft. Approximately 5,000 of the total 20,000 airport facilities in the U.S. are heliports at which only helicopters (rotocraft) operate. Therefore, EPA also calculated the percent of rotocraft hours flown that are conducted by piston-engine aircraft. Thirty-six percent (36%) of all GA rotocraft hours flown are by piston-engine rotocraft while sixty-four percent (64%) of all GA rotocraft hours flown are by turboprop and turbojet powered rotocraft. Two percent (2%) of all AT rotocraft hours flown are by piston-engine rotocraft while ninety-eight percent (98%) of all AT rotocraft hours flown are by turboprop and turbojet powered rotocraft. Table 3 identifies the piston and turbine fractions that were used in the absence of airport-specific information to calculate piston-engine operations at airports and heliports in the 2008 NEI.

Table 3: Piston and Turbine Activity Fractions used in the 2008 NEI

	Airports		**Heliports**	
	GA	**AT**	**GA**	**AT**
Piston Powered	72.5%	23.1%	36.1%	2%
Turbine Powered	27.5%	76.9%	63.9%	98%

[52] Numbers in the text may not add to 100% due to rounding; the percentages in Table 3 are the values we used to calculate the 2008 NEI.

(b) Calculating the Piston-engine Aircraft Emission Factor: Grams of Lead Emitted per LTO:

Piston-engine aircraft can have either one or two engines. EDMS version 5.0.2 contains information on the amount of avgas used per LTO for some single and twin-engine aircraft. The proportion of piston-engine LTOs conducted by single- versus twin-engine aircraft was taken from the FAA's GAATA Survey for 2008 (90% of LTOs are conducted by aircraft having one engine and 10% of LTOs by aircraft having two engines).[53] Since twin-engine aircraft have higher fuel consumption rates than those with single engines, a weighted-average LTO fuel usage rate was calculated to apply to the population of piston-engine aircraft as a whole. For the single-engine aircraft, the average amount of fuel consumed per LTO was determined from the six types of single piston-engine aircraft within EDMS.[54] This was calculated by averaging the single-engine EDMS outputs for fuel consumed per LTO using the EDMS scenario property of ICAO/USEPA Default - Times in Mode (TIM), with a 16 minute taxi-in/taxi-out time according to EPA's *Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources*, 1992.[55] This gives a value of 16.96 pounds of fuel per LTO (lbs/LTO). The average single-engine fuel consumption rate was divided by the average density of 100LL avgas, 6 pounds per gallon (lbs/gal), producing an average fuel usage rate for single-engine piston aircraft of 2.83 gallons per LTO (gal/LTO). This same calculation was performed for the two twin-engine piston aircraft within EDMS, producing an average LTO fuel usage rate for twin-engine piston aircraft of 9.12 gal/LTO.

Using these single- and twin-engine piston aircraft fuel consumption rates, a weighted average fuel usage rate per LTO was computed by multiplying the average fuel usage rate for single-engine aircraft (2.83 gal/LTO) by the fleet percentage of single-engine aircraft LTOs (90%). Next, the twin-engine piston aircraft average fuel usage rate (9.12 gal/LTO) was multiplied by the fleet percentage of twin-engine aircraft LTOs (10%). By summing the results of the single- and twin-engine aircraft usage rates, the overall weighted-average fuel usage rate per LTO of 3.46 gal/LTO was obtained.

To calculate the emission factor, the concentration of lead in fuel is multiplied by the fuel consumption per LTO. The maximum lead concentration specified by ASTM for 100LL is 0.56 grams per liter or 2.12 grams per gallon. This amount of lead is normally added to assure that the required lean and rich mixture knock values are achieved. Multiplying this lead concentration in avgas by the weighted average fuel usage rate produces an overall average value of 7.34 grams of lead per LTO (g Pb/LTO) for piston-engines: 3.46 gal/LTO x 2.12 g Pb/gal = 7.34 g Pb/LTO.

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[53] The LTOs from the categories of 1-engine fixed wing piston, piston rotocraft, experimental total, and light sport were summed to determine the total number of single-engine piston aircraft LTOs.
[54] EPA understands that EDMS 5.0.2 has a limited list of piston-engines, but these are currently the best data available.
[55] U.S. EPA, *Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources*, EPA-450/4-81026d (Revised), 1992.

(c) Retention of Lead in Engine and Oil (1-Pb Retention):

Data collected from aircraft piston-engines operating on leaded avgas suggests that about 5% of the lead from the fuel is retained in the engine and engine oil.[56] Thus the emitted fraction is 0.95. This information is used in calculating airport-specific lead inventories and will be used to develop future national estimates of lead emitted from the consumption of leaded avgas.

Applying these parameters in the equation above yields the following equation:

$$\text{Pb(tons)} = \frac{\text{(piston-engine LTO) (7.34 g Pb/LTO) (0.95)}}{\text{907,180 g/ton}}$$

which simplifies to:

$$\text{Pb(tons)} = \text{(piston-engine LTO)} \ (7.7 \times 10^{-6})$$

Where piston-engine LTO[57] = (GA LTO x 0.725) + (AT LTO x 0.231)

(d) Estimating Lead Emissions from Piston-Engine Helicopters:

The emission factor for helicopters (g Pb/LTO) was determined in the same manner as described above for piston-engine fixed-wing aircraft. The concentration of lead in avgas (2.12 g/gal) was multiplied by the weighted average fuel usage rate for four types of Robinson helicopter engines.[58] This produced an overall average emission factor of 6.60 grams of lead per LTO (g Pb/LTO) for piston-engine powered helicopters.

There are no national databases that provide heliport-specific LTO activity data for piston-engine powered helicopters separately from turbine-engine powered helicopters. The 2008 FAA GA and Part 135 Activity (GAATA) Survey reports that approximately 36% of all GA helicopter hours flown are by piston-engine aircraft which use avgas, and about 64% are by turbine-engine powered which use jet fuel (which does

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[56] The information used to develop this estimate is from the following references: (a) Todd L. Petersen, Petersen Aviation, Inc, *Aviation Oil Lead Content Analysis*, Report # EPA 1-2008, January 2, 2008, available at William J. Hughes Technical Center Technical Reference and Research Library at http://actlibrary.tc.faa.gov/ and (b) E-mail from Theo Rindlisbacher of Switzerland Federal Office of Civil Aviation to Bryan Manning of U.S. EPA, regarding lead retained in engine, September 28, 2007.

[57] This equation for piston-engine LTOs only applies to non-heliport facilities. See the text immediately below for equations for calculating piston-engine LTOs and Pb emissions at heliports.

[58] This was done using the following 4 engine types in EDMS 5.1: Robinson R22 IO-320-D1AD; Robinson R22 IO-360-B; Robinson R22 O-320; Robinson R22 TSIO-360C. The fuel consumption rates were: Robinson R22 IO-320-D1AD – 5.546 g Pb/LTO; Robinson R22 IO-360-B – 5.973 g Pb/LTO; Robinson R22 O-320 – 6.276 g Pb/LTO; Robinson R22 TSIO-360C – 8.604 g Pb/LTO.

not contain lead).[59] The 2008 FAA GAATA Survey reports that approximately 2% of all AT helicopter hours flown are by piston-engine aircraft which use avgas, and about 98% are by turbine-engine powered rotocraft. We expect the fraction of helicopter activity conducted by piston-engines to vary by heliport with some facilities having no piston-engine powered helicopter activity and some hosting mainly or only piston-engine powered helicopters. However, in the absence of heliport-specific data, the national default estimates of 36% for GA and 2% for AT from the GAATA Survey were used. Therefore, to calculate piston-engine aircraft LTO as input for this equation, the helicopter GA LTOs were multiplied by 0.36 and helicopter AT LTOs were multiplied by 0.02.

Lead emitted at the heliport facility was calculated for the 2008 NEI using either the LTO data provided in FAA databases or the estimate LTO activity in the following equation (i.e., 141 LTOs):

$$\text{Pb(tons)} = \frac{\text{(piston-engine helicopter LTO) (6.60 g Pb/LTO) (0.95)}}{\text{907,180 g/ton}}$$

which simplifies to:

$$\text{Pb(tons)} = \text{(piston-engine helicopter LTO)} \ (6.9 \times 10^{-6})$$

Where piston-engine helicopter LTO = (Helicopter GA LTO x 0.36) + (Helicopter AT LTO x 0.02)

Section 7. Improving Airport-specific Lead Emissions Estimates

There are refinements to the methods described here that would improve airport-specific inventories, most of which involve acquiring airport- and aircraft-specific input data. The following information describes data inputs that could be used to generate airport lead inventories tailored to specific airports or otherwise improve the estimates using currently available data. State and local authorities might have, or be able to collect, better information for some of these key data inputs.

State and local agencies might have access to airport-specific data that would improve the national estimates of lead emissions per LTO. These improvements largely involve replacing national average or default values with airport-specific data on the activity of piston-engine aircraft. Three key data inputs are:

[59] The FAA GAATA is a database collected from surveys of pilots flying aircraft used for general aviation and air taxi activity. For more information on the GAATA, see Appendix A at http://www.faa.gov/data_statistics/aviation_data_statistics/general_aviation/

1) Airport-specific LTO activity for piston-powered aircraft, including the fraction of piston-engine activity conducted by single- versus twin-engine aircraft. Some airport facilities collect this information and states may use these data to calculate airport-specific lead inventories. The activity data should be current and updated on a regular schedule so that the data represents the inventory year as closely as possible.
2) The time spent in each mode of the LTO cycle. EPA uses the EDMS scenario property of ICAO/USEPA Default - Times in Mode, with a 16 minute taxi-in/taxi-out time according to EPA's Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources, 1992. While some local authorities have confirmed that these are the relevant times in mode at their airports for piston aircraft, the applicability of these times in mode will vary by airport. EPA has learned that one of the important factors in piston aircraft operation that is currently not included in the time in mode or emissions estimates is the time and fuel consumption during the pre-flight run-up checks conducted by piston-engine aircraft prior to takeoff.
3) Other data inputs for the airport-specific lead inventory calculation for which states or local authorities may provide airport-specific information include the concentration of lead in the avgas supplied at an airport, and the fraction of lead in fuel that is retained in the engine and oil, and aircraft-specific fuel consumption rates by the piston-engine aircraft in specific modes of operation.

The accuracy of the based aircraft data on which equation 4 is modeled can be improved. FAA recognizes the need to improve the integrity of the 5010 data report based-aircraft counts for all of the GA airports and reliever airports in the NPIAS and is currently in the process of improving the data collection and submission methods to accomplish this task.[60]

Section 8. Lead emitted in flight (i.e., outside the LTO cycle):

Lead emissions, especially those at altitude, undergo dispersion and eventually deposit to surfaces, and lead deposited to soil and water can remain available for uptake by plants, animals and humans for long periods of time. Because lead is a persistent pollutant, we are including all lead emissions – at airports and in-flight – in the NEI.[61]

For inventory purposes, lead emitted outside the LTO cycle occurs during aircraft cruise mode and portions of the climb-out and approach modes above the mixing height (typically 3,000 ft[62]). This part of an aircraft operation emits lead at various altitudes as well as close to and away from airports. Because the precise area of lead emission and deposition is not known for these flights, EPA is using a simplistic approach to allocate

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[60] National Based Aircraft Inventory Program: http://www.basedaircraft.com/public/FrequentlyAskedQuestions.aspx, accessed 2/17/2009
[61] U.S. EPA, 2006. Air Quality: Criteria for Lead: 2006; EPA/600/R-5/144aF; U.S. Government Printing Office, Washington, DC, October, 2006.
[62] According to EPA's *Procedurees for Emission Inventory Preparation, Volume IV: Mobile Sources, 1992.*

these emissions for the purposes of the 2008 NEI. A brief explanation of the nature of GA flights is provided here for context regarding emissions of lead in-flight.

FAA categorizes GA flights as either local area or itinerant operations and this distinction plays a role in the area over which lead is emitted. Local operations are those activities performed by aircraft operating in the local traffic pattern or within sight of the airport, aircraft executing simulated instrument approaches or low passes at the airport, and/or aircraft operating to or from the airport in a designated practice area located within a 20-mile radius of the airport. Local operations are common for GA aircraft. This includes applications such as recreational, proficiency and instructional flying as well as many common general aerial support tasks. Emissions during local flying are more likely to influence air and soil concentrations of lead in the vicinity of the airport because they occur near the airport, often at altitudes below the mixing height.

Itinerant operations are all operations other than those described above as local operations. An itinerant aircraft operation usually is one in which the aircraft departs from one airport and lands at a different airport. Depending on air time and distance, an itinerant flight is much more likely to involve departing the local flying area of the originating airport and climbing to altitudes above the mixing height. It is reasonable then, to generally expect that lead emitted outside the LTO cycle during itinerant operations, in contrast with local operations, will be more widely dispersed and at greater distances from the airport.

The portion of the national avgas lead emitted in flight (i.e., outside the LTO cycle) is calculated by subtracting the sum of airport facility lead inventories from the national avgas lead inventory. Even though FAA collects and reports information regarding the fraction of GA operations that are local and itinerant, there is no practical method to assign in-flight lead emissions to small geographic areas such as airports or census tracts. And similar data is not available for AT operations, a portion of which are conducted by piston-engine aircraft. Since the average duration of a piston-engine aircraft flight is approximately an hour, an itinerant flight can traverse county lines. Therefore, given the current data available, the best approach is to assign the out-of-LTO cycle lead to the state where the flight originated.

In the 2008 NEI EPA allocated lead emissions that are calculated as being outside the LTO cycle to states based on the state-specific fraction of national GA and AT piston-engine LTO activity. The state-specific fractions were calculated by multiplying the percent of GA and AT piston-engine LTO activity in each state by 296 tons, which is the amount of lead we currently estimate is emitted outside of the LTO cycle nationwide. Table 4 presents the total GA and AT piston-engine LTOs by state, the state-specific faction of national GA and AT piston-engine LTO activity, and the out-of-LTO lead emissions assigned to each state.

Table 4: Out-of-LTO Lead Emissions by State

STATE	Total GA and AT Piston LTOs	Percent of National GA and AT Piston LTOs (by state)	Out of LTO Pb emissions (tons)
AK	660,133	2.0%	5.86
AL	671,026	2.0%	5.96
AR	638,875	1.9%	5.68
AZ	1,430,302	4.3%	12.71
CA	3,881,357	11.6%	34.48
CO	780,426	2.3%	6.93
CT	226,807	0.7%	2.01
DC	28,833	0.1%	0.26
DE	84,617	0.3%	0.75
FL	2,751,015	8.3%	24.44
GA	750,876	2.3%	6.67
HI	138,432	0.4%	1.23
IA	281,961	0.8%	2.50
ID	430,812	1.3%	3.83
IL	920,908	2.8%	8.18
IN	566,583	1.7%	5.03
KS	459,720	1.4%	4.08
KY	280,378	0.8%	2.49
LA	622,011	1.9%	5.53
MA	714,159	2.1%	6.34
MD	436,861	1.3%	3.88
ME	228,302	0.7%	2.03
MI	880,818	2.6%	7.82
MN	647,876	1.9%	5.76
MO	389,551	1.2%	3.46
MS	461,383	1.4%	4.10
MT	270,311	0.8%	2.40
NC	743,004	2.2%	6.60
ND	214,139	0.6%	1.90
NE	221,681	0.7%	1.97
NH	173,355	0.5%	1.54
NJ	466,961	1.4%	4.15
NM	309,657	0.9%	2.75
NV	298,712	0.9%	2.65
NY	999,738	3.0%	8.88
OH	1,180,583	3.5%	10.49
OK	575,402	1.7%	5.11
OR	596,730	1.8%	5.30
PA	954,839	2.9%	8.48

PR	80,728	0.2%	0.72
RI	45,348	0.1%	0.40
SC	506,650	1.5%	4.50
SD	228,198	0.7%	2.03
TN	535,913	1.6%	4.76
TX	2,422,722	7.3%	21.52
UT	299,471	0.9%	2.66
VA	502,559	1.5%	4.46
VI	25,763	0.1%	0.23
VT	88,318	0.3%	0.78
WA	1,189,142	3.6%	10.56
WI	778,320	2.3%	6.91
WV	143,393	0.4%	1.27
WY	106,190	0.3%	0.94

For additional information or if you have questions regarding the methods described in this document, please contact Meredith Pedde (pedde.meredith@epa.gov) or Marion Hoyer (hoyer.marion@epa.gov).

Supplemental Table 1

Table A-1: Scaling factors

Year	U.S. Product Supplied of Aviation Gasoline (Thousand Barrels)[63]	Ratio of 2008 to Year X
Before 1981[64]		0.57
1981	11,147	0.50
1982	9,307	0.60
1983	9,444	0.59
1984	8,692	0.64
1985	9,969	0.56
1986	11,673	0.48
1987	9,041	0.62
1988	9,705	0.58
1989	9,427	0.59
1990	8,910	0.63
1991	8,265	0.68
1992	8,133	0.69
1993	7,606	0.74
1994	7,555	0.74
1995	7,841	0.71
1996	7,400	0.76
1997	7,864	0.71
1998	7,032	0.80
1999	7,760	0.72
2000	7,188	0.78
2001	6,921	0.81
2002	6,682	0.84
2003	5,987	0.94
2004	6,189	0.91
2005	7,006	0.80
2006	6,626	0.85
2007	6,258	0.90
2008	5,603	1.00

[63] Data from the Energy Information Administration's (EIA's) table, "U.S. Product Supplied of Aviation Gasoline (Thousand Barrels)." Available at: http://tonto.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=mgaupus1&f=A Accessed August 25, 2010.

[64] EIA does not have data for volumes of avgas product supplied for years earlier than 1981. To calculate the scaling factor to use for activity data from years before 1981, we used the ratio of 2008 avgas volume product supplied to the average avgas volume supplied from 1981 to 1989.

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Documentation for the Commercial Marine Vessel Component of the National Emissions Inventory

Methodology

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1.0 INTRODUCTION

1.1 What is the National Emission Inventory?

The National Emission Inventory (NEI) is a comprehensive inventory covering all anthropogenic sources of criteria pollutants and hazardous air pollutants (HAPs) for all areas of the United States. The NEI was created by the U.S. Environmental Protection Agency's Emission Inventory and Analysis Group (EIAG) in Research Triangle Park, North Carolina. The NEI will be used to support air quality modeling and other activities. To this end, the EPA established a goal to compile comprehensive emissions data in the NEI for criteria and HAPs for mobile, point, and nonpoint sources. This report presents an overview of how emission estimates for the commercial marine vessel (CMV) component of the 2008 NEI was compiled.

1.2 Why Did the EPA Create the NEI?

The Clean Air Act (CAA), as amended in 1990, includes mandates for the EPA related to criteria and hazardous air pollutants. The CAA defines criteria pollutants as being one of the following air pollutants:

- Carbon monoxide (CO);
- Sulfur oxides (SO_x);
- Nitrogen oxides (NO_x);
- Ozone; and
- Particulate matter (PM).

Where emission factors and activity data permit, ammonia (NH_3) estimates are also included as an important precursor to PM. Hazardous air pollutants are also delineated in the CAA, see *http://www.epa.gov/ttn/atw/188polls.html* for a complete list of regulated pollutants and their chemical abstract service [CAS] numbers.

The CAA requires the EPA to identify emission sources of these pollutants, quantify emissions, develop regulations for the identified source categories, and assess the public health and environmental impacts after the regulations are put into effect. The NEI is a tool that EPA can use to meet the CAA mandates. In this report, criteria and HAP emission estimates are discussed for CMV sources.

1.3 How is the EPA Going to Use This Version of the NEI?

It is anticipated that the emission inventory developed from this effort will have multiple end uses. The data have been formatted according to protocols established for the EPA's NEI submittals. The common data structure on which the NEI platform is based will allow the NEI emission data to be transferred to multiple end-users for a variety of purposes.

The criteria and HAP emission estimates developed for the NEI will be used to evaluate air pollution trends, air quality modeling analysis and impacts of potential regulations.

1.4 Report Organization

Following this introduction, Section 2.0 provides information on how the national CMV, emission estimates were developed. This inventory effort was coordinated by the EPA's Office of Transportation and Air Quality (OTAQ) and EIAG.

The appendix were created to provide technical details on how the national emissions were developed and how state and local inventory data (when provided) were incorporated into the national estimates. Appendix A provides a copy of the report documenting how the 2002 data were adjusted to reflect marine vessel activity and emissions for 2008.

2.0 DEVELOPMENT OF THE COMMERCIAL MARINE VESSEL COMPONENT FOR THE NEI

2.1 How Does This CMV Study Fit into the NEI?

The NEI was developed to include all point, nonpoint (sometimes referenced as "area"), and mobile sources. The approaches used in the point and nonpoint source categories are documented in other reports. Table 1 summarizes the approaches used to estimate emissions from all nonroad sources included in the NEI program. Those source categories and years that are included in this report are noted in bold.

The scope of this inventory component of the NEI was to compile criteria and HAP emissions data for CMVs operating in United States waters and federal waters extending 200 nautical miles from the United States' coastline. In this effort, national emission estimates were often developed and allocated to counties based on available Geographic Information System (GIS) data. The methodologies used to estimate emissions and the procedures used to spatially allocate them to the county-level are discussed in this report.

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources
(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
NONROAD Categories			
Nonroad Gasoline, Diesel, LPG, CNG	2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3, & HAPs	Emission estimates for NONROAD model engines were developed using EPA's National Mobile Inventory Model (NMIM), which incorporates NONROAD2004. Where states provided alternate nonroad inputs, these data replaced EPA default inputs. State-supplied emissions data also replaced default EPA emission estimates.

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
	1999	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) an updated 1999 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. Replaced State-submitted data for California for all NONROAD model categories; Pennsylvania for recreational marine and aircraft ground support equipment, and Texas for select equipment categories.
	1996, 1997, 1998, 2000 & 2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated year-specific national and California inventories, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios and California county-to-state ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. California results replace the diesel equipment emissions generated from prior application of county-to-national ratios.

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Nonroad Gasoline, Diesel, LPG, and CNG (Continued)	1991-1995	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3	Using 1990 and 1996 county-level emissions inventories, estimated emissions using linear interpolation of national emissions between 1990 and 1996. From these emissions, calculated the average annual growth rate for each pollutant/SCC combination for each year, and then applied the growth factors to 1990 county-level emissions to estimate 1991-1995 emissions.
	1990	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated 1990 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model.
	1986, 1988, & 1989	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3	Using 1985 and 1990 county-level emissions inventories, estimated emissions using linear interpolation of national emissions between 1985 and 1990. From these emissions, calculated the average annual growth rate for each pollutant/SCC combination for each year, and then applied the growth factors to 1985 county-level emissions to estimate 1986-1989 emissions.
	1987	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using EPA's draft Lockdown C NONROAD model (dated May 2002), developed updated national emissions for 1987 by running 4 seasonal NONROAD model runs to estimate annual criteria pollutant emissions. Also performed national NONROAD model runs to estimate typical summer weekday emissions.

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Nonroad Gasoline, Diesel, LPG, and CNG (Continued)	1985	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated 1985 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model.
	1970, 1975, 1978, & 1980	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using EPA's draft Lockdown C NONROAD model (dated May 2002), developed updated national emissions for all years by running 4 seasonal NONROAD model runs to estimate annual criteria pollutant emissions. Also performed national NONROAD model runs to estimate typical summer weekday emissions.
	1996, 1997, 1998, 1999, 2000, & 2001	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD. NH_3 emissions for California were also recalculated using updated diesel fuel consumption values generated for California-specific runs, and assuming the 1996 county-level distribution.
	1985 & 1990	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD.
	1987	NH_3	Obtaining 1987 national fuel consumption estimates from Lockdown C NONROAD model and multiplying by NH_3 emission factors.

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)
(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Nonroad Gasoline, Diesel, LPG, and CNG (Continued)	1970, 1975, 1978, & 1980	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model and multiplying by NH_3 emission factors.
	1990, 1996, & 1999	HAPs	Speciation profiles applied to county VOC and PM estimates. Metal HAPs were calculated using fuel and activity-based emission factors. Some state data were provided and replaced national estimates. (2003)
Aircraft			
Commercial Aircraft	2008	Criteria and HAPs	Federal Aviation Administration (FAA) Emissions and Dispersion and Modeling System (EDMS) - Version 5.1.was run using BTS T-100 LTO data. (2009)
	2002	Criteria and HAPs	Federal Aviation Administration (FAA) Emissions and Dispersion and Modeling System (EDMS) was run for criteria pollutants, VOC and PM emissions were speciated into HAP components. (2004)
	1990, 1996, 1999, 2000, 2001	VOC, NO_x, CO, SO_x	Input landing and take-off (LTO) data into FAA EDMS. National emissions were assigned to airports based on airport specific LTO data and BTS GIS data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999	HAPs	Speciation profiles were applied to VOC estimates to get national HAP estimates. State data replaced national estimates. (2003)
General Aviation, Air Taxis	2008	Criteria and HAPs	Used FAA LTO data from TAF and OTAQ provided activity data for smaller airports derived from FAA 5010 master plans. EPA approved generic emission factors for criteria estimates. Speciation profiles were applied to VOC and PM estimates to get national HAP estimates. (2009)

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)
(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
General Aviation, Air Taxis (Continued)	1978, 1987, 1990, 1996, 1999, 2000, 2001, & 2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data and EPA approved emission factors for criteria estimates. Speciation profiles were applied to VOC estimates to get national HAP estimates. State data replaced national estimates. (2004)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999, & 2002	HAPs	Used FAA LTO data and EPA approved emission factors for criteria estimates. Speciation profiles were applied to VOC estimates to develop national HAP estimates. (2004)
	1990, 1996, 1999, & 2002	Pb	Used Department of Energy (DOE) aviation gasoline usage data with lead concentration of aviation gasoline. (2004)
	1996	NH_3	Applied NH_3 emissions factors to 1996 national jet fuel and aviation gasoline consumption estimates.
Military Aircraft	1978, 1987, 1990, 1996, 1999, 2000, 2001, 2002, 2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data as reported in TAF and EPA approved emission factors for criteria estimates. Representative HAP profiles were not readily available, therefore HAP estimates were not developed. (2009)
	1970-1998	VOC, NO_x, CO, SO_X, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
Auxiliary Power Units	2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Federal Aviation Administration (FAA) Emissions and Dispersion and Modeling System (EDMS) - Version 5.1.was run using BTS T-100 LTO data. (2009)
	1985-2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Grew 1996 emissions to each year using LTO operations data from the FAA. Estimation methods prior to 1996 reported in EPA, 1998.

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)
(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Unpaved Airstrips[1]	1985-2001	PM_{10}, $PM_{2.5}$	Grew 1996 emissions to each year using SIC 45-Air Transportation growth factors, consistent with the current draft version of EGAS. Estimation methods prior to 1996 reported in EPA, 1998.
Aircraft Refueling[1]	1985-2001	VOC	Grew 1996 emissions to each year using SIC 45-Air Transportation growth factors, consistent with the current draft version of EGAS. Estimation methods prior to 1996 reported in EPA, 1998.
Commercial Marine Vessel (CMV)			
All CMV Categories	**2008**	**VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$**	**2002 estimates were adjusted by OTAQ to reflect 2008 activity levels., note that the SCCs for this category have changed such that the Diesel category refers to smaller vessels (Category 1 and 2) using distillate fuels and the Residual category refers to larger (Category 3) vessel using a blend of residual fuels (2009)**
	2008	**HAPs**	**OTAQ's 2008 estimates were speciated into HAP components using SEPA profiles**
	2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2001 Estimates carried over. Used state data when provided. (2004)
		HAPs	1999 Estimates carried over. Used state data when provided. (2004)
CMV Diesel	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$	Used criteria emission estimates in the background document for marine diesel regulations for 2000. Adjusted 2000 criteria emission estimates for other used based on fuel usage. Emissions were disaggregated into port traffic and underway activities. Port emissions were assigned to specific ports based on amount of cargo handled. Underway emissions were allocated based on Army Corp of Engineering waterway data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999	HAPs	VOC and PM emission estimates were speciated into HAP components. State data replaced national estimates. (2003)

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
	1996	NH_3	Applied NH_3 emissions factors to 1996 distillate and residual fuel oil estimates (i.e., as reported in EIA, 1996).
	1990-1995	NH_3	Estimation methods reported in EPA, 1998.
CMV Steam Powered	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$	Calculated criteria emissions based on EPA SIP guidance. Emissions were disaggregated into port traffic and under way activities. Port emissions were assigned to specific ports based on amount of cargo handled. Underway emissions were allocated based on Army Corp of Engineering waterway data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, & 1999	HAPs	VOC and PM emission estimates were speciated into HAP components. State data replaced national estimates. (2003)
Military Marine	1997-2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Applied EGAS growth factors to 1996 emissions estimates for this category.
CMV Coal,[2] CMV, Steam powered, CMV Gasoline[2]	1997-1998	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Applied EGAS growth factors to 1996 emissions estimates for this category.
CM Coal, CMV, Steam powered, CMV Gasoline, Military Marine	1991-1995	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Estimation methods reported in EPA, 1998.
Locomotives			
Class I, Class II, Commuter, Passenger, and Yard Locomotives	1978, 1987, 1990, 1996, 1999, 2000, 2000, & 2002	VOC, NO_x, CO, PM_{10}, $PM_{2.5}$	Criteria pollutants were estimated by using locomotive fuel use data from DOE EIA and available emission factors. County-level estimates were obtained by scaling the national estimates with the rail GIS data from DOT. State data replaced national estimates. (2004)

Table 2-1. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Class I, Class II, Commuter, Passenger, and Yard Locomotives (Continued)	1978, 1987, 1990, 1996, 1999, 2000, 2001, & 2002	SO_2	SO_x emissions were calculated by using locomotive fuel use and fuel sulfur concentration data from EIA. County-level estimates were obtained by scaling the national estimates with the county level rail activity data from DOT. State data replaced national estimates. (2004)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999, & 2002	HAPs	HAP emissions were calculated by applying speciation profiles to VOC and PM estimates. County-level estimates were obtained by scaling the national estimates with the county level rail activity from DOT. State data replaced national estimates. (2004)
	1997-1998	NH_3	Grew 1996 base year emissions using EGAS growth indicators.
	1996	NH_3	Applied NH_3 emissions factors to diesel consumption estimates for 1996.
	1990-1995	NH_3	Estimation methods reported in EPA, 1998.

Notes:

* Dates included at the end of Estimation Method represent the year that the section was revised.

1 Emission estimates for unpaved airstrips and aircraft refueling are included in the area source NEI, since they represent non-engine emissions.

2 National Emission estimates for CMV Coal and CMV Gasoline were not developed though states and local agencies may have submitted estimates for these source categories.

EPA, 1998. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Factors and Inventory Group, National Air Pollutant Emission Trends, Procedures Document, 1900–1996, EPA-454/R-98-008. May 1998.

The target inventory area includes every state in the United States and every county within a state. There are no boundary limitations pertaining to traditional criteria pollutant nonattainment areas or to designated urban areas. The pollutants inventoried included all criteria pollutants (except for the other nonroad source category which addressed only HAPs in this report) and the 188 HAPs identified in Section 112(b) of the CAA. Some state or local agencies provided emissions information on more HAPs than those delineated in the CAA, only the federally regulated HAPs are included in the NEI.

In addition to numerous specific chemical compounds, the list of 188 HAPs includes several compound groups [e.g., individual metals and their compounds, polycyclic organic matter (POM)]; the NEI includes emission estimates for the individual compounds wherever possible. Many of the uses of the NEI depend upon data (e.g., toxicity) for individual compounds within these groups rather than aggregated data on each group as a whole.

The intent in presenting the following emission inventory approach is to provide sufficient and transparent documentation such that states and local agencies can use these approaches, in conjunction with their specific local activity data to develop more accurate and comparable emission estimates in future submittals.

2.2 What are Commercial Marine Vessels?

The CMV source category includes all boats and ships used either directly or indirectly in the conduct of commerce or military activity. These vessels range from 20-foot charter boats to large tankers which can exceed 1,000 feet in length (EPA, 1989). In spite of the broad range of vessels represented by this category, a number of common characteristics allow for the use of simple emission estimation methods. The majority of vessels in this category are powered by diesel engines that are either fueled with distillate or residual fuel oil blends. For the purpose of this inventory it is assumed that Category 3 vessels primarily use residual blends while Category 1 and 2 vessels typically used distillate fuels.

The Category 3 (C3) inventory developed by OTAQ includes vessels which use C3 engines for propulsion. C3 engines are defined as having displacement above 30 liters per cylinder (U.S. EPA, 2003). The resulting inventory includes emissions from both propulsion and auxiliary engines used on these vessels, as well as those on gas and steam turbine vessels. Geographically, the inventories include port and interport emissions that occur within the area that extends 200 nautical miles (nm) from the official U.S. baseline, which is roughly equivalent to the border of the U.S. Exclusive Economic Zone (EEZ).

Category 1 and 2 vessels tend to be smaller ships that operate closer to shore, and along inland and intercoastal waterways. Naval vessels are not included in this inventory, though Coast Guard vessels are included as Category 1 and 2 vessels.

The CMV source category does not include recreational marine vessels, which are generally less than 100 feet in length, most being less than 30 feet, and powered by either inboard or outboard engines (EPA, 1989). Emissions from recreational marine vessels are included in the nonroad source category.

2.3 What Pollutants are Included in the National Emission Estimates for CMVs?

The EPA's Office of Transportation and Air Quality (OTAQ) provided estimates for all criteria pollutants including volatile organic compounds (VOC), nitrogen oxides (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$) and carbon dioxide (CO_2). Criteria emissions were provided for Category 1 and 2 vessels (Carey, 2009b); Category 3 port, reduced speed zone, and cruising activities (Carey, 2009a and Carey, 2009c); and Category 3 interport activities (Carey, 2009d).

The VOC and PM estimates were speciated into hazardous air pollutants (HAP) components based on available data sources. The Swedish Environmental Protection Agency (SEPA) document *Methodology for Calculating Emissions from Ships: 1. Update of emission factors* served as the primary source of HAP emission factors which were converted into speciation profiles (Cooper and Gustafsson, 2004). Ammonia emission factors were also obtained from the SEPA, but as these factors require activity data, and such data were not available for Category 3 vessels operating in Federal waters, ammonia was estimated as a ratio of PM_{10} using the SEPA emission factors. Similar ratios were developed for Category 1 and 2 vessels, assuming that this fleet primarily operates on marine diesel fuel with 80.5 percent of the fleet equipped with medium speed engines and the remaining 19.5 percent were high speed engines. This provided a weighted NH_3 emission factor of 4.61E-03 g/kw-hr for operations at-sea and in-port. The PM_{10} factors vary for at-sea (0.2 g/kw-hr) and in-port (0.4 g/kw-hr), so our NH_3 / PM_{10} ratios were different for at-sea (2.31E-02) and in-port (1.15E-02).

While the SEPA document was used as the primary speciation source, other resources were investigated for potential inclusion in this effort. Recent BTEX data from Moldanova et al. were examined, but it included inconsistent benzene factors, some over 20% of hydrocarbon (HC) factors, were much higher than others found in recent publications and, as a result, were not included (Cook, 2009). CE-CERT metals data was also reviewed as it pertained to slow speed residual fuel engines (Cook, 2009). The CE-CERT emission factors were in line with the Swedish factors for nickel and lead, but they were an order of magnitude different for chromium, cadmium, and selenium. As a result, the Swedish factors were retained over the CE-CERT data based on the larger study sample size, while CE-CERT's manganese emission factors were added as these factors were not included in the Swedish study (Cook, 2009).

The complete pollutant list for CMVs is shown in Table 2-2.

2.4 How Were the CMV Emissions Estimated?

As noted above, the CMV criteria and CO_2 emission estimates were provided for this inventory by OTAQ. Category 3 commercial marine inventories were developed for a base year of 2002 then projected to 2008 applying regional adjustment factors to account for growth. In addition, NO_X adjustment factors were applied to account for implementation of the NO_X Tier 1 standard. Details about adjustments and growth factors can be found in the Category 3 documentation (Appendix A). For Category 1 and 2 marine diesel engines, the emission estimates were consistent with the 2008 Locomotive and Marine federal rule making (Carey, 2009b).

Table 2-2. Commercial Marine Vessel Pollutant List

2,2,4 Trimethylpentane	Carbon Monoxide*	Naphthalene
Acenaphthene	Chromium(VI)	Nickel
Acenaphthylene	Chromium (III)	Nitrogen Oxides*
Acetaldehyde	Chrysene	PAH, total
Acrolein	Cobalt	Phenanthrene
Ammonia	Dibenzo[a,h]Anthracene	Phosphorus
Anthracene	Dioxins/Furans	PM10 Primary*
Arsenic	Ethyl benzene	PM2.5 Primary+
Benz(a)anthracene	Fluoranthene	Polychlorinated Biphenyls
Benzene	Fluorene	Propionaldehyde
Benzo(a)pyrene	Formaldehyde	Pyrene
Benzo(b)fluoranthene	Hexachlorobenzene	Selenium
Benzo(g,h,i)perylene	Hexane	Styrene
Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Sulfur Dioxide*
Beryllium	Lead	Toluene
Cadmium	Manganese	VOCs*
Carbon Dioxide*	Mercury	Xylene

* Provided by OTAQ

\+ $PM_{2.5}$ was provided by OTAQ for all vessels and modes except for Category 3 Interport, where it was calculated using OTAQ guidance.

OTAQ's emissions were then allocated to individual GIS polygons using appropriate methods that varied by operating mode (i.e., hotelling, maneuvering, reduced speed zone, and underway). HAP emissions were estimated by applying speciation profiles to each polygon's VOC and PM estimates. Figure 2-1 provides an overview of the approach used to estimate and spatially allocate CMV emissions.

Speciation profiles were applied to the VOC, PM_{10}, and $PM_{2.5}$ emission estimates to calculate the associated HAP emissions using the following equation.

$$VOC\text{-}PM_{10/2.5} * speciation\ profile_i = HAP\ emission\ estimate:$$

Where:

HAP emission estimate	= HAP Emission estimate (tons/year) for pollutant:
$VOC\text{-}PM_{10/2.5}$	= VOC or PM emission estimate (tons/year)
Speciation $Profile_i$	= VOC or PM speciation fraction for HAP i

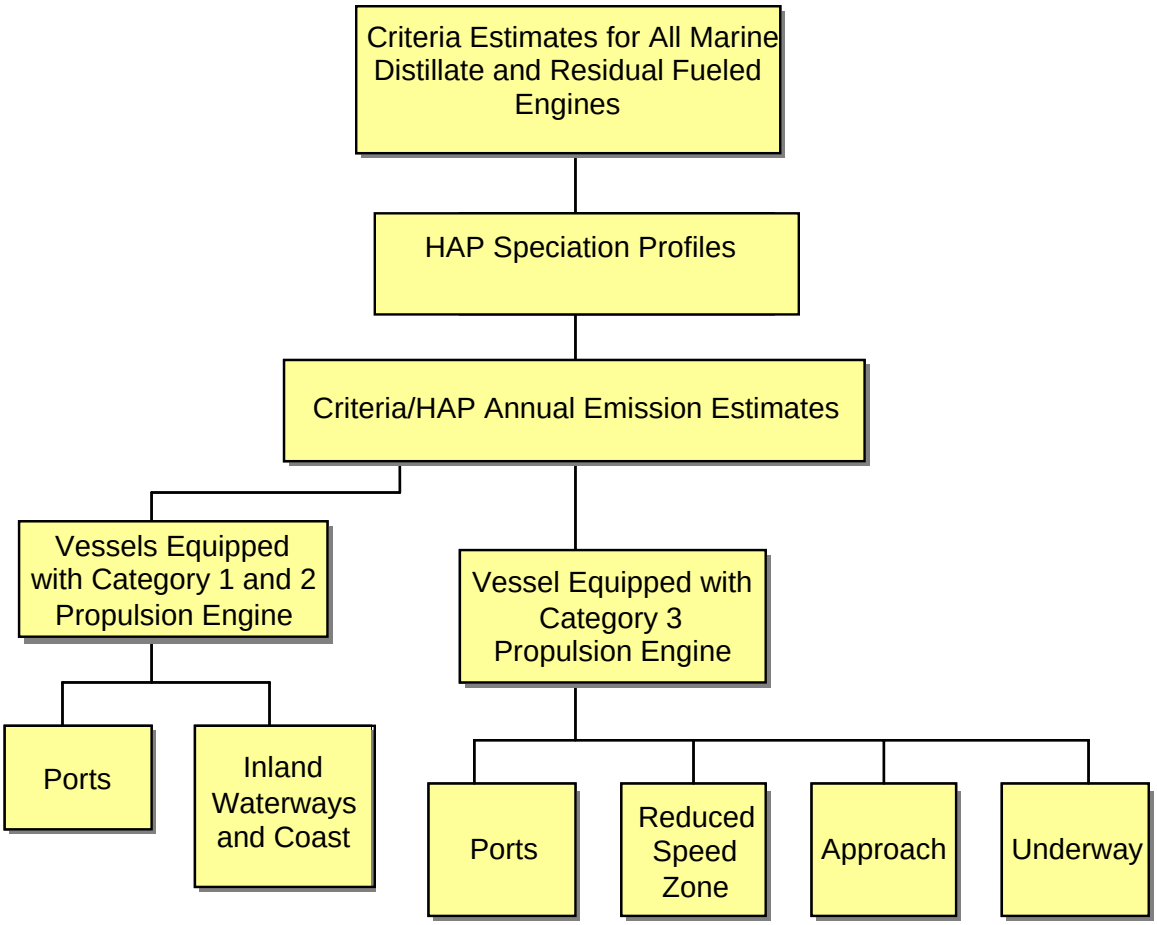

Figure 2-1. General Approach Used to Develop Marine Vessel Component of the 2008 National Emission Inventory

For Category I diesel-powered vessels, the speciation profiles were based on high-speed diesel vehicle (HSDV) factors obtained from information in the SEPA's *Methodology for Calculating Emissions from Ships: 1. Update of emission factors* (Cooper and Gustafsson, 2004). For Category 2 diesel-powered vessels, the speciation profiles were developed from medium-speed diesel vehicles (MSDV). Since emissions and activity data were provided as a combined value for all Category 1 and 2 vessels, the Category 1 and Category 2 emission factors were averaged to obtain a single emission factor for all diesel vessels. All port activities for Category 1 and 2 vessels were assumed to be maneuvering.

For Category 3 vessels, speciation profiles were developed using data from *Methodology for Calculating Emissions from Ships: 1. Update of emission factors* and assuming 80.5% of Category 3 vessels were equipped with slow-speed engines and 19.5% of vessels were equipped with medium speed engines based on vessel census data reported in the International Maritime Organization's (IMO) recent greenhouse gas (GHG) study (IMO 2009). Separate speciation profiles were created for Category 3 vessels for underway, maneuvering, and hotelling activities. Chromium emissions were split into hexavalent and trivalent chromium based on an assumption that 34% of total chromium was hexavalent and the remaining 66% was trivalent.

2.5 How Were Emissions Allocated?

Previous emissions allocations were based on waterway length and port county assignment. In this effort, spatial accuracy was greatly enhanced via the creation of GIS polygons representing port and waterway boundaries. GIS polygons allowed the estimation/allocation of emissions to defined port, waterway, and coastal areas, leading to improved spatial resolution compared to 2002's county-level emissions. Methodologies for both port and underway emissions are described in detail in the sections that follow.

2.6 How Were Port Emissions Allocated?

Port boundaries were developed using a variety of resources to identify the most accurate port boundaries. First, GIS data or maps provided directly from the port were used. Next, maps or port descriptions from local port authorities, port districts, etc. were used in combination with existing GIS data to identify port boundaries. Finally, satellite imagery from tools such as Google Earth and street layers from StreetMap USA were used to delineate port areas. Emphasis was placed on mapping the 117 ports with Category 3 vessel activity using available shape files of the port area. The Port of Huntington was developed differently given its large extent and limited available map data. The state of West Virginia provided a revised file of US Army Corps of Engineers *port terminals* reported to be part of the Port of Huntington-Tristate area. A 200 meter buffer of the water features near these port terminals was created to identify port area.

In all cases, polygons were created on land, bordering waterways and coastal areas, and were split by county boundary. Each polygon was identified by the port name and state and county FIPS in addition to a unique ShapeID. Smaller ports with Category 1 and 2 activities were mapped as small circles. Note that no Category 3 emissions were mapped to small circles. The final shapefile contained 159 ports and 196 polygons.

OTAQ provided Category 1 and 2 criteria emissions and activity as a single national number. These emissions and activity were allocated to ports based on total commodity tonnage

data obtained from the U.S. Army Corps of Engineers (USACE) Principal Ports file for 2007 (U.S. ACE, 2009). Emissions were then assigned to polygons within a port based on port area.

OTAQ developed port-level emissions for 117 of the largest U.S. ports with Category 3 activity. Activity in megawatt hours (MWh) and resulting criteria and CO_2 emissions were provided by port for maneuvering and hotelling modes. Emissions were then assigned to polygons within a port based on port area. HAP emissions were then speciated from VOC and PM estimates for each polygon using the methodology described in Section 3.0.

2.7 How Were Underway Emissions Allocated?

For this inventory, a GIS polygon layer was created to more accurately represent the location of CMV-related activity and emissions. Inland waterway polygons were obtained from the Bureau of Transportation Statistics' National Transportation Atlas Database hydro polygon layer (U.S. DOT, 2007). These polygons were further divided by county boundary and waterway ID. Coastal waters were drawn using Mineral Management Service state-federal boundary files and were also divided to indicate county boundaries. Federal waters were included as large area blocks outlined by the Exclusive Economic Zone (EEZ) boundary provided by EPA, which extends to approximately 200 nautical miles from the coastline. The final product is a polygon layer that includes all inland and coastal state waters and federal waters along with FIP, polygon area, and a unique ShapeID. Underway emissions were allocated differently by vessel category and mode, as outlined below.

2.7.1 *Category 1 and 2 Underway*

OTAQ provided Category 1 and 2 criteria emissions and activity as a single national number. These emissions and activity were allocated to underway polygons in state waters based on total commodity movements (in tons) data obtained from USACE (U.S. ACE, 2001). These data were waterway-specific, so waterways that crossed into multiple FIPs had emissions assigned by waterway length in each polygon. HAP emissions were then speciated from VOC and PM estimates using the methodology described in Section 3.0 for each polygon.

2.7.2 *Category 3 Reduced Speed Zones (RSZ)*

OTAQ provided polyline shapefiles indicating location of RSZ activities along with port-specific RSZ emissions and activity. These polylines were intersected with existing shipping lane polygons, and emissions were allocated to polygons based on the approach segment length on a per-port basis. HAP emissions were then speciated from VOC and PM estimates using the methodology described in Section 3.0 for each polygon.

2.7.3 *Category 3 Approach*

OTAQ provided polyline shapefiles indicating location of cruising activities along with port-specific cruising emissions and activity. These polylines were intersected with our existing polygons, and emissions were allocated to polygons based on the approach segment length on a per-port basis. HAP emissions were then speciated from VOC and PM estimates using the methodology described in Section 3.0 for each polygon.

2.7.4 *Category 3 Interport*

OTAQ provided 4km grids for interport-only emissions for CO, CO_2, HC, NO_x, SO_x, and PM_{10}. These grids were provided in a customized projection which, without a custom geographic transformation, could not be converted to match the polygon layer's projection. Furthermore, the emission estimates provided by OTAQ were developed using EEZs which were in the GCS Arc Sphere projection. Per OTAQ's direction, the interport polygons were converted from North American Equidistant Conic to GCS Arc Sphere by using the data frame projections tool as the a transformation method. This approach was recommended by OTAQ in order to mirror previous methodology and provide emission estimates consistent with the recent Category 3 Commercial Marine Inventory. Zonal statistics tools were used to sum the gridded emissions within each underway polygon**.** HAP emissions were then speciated from VOC and PM estimates using the methodology described in Section 3.0 for each polygon.

2.8 QA/QC

Given the significant methodological changes over previous inventory efforts, several quality checks were implemented to ensure that these data were developed and allocated in a clear and reproducible manner. Some of the quality checks implemented include the following:

GIS shapefiles

- Topology was created and validated through several rounds or revisions to remove gaps or overlapping features both within and between polygon layers.
- Boundaries derived from Google Earth imagery were validated against Street Map network, port-provided map images, USACE ports points, and other online mapping resources to improve boundary accuracy.
- All final shapefiles and polygon characteristics (such as area, etc.) were managed and evaluated in a single projection to ensure quality area and distance measurements, consistent results across CMV activity types, and maximum accuracy across the study area. The only exception to this was in the case of the interport criteria emissions, as described in Section 4.2.4.

Emissions allocations and estimations

- Emission factors were compiled from a variety of sources, and emission factor development methodologies evaluated to identify the most accurate emission factor for use in this inventory effort.
- National emission sums were checked both before and after allocation to ensure no emissions were dropped or grown.
- HAP speciation profiles were checked for accuracy, and speciated emissions were checked on both the polygon and national level to ensure accuracy.
- All unit conversions were double-checked for errors.
- Emission sums were evaluated across activity types (i.e., hotelling, maneuvering, cruising, reduced speed zones, and interport) to ensure they consistently mirror activity levels.
- Port and underway emissions were examined across SCCs to ensure consistency with activity levels and vessel populations.

- 2008 pollutants and emissions were checked against the 2005 inventory to identify any missing pollutants or major changes compared to previous inventories. Discrepancies were investigated and revisions were made as needed.

2.9 What are the Results?

Table 2-3 summarizes the emission estimates for CMVs for criteria pollutants. Table 2-4 summarizes the emission estimates for individual HAPs. Note that for the purposes of this inventory vessels equipped with category 1 and 2 propulsion engines are assumed to operate on Distillate diesel, while vessels equipped with Category 3 propulsion engines are assumed to used a residual blend. Both tables provide data for all states; these 2008 estimates do not include state submitted data.

Table 2-3. Commercial Marine Vessel Criteria and Greenhouse Gas Emission Estimates 2008 (TPY)

Pollutant	Diesel Port	Diesel Underway	Diesel Total	Residual Port	Residual Underway	Residual Total	CMV Total
CO	113,452	37,817	151,269	5,871	68,588	74,459	**225,728**
CO_2	39,221,848	13,073,950	52,295,798	3,703,169	30,986,332	34,689,501	**86,985,299**
NH_3	210	140	350	64	323	387	**737**
NO_X	588,844	196,281	785,125	70,044	813,908	883,952	**1,669,077**
PM10-PRI	20,954	6,985	27,939	6,730	67,702	74,432	**102,371**
PM25-PRI	20,325	6,775	27,100	6,081	62,318	68,399	**95,499**
SO_2	34,803	11,601	46,404	52,512	522,327	574,839	**621,243**
VOC	12,752	4,251	17,003	2,412	28,711	31,123	**48,126**

* Note that for the purposes of this inventory vessels equipped with category 1 and 2 propulsion engines are assumed to operate on Distillate diesel, while vessels equipped with Category 3 propulsion engines are assumed to used a residual blend.

Table 2-4. Commercial Marine Vessel HAP Emission Estimates 2008 (TPY)

Pollutant	Diesel Port	Residual Port	Diesel Underway	Residual Underway
2,2,4-Trimethylpentane	3.825675	NA	1.062688	NA
Acenaphthene	0.36585	0.002068	0.101625	0.021188
Acenaphthylene	0.564019	0.003193	0.156672	0.032717
Acetaldehyde	710.6	0.552315	197.388896	6.574751
Acrolein	33.47466	NA	9.298516	NA
Anthracene	0.564019	0.003193	0.156672	0.032717
Arsenic	0.366686	2.358644	0.209535	11.836005
Benz[a]Anthracene	0.60975	0.003448	0.169375	0.035334
Benzene	194.5738	0.023636	54.048288	0.281365
Benzo[a]Pyrene	0.052384	0.011793	0.034923	0.059180
Benzo[b]Fluoranthene	0.104768	0.023586	0.069845	0.118360
Benzo[g,h,i,]Perylene	0.137194	0.000778	0.038109	0.007977
Benzo[k]Fluoranthene	0.052384	0.011793	0.034923	0.059180
Beryllium	NA	0.003674	NA	0.036965
Cadmium	0.059298	0.057506	0.035970	1.530064
Chromium (VI)	0.178105	1.224973	0.118737	4.419583
Chromium III	0.345733	2.377888	0.230489	8.579191
Chrysene	0.106706	0.000604	0.029641	0.006188
Cobalt	NA	1.717108	NA	10.426100
Dioxins/Furans as 2,3,7,8-TCDD TEQs	1.57E-06	1.18E-06	0.000001	0.000006
Ethyl Benzene	19.12838	NA	5.313438	NA
Fluoranthene	0.335363	0.001897	0.093156	0.019443
Fluorene	0.746944	0.004227	0.207484	0.043311
Formaldehyde	1430.802	3.786611	397.445137	45.075801
Hexachlorobenzene	0.000419	9.43E-05	0.000279	0.000473
Hexane	52.60303	NA	14.611954	NA
Indeno[1,2,3-c,d]Pyrene	0.104768	0.023586	0.069845	0.118360
Lead	1.571513	0.354705	1.047675	1.773791
Manganese	0.032059	0.385606	0.008905	3.879322
Mercury	0.000524	0.008218	0.000349	0.035508
Naphthalene	21.35649	0.121021	5.932360	1.240126
Nickel	10.47675	90.68502	6.984500	398.764466
PAH, total	26.5488	0.154501	7.496895	1.584859
Phenanthrene	0.85365	0.004829	0.237125	0.049480
Phosphorus		26.71489	NA	387.932155
Polychlorinated Biphenyls	0.005238	0.001179	0.003492	0.005918
Propionaldehyde	58.34154	NA	16.205985	NA
Pyrene	0.594506	0.003363	0.165141	0.034462
Selenium	0.000593	0.053465	0.000360	0.235603
Styrene	20.08479	NA	5.579110	NA
Toluene	30.6054	NA	8.501500	NA
Xylenes (Mixed Isomers)	45.9081	NA	12.752250	NA

* Note that for the purposes of this inventory vessels equipped with category 1 and 2 propulsion engines are assumed to operate on Distillate diesel, while vessels equipped with Category 3 propulsion engines are assumed to used a residual blend.
NA – Not Applicable.

2.10 Commercial Marine Vessel References

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Appendix A
2008 Category 3 Commercial Marine Vessel Inventory Methodology

Citation: U.S. Environmental Protection Agency. *Development of 2008CY Category 3 Commercial Marine Inventory*. Office of Transportation and Air Quality, Ann Arbor, MI. 2009.

Development of 2008CY Category 3 Commercial Marine Inventory

The Category 3 (C3) inventory includes vessels which use C3 engines for propulsion. C3 engines are defined as having displacement above 30 liters per cylinder. The resulting inventory includes emissions from both propulsion and auxiliary engines used on these vessels, as well as those on gas and steam turbine vessels.

Geographically, the inventories include port and interport emissions that occur within the area that extends 200 nautical miles (nm) from the official U.S. baseline, which is roughly equivalent to the border of the U.S. Exclusive Economic Zone (EEZ). The U.S. region was clipped to the boundaries of the U.S. EEZ in areas where the 200nm boundary extended beyond the EEZ.

Category 3 commercial marine inventories were developed for a base year of 2002. [1] These were then projected to 2008. Regional adjustment factors were applied to account for growth. In addition, NO_X adjustment factors were applied to account for implementation of the NO_X Tier 1 standard. The methodology for each type of adjustment is described below.

Growth Factors by Geographic Region

The emissions inventory is calculated for nine geographic regions: Alaska East, Alaska West, East Coast, Gulf Coast, Hawaii East, Hawaii West, North Pacific, South Pacific, and the Great Lakes. Average annual growth rates from 2002-2020 were calculated for five regions: East Coast, Gulf Coast, North Pacific, South Pacific, and the Great Lakes. The Alaska regions were assigned the growth factor for the North Pacific region, while the Hawaii regions were assigned the growth factor for the South Pacific region. Each regional growth rate was then compounded over the inventory projection time period for 2008 (i.e., 6 years). The average annual growth rates and resulting multiplicative growth factors for each emission inventory region is presented in Table 1 below.

Table 1. Regional Emission Inventory Growth Factors for 2008

Emission Inventory Region	2002-2020 Average Annualized Growth Rate (%)	Multiplicative Growth Factor for 2008 Relative to 2002
Alaska East (AE)	3.3	1.2151
Alaska West (AW)	3.3	1.2151
East Coast (EC)	4.5	1.3023
Gulf Coast (GC)	2.9	1.1871
Hawaii East (HE)	5.0	1.3401
Hawaii West (HW)	5.0	1.3401
North Pacific (NP)	3.3	1.2151
South Pacific (SP)	5.0	1.3401
Great Lakes (GL)	1.7	1.1064

NO_x Adjustment Factors

The 2008 calendar year baseline inventory includes pre-control (Tier 0) engines and those subject to the NO_X Tier 1 standard that became effective in 2000. The NO_X emission factors (EFs) by tier and engine/ship type are given in Table 2.

Table 2. NO_X Emission Factors by Tier

Engine/Ship Type	NO_X EF (g/kW-hr)	
	Tier 0	Tier 1
Main		
Slow-Speed Diesel (SSD)	18.1	16.1
Medium-Speed Diesel (MSD)	14	12.5
Steam Turbine (ST)	2.1	n/a
Gas Turbine	6.1	n/a
Auxiliary		
Passenger Ship	14.6	13.0
Other Ships	14.5	12.9

The NO_X EFs by tier were then used with age distributions to generate calendar year NO_X EFs by engine/ship type for 2008. For 2002, Tier 0 EFs were used for simplicity. These calendar year NO_X EFs are provided in Table 3. Since the age distributions are different for vessels in the Great Lakes, NO_X EFs were determined separately for the Great Lakes.

Table 3. NO_X Emission Factors by Calendar Year

Engine/Ship Type	CY NO_X EF (g/kW-hr)		
		2008	
	2002	DSP[a]	GL[b]
Main			
Slow-Speed Diesel (SSD)	18.1	17.07	17.50
Medium-Speed Diesel (MSD)	14	13.01	13.74
Steam Turbine (ST)	2.1	2.1	2.1
Gas Turbine	6.1	6.1	n/a
Auxiliary			
Passenger Ship	14.6	13.76	14.32
Other Ships	14.5	13.60	14.16

[a]DSP = Deep sea ports and areas other than the Great Lakes
[b]GL = Great Lakes

Emission adjustment factors for NO_X were then calculated. Adjustment factors are ratios of the 2008 calendar year EFs to the 2002 calendar year EFs. The adjustment factors by engine/ship type are provided in Table 4.

Table 4. NO_X EF Adjustment Factors for 2008CY

Engine/Ship Type	2008 NO_X Adj (unitless)	
	DSP[a]	GL[b]
Main		
Slow-Speed Diesel (SSD)	0.9433	0.9670
Medium-Speed Diesel (MSD)	0.9293	0.9815
Steam Turbine (ST)	1.0000	1.0000
Gas Turbine	1.0000	n/a
Auxiliary		
Passenger Ship	0.9403	0.9784
Other Ships	0.9403	0.9784

Methodology for Development of 2008CY Port Inventories

For the non-California ports, 2002 emissions for each port are summed by engine/ship type. Propulsion and auxiliary emissions are summed separately, since the EF adjustment factors differ. The appropriate regional growth factor, as provided in Table 1, is then applied, along with the NO_X EF adjustment factors by engine/ship type in Table 4 to calculate the 2008 port inventories.

For the California ports, 2002 emissions for each port are summed by ship type. Propulsion and auxiliary emissions are summed separately, since the EF adjustment factors differ. The EF adjustment factors by engine/ship type in Table 4 are consolidated by ship type, using the CARB assumption that engines on all ships except passenger ships are 95 percent slow speed diesel (SSD) engines and 5 percent medium speed diesel engines (MSD) based upon a 2005 CARB survey. All passenger ships were assumed to be MSD engines. Steam turbines (ST) and gas turbines (GT) are not included in the CARB inventory. The NO_X EF adjustment factors by ship type are then applied, along with ship-specific growth factors used by CARB, to calculate the 2008 California port inventories. The ship-specific growth factors for 2008 relative to 2002 are provided in Table 5 below.

Table 5. Growth Factors by Ship Type for California Ports

Ship Type	Calendar Year	
	2002	2008
Auto	1.0000	1.1525
Bulk	1.0000	0.7412
Container	1.0000	1.4023
General	1.0000	0.9071
Passenger	1.0000	1.9823
Reefer	1.0000	1.0112
RoRo	1.0000	1.1525
Tanker	1.0000	1.3005

Methodology for Development of 2008CY Interport Inventories

The interport portion of the inventory is not segregated by engine or ship type. As a result, regional NO_X EF adjustment factors were developed based on the assumed mix of main (propulsion) engine types in each region. The mix of main engine types by region was developed using the ship call and power data and is presented in Table 6. Main engines are considered a good surrogate for interport emissions, since the majority of emissions while underway are due to the main engines. The NO_X EF adjustment factors by main engine type in Table 4 were used together with the mix of main engine types by region in Table 6 to develop the regional adjustment factors. The resulting NO_X EF regional adjustment factors are provided in Table 7. These NO_X EF regional adjustment factors, together with the regional growth factors in Table 1, were applied to calculate the 2008 interport inventories.

Table 6. Installed Power by Main Engine Type

Region	2008 Installed Power (%)			
	MSD	SSD	GT	ST
Alaska East (AE)	19.1%	18.4%	0.3%	62.2%
Alaska West (AW)	19.1%	18.4%	0.3%	62.2%
East Coast (EC)	25.6%	72.5%	0.9%	1.0%
Gulf Coast (GC)	13.7%	85.5%	0.0%	0.8%
Hawaii East (HE)	66.2%	18.5%	7.4%	8.0%
Hawaii West (HW)	66.2%	18.5%	7.4%	8.0%
North Pacific (NP)	5.1%	83.5%	1.6%	9.7%
South Pacific (SP)	17.8%	82.2%	0.0%	0.0%
Great Lakes (GL)	47.9%	43.7%	0.0%	8.4%

Table 7. NO_X EF Regional Adjustment Factors

Region	2002	2008
Alaska East (AE)	1.0000	0.9761
Alaska West (AW)	1.0000	0.9761
East Coast (EC)	1.0000	0.9408
Gulf Coast (GC)	1.0000	0.9419
Hawaii East (HE)	1.0000	0.9428
Hawaii West (HW)	1.0000	0.9428
North Pacific (NP)	1.0000	0.9490
South Pacific (SP)	1.0000	0.9408
Great Lakes (GL)	1.0000	0.9767

The resulting 2008 Category 3 emission inventories are shown in Table 8 for each of the nine geographic regions and the nation.

Table 8. 2008 Regional and National Emissions from Category 3 Vessel Main and Auxiliary Engines

Region	Metric Tonnes						
	NO_X	PM_{10}	$PM_{2.5}$ [a]	HC	CO	SO_2	CO_2
Alaska East (AE)	21,590	1,749	1,609	733	1,730	13,032	807,159
Alaska West (AW)	71,901	5,755	5,294	2,441	5,750	42,694	2,631,081
East Coast (EC)	271,707	23,021	21,180	9,573	22,665	190,767	10,696,360
Gulf Coast (GC)	195,240	16,839	15,492	6,903	16,990	125,728	7,604,870
Hawaii East (HE)	28,837	2,403	2,211	1,013	2,390	17,843	1,108,047
Hawaii West (HW)	40,573	3,381	3,110	1,426	3,362	25,105	1,559,016
North Pacific (NP)	30,248	2,647	2,435	1,153	2,568	18,790	1,216,723
South Pacific (SP)	132,669	10,982	10,103	4,692	11,368	81,896	5,145,632
Great Lakes (GL)	16,395	1,318	1,212	557	1,312	9,797	605,001
Total Metric Tonnes	**809,160**	**68,094**	**62,646**	**28,492**	**68,136**	**525,651**	**31,373,889**
Total Short Tons [b]	**891,946**	**75,061**	**69,056**	**31,407**	**75,107**	**579,431**	**34,583,792**

[a] Estimated from PM_{10} using a multiplicative adjustment factor of 0.92.

Reference (for 2002 inventory development)

1) U.S. Environmental Protection Agency, "Draft Regulatory Impact Analysis: Control of Emissions of Air Pollution from Category 3 Marine Diesel Engines," Office of Transportation and Air Quality, EPA-420-D-09-002, June 2009.

Appendix B

2008 Commercial Marine Vessel Hazardous Air Pollutant Speciation Profiles

Table 1. Category 1 and 2 Hazardous Air Pollutant Speciation Profile for Port Activities

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
540841	2,2,4-trimethylpentane	VOC	3.00E-04
83329	Acenaphthene	$PM_{2.5}$	1.80E-05
208968	Acenaphthylene	$PM_{2.5}$	2.78E-05
75070	Acetaldehyde	VOC	5.57E-02
107028	Acrolein	VOC	2.63E-03
NH3	Ammonia	PM_{10}	1.15E-02
120127	Anthracene	$PM_{2.5}$	2.78E-05
7440382	Arsenic	PM_{10}	1.75E-05
56553	Benz[a]Anthracene	$PM_{2.5}$	3.00E-05
71432	Benzene	VOC	1.53E-02
50328	Benzo[a]Pyrene	PM_{10}	2.50E-06
205992	Benzo[b]Fluoranthene	PM_{10}	5.00E-06
191242	Benzo[g,h,I,]Perylene	$PM_{2.5}$	6.75E-06
207089	Benzo[k]Fluoranthene	PM_{10}	2.50E-06
7440439	Cadmium	PM_{10}	2.83E-06
16065831	Chromium III	PM_{10}	1.65E-05
18540299	Chromium VI	PM_{10}	8.50E-06
218019	Chrysene	$PM_{2.5}$	5.25E-06
600	Dioxin	PM_{10}	2.50E-09
100414	Ethylbenzene	VOC	1.50E-03
206440	Fluoranthene	$PM_{2.5}$	1.65E-05
86737	Fluorene	$PM_{2.5}$	3.68E-05
50000	Formaldehyde	VOC	1.12E-01
118741	Hexachlorobenzene	PM_{10}	2.00E-08
193395	Indeno[1,2,3-c,d]Pyrene	PM_{10}	5.00E-06
439921	Lead	PM_{10}	7.50E-05
7439965	Manganese	PM_{10}	1.53E-06
7439976	Mercury	PM_{10}	2.50E-08
91203	Naphthalene	$PM_{2.5}$	1.05E-03
110543	n-Hexane	VOC	4.13E-03
7440020	Nickel	PM_{10}	5.00E-04
1336363	Polychlorinated Biphenyls	PM_{10}	2.50E-07
85018	Phenanthrene	$PM_{2.5}$	4.20E-05
123386	Propionaldehyde	VOC	4.58E-03
129000	Pyrene	$PM_{2.5}$	2.93E-05
7782492	Selenium	PM_{10}	2.83E-08
100425	Styrene	VOC	1.58E-03
108883	Toluene	VOC	2.40E-03

Table 2. Category 1 and 2 Hazardous Air Pollutant Speciation Profile for Underway Activities

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
1330207	Xylene	VOC	3.60E-03
540841	2,2,4-trimethylpentane	VOC	2.50E-04
83329	Acenaphthene	$PM_{2.5}$	1.50E-05
208968	Acenaphthylene	$PM_{2.5}$	2.31E-05
75070	Acetaldehyde	VOC	4.64E-02
107028	Acrolein	VOC	2.19E-03
NH3	Ammonia	PM_{10}	2.31E-02
120127	Anthracene	$PM_{2.5}$	2.31E-05
7440382	Arsenic	PM_{10}	3.00E-05
56553	Benz[a]Anthracene	$PM_{2.5}$	2.50E-05
71432	Benzene	VOC	1.27E-02
50328	Benzo[a]Pyrene	PM_{10}	5.00E-06
205992	Benzo[b]Fluoranthene	PM_{10}	1.00E-05
191242	Benzo[g,h,I,]Perylene	$PM_{2.5}$	5.63E-06
207089	Benzo[k]Fluoranthene	PM_{10}	5.00E-06
7440439	Cadmium	PM_{10}	5.15E-06
16065831	Chromium III	PM_{10}	3.30E-05
18540299	Chromium VI	PM_{10}	1.70E-05
218019	Chrysene	$PM_{2.5}$	4.38E-06
600	Dioxin	PM_{10}	5.00E-09
100414	Ethylbenzene	VOC	1.25E-03
206440	Fluoranthene	$PM_{2.5}$	1.38E-05
86737	Fluorene	$PM_{2.5}$	3.06E-05
50000	Formaldehyde	VOC	9.35E-02
118741	Hexachlorobenzene	PM_{10}	4.00E-08
193395	Indeno[1,2,3-c,d]Pyrene	PM_{10}	1.00E-05
7439921	Lead	PM_{10}	1.50E-04
7439965	Manganese	PM_{10}	1.28E-06
7439976	Mercury	PM_{10}	5.00E-08
91203	Naphthalene	$PM_{2.5}$	8.76E-04
110543	n-Hexane	VOC	3.44E-03
7440020	Nickel	PM_{10}	1.00E-03
1336363	Polychlorinated Biphenyls	PM_{10}	5.00E-07

Table 2. Category 1 and 2 Hazardous Air Pollutant Speciation Profile for Underway Activities (Continued)

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
85018	Phenanthrene	$PM_{2.5}$	3.50E-05
123386	Propionaldehyde	VOC	3.81E-03
129000	Pyrene	$PM_{2.5}$	2.44E-05
7782492	Selenium	PM_{10}	5.15E-08
100425	Styrene	VOC	1.31E-03
108883	Toluene	VOC	2.00E-03
1330207	Xylene	VOC	3.00E-03

Table 3. Category 3 Hazardous Air Pollutant Speciation Profile for Hotelling Activities

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
83329	Acenaphthene	$PM_{2.5}$	3.40E-07
208968	Acenaphthylene	$PM_{2.5}$	5.25E-07
75070	Acetaldehyde	VOC	2.29E-04
NH3	Ammonia	PM_{10}	1.08E-02
120127	Anthracene	$PM_{2.5}$	5.25E-07
7440382	Arsenic	PM_{10}	4.00E-04
56553	Benz[a]Anthracene	$PM_{2.5}$	5.67E-07
71432	Benzene	VOC	9.80E-06
50328	Benzo[a]Pyrene	PM_{10}	2.00E-06
205992	Benzo[b]Fluoranthene	PM_{10}	4.00E-06
191242	Benzo[g,h,I,]Perylene	$PM_{2.5}$	1.28E-07
207089	Benzo[k]Fluoranthene	PM_{10}	2.00E-06
7440417	Beryllium	PM_{10}	5.46E-07
7440439	Cadmium	PM_{10}	5.90E-06
16065831	Chromium III	PM_{10}	3.96E-04
18540299	Chromium VI	PM_{10}	2.04E-04
218019	Chrysene	$PM_{2.5}$	9.93E-08
7440484	Cobalt	PM_{10}	2.92E-04
53703	Dibenzo[a,h]Anthracene	$PM_{2.5}$	0.00E+00
600	Dioxin	PM_{10}	2.00E-09

Table 3. Category 3 Hazardous Air Pollutant Speciation Profile for Hotelling Activities (Continued)

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
206440	Fluoranthene	$PM_{2.5}$	3.12E-07
86737	Fluorene	$PM_{2.5}$	6.95E-07
50000	Formaldehyde	VOC	1.57E-03
118741	Hexachlorobenzene	PM_{10}	1.60E-08
193395	Indeno[1,2,3-c,d]Pyrene	PM_{10}	4.00E-06
7439921	Lead	PM_{10}	6.00E-05
7439965	Manganese	PM_{10}	5.73E-05
7439976	Mercury	PM_{10}	1.40E-06
91203	Naphthalene	$PM_{2.5}$	1.99E-05
7440020	Nickel	PM_{10}	1.54E-02
1336363	Polychlorinated Biphenyls	PM_{10}	2.00E-07
85018	Phenanthrene	$PM_{2.5}$	7.94E-07
7723140	Phosphorous	PM_{10}	4.38E-03
130498292	POM as 16-PAH	$PM_{2.5}$	2.49E-05
130498292	POM as 7-PAH	PM_{10}	4.50E-07
129000	Pyrene	$PM_{2.5}$	5.53E-07
7782492	Selenium	PM_{10}	9.08E-06

Table 4. Category 3 Hazardous Air Pollutant Speciation Profile for Maneuvering Activities

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
83329	Acenaphthene	$PM_{2.5}$	3.40E-07
208968	Acenaphthylene	$PM_{2.5}$	5.25E-07
75070	Acetaldehyde	VOC	2.29E-04
NH3	Ammonia	PM_{10}	2.38E-03
120127	Anthracene	$PM_{2.5}$	5.25E-07
7440382	Arsenic	PM_{10}	8.74E-05
56553	Benz[a]Anthracene	$PM_{2.5}$	5.67E-07
71432	Benzene	VOC	9.80E-06
50328	Benzo[a]Pyrene	PM_{10}	4.37E-07
205992	Benzo[b]Fluoranthene	PM_{10}	8.74E-07

Table 4. Category 3 Hazardous Air Pollutant Speciation Profile for Maneuvering Activities (Continued)

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
191242	Benzo[g,h,I,]Perylene	$PM_{2.5}$	1.28E-07
207089	Benzo[k]Fluoranthene	PM_{10}	4.37E-07
7440417	Beryllium	PM_{10}	5.46E-07
7440439	Cadmium	PM_{10}	2.26E-05
16065831	Chromium III	PM_{10}	1.27E-04
18540299	Chromium VI	PM_{10}	6.53E-05
218019	Chrysene	$PM_{2.5}$	9.93E-08
7440484	Cobalt	PM_{10}	5.94E-05
53703	Dibenzo[a,h]Anthracene	$PM_{2.5}$	0.00E+00
600	Dioxin	PM_{10}	4.37E-10
206440	Fluoranthene	$PM_{2.5}$	3.12E-07
86737	Fluorene	$PM_{2.5}$	6.95E-07
50000	Formaldehyde	VOC	1.57E-03
118741	Hexachlorobenzene	PM_{10}	3.50E-09
193395	Indeno[1,2,3-c,d]Pyrene	PM_{10}	8.74E-07
7439921	Lead	PM_{10}	1.40E-05
7439965	Manganese	PM_{10}	5.73E-05
7439976	Mercury	PM_{10}	2.71E-07
91203	Naphthalene	$PM_{2.5}$	1.99E-05
7440020	Nickel	PM_{10}	3.25E-03
1336363	Polychlorinated Biphenyls	PM_{10}	4.37E-08
85018	Phenanthrene	$PM_{2.5}$	7.94E-07
7723140	Phosphorous	PM_{10}	1.79E-03
130498292	POM as 16-PAH	$PM_{2.5}$	2.49E-05
130498292	POM as 7-PAH	PM_{10}	4.90E-07
129000	Pyrene	$PM_{2.5}$	5.53E-07
7782492	Selenium	PM_{10}	1.91E-06

Table 5. Category 3 Hazardous Air Pollutant Speciation Profile for Underway Activities

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
83329	Acenaphthene	$PM_{2.5}$	3.40E-07
208968	Acenaphthylene	$PM_{2.5}$	5.25E-07

Table 5. Category 3 Hazardous Air Pollutant Speciation Profile for Underway Activities (Continued)

Pollutant Code	Pollutant	Speciation Basis	2008 Emission Factor
75070	Acetaldehyde	VOC	2.29E-04
NH3	Ammonia	PM_{10}	4.77E-03
120127	Anthracene	$PM_{2.5}$	5.25E-07
7440382	Arsenic	PM_{10}	1.75E-04
56553	Benz[a]Anthracene	$PM_{2.5}$	5.67E-07
71432	Benzene	VOC	9.80E-06
50328	Benzo[a]Pyrene	PM_{10}	8.74E-07
205992	Benzo[b]Fluoranthene	PM_{10}	1.75E-06
191242	Benzo[g,h,I,]Perylene	$PM_{2.5}$	1.28E-07
207089	Benzo[k]Fluoranthene	PM_{10}	8.74E-07
7440417	Beryllium	PM_{10}	5.46E-07
7440439	Cadmium	PM_{10}	2.26E-05
7440473	Chromium	PM_{10}	1.92E-04
16065831	Chromium III	PM_{10}	1.27E-04
18540299	Chromium VI	PM_{10}	6.53E-05
218019	Chrysene	$PM_{2.5}$	9.93E-08
7440484	Cobalt	PM_{10}	1.54E-04
53703	Dibenzo[a,h]Anthracene	$PM_{2.5}$	0.00E+00
600	Dioxin	PM_{10}	8.74E-10
206440	Fluoranthene	$PM_{2.5}$	3.12E-07
86737	Fluorene	$PM_{2.5}$	6.95E-07
50000	Formaldehyde	VOC	1.57E-03
118741	Hexachlorobenzene	PM_{10}	6.99E-09
193395	Indeno[1,2,3-c,d]Pyrene	PM_{10}	1.75E-06
7439921	Lead	PM_{10}	2.62E-05
7439965	Manganese	PM_{10}	5.73E-05
7439976	Mercury	PM_{10}	5.24E-07
91203	Naphthalene	$PM_{2.5}$	1.99E-05
7440020	Nickel	PM_{10}	5.89E-03
1336363	Polychlorinated Biphenyls	PM_{10}	8.74E-08
85018	Phenanthrene	$PM_{2.5}$	7.94E-07
7723140	Phosphorus	PM_{10}	5.73E-03
130498292	POM as 16-PAH	$PM_{2.5}$	2.49E-05
130498292	POM as 7-PAH	PM_{10}	4.90E-07
129000	Pyrene	$PM_{2.5}$	5.53E-07
7782492	Selenium	PM_{10}	3.48E-06

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1.0 INTRODUCTION

1.1 What are Locomotive Sources?

The locomotive source category includes railroad locomotives powered by diesel-electric engines. A diesel-electric locomotive uses 2-stroke or 4-stroke diesel engines and an alternator or a generator to produce the electricity required to power its traction motors. The locomotive source category does not include locomotives powered by electricity or steam. Emissions associated with the operation of electric locomotives would be included in the point source utility emission estimate. It is believed that the number of wood or coal driven steam locomotives is currently very small; therefore, these types of locomotives are not included in this inventory.

The locomotive source category is further divided up into three categories: Class I line haul, Class II/III line haul, and Class I yard. The national rail estimates were developed by the Eastern Regional Technical Advisory Committee hereafter referenced as ERTAC Rail. This group is comprised of eastern states' regulatory agencies in collaboration with the rail industry. ERTAC Rail developed emissions estimates based on fuel data obtained from the American Association of Railroads for each subcategory. California locomotive emission estimates were handled separately from the rest of the United States because of their use of low sulfur locomotive diesel fuels.

2.0 DEVELOPMENT OF THE LOCOMOTIVE COMPONENT FOR THE NEI

2.1 What Pollutants are Included in the National Emission Estimates for Locomotives?

All of the criteria pollutants, VOC, CO, NO_x, SO_x, PM, and $PM_{2.5}$, are included in the locomotive component of the NEI. OTAQ identified the HAPs for which data were available to develop inventory estimates (Scarbro, 2001). The hazardous air pollutants (HAPs), listed below, were identified based on available test data and accepted emission estimation procedures. Emission estimation methods have changed over the history of the NEI, as outlined briefly in Table 2-2 for nonroad sources.

Table 2-1. Locomotive Pollutant List

1,3-Butadiene	Beryllium	Napthalene
2,2,4-Trimethylpentane	Cadmium	n-Hexane
Acenaphthene	Chromium (Hexavalent)	Nickel
Acenaphthylene	Chromium (Trivalent)	Phenanthrene
Acetaldehyde	Chrysene	PAH Propionaldehyde
Acrolein	Dibenz(a,h) anthracene	Pyrene
Anthracene	Ethyl Benzene	Styrene
Arsenic	Fluoranthene	Toluene
Benzene	Fluorene	Xylene
Benzo(a)anthracene	Formaldehyde	
Benzo[a]pyrene	Indeno(1,2,3-cd) pyrene	
Benzo[b]fluoranthene	Lead	
Benzo[g,h,i,]perylene	Manganese	
Benzo[k]fluoranthene	Mercury	

Table 2-2. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
NONROAD Categories			
Nonroad Gasoline, Diesel, LPG, CNG	2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3, & HAPs	Emission estimates for NONROAD model engines were developed using EPA's National Mobile Inventory Model (NMIM), which incorporates NONROAD2008. Where states provided alternate NMIM nonroad inputs, these data replaced EPA default inputs.
	2005	VOC, NO_x, CO, SO_2, , PM_{10}, $PM_{2.5}$, NH_3, & HAPs	Emission estimates for NONROAD model engines were developed using EPA's NMIM, which incorporates NONROAD2005. Where States provided alternate nonroad inputs, these data replaced EPA default inputs.
	2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3, & HAPs	Emission estimates for NONROAD model engines were developed using EPA's NMIM, which incorporates NONROAD2004. Where states provided alternate nonroad inputs, these data replaced EPA default inputs. State-supplied emissions data also replaced default EPA emission estimates.
	1999	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) an updated 1999 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. Replaced State-submitted data for California for all NONROAD model categories; Pennsylvania for recreational marine and aircraft ground support equipment, and Texas for select equipment categories.
	1996, 1997, 1998, 2000 & 2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated year-specific national and California inventories, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios and California county-to-state ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model. California results replace the diesel equipment emissions generated from prior application of county-to-national ratios.

Table 2-2. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Nonroad Gasoline, Diesel, LPG, and CNG (Continued)	1991-1995	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3	Using 1990 and 1996 county-level emissions inventories, estimated emissions using linear interpolation of national emissions between 1990 and 1996. From these emissions, calculated the average annual growth rate for each pollutant/SCC combination for each year, and then applied the growth factors to 1990 county-level emissions to estimate 1991-1995 emissions.
	1990	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated 1990 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model.
	1986, 1988, & 1989	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, NH_3	Using 1985 and 1990 county-level emissions inventories, estimated emissions using linear interpolation of national emissions between 1985 and 1990. From these emissions, calculated the average annual growth rate for each pollutant/SCC combination for each year, and then applied the growth factors to 1985 county-level emissions to estimate 1986-1989 emissions.
	1987	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using EPA's draft Lockdown C NONROAD model (dated May 2002), developed updated national emissions for 1987 by running 4 seasonal NONROAD model runs to estimate annual criteria pollutant emissions. Also performed national NONROAD model runs to estimate typical summer weekday emissions.
	1985	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using emission estimates from two emission inventories including: 1) a 1996 county-level inventory, developed using EPA's October 2001 draft NONROAD model; and 2) updated 1985 national inventory, based on EPA's draft Lockdown C NONROAD model (dated May 2002). Using the 1996 county-level emission estimates, seasonal and daily county-to-national ratios were then developed for application to updated national estimates per season estimated from the Lockdown C model.
	1970, 1975, 1978, & 1980	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Using EPA's draft Lockdown C NONROAD model (dated May 2002), developed updated national emissions for all years by running 4 seasonal NONROAD model runs to estimate annual criteria pollutant emissions. Also performed national NONROAD model runs to estimate typical summer weekday emissions.

Table 2-2. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Nonroad Gasoline, Diesel, LPG, and CNG (Continued)	1996, 1997, 1998, 1999, 2000, & 2001	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD. NH_3 emissions for California were also recalculated using updated diesel fuel consumption values generated for California-specific runs, and assuming the 1996 county-level distribution.
	1985 & 1990	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model, multiplying by NH_3 emission factors, and distributing to counties using 1996 inventory, based on October 2001 draft NONROAD.
	1987	NH_3	Obtaining 1987 national fuel consumption estimates from Lockdown C NONROAD model and multiplying by NH_3 emission factors.
	1970, 1975, 1978, & 1980	NH_3	Obtaining national fuel consumption estimates from the Lockdown C NONROAD model and multiplying by NH_3 emission factors.
	1990, 1996, & 1999	HAPs	Speciation profiles applied to county VOC and PM estimates. Metal HAPs were calculated using fuel and activity-based emission factors. Some state data were provided and replaced national estimates. (2003)
Aircraft			
Commercial Aircraft	2008	Criteria and HAPs	Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) - Version 5.1.was run using BTS T-100 LTO data. (2009)
	2002 and 2005	Criteria and HAPs	Federal Aviation Administration (FAA) Emissions and Dispersion and Modeling System (EDMS) was run for criteria pollutants, VOC and PM emissions were speciated into HAP components. (2004)
	1990, 1996, 1999, 2000, 2001	VOC, NO_x, CO, SO_x	Input landing and take-off (LTO) data into FAA EDMS. National emissions were assigned to airports based on airport specific LTO data and BTS GIS data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999	HAPs	Speciation profiles were applied to VOC estimates to get national HAP estimates. State data replaced national estimates. (2003)
General Aviation, Air Taxis	2008	Criteria and HAPs	Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS) - Version 5.1.was run using BTS T-100 LTO for aircraft identified as Air taxis. (2010) Used FAA LTO data from TAF and OTAQ provided activity data for smaller airports derived from FAA 5010 master plans. EPA approved generic emission factors for criteria estimates. Speciation profiles were applied to VOC and PM estimates to get national HAP estimates. (2010)

Table 2-2. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
General Aviation, Air Taxis (Continued)	2005	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2002 emissions for approximately 4,000 largest airports were calculated via EDMS and SIP guidance and included in the 2005 NEI as point sources. Only airports in FAA's T100 and TAF databases were included. State point source submittals were incorporated.
	1978, 1987, 1990, 1996, 1999, 2000, 2001, & 2002	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data and EPA approved emission factors for criteria estimates. Speciation profiles were applied to VOC estimates to get national HAP estimates. State data replaced national estimates. (2004)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999, & 2002	HAPs	Used FAA LTO data and EPA approved emission factors for criteria estimates. Speciation profiles were applied to VOC estimates to develop national HAP estimates. (2004)
	1990, 1996, 1999, & 2002	Pb	Used Department of Energy (DOE) aviation gasoline usage data with lead concentration of aviation gasoline. (2004)
	1996	NH_3	Applied NH_3 emissions factors to 1996 national jet fuel and aviation gasoline consumption estimates.
Military Aircraft	2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data as reported in TAF and EPA approved emission factors for criteria estimates. Representative HAP profiles were not readily available, therefore HAP estimates were not developed. (2010)
	2005	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2002 emissions were included in the 2005 NEI as point sources similar to other TAF reported data.
	1978, 1987, 1990, 1996, 1999, 2000, 2001, 2002, 2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Used FAA LTO data as reported in TAF and EPA approved emission factors for criteria estimates. Representative HAP profiles were not readily available, therefore HAP estimates were not developed.
	1970-1998	VOC, NO_x, CO, SO_X, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
Auxiliary Power Units and Ground Support Equipment	2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, HAPs	Federal Aviation Administration (FAA) Emissions and Dispersion and Modeling System (EDMS) - Version 5.1.was run using BTS T-100 LTO data. (2009)
	2002 and 2005	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, HAPs	Computed via NONROAD2005 model runs
	1985-2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Grew 1996 emissions to each year using LTO operations data from the FAA. Estimation methods prior to 1996 reported in EPA, 1998.

Table 2-2. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Unpaved Airstrips[1]	1985-2001	PM_{10}, $PM_{2.5}$	Grew 1996 emissions to each year using SIC 45-Air Transportation growth factors, consistent with the current draft version of EGAS. Estimation methods prior to 1996 reported in EPA, 1998.
Aircraft Refueling[1]	1985-2001	VOC	Grew 1996 emissions to each year using SIC 45-Air Transportation growth factors, consistent with the current draft version of EGAS. Estimation methods prior to 1996 reported in EPA, 1998.
Commercial Marine Vessel (CMV)			
All CMV Categories	2008	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	OTAQ provided CAP emission estimates for all CMV categories. Note that the SCCs for this category have changed such that the Diesel category refers to smaller vessels (Category 1 and 2) using distillate fuels and the Residual category refers to larger (Category 3) vessels using a blend of residual fuels. Emissions were allocated to segments using GIS shapefiles and adjusted based on limited state data (2010)
	2008	HAPs	OTAQ's 2008 estimates were speciated into HAP components using SEPA profiles (2009)
CMV Diesel	2002 and 2005	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	2001 Estimates carried over. Used state data when provided. (2004)
		HAPs	1999 Estimates carried over. Used state data when provided. (2004)
	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$	Used criteria emission estimates in the background document for marine diesel regulations for 2000. Adjusted 2000 criteria emission estimates for other used based on fuel usage. Emissions were disaggregated into port traffic and underway activities. Port emissions were assigned to specific ports based on amount of cargo handled. Underway emissions were allocated based on Army Corp of Engineering waterway data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999	HAPs	VOC and PM emission estimates were speciated into HAP components. State data replaced national estimates. (2003)
	1996	NH_3	Applied NH_3 emissions factors to 1996 distillate and residual fuel oil estimates (i.e., as reported in EIA, 1996).
	1990-1995	NH_3	Estimation methods reported in EPA, 1998.

Table 2-2. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
CMV Steam Powered	2005	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$, HAPs	2002 estimates grown to 2005 (2008).
	2002	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$, HAPs	2002 based estimates were developed for port and underway category 3 (C3) vessels as part of a rulemaking effort. Emissions were developed separately for near port and underway emissions. For near port emissions, inventories for 2002 were developed for 89 deep water and 28 Great Lake ports in the U.S. The Waterway Network Ship Traffic, Energy, and Environmental Model (STEEM) was used to provide emissions from ships traveling in shipping lanes between and near individual ports (2008)
	1978, 1987, 1990, 1996, 1999, 2000, & 2001	VOC, NO_x, CO, SO_x, PM_{10}, & $PM_{2.5}$	Calculated criteria emissions based on EPA SIP guidance. Emissions were disaggregated into port traffic and under way activities. Port emissions were assigned to specific ports based on amount of cargo handled. Underway emissions were allocated based on Army Corp of Engineering waterway data. State data replaced national estimates. (2003)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, & 1999	HAPs	VOC and PM emission estimates were speciated into HAP components. State data replaced national estimates. (2003)
Military Marine	1997-2001	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Applied EGAS growth factors to 1996 emissions estimates for this category.
CMV Coal,[2] CMV, Steam powered, CMV Gasoline[2]	1997-1998	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Applied EGAS growth factors to 1996 emissions estimates for this category.
CM Coal, CMV, Steam powered, CMV Gasoline, Military Marine	1991-1995	VOC, NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$	Estimation methods reported in EPA, 1998.
Locomotives			
Class I, II, III and Yard operations	**2008**	**VOC, NO_x, CO, PM_{10}, $PM_{2.5}$, SO_x & HAPs**	**Criteria emission estimates were provided to EPA by ERTAC. These data were assigned to individual railway segments using DOT shapefiles and guidance from ERTAC. HAP emissions were calculated by applying speciation profiles to VOC and PM estimates. (2010)**

Table 2-2. Methods Used to Develop Annual Emission Estimates for Nonroad Mobile Sources (Continued)

(Categories included in this report are noted in bold print)

Category	Base Year	Pollutant(s)	Estimation Method*
Class I, Class II, Commuter, Passenger, and Yard Locomotives	1978, 1987, 1990, 1996, 1999, 2000, 2000, 2002, & 2005	VOC, NO_x, CO, PM_{10}, $PM_{2.5}$	Criteria pollutants were estimated by using locomotive fuel use data from DOE EIA and available emission factors. County-level estimates were obtained by scaling the national estimates with the rail GIS data from DOT. State data replaced national estimates. (2004)
	1978, 1987, 1990, 1996, 1999, 2000, 2001, 2002, & 2005	SO_2	SO_x emissions were calculated by using locomotive fuel use and fuel sulfur concentration data from EIA. County-level estimates were obtained by scaling the national estimates with the county level rail activity data from DOT. State data replaced national estimates. (2004)
	1970-1998	VOC, NO_x, CO, SO_x, PM_{10}, $PM_{2.5}$	Estimated emissions for interim years using linear interpolation between available base years. (2003)
	1990, 1996, 1999, & 2002	HAPs	HAP emissions were calculated by applying speciation profiles to VOC and PM estimates. County-level estimates were obtained by scaling the national estimates with the county level rail activity from DOT. State data replaced national estimates. (2004)
	1997-1998	NH_3	Grew 1996 base year emissions using EGAS growth indicators.
	1996	NH_3	Applied NH_3 emissions factors to diesel consumption estimates for 1996.
	1990-1995	NH_3	Estimation methods reported in EPA, 1998.

Notes:

* Dates included at the end of Estimation Method represent the year that the section was revised.

1 Emission estimates for unpaved airstrips and aircraft refueling are included in the area source NEI, since they represent non-engine emissions.

2 National Emission estimates for CMV Coal and CMV Gasoline were not developed though states and local agencies may have submitted estimates for these source categories.

EPA, 1998. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Emission Factors and Inventory Group, National Air Pollutant Emission Trends, Procedures Document, 1900–1996, EPA-454/R-98-008. May 1998.

3.0 HOW WERE LOCOMOTIVE EMISSIONS ESTIMATED?

ERTAC Rail used confidential railroad-provided data to generate railroad-specific criteria emission estimates for line haul and rail yards at the rail segment and rail yard level, respectively. Appendices A-C provide more detail on how emissions were developed and includes critical data used in calculating these estimates. This section of the report describes the emission estimating methods used in general terms as well as the approach for reallocating the emissions to protect confidential data. The data and documentation provided with respect to ERTAC Rail's emission estimates pertain to the version that was incorporated into the NEI and does not reflect recent revisions.

3.1 Line Haul Criteria Emissions Estimates

Criteria pollutant emissions were estimated by applying emission factors to the total amount of distillate fuel oil used by line haul locomotives. Fuel usage was obtained from publically available Class I Railroad Annual Reports (Form R-1). The R-1 reports are submitted to the Surface Transportation Board annually and include financial and operations data to be used in monitoring rail industry health and identifying changes that may affect national transportation policy. Additionally, each railroad provided fleet mix information that allowed ERTAC Rail to calculate railroad-specific emission factors. Weighted Emission Factors (EF) per pollutant for each gallon of fuel used (gm/gal or lbs/gal) were calculated for each Class I railroad fleet based on its fraction of line haul locomotives at each regulated Tier level. EPA emission factors were used for $PM_{2.5}$, SO_2, and NH_3.

The weighted emission factors were then applied to the link-specific fuel consumption to obtain emissions for each rail segment. Given the confidentiality of the activity data, emissions for criteria pollutants were provided to EPA by ERTAC Rail by county for Class I line haul. Class II/III rail was provided by railroad company and county. Appendices A and B provide more detail on the Class I and Class II/III line haul emission development, respectively.

3.2 Rail Yard Criteria Emissions Estimates

Rail yard locations were identified using a database from the Federal Railroad Administration. Criteria pollutant emissions were estimated by applying emission factors to the total amount of distillate fuel used by locomotives. Each railroad provided fleet mix information that allowed ERTAC to calculate railroad-specific emission factors. The company-specific, system wide fleet mix was used to calculate weighted average emissions factors for switchers operated by each Class I railroad. EPA emission factors were used for $PM_{2.5}$, SO_2, and NH_3.

R-1 report-derived fuel use was allocated to rail yards using an approximation of line haul activity data within the yard; see Appendix C for more details. These fuel consumption values were further revised by direct input from the Class I railroads. The weighted emission factors were then applied to the yard-specific fuel consumption to obtain emissions for each yard. Since the rail yard inventory was based on publically-available data, the final criteria emission estimates were provided per rail yard.

3.3 Hazardous Air Pollutant Emissions Estimates

HAP emissions were estimated by applying speciation profiles to the VOC or PM estimates. The speciation profiles were derived from *Evaluation of Factors that Affect Diesel Exhaust Toxicity* (Truex and Norbeck, 1998), and data provided by OTAQ (Scarbro, 2001 and 2002). It should be noted that since California uses low sulfur diesel fuel and emission factors specific for California railroad fuels were available, calculations of the state's emissions were done separately from the other states. The HAP speciation profile used in this effort is shown in Table 3-1. HAP estimates were calculated at the yard and link level, after the criteria emissions had been allocated.

Table 3-1. Hazardous Air Pollutant Speciation Profile for 2008 Locomotive Emission Estimation

Pollutant Name	California	All Other States	Speciation Base
1,3 Butadiene	0.0000615	0.0047735	PM_{10}
2-2-4 Trimethylpentane	0.0022425	0.0022425	VOC
Acenaphthene	0.0000080	0.0000306	PM_{10}
Acenaphthylene	0.0002182	0.0004275	PM_{10}
Acetaldehyde	0.0004492	0.0276274	PM_{10}
Acrolein	0.0000855	0.0045943	PM_{10}
Anthracene	0.0000535	0.0001009	PM_{10}
Arsenic	0.0000004	0.0000004	PM_{10}
Benzene	0.0000517	0.0038020	PM_{10}
Benzo(a)anthracene	0.0000121	0.0000160	PM_{10}
Benzo(a)pyrene	0.0000044	0.0000027	PM_{10}
Benzo(b)fluoranthene	0.0000044	0.0000064	PM_{10}
Benzo(ghi)perylene	0.0000044	0.0000031	PM_{10}
Benzo(k)fluoranthene	0.0000044	0.0000052	PM_{10}
Beryllium	0.0000280	0.0000280	PM_{10}
Cadium	0.0000280	0.0000280	PM_{10}
Chromium (III)	0.0000001	0.0000040	PM_{10}
Chromium (VI)	0.0000000	0.0000021	PM_{10}
Chrysene	0.0000092	0.0000119	PM_{10}
Dibenz(a,h)anthracene	0.0000000	0.0000000	PM_{10}
Ethylbenzene	0.0020000	0.0020000	VOC
Fluoranthene	0.0000601	0.0000746	PM_{10}
Fluorene	0.0000619	0.0001407	PM_{10}
Formaldehyde	0.0009451	0.0636582	PM_{10}
Indeno(1,2,3-cd)pyrene	0.0000033	0.0000027	PM_{10}
Lead	0.0000840	0.0000840	PM_{10}
Manganese	0.0000020	0.0000020	PM_{10}
Mercury	0.0000280	0.0000280	PM_{10}
Napthalene	0.0018505	0.0025756	PM_{10}
n-Hexane	0.0055000	0.0055000	VOC

Table 3-1. Hazardous Air Pollutant Speciation Profile for 2008 Locomotive Emission Estimation (Cont.)

Pollutant Name	California	All Other States	Speciation Base
Nickel	0.0000066	0.0000066	PM_{10}
Phenanthrene	0.0002822	0.0005671	PM_{10}
Propionaldehyde	0.0061000	0.0061000	VOC
Pyrene	0.0000771	0.0001054	PM_{10}
Styrene	0.0021000	0.0021000	VOC
Toluene	0.0032000	0.0032000	VOC
Xylene	0.0048000	0.0048000	VOC

4.0 HOW WERE COUNTY LINE HAUL EMISSIONS REALLOCATED TO INDIVIDUAL RAIL SEGMENTS?

4.1 Class I Line Haul Emissions Allocation

Class I line haul emissions were allocated to rail segments based on segment-specific railroad traffic data (ton miles) obtained from the Department of Transportation (BTS, 2009). This dataset categorizes the segments' level of activity into ranges of MGTM and is populated by FRA. Emissions were divided between all mainline segments using these activity ranges as a proxy to allocate more emissions to segments with higher activity.

Since the activity data were provided as ranges, a single "allocation value", typically the midpoint of the range, was selected for use in the emissions allocation. The exception to this was the "0" activity category, which by definition had "unknown" activity. As a result, most mainline segments with the "0" activity category were not included in the emissions calculation/allocation. However, there was a small subset of segments that did have known activity values in the confidential data set but were labeled as "unknown" in the publically available data set. Those segment IDs were provided by ERTAC Rail for inclusion in the emission allocation; however, the activity of these segments was averaged to protect confidential data. Table 4-1 lists the activity categories along with their ranges in MGTM/mi and the allocation value used in the emissions spatial allocation.

Table 4-1. Line Haul Segment Activity (MGTM/Mi) Categories

Category	Range Minimum	Range Maximum	Allocation Value Used
0*	0.0003	0.09	0.01233
1	0.1	4.9	2.5
2	5	9.9	7.45
3	10	19.9	14.95
4	20	39.9	29.95
5	40	59.9	49.95
6	60	99.9	79.95
7	100	1000000	100

* The "0" category has "unknown" activity in the publically available segment data. As a result, this table lists the minimum, maximum, and average of the confidential activity data greater than zero that were categorized as "unknown" in the public data.

The county emission sums were reallocated to the segments by multiplying the county emissions by the segment's allocation value divided by the sum of the allocation values for all links within the county.

$$E_{iL} = E_{iC} * \frac{A_L}{\sum_{C=1}^{N} A_{LC}}$$

Where:

E_{iL} = Emissions of pollutant i per link L (tons/year).
E_{iC} = Emissions of pollutant i per county C (tons/year).
A_L = Allocation value for link L per activity category from public BTS dataset
A_{LC} = Sum of allocation values for all links in county C from public BTS dataset

Note that rail line data for Puerto Rico, U.S. Virgin Islands, and Hawaii data were not included in ERTAC Rail's shapefile and were developed separately; however, since these areas have exclusively Class II/III railroads present, these efforts are discussed in the following section.

4.2 Class II/III Line Haul Emissions Allocation

ERTAC Rail created a shapefile of Class II/III mainline rail segments from their FRA-provided proprietary shapefile as described in Appendix B for the contiguous 48 states and Alaska. Raw rail line data for Puerto Rico were obtained from USGS (Scanlon and Briere, 2000), and rail line data for Hawaii was obtained from ESRI's Digital Chart of the World (ESRI 2010). The U.S. Virgin Islands have no rail lines. Because Class II/III railroads are less likely to use rail segments that are heavily traveled by Class I railroads, the activity-based approach used for Class I lines was not appropriate. Instead, Class II/III line haul emissions were allocated to rail segments using segment length as a proxy.

The county emission sums were reallocated to the segments by multiplying the county emissions by the segment's length divided by the sum of the length for all links within the county.

$$E_{iL} = E_{iC} * \frac{l_L}{\sum_{C=1}^{N} l_{LC}}$$

Where:

E_{iL} = Emissions of pollutant i per link L (tons/year).
E_{iC} = Emissions of pollutant i per county C (tons/year).
l_L = Allocation value for link L per activity category from public BTS dataset
l_{LC} = Sum of allocation values for all links in county C from public BTS dataset

Since ERTAC Rail used proprietary data to develop the shapefile, some segment IDs were not found in the EIS data set. These segments were manually identified, and their emissions were allocated to the nearest segment within the EIS data set.

4.3 Rail Yard Emissions Allocation

Rail yard emissions were developed based on yard name and ownership properties. As a result, unique yards needed to be identified and emissions summed. Unfortunately, the yard data lacked detail necessary for confident duplicate checks and yard matching such as address, detailed yard name, etc. As a result, a GIS was used to find the centroid of the yards based on the latest public BTS rail network, using the yard name and FIPS. The list of unique yards was further examined against ERTAC's data and within Google Earth to identify any yards that required further revision. A crosswalk of original ERTAC data to new, consolidated yard IDs facilitated the summing of activity and emissions. 753 unique yards were identified nationwide. This underestimate of the total number of yards is most likely due to using line-haul-focused data to identify locations and develop rail yard emissions.

Once the unique yards were identified and criteria emissions were summed at the yard, the PM and VOC-based HAP speciation profile was applied to estimate HAP emissions at each yard.

4.4 State Provided Data

In this version of NEI, state and local agencies were invited to provide locomotive data that replaced the estimates based on national fuel consumption. However, only a small rail yard dataset was received from Kentucky. Their rail yard list was compared with the ERTAC/ERG yard list, and 2 yards were found in both sets. These yards were merged so as to avoid duplication in activity or emissions.

4.5 What are the Results?

Table 3 summarizes the 2008 locomotive mobile source emission estimates.

Table 3. 2008 Locomotive Emissions Data

2008 Locomotive Criteria Emissions				
Pollutant Name	**Class I Line Haul**	**Class II/III Line Haul**	**Rail Yard**	**TOTAL**
CO	110,969	5,055	9,152	125,176
NH_3	347	16	27	390
NO_X	754,433	51,342	73,741	879,516
PM_{10}-PRI	25,477	1,264	2,086	28,827
PM_{25}-PRI	23,439	1,163	2,024	26,626
SO_2	7,836	357	619	8,811
VOC	37,941	1,896	4,824	44,661
2008 Locomotive Hazardous Air Pollutant Emissions				
Pollutant Name	**Class I Line Haul**	**Class II/III Line Haul**	**Rail Yard**	**TOTAL**
1,3 Butadiene	116.7941	5.7969	9.3296	131.9206
2-2-4 Trimethylpentane	85.0832	4.2511	10.8178	100.1521
Acenaphthene	0.7569	0.0376	0.0609	0.8554

Table 3. 2008 Locomotive Emissions Data (Cont.)

2008 Locomotive Hazardous Air Pollutant Emissions				
Pollutant Name	**Class I Line Haul**	**Class II/III Line Haul**	**Rail Yard**	**TOTAL**
Acenaphthylene	10.6772	0.5298	0.8639	12.0709
Acetaldehyde	676.0572	33.5552	54.0089	763.6213
Acrolein	112.4351	5.5806	8.9828	126.9985
Anthracene	2.5231	0.1252	0.2042	2.8525
Arsenic	0.0091	0.0005	0.0007	0.0103
Benzene	93.0272	4.6173	7.4312	105.0757
Benzo(a)anthracene	0.4047	0.0201	0.0329	0.4577
Benzo(a)pyrene	0.0717	0.0036	0.0059	0.0812
Benzo(b)fluoranthene	0.1607	0.0079	0.0131	0.1817
Benzo(ghi)perylene	0.0798	0.0040	0.0066	0.0904
Benzo(k)fluoranthene	0.1312	0.0065	0.0107	0.1484
Beryllium	0.7138	0.0354	0.0584	0.8076
Cadium	0.7138	0.0354	0.0584	0.8076
Chromium (III)	0.0985	0.0049	0.0079	0.1113
Chromium (VI)	0.0508	0.0025	0.0041	0.0574
Chrysene	0.2998	0.0149	0.0244	0.3391
Ethylbenzene	75.8814	3.7914	9.6479	89.3207
Fluoranthene	1.8868	0.0936	0.1538	2.1342
Fluorene	3.5039	0.1739	0.2830	3.9608
Formaldehyde	1,557.66	77.3124	124.4335	1759.4059
Indeno(1,2,3-cd)pyrene	0.0684	0.0034	0.0056	0.0774
Lead	2.1413	0.1062	0.1753	2.4228
Manganese	0.0520	0.0026	0.0043	0.0589
Mercury	0.7138	0.0354	0.0584	0.8076
Napthalene	64.8766	3.2187	5.2765	73.3718
n-Hexane	208.6739	10.4263	26.5317	245.6319
Nickel	0.1669	0.00983	0.0137	0.19043
Phenanthrene	14.1555	0.7024	1.1450	16.0029
Propionaldehyde	231.4383	11.5637	29.4261	272.4281
Pyrene	2.6566	0.1318	0.2161	3.0045
Styrene	79.6755	3.9809	10.1303	93.7867
Toluene	121.4103	6.0662	15.4366	142.9131
Xylene	182.1154	9.0993	23.1549	214.3696

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Appendix A

ERTAC Class I Line Haul Documentation

DRAFT
ERTAC Rail Emissions Inventory
Part 1: Class I Line-Haul Locomotives

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Introduction

Air protection agencies from twenty-seven states, coordinated through the Eastern Regional Technical Advisory Committee (ERTAC) and headed by the Lake Michigan Air Directors Consortium (LADCO), identified a need to better quantify and characterize rail-related emissions inventories. Traditional locomotives largely utilize diesel engines, resulting in emissions of NO_x, diesel PM, hydrocarbons, greenhouse gases, and other pollutants. These emissions are sometimes concentrated in areas exceeding National Ambient Air Quality Standards. No cohesive nationwide railroad emission estimates based on local operations are known to have been made previously. Inventory development methods for locomotive emissions estimates vary from state to state and, in general, lack the spatial or temporal resolution needed to support air quality modeling and planning [1-5].

The ERTAC Rail Subcommittee (ERTAC Rail) was established with active representatives from twelve member states, three regional planning offices, and the US EPA. The subcommittee's goals are to (1) standardize agencies' inventory development methods through a collaborative effort, (2) improve the quality of data received and the resulting emission inventories, and (3) reduce the administrative burden on railroad companies of providing data.

With support from the Rail industry and assistance from the ERTAC Rail Data Workgroup (Appendix A), ERTAC Rail has developed 3 inventories of locomotive emissions (Table 1); from Class I line-haul, Shortline and Regional Railroads (Class II and III operations), and Class I railyard switchers. Because of the difficulty in obtaining data and differences in states' needs for inventory years, sources from both 2007 and 2008 were utilized (Appendix B.) Due to the variability and uncertainty in much of the data, the results are considered applicable for either 2007 or 2008.

The Surface Transportation Board (STB) defines Class I Railroads as having had minimum carrier operating revenues of $401.4 million (USD) in 2008. There are 8 Class I Railroads operating in the United States (Table 2), about 12 Regional Railroads (Class II), and approximately 530 Class III Railroads (Shortlines). While categorized as a Class I Railroad, Amtrak was excluded from these inventories because of significant differences in equipment and operation characteristics. Line-haul locomotives travel long distances (e.g. between cities) while switcher locomotives largely operate in railyards, splitting and joining rail cars with varying destinations. Passenger and Commuter Rail (including Amtrak), industrial locomotives, and associated non-locomotive equipment are not included in these inventories.

This paper documents the data sources and methodologies used for calculating the Class I line-haul emissions inventory. Class I line-haul activities are the largest source of rail-related emissions, with estimates of Class I line-haul fuel consumption totals to be from 74 to 84% of all rail sources combined[4, 5]. For this reason, characterizing Class I line-haul emissions were a focal point of ERTAC Rail's inventory development efforts. Information on ERTAC Rail, Railroad participation, the Rail industry, and effects of rail on air quality are available elsewhere[6].

Table 1. Summary of ERTAC Rail Inventories: U.S. Locomotive Emissions and Fuel Use for either 2007 or 2008*.

	Fuel Use** (gal/yr)	Emissions (tons/yr)					
		NO_x	$PM_{2.5}$	HC	SO_2	CO	NH_3
Class I*** line-haul	3,770,914,002	754,443	23,439	37,941	7,836	110,969	347
Class I switcher	300,492,223	73,741	2,024	4,824	619	9,152	27
Class II and III	157,800,000	51,367	1,163	1,897	357	5,058	16

*See Appendix B for a description of the year and source of data utilized for each inventory.
**Locomotive grade diesel
***Excluding Amtrak and including work train fuel use

Table 2. Class I Railroads, Reported Locomotive Fuel Use, and Railroad Fuel Consumption Index (RFCI) [7].

Class I Railroads*	R-1 Reported Locomotive Fuel Use (gal/yr)		RFCI (ton-miles/gal)
	Line-Haul (2007)**	Switcher (2008)	
BNSF	1,393,874,954	52,497,057	883.14
Canadian National	93,830,751	12,290,022	1190.79
Canadian Pacific***	50,320,233	4,594,067	1096.28
CSX	514,687,186	53,717,674	963.81
Kansas City Southern	69,787,071	1,816,759	785.89
Norfolk Southern	463,267,278	32,317,375	865.75
Union Pacific	1,185,146,529	143,470,336	974.64
Total	**3,770,914,002**	**300,492,223**	**929.47**

* Excluding Amtrak
** Includes work trains
*** CP's line-haul fuel use values include 2008 data (rather than 2007) for their Delaware and Hudson subsidiary.

Method

Earlier efforts to characterize line-haul railroad emissions relied on highly aggregated activity data (Figure 1), and generally apportioned annual system-wide fuel use equally across all route miles of track operated by a Class I railroad. However, the majority of freight tonnage carried by Class I railroads is concentrated on a disproportionately small number of route miles. In addition, emissions calculations were previously based on an estimate of annual nationwide-average locomotive fleet mix to create one set of emissions factors.

For this inventory, the Class I Railroads allowed ERTAC Rail access under a confidentiality agreement to a link-level (single lengths of track) line-haul GIS layer activity dataset managed by the Federal Railroad Administration[9]. Each railroad also provided fleet mix information that allowed ERTAC Rail to calculate weighted emission factors based on the fraction of their line-haul fleet meeting each Tier level category. The use of this data, largely following a line-haul inventory methodology recommended by Sierra Research[2, 3], resulted in a link-level line-haul locomotive emission inventory using railroad-specific emission factors. This segment-level inventory is nationwide, aggregated to state and county level files, and will be released as gridded emissions files for use in photochemical and dispersion modeling. Link-level emissions may be provided for special study requests pending approval of any Class I railroads operating in the study domain. The calculations are described below as a two-part process, calculating railroad-specific factors and emissions per rail link.

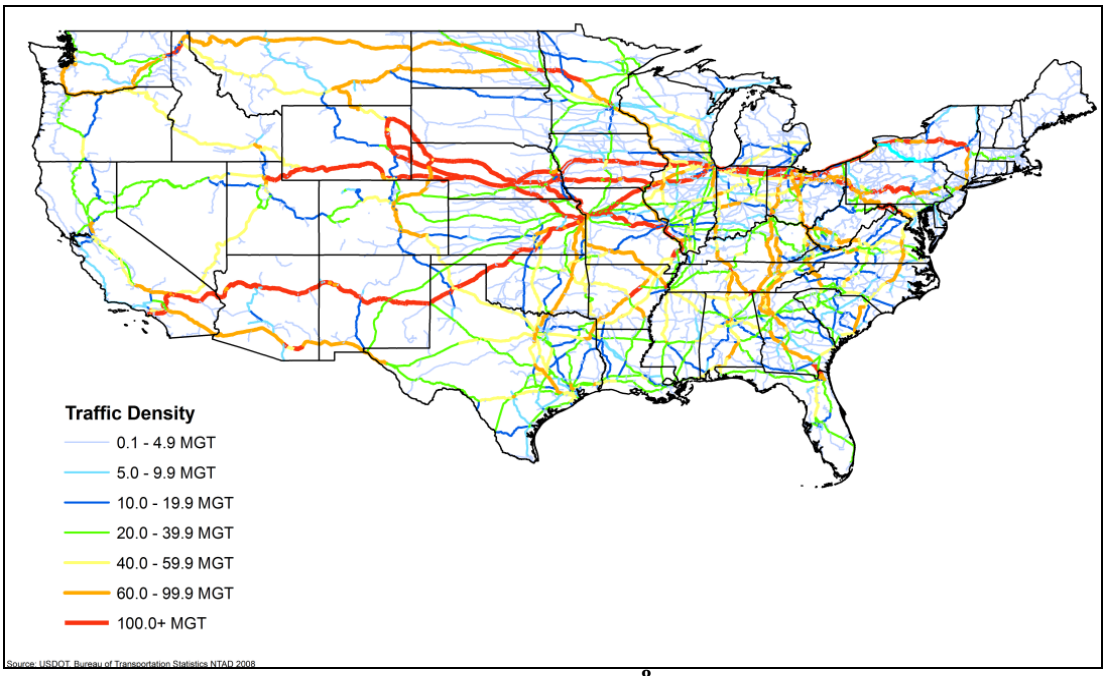

Figure 1. US Railroad Traffic Density in 2006.[8] MGT is million gross tons.

1. Calculate Railroad-Specific Factors.

The EPA provides annual default Emission Factors for locomotives based on characteristic operating cycles ('duty cycles') and the estimated nationwide fleet mixes for both switcher and line-haul locomotives. However, fleet mixes vary from railroad to railroad and, as can be seen in Figure 2, Class I railroad activity is highly regionalized in nature and subject to issues of local terrain such as operation on plains vs. mountainous areas, which can have a significant impact on fuel consumption and emissions.

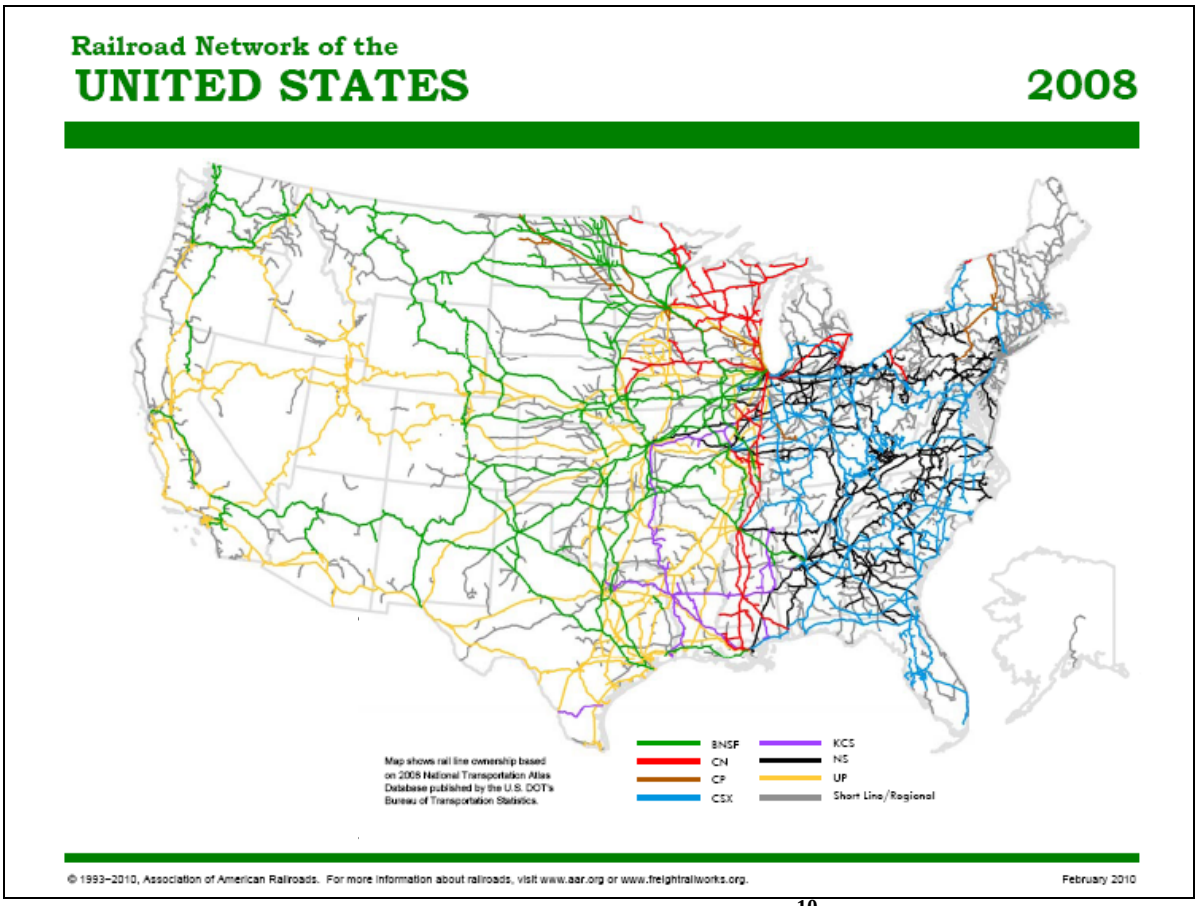

Figure 2. Class I Railroad Territories in the United States[10].

As an alternative approach to using a single nationwide set of emission factors, ERTAC Rail requested each Class I company to provide a description of their line-haul fleet mix based on Tier rating, which each company provided under a confidentiality agreement. An engine's Tier level is based on the year the engine was built and determines allowable emission limits (Table 3).

Table 3. EPA line-haul locomotive Emission Factors by Tier, 1997 standards (grams/gal). Note that the new standards released in 2008 did not apply to fleets in the year 2008. [11]

	PM_{10}	HC	NO_x	CO
Uncontrolled (pre-1973)	6.656	9.984	270.4	26.624
Tier 0 (1973-2001)	6.656	9.984	178.88	26.624
Tier 1 (2002-2004)	6.656	9.776	139.36	26.624
Tier 2 (2005 +)	3.744	5.408	102.96	26.624

Based on values in EPA Technical Highlights: Emission Factors for Locomotives, EPA Office of Transportation and Air Quality, EPA-420-F-09-025, April 2009.

Weighted Emission Factors (EF) per pollutant for each gallon of fuel used (gm/gal or lbs/gal) were calculated for each Class I railroad fleet based on its fraction of line-haul locomotives at each regulated Tier level (Eqn 1; Table 3).

$$EF_{iRR} = \sum_{T=1}^{4} (EF_{iT} * f_{TRR}) \qquad \text{Equation 1}$$

EF_{iRR} = Weighted Emission Factor for pollutant i for Class I railroad RR (gm/gal).
EF_{iT} = Emission Factor for pollutant i for locomotives in Tier T (gm/gal) (Table 3). There were 4 Tiers of locomotives in the 2008 fleets.
f_{TRR} = Fraction of railroad RR fleet in Tier T.

While engine emissions are variable within Tier categories, this approach likely provides better regional estimates than uniformly applying the nationwide average emission factors. This approach likely provides conservative emission estimates as locomotive engines are certified to meet or exceed the emissions standard for each Tier, although emission levels may increase after certification.

Other emission factors are not engine specific. For locomotives, $PM_{2.5}$ is assumed to be 97% of PM_{10} [11], and emission factors applied for SO_2 and NH_3 are 1.88 g/gal [11] and 83.3 mg/gal [12] respectively. Greenhouse gases are estimated using emission factors shown in Table 4.

Table 4. EPA greenhouse gas emission factors for locomotive diesel fuel (grams/gal). [13]

	CO_2	N_2O	CH_4
Locomotive diesel	1.015E4	0.26	0.80

A Railroad Fuel Consumption Index (RFCI) was also calculated for each Class I railroad using their system-wide line-haul fuel consumption (FC) and gross ton-mile (GTM) data reported in their annual R-1 reports submitted to the Surface Transportation Board[7] (Eqn 2). This value represents the average number of GTM produced per gallon of diesel fuel used over their system in a year, and varies between railroad carriers depending on factors such as fleet mix, system

terrain, speeds, loading/weight of cargo, train type (e.g., intermodal, unit, and manifest), and operating practices. (Table 2).

$$RFCI_{RR} = \frac{GTM_{RR}}{FC_{RR}} \qquad \text{Equation 2}$$

$RFCI_{RR}$ = Railroad Fuel Consumption Index (gross ton-miles/gal) per Class I railroad (RR).
GTM_{RR} = Gross Ton-Miles (GTM), annual system-wide gross ton miles of freight transported per RR. (R-1 Report Schedule 755, Line 104)
FC_{RR} = Annual system-wide fuel consumption by line-haul and work trains per RR (gal) (R-1 Report Schedule 750, Lines 1 and 6).

2. Calculate Emissions per Link.

Emissions of pollutant i per link L (E_{iL}) are then calculated by multiplying the gallons of diesel fuel consumed by each Class I railroad on the link by that railroad's weighted Emission Factor for the pollutant, and summed over all railroads operating on the link (Eqn 3). This approach splits the activity on each link (represented by MGT) evenly between all railroads operating on the link. Note that the weighted Emission Factors are converted to tons/gal for these calculations, and that variables with units in tons may represent tons of freight hauled (MGT, RFCI) or tons of pollutants (EF, E).

$$E_{iL} = \sum_{RR=1}^{N} \frac{\left(\frac{MGT_L * 10^6}{N}\right) * l_L}{RFCI_{RR}} * EF_{iRR} \qquad \text{Equation 3}$$

E_{iL} = Emissions of pollutant i per link L (tons/year).
N = Number of Class I railroads operating on link L.
MGT_L = Millions of Gross Tons hauled per link per year from the FRA database (10^6 tons/yr)[9].
l_L = Link length from the FRA database (miles).
EF_{iRR} = Weighted Emission Factor for pollutant i per railroad RR (Eqn 1; tons/gal).
$RFCI_{RR}$ = Railroad Fuel Consumption Index per railroad RR (Eqn 2; gross ton-miles/gal).

Note that approximately 36% of Class I route miles in the United States are shared by more than one Class I carrier, a fraction that drops to 26% when neglecting track only shared between one Class I freight railroad and Amtrak. Accurately apportioning the specific fractions of tonnage (MGT) per carrier per link was considered, but after comparing likely worst-case areas, the difficultly of merging carrier-specific MGT with the aggregated FRA MGT dataset was considered too great considering the potential gain in accuracy. Where warranted, MGT data may be apportioned more accurately in the future.

Limitations, Conclusions, and Future Work

Rail-related emissions can be important components of emissions inventories used to support effective air quality management practices, at local, state, regional, and national levels. This line-haul inventory, as well as the companion Class I railyard inventory and Class II/III inventory, greatly improve our estimates of rail-related emissions. However, a systematic study of variability and uncertainty in line-haul locomotive emissions and activity, by fleets, locations, and through time, would give valuable information for identifying how to best improve this inventory as well provide an indication of how representative the inventory may be. An uncertainty study on the data used for this inventory, including the R-1 reported fuel use and the confidential link-level tonnage data, would also help in evaluating the quality of this inventory. Localized studies should also examine how shared tracks are apportioned between multiple carriers.

Early ERTAC Rail discussions concluded that link-level tonnage was the most important data to obtain, while other variables such as track grade and track speed could not be addressed at this time. ERTAC Rail calculated railroad-specific fleet-averaged emission factors rather than applying the estimated national average; however, it is recognized that emissions from individual engines are highly variable even within Tier categories depending on variables such as the specific locomotive model, operation cycle, and conditions of operation. Future evaluation of emission variability within Tiers and between certain types of operation and locations would also be valuable.

Emissions inventory preparation guidance from the U.S. EPA describes locomotive activity as relatively constant throughout the year (e.g. no daily, weekly, or seasonal variability); however, actual activity levels do vary seasonally and annual averaging may dilute or exaggerate concentrations during pollution episodes. ERTAC Rail and the Class I railroad community had some discussions addressing if incorporating more specific fleet mix or monthly or seasonal variation may be worthwhile, and these topics should be looked into further.

Finally, it is important to reiterate that the link-level MGT data maintained by the FRA is proprietary and can only be released to agencies/groups outside the FRA with the express permission of each Class I railroad. It is possible that one or more Class I railroads could withhold permission for access, but data for specialized studies may be provided if requested. This database can also be improved by better distinguishing between haulage and trackage rights, and by apportioning tonnage hauled on links to specific carriers.

We would like to thank the Class I Railroads and their representatives for their assistance and support in the development of this inventory.

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Appendix A: ERTAC Rail Data Workgroup

REPRESENTATIVE	ORGANIZATION
Matt Harrell	IL EPA
Michelle Bergin (Co-Chair) and Byeong Kim	GA EPD
Mark Janssen (Co-Chair)	LADCO
Julie McDill and Patrick Davis	MARAMA
Laurel Driver	US EPA OAQPS
Robert Fronczak	AAR
Steven Sullivan	ASLRRA
Rick Nath	CSX
David Seep and Lyle Staley	BNSF
Ken Roberge	CPR
Carl Akins and Peter Conlon	KCS
Erika Akkerman	CN
M. John Germer	UP
Brent Mason and Richard Russell	NS
Joanne Maxwell	Amtrak

Appendix B: Source and Year of Data Utilized for Each Inventory

Data	Year	Source
Class I Line-Haul		
Annual Line-Haul Fuel Use and Gross Ton-Miles	2007	STB R-1 Reports (CP data for D&H is for 2008.)
Line-haul fleet mix for emission factors	2008	Each Class I railroad
Link-level tonnage	2007	FRA confidential database
Class I Railyards (Switcher Locomotives)		
Annual Switcher Fuel Use	2008	R-1 Reports
Switcher fleet mix for emission factors	2008	Each Class I railroad
Link-level tonnage or Density Code (for activity estimate)	2007	FRA confidential database
Class II and III Locomotives		
Annual Total Fuel Use	2008	ASLRRA Annual Report (2008)
Track length and railroad	2008	ASLRRA Annual Report (2008)
Estimated fleet mix for emission factors		Discussions with ASLRRA and Class II and III representatives.

Appendix B

ERTAC Class II/III Line Haul Documentation

DRAFT

ERTAC – Class 2/3 Shapefile Documentation

13 Jul 2009

Introduction

This document outlines the methods and procedures used to compile a shapefile representing the links in the FRA 1:100,000 railroad dataset that are owned or operated by Class II and III railroad companies. It is important to note that there is a considerable amount of overlap between the Class II's and III's and the Class I and passenger railroads. Class II's and III's can operate on Class I or passenger rail links and vice versa. Although the final shapefile specifically represents Class II and III links, there are many Class I and passenger railroads represented as well.

Procedure

1. Started with all proprietary FRA links where "NET = 'M' and "STCNTYFIPS" <> ' ' (this definition query selects all active mainline links located within the United States).
2. Ran 12 queries, one for each ownership and trackage rights field, to select all links not associated with a Class I freight railroad or Amtrak and not containing a null value (e.g., "RROWNER1" <> 'AMTK' AND "RROWNER1" <> 'BNSF' AND "RROWNER1" <> 'CN' AND "RROWNER1" <> 'CPRS' AND "RROWNER1" <> 'CSXT' AND "RROWNER1" <> 'KCS' AND "RROWNER1" <> 'NS' AND "RROWNER1" <> 'UP' AND "RROWNER1" <> ' '). The first query was setup as a new selection. Each of the 11 subsequent queries were setup to add records to initial set of records. 26,261 links were selected and exported to a new shapefile.
3. Due to the multitude of railroad codes used to represent commuter rail operations across the country, additional processing was required to remove any links that were not operated by a Class II or III freight railroad. Each commuter railroad was queried out of the new shapefile and the links analyzed to eliminate all links where no Class II or III operations were occurring. The following commuter rail operations were evaluated: NJT (New Jersey Transit), MNCW (Metro-North Commuter Railroad), LI (Long Island Railroad), CDOT (Connecticut DOT), MBTA (Massachusetts Bay Transportation Authority), SEPA (Southeastern Pennsylvania Transportation Authority), MARC (Maryland Area Rail Commuter), VRE (Virginia Railway Express), MTRA (Northeastern Illinois Regional Commuter Railroad), CSS (Northern Indiana Commuter Transportation District), DART (Dallas Area Rapid Transit), SCRA (Southern California Regional Rail Authority – including also SCAX, LACM, LAPT, and LATC), TCRA (South Florida Regional Transportation Authority), PJPB (Caltrain), and ACE (Altamont Commuter Express).

Approximately 1581 links were identified with no Class II or III operations and were deleted from the Class 2/3 shapefile.

4. The remaining Class II and III links were then compared to the regional maps contained in the July-August issue of The Official Railway Guide to assess the completeness of the Class 2/3 shapefile. Six specific edits were made to the shapefile to correct the most glaring errors: 1) BMLP links deleted (Black Mesa & Lake Powell, an electric coal hauling railway in Arizona); 2) DSNG links deleted (Durango & Silverton steam tourist railroad in Colorado; 3) CIC haulage rights links on CN from Chicago to Omaha deleted; 4) DMIR links deleted (Duluth, Missabe & Iron Range, now owned and operated by CN in Minnesota; 5) EVWR's ex-CSXT links coded from Evansville, IN to Okawville, IL (Evansville Western Railroad); 6) INRD ex-CP links coded from Chicago, IL to Louisville, IN (Indiana Rail Road).
5. During the course of reviewing the FRA dataset, 555 "active" links were found to have no ownership or trackage rights codes. 1005 links have no codes listed in the 3 ownership fields. In most cases these links are very short and scattered across the country. Only the links representing the EVWR and INRD spanned large distances and were fixed. The other problem links were deemed to be insignificant. A listing of these links will be provided back to the FRA to assist with their coding in 1:100K railway shapefile.

Appendix C

ERTAC Rail Yard Documentation

DRAFT
ERTAC Rail Emissions Inventory
Part 2: Class I Railyard Switcher Locomotives

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Mark Janssen, Lake Michigan Air Directors Consortium

Acknowledgments: Robert Fronczak, Association of American Railroads
Laurel Driver, US EPA, Office of Air Quality Planning and Support
Byeong Kim, GA Environmental Protection Division

Introduction

Air protection agencies from twenty-seven states, coordinated through the Eastern Regional Technical Advisory Committee (ERTAC) and headed by the Lake Michigan Air Directors Consortium (LADCO), identified a need to better quantify and characterize rail-related emissions inventories. Traditional locomotives largely utilize diesel engines, resulting in emissions of NO_x, diesel PM, hydrocarbons, greenhouse gases, and other pollutants. These emissions are sometimes concentrated in areas exceeding National Ambient Air Quality Standards. No cohesive nationwide railroad emission estimates are known to have been made previously. Inventory development methods for locomotive emissions estimates vary from state to state and, in general, lack the spatial or temporal resolution needed to support air quality modeling and planning [1-5].

The ERTAC Rail Subcommittee (ERTAC Rail) was established with active representatives from twelve member states, three regional planning offices, and the US EPA. The subcommittee's goals are to (1) standardize agencies' inventory development methods through a collaborative effort, (2) improve the quality of data received and the resulting emission inventories, and (3) reduce the administrative burden on railroad companies of providing data. With support from the Rail industry and assistance from the ERTAC Rail Data Workgroup (Appendix), ERTAC Rail has developed 3 inventories of locomotive emissions; from Class I line-haul, Shortline and Regional Railroads, and Class I railyard switchers, for the year 2008 (Table 1).

The Surface Transportation Board (STB) defines Class I Railroads as having had minimum carrier operating revenues of $401.4 million (USD) in 2008. There are 8 Class I Railroads operating in the United States (Table 2), about 12 Regional Railroads (Class II), and approximately 530 Class III Railroads (Shortlines). While categorized as a Class I Railroad, Amtrak was excluded from these inventories because of significant differences in equipment and operation characteristics. Line-haul locomotives travel long distances (e.g. between cities) while switcher locomotives largely operate in railyards, splitting and joining rail cars with varying destinations. Passenger and Commuter Rail (including Amtrak), industrial locomotives, and associated non-locomotive equipment are not included in these inventories.

Table 1. Summary of ERTAC Rail Inventories: U.S. Locomotive Emissions and Fuel Use for either 2007 or 2008*.

	Fuel Use** (gal/yr)	Emissions (tons/yr)					
		NO_x	$PM_{2.5}$	HC	SO_2	CO	NH_3
Class I*** line-haul	3,770,914,002	754,443	23,439	37,941	7,836	110,969	347
Class I switcher	300,492,223	73,741	2,024	4,824	619	9,152	27
Class II and III	157,800,000	51,367	1,163	1,897	357	5,058	16

*See Appendix B for a description of the year and source of data utilized for each inventory.
**Locomotive grade diesel
***Excluding Amtrak and including work train fuel use

Table 2. Class I Railroads and Reported Locomotive Fuel Use[7].

Class I Railroads*	R-1 Reported Locomotive Fuel Use (gal/yr)	
	Line-Haul (2007)**	Switcher (2008)
BNSF	1,393,874,954	52,497,057
Canadian National	93,830,751	12,290,022
Canadian Pacific***	50,320,233	4,594,067
CSX	514,687,186	53,717,674
Kansas City Southern	69,787,071	1,816,759
Norfolk Southern	463,267,278	32,317,375
Union Pacific	1,185,146,529	143,470,336
Total	**3,770,914,002**	**300,492,223**

* Excluding Amtrak
** Includes work trains
*** CP's line-haul fuel use values include 2008 data (rather than 2007) for their Delaware and Hudson subsidiary.

This paper documents the data sources and methodologies used for calculating the Class I switcher ("Railyard") inventory. Information on ERTAC Rail, Railroad participation, the Rail industry, and effects of rail on air quality are available elsewhere[6].

Method

Switcher locomotives are expected to be the single largest source of air emissions in railyards. Therefore, as a starting point for a comprehensive railyard inventory, a Class I switcher emission inventory was developed. It is assumed that estimates for yards of interest, associated equipment and activity, and smaller railroads could be refined later.

While ERTAC Rail represents states east of the Mississippi River, the railroad companies specified they wanted this effort to result in a consistent nationwide inventory. ERTAC Rail agreed to calculate emissions for all states when the data was available and when additional

significant effort was not required. Because both the dataset of railyards and switcher fuel use was nationwide in scope, the resulting initial railyard inventory is a nationwide, 'top-down' derivation. However, railroad companies may have different levels and quality of data available, and may have interpreted some data requests differently. Also, states are requested to update yards they have detailed information on when possible, and a few states (i.e. California) have unique railroad operations and equipment. Therefore, data for some areas will be more accurate than for others, and locally-derived inventories may be more accurate.

This documentation describes development of the initial top-down inventory, which consisted of three main activities:

1. Locate Class I Railyards
2. Select/Calculate Emission Factors
3. Estimate Locomotive Activity
4. Improve Estimates

1. Locate Class I Railyards.

Identification and correct placement of railyards was an important first step, requiring a comprehensive electronic dataset. A confidential database was obtained from the Federal Railroad Administration (FRA) with permission from the Class I Railroads (FRA database). A similar public database compiled by the Bureau of Transportation Statistics is also available[7] . Data from this source will not match the confidential data exactly, but will be very similar. The FRA database has rail links (track lengths) individually identified as parts of specific railyards. While there may be discrepancies in how each railroad defined railyard links, this dataset appears to identify most Class I railyards in the U.S., and shows a high density of yards in the eastern states (Figure 1). The database gives length, up to 3 owners and 3 operators, and a Federal Density Code (explained below) for each railyard link.

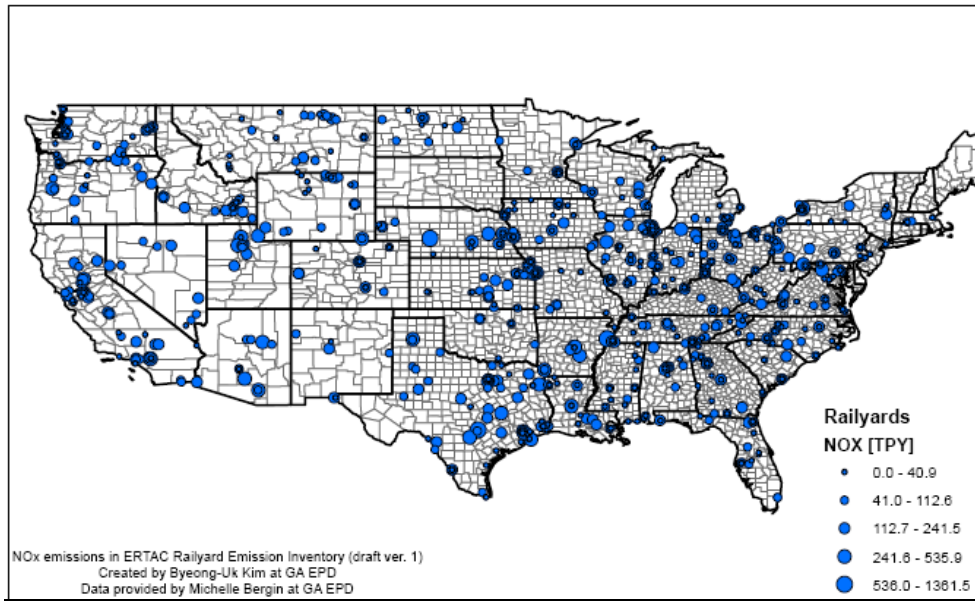

Figure 1. Class I Railyards in the United States and estimates of Annual NOx emissions from switcher locomotives (tons/yr in 2008).

2. Select/Calculate Emission Factors.

The EPA provides annual default emission factors based on characteristic operating cycles ('duty cycles') and the estimated nationwide fleet mix for both switcher and line-haul locomotives. However, switcher fleet mix is not uniform from company to company and, as can be seen in Figure 2, Class I railroad activity is highly regional.

As an alternative approach, ERTAC Rail requested each Class I rail company to provide a description of their switcher fleet mix based on Tier rating, which each company provided under a confidentiality agreement. An engine's Tier determines allowable emission limits based on the year the engine was built (Table 3). While engine emissions are variable within Tier categories, this estimate likely provides a better regional estimate than the nationwide average. The company-specific systemwide fleet mix was used to calculate weighted average emissions factors for switchers operated by each Class I railroad.

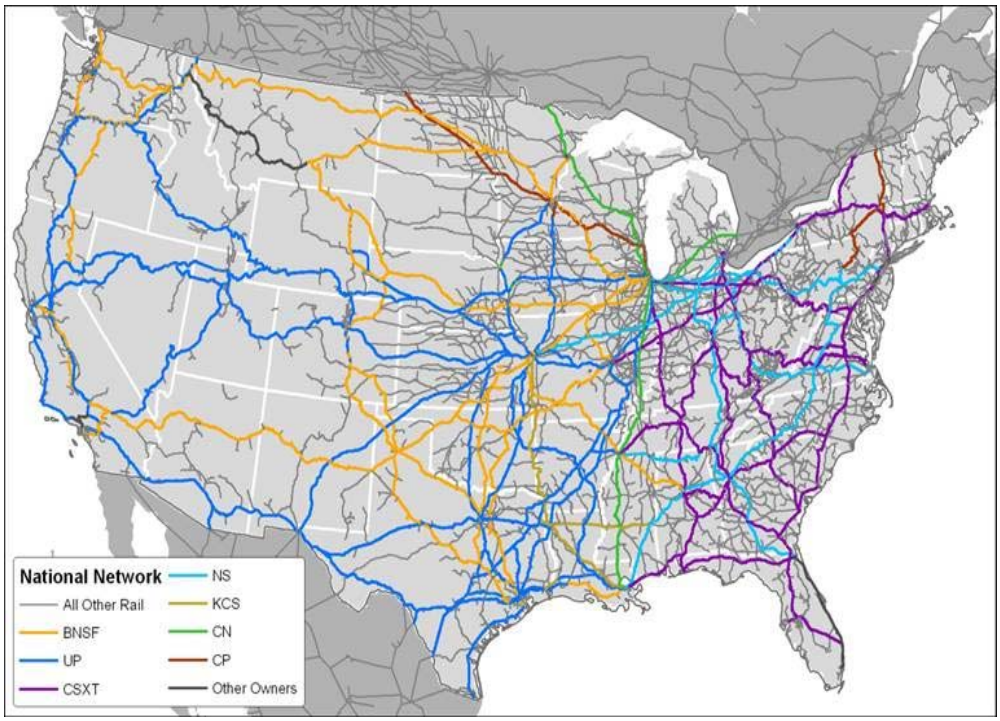

Figure 2. Class I Railroad Territories in the United States.

Table 3. EPA switcher locomotive emission factors by Tier, 1997 standards (grams/gal).

	PM_{10}	HC	NO_x	CO
Uncontrolled (pre-1973)	6.688	15.352	264.48	27.816
Tier 0 (1973-2001)	6.688	15.352	191.52	27.816
Tier 1 (2002-2004)	6.536	15.352	150.48	27.816
Tier 2 (2005 +)	2.888	7.752	110.96	27.816

Listed years apply to the year the engine was built. Table based on values from [8]. Note that the new standards released in 2008 did not apply to existing fleets in the year 2008.

For locomotives, $PM_{2.5}$ is assumed to be 97% of PM_{10} [8], and emission factors for SO_2 and NH_3 are 1.88 g/gal and 83.3 mg/gal respectively (add cites). Greenhouse gases are also estimated using emission factors shown in Table 4.

Table 4. EPA greenhouse gas emission factors for locomotive diesel fuel (grams/gal).

	CO_2	**N_2O**	**CH_4**
Locomotive diesel	1.015E4	0.26	0.80

Source: U.S. Environmental Protection Agency. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2005, EPA 430-R-07-002, Annex 3.2, (April 2007), web site: http://www.epa.gov/climatechange/emissions/usinventoryreport.html

These emission factors are based on a characteristic duty cycle for switchers which assumes operation over 24-hour per day 365 days per year. An evaluation of the effect of variability in railyards and switching duties on emissions would be useful for future inventories.

3. Estimate Locomotive Activity.

Class I railroads report total annual switcher locomotive fuel use to the STB, which is reported in publicly available 'R-1' reports (Table 2). There may be inconsistencies between railroads in how fuel use is estimated to be apportioned between line-haul and switcher locomotive use, and possibly in the total locomotive fuel use, so these values may be adjusted in the future. However, the use of these values provides a starting point for estimating total U.S. Class I locomotive-related emissions segregated by Class I carrier. The R-1 report was used by ERTAC for both the line-haul and switcher locomotive emissions inventories.

The next step for inventory development is to allocate switcher fuel use to each railyard. Two methods were applied, one that relies on publicly available line-haul activity (the 'Dencode' method), and the other using confidential line-haul activity (the 'MGT' method.) At this time, Norfolk Southern and Kansas City Southern have provided input for use of the MGT method and the Dencode method is applied for the other five railroads.

The Dencode Method – Publicly available data

Each link in both the publicly available BTS database and the confidential FRA database has a 'Federal Density Code' (Dencode) ranging from 1 to 7 assigned based on the cumulative annual freight tonnage hauled on the link (track). Total Switcher Fuel Use in each railyard Y (SFU_Y) is estimated as follows:

First the Switcher Activity Indicator per yard (SAI_Y) is estimated by multiplying the average dencode of the links identified as part of the same railyard by the sum of the length of the links for that railyard (Eqn 1).

$$SAI_Y = \sum (l_{nY} * FDC_{nY}) \qquad \text{Equation 1}$$

SAI_Y = Switcher Activity Indicator in Railyard Y

n_Y = number of links identified as part of railyard Y
l_{nY} = length of link n in miles
FDC_n = Federal Density Code (1 to 7) of link n

Next, this value is then weighted (SAI_Y') based on an ownership factor (OF) set between 0 and 1. The OF depends on the number of owners listed for each railyard: if there is one owner the OF is set to 1, if there are two owners the primary owner is set to 0.8 and the secondary is 0.2, and if there are 3 owners the primary is 0.6, the secondary is 0.2, and the tertiary is 0.1.

$SAI_Y' = OF_Y * SAI_Y$ Equation 2

Next, the SAI_Y' of all railyards belonging to a Class I railroad (RR) were summed, and the fraction of the railroads total SAI associated with each railyard was multiplied by the railroads total annual switcher fuel use reported in the R-1 (TFU_{RR}), resulting in the total Switcher Fuel Use for each railyard Y (Eqn 2).

$$SFU_Y = \frac{SAI_Y'}{\sum_{RR} SAI_Y'} * TFU_{RR}$$ Equation 3

SFU_Y = Switcher Fuel Use at railyard Y

Finally, the SFU_Y is multiplied by the emission factors described in the previous section to obtain annual switcher emissions at each railyard.

The MGT Method – Confidential data

Two railroads, Norfolk Southern and Kansas City Southern, provided confidential link-level tonnage information and weighting factors to correct skewed estimates to improve estimated switcher activity at important yards. Other railroads may also allow the use of this technique for their inventories in the future.

The MGT Method also uses the FRA database for railyard identification and link lengths. However, rather than using the average dencode per link, confidential annual gross tonnage (MGT) hauled per link in the railyard was used to calculate the railyard switcher activity (SAI_Y). This is calculated by replacing FDC_n in Equation 2 with link-specific tonnage MGT_n (Equation 4).

$$SAI_Y = \sum (l_{nY} * MGT_{nY})$$ Equation 4

SAI_Y = Switcher Activity Indicator in Railyard Y
n_Y = number of links identified as part of railyard Y

l_{nY} = length of link n in miles
MGT_{nY} = million gross tons on link n

This method provides a more refined comparison between railyards than the use of the 7-category dencodes; however, is more susceptible to errors for yards where tonnage is not correlated to switching activity. For example, a yard with large coal trains pulling through used for crews to change over would be assigned an overly high level of emissions for switching activity. To account for this, a discretionary Switching Activity Factor (SAF) was introduced to allow railroads to roughly weight yards with clearly higher or lower levels of switching activity than what results from the mathematical allocation. Therefore, SAI_Y is weighted based on both the ownership factor (OF) as well as the SAF (Equation 5). For example, a yard used for crew changes and not switching may have an SAF of 0, while a yard at a major interchange between cities may have an SAF of 3.

$$SAI_Y' = OF_Y * SAF_Y * SAI_Y \qquad \text{Equation 5}$$

Again, the SAI_Y' of all railyards belonging to a Class I railroad (RR) are summed, and the fraction of the railroads total SAI associated with each railyard was multiplied by the railroads total annual switcher fuel use reported in the R-1 (TFU_{RR}), resulting in the total Switcher Fuel Use for each railyard Y (Eqn 6).

$$SFU_Y = \frac{SAI_Y'}{\sum_{RR} SAI_Y'} * TFU_{RR} \qquad \text{Equation 6}$$

While the SAF allows estimates of yard-specfic emissions to be adjusted, the total level of emissions for each railroad, which is based on systemwide fuel use and systemwide emission factors, remains unchanged. The MGT method SFU_Y is also later multiplied by the emission factors described in the previous section to obtain annual switcher emissions at each railyard.

4. Improve estimates.

In addition to the Switching Activity Factor described above, direct input was also used to improve emission estimates for important railyards. Each Class I railroad provided an estimate of annual average switcher fuel use (generally much lower than the EPA default of 82,490 gal/yr) as well as the name, location, and number of operating switchers for railyards with 8 or more switchers operating in ozone or PM2.5 nonattainment areas. This data was used to overwrite the dencode or MGT derived emissions estimates for those railyards.

The difference in estimated fuel use for those railyards was re-allocated (added or removed) between the remaining railyards belonging to that Class I railroad. It is important to note that there are some discrepancies in how this data was reported for the large railyards by each railroad. For example, some railroads reported all switchers located at a railyard while others reported ‘full time equivalent’ switchers, meaning the number of switchers normalized to a full working cycle (24-hours per day year-round.) This process should be standardized for future inventory versions.

States also have the option of updating specific railyard emissions estimates. Because this inventory is derived 'top-down', local studies and familiarity with specific railyards is expected to provide better estimates, which can be used to adjust this inventory. Care must be taken to ensure the other railyard estimates are adjusted to account for increases or decreases in estimated fuel use per yard.

Limitations, Conclusions, and Future Work

What this ERTAC Rail railyard inventory does well is provide a comprehensive overview of where railyards are, who owns them, and gives a geographical allocation of switcher emissions bounded by what is reported as nationwide switcher fuel usage by the Class I railroads. These sources can be important for air quality management in nonattainment areas, as well as in regional analysis and for future transportation planning. This inventory will be useful for regional and some local modeling, helps identify where railyards need to be better characterized, and provides a strong foundation for future development of a meaningful nationwide Class I switcher emissions inventory.

There are important uncertainties associated with estimates from this method, including, but not limited to, the use of tonnage hauled as an indicator of the amount of switching activity, and, for a few of the railroads, how the amount of switcher fuel use was determined to be reported in the R-1. The R-1 reported values are currently under examination.

There is also likely significant variability in actual switching duty-cycles and, potentially, in the number of switchers operating at some railyards at different times of the year. 'Road-switching', or the use of what are considered switching locomotives to move between nearby yards, should be addressed in either this or the ERTAC line-haul inventory.

It must be noted that freight-related rail activity is not always routine and no annual emissions inventory will ever be able to capture the innate variability of the source. However, as other large emission sources are reduced, and if rail activity increases as expected, it is important to include our best estimates of these sources in air quality analysis. In the future, on-line data loggers and other tracking technologies, combined with ambient studies and detailed modeling, will hopefully provide more insight to the emissions of locomotives and other railyard sources.

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Appendix E-3

Nonpoint Industrial and Commercial/Institutional (ICI) Fuel Combustion Category Documentation

AREA COMBUSTION SOURCE EMISSIONS INVENTORY IMPROVEMENT METHODOLOGY

TECHNICAL MEMORANDUM

Contract No. 07-0901-RPO-036

March 20, 2009

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A. INTRODUCTION

The objective of this project is to estimate area source emissions from Industrial and Commercial/Institutional (ICI) fuel combustion for the CENRAP region, which encompasses the States and tribal areas of Arkansas, Iowa, Kansas, Louisiana, Minnesota, Missouri, Nebraska, Oklahoma, and Texas. This project will result in the development of a set of revised 2002 ICI area source emission inventories for sulfur dioxide (SO_2), nitrogen oxides (NO_x), non-methane volatile organic compounds (VOCs), particulate matter (specifically, PM_{10} and primary/direct $PM_{2.5}$), ammonia (NH_3), carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The emission inventories will be developed at the county level and will provide emissions for the following time periods: annual; monthly; and average weekly, weekday, and weekend day emissions for each month.

This technical memorandum is one of two components for documenting the methodology that E.H. Pechan & Associates, Inc. (Pechan) will follow in preparing CENRAP's 2002 ICI area source emissions inventory. The second component is a set of Microsoft® Excel workbook templates that Pechan will use to implement the methodology described in this document. This memorandum is organized into four sections: this section (Introduction), Section B (Methodology) , which describes the emission estimation methodology, Section C (Calculation Templates), which summarizes the content of the calculation templates, and Section D (References), which identifies the information sources that were consulted in preparing this document.

B. METHODOLOGY

This section documents the emission inventory development methodology that Pechan will use to prepare an ICI combustion area source emission inventory for the CENRAP States. Table 1 identifies the source classification codes (SCCs) for which Pechan plans to prepare ICI combustion area source emission estimates. It is important to note that some of these SCCs may not ultimately appear in each CENRAP State's inventory. If it is determined that all of an individual State's consumption of a particular fuel is already accounted for in the State's nonroad and/or point source inventory, then the SCC for that fuel will not be included in the area source inventory for that State.

The key data inputs in the emissions estimation methodology are:

1. Total Industrial and total Commercial/Institutional energy consumption by fuel type and CENRAP State for the year 2002;
2. Industrial energy consumption used for non-fuel purposes by fuel type and State in 2002;
3. ICI distillate fuel and liquefied petroleum gas (LPG) consumption for nonroad sources by State in year 2002;
4. ICI energy consumption by fuel type for point sources by CENRAP State in year 2002;
5. Emission factors relating emission rates to volume of energy consumed by fuel type for the ICI sectors;
6. Sulfur content of coal consumed in the ICI sectors by State in year 2002;

Table 1. ICI Combustion Area Source Classification Codes

SCC	DESCRIPTION
2102001000	Stationary Source Fuel Combustion; Industrial; Anthracite Coal; Total: All Boiler Types
2102002000	Stationary Source Fuel Combustion; Industrial; Bituminous/Subbituminous Coal; Total: All Boiler Types
2102004000	Stationary Source Fuel Combustion; Industrial; Distillate Oil; Total: Boilers and IC Engines
2102005000	Stationary Source Fuel Combustion; Industrial; Residual Oil; Total: All Boiler Types
2102006000	Stationary Source Fuel Combustion; Industrial; Natural Gas; Total: Boilers and IC Engines
2102007000	Stationary Source Fuel Combustion; Industrial; Liquid Petroleum Gas; Total: All Boiler Types
2102008000	Stationary Source Fuel Combustion; Industrial; Wood; Total: All Boiler Types
2102011000	Stationary Source Fuel Combustion; Industrial; Kerosene; Total: All Boiler Types
2103001000	Stationary Source Fuel Combustion; Commercial/Institutional; Anthracite Coal; Total: All Boiler Types
2103002000	Stationary Source Fuel Combustion; Commercial/Institutional; Bituminous/Subbituminous Coal; Total: All Boiler Types
2103004000	Stationary Source Fuel Combustion; Commercial/Institutional; Distillate Oil; Total: Boilers and IC Engines
2103005000	Stationary Source Fuel Combustion; Commercial/Institutional; Residual Oil; Total: All Boiler Types
2103006000	Stationary Source Fuel Combustion; Commercial/Institutional; Natural Gas; Total: Boilers and IC Engines
2103007000	Stationary Source Fuel Combustion; Commercial/Institutional; Liquid Petroleum Gas; Total: All Combustor Types
2103008000	Stationary Source Fuel Combustion; Commercial/Institutional; Wood; Total: All Boiler Types
2103011000	Stationary Source Fuel Combustion; Commercial/Institutional; Kerosene; Total: All Combustor Types

7. County-level employment in the ICI sectors by State for the year 2002; and
8. Temporal allocation data for estimating the proportion of annual fuel combusted by month, as well as data for estimating the volume of fuel combusted in each month for the following time-frames: average week, average week day; and average weekend day.

The following sections describe the methodology/data source(s) for developing each of these data inputs. The following identifies the planned source(s) of information for each of these data elements. In selecting the information sources for each of these data elements, Pechan evaluated the representativeness and level of confidence criteria identified in the Quality Assurance Project Plan (QAPP) for this project. For example, information sources that provide data specific to the source category/geography/inventory period were selected over those that are less specific.

1. Total ICI Energy Consumption

For total Industrial and total Commercial/Institutional energy consumption by fuel type/State, Pechan will use the same source that EPA uses in developing ICI combustion emission estimates for the National Emissions Inventory (NEI) – the Energy Information Administration (EIA)'s State Energy Data System (SEDS) (EIA, 2009a). The SEDS reports total energy consumption estimates by sector, State, fuel type, and year. To facilitate use with the criteria pollutant and GHG emission factors, Pechan will compile the SEDS energy consumption data in both sets of units provided by the SEDS: physical units and British thermal units (Btus).

2. Non-Fuel Energy Consumption

Some Industrial sector energy is consumed for non-fuel purposes. For example, natural gas is used as a feedstock in chemical manufacturing plants and to make nitrogenous fertilizer, and LPG is used to create intermediate products that are made into plastics. To estimate the volume of fuel that is associated with ICI combustion, it is necessary to subtract the volume of fuel consumption for non-energy uses from the volume of total fuel consumption. The EPA's State Inventory Tool (SIT) provides national defaults representing the percentage of total Industrial fuel consumption from non-energy uses.[1] These default values have an additional limitation beyond their lack of geographic detail - they represent the EIA's definition of the Industrial sector, which includes fuel use that is accounted for in other inventory source categories. In particular, the EIA Industrial sector includes fuel consumption from Farm, Mining, Construction, and Commercial sectors that is accounted for in the nonroad inventory. Because of these limitations, Pechan plans to use regional non-fuel use percentages computed from energy consumption data from the EIA's *2002 Manufacturing Energy Consumption Survey* (MECS) for all fuel types except coal (EIA, 2007). There are two reasons why MECS provides a more representative data set for use in this study: (1) MECS provides data specific to the regions of interest; and (2) MECS focuses solely on the Manufacturing sector. The latter characteristic is particularly important for fuel types which consume significant amounts of non-Manufacturing sector energy that is already included elsewhere (e.g., distillate fuel used by the Construction sector, which is included in the nonroad inventory). The MECS non-fuel consumption data treat

[1] Although the SIT also develops CO_2 emission estimates associated with non-fuel energy use, such estimates are not developed here because they are not associated with industrial fuel combustion.

coal that is used to produce coke as a feedstock. However, available data indicate that none of the CENRAP States produce coke (Pechan, 2006). In addition, the 2002 MECS data treat "synthetic coal" that is ultimately combusted as regular coal, as a non-fuel (feedstock) use. Because of these data limitations, Pechan contacted EIA for assistance in obtaining a reasonable estimate of the percentage of non-coking coal that is used for non-fuel purposes (treating "synthetic coal" as a fuel use). Based on the EIA's estimate that 5-10 percent of 2002 non-coke coal was used for non-fuel purposes, Pechan plans to assume that 7 percent of CENRAP Industrial sector coal consumption is for non-fuel purposes (Lorenz, 2009).

Table 2 presents the available non-fuel use percentages by type of energy. It was not possible to develop percentages by region for each fuel type because some regional MECS data are withheld. For this study, Pechan plans to use the most geographic-specific data reported in Table 2. States are encouraged to provide available State-specific estimates to replace the defaults below.

Table 2. Industrial Sector Energy Consumption from Non-Fuel Uses

Energy Type	2002 MECS % Energy Consumption from Non-Fuel Use			
	Midwest	South	Midwest+South	National
Residual	not available	not available	25%	17%
Distillate	not available	not available	9%	7%
Natural Gas	6%	15%	12%	10%
LPG/NGL	88%	98%	97%	97%
Coal	not available	not available	not available	7%

Sources: EIA, 2007 and Lorenz, 2009.
Midwest region includes Iowa, Kansas, Minnesota, Missouri, and Nebraska.
South region includes Arkansas, Louisiana, Oklahoma, and Texas.

3. Nonroad Source Energy Consumption

To avoid double-counting with the nonroad inventory, it is necessary to subtract 2002 year diesel and LPG consumption estimates for Industrial, Farm, Logging, Mining, and Construction sector nonroad equipment. For the Commercial sector SEDS data, it is necessary to subtract 2002 year diesel and LPG consumption for Commercial sector nonroad equipment. Pechan plans to run the NONROAD model for 2002 for the CENRAP States to obtain State-level diesel and LPG consumption estimates to perform these subtractions. Table 3 identifies the SCCs for which Pechan will compile NONROAD fuel consumption estimates.

Table 3. Nonroad Sector Subtraction SCCs

SCC	Description_2	Description_3	Description_4
Industrial Sector-Distillate			
2270000000	Off-highway Vehicle Diesel	Compression Ignition Equipment except Rail and Marine	Total
2270001000	Off-highway Vehicle Diesel	Recreational Equipment	Total
2270001010	Off-highway Vehicle Diesel	Recreational Equipment	Motorcycles: Off-road
2270001020	Off-highway Vehicle Diesel	Recreational Equipment	Snowmobiles
2270001030	Off-highway Vehicle Diesel	Recreational Equipment	All Terrain Vehicles
2270001040	Off-highway Vehicle Diesel	Recreational Equipment	Minibikes
2270001050	Off-highway Vehicle Diesel	Recreational Equipment	Golf Carts
2270001060	Off-highway Vehicle Diesel	Recreational Equipment	Specialty Vehicles/Carts
2270002000	Off-highway Vehicle Diesel	Construction and Mining Equipment	Total
2270002003	Off-highway Vehicle Diesel	Construction and Mining Equipment	Pavers
2270002006	Off-highway Vehicle Diesel	Construction and Mining Equipment	Tampers/Rammers
2270002009	Off-highway Vehicle Diesel	Construction and Mining Equipment	Plate Compactors
2270002012	Off-highway Vehicle Diesel	Construction and Mining Equipment	Concrete Pavers
2270002015	Off-highway Vehicle Diesel	Construction and Mining Equipment	Rollers
2270002018	Off-highway Vehicle Diesel	Construction and Mining Equipment	Scrapers
2270002021	Off-highway Vehicle Diesel	Construction and Mining Equipment	Paving Equipment
2270002024	Off-highway Vehicle Diesel	Construction and Mining Equipment	Surfacing Equipment
2270002027	Off-highway Vehicle Diesel	Construction and Mining Equipment	Signal Boards/Light Plants
2270002030	Off-highway Vehicle Diesel	Construction and Mining Equipment	Trenchers
2270002033	Off-highway Vehicle Diesel	Construction and Mining Equipment	Bore/Drill Rigs
2270002036	Off-highway Vehicle Diesel	Construction and Mining Equipment	Excavators
2270002039	Off-highway Vehicle Diesel	Construction and Mining Equipment	Concrete/Industrial Saws
2270002042	Off-highway Vehicle Diesel	Construction and Mining Equipment	Cement and Mortar Mixers
2270002045	Off-highway Vehicle Diesel	Construction and Mining Equipment	Cranes
2270002048	Off-highway Vehicle Diesel	Construction and Mining Equipment	Graders

SCC	Description_2	Description_3	Description_4
2270002051	Off-highway Vehicle Diesel	Construction and Mining Equipment	Off-Highway Trucks
2270002054	Off-highway Vehicle Diesel	Construction and Mining Equipment	Crushing/Processing Equipment
2270002057	Off-highway Vehicle Diesel	Construction and Mining Equipment	Rough Terrain Forklifts
2270002060	Off-highway Vehicle Diesel	Construction and Mining Equipment	Rubber Tired Loaders
2270002063	Off-highway Vehicle Diesel	Construction and Mining Equipment	Rubber Tire Tractor/Dozers
2270002066	Off-highway Vehicle Diesel	Construction and Mining Equipment	Tractors/Loaders/Backhoes
2270002069	Off-highway Vehicle Diesel	Construction and Mining Equipment	Crawler Tractor/Dozers
2270002072	Off-highway Vehicle Diesel	Construction and Mining Equipment	Skid Steer Loaders
2270002075	Off-highway Vehicle Diesel	Construction and Mining Equipment	Off-Highway Tractors
2270002078	Off-highway Vehicle Diesel	Construction and Mining Equipment	Dumpers/Tenders
2270002081	Off-highway Vehicle Diesel	Construction and Mining Equipment	Other Construction Equipment
2270003000	Off-highway Vehicle Diesel	Industrial Equipment	Total
2270003010	Off-highway Vehicle Diesel	Industrial Equipment	Aerial Lifts
2270003020	Off-highway Vehicle Diesel	Industrial Equipment	Forklifts
2270003030	Off-highway Vehicle Diesel	Industrial Equipment	Sweepers/Scrubbers
2270003040	Off-highway Vehicle Diesel	Industrial Equipment	Other General Industrial Equipment
2270003050	Off-highway Vehicle Diesel	Industrial Equipment	Other Material Handling Equipment
2270003060	Off-highway Vehicle Diesel	Industrial Equipment	AC/Refrigeration
2270003070	Off-highway Vehicle Diesel	Industrial Equipment	Terminal Tractors
2270005000	Off-highway Vehicle Diesel	Agricultural Equipment	Total
2270005010	Off-highway Vehicle Diesel	Agricultural Equipment	2-Wheel Tractors
2270005015	Off-highway Vehicle Diesel	Agricultural Equipment	Agricultural Tractors
2270005020	Off-highway Vehicle Diesel	Agricultural Equipment	Combines
2270005025	Off-highway Vehicle Diesel	Agricultural Equipment	Balers
2270005030	Off-highway Vehicle Diesel	Agricultural Equipment	Agricultural Mowers
2270005035	Off-highway Vehicle Diesel	Agricultural Equipment	Sprayers
2270005040	Off-highway Vehicle Diesel	Agricultural Equipment	Tillers > 6 HP
2270005045	Off-highway Vehicle Diesel	Agricultural Equipment	Swathers
2270005050	Off-highway Vehicle Diesel	Agricultural Equipment	Hydro-power Units

SCC	Description_2	Description_3	Description_4
2270005055	Off-highway Vehicle Diesel	Agricultural Equipment	Other Agricultural Equipment
2270005060	Off-highway Vehicle Diesel	Agricultural Equipment	Irrigation Sets
2270007000	Off-highway Vehicle Diesel	Logging Equipment	Total
2270007005	Off-highway Vehicle Diesel	Logging Equipment	Chain Saws > 6 HP
2270007010	Off-highway Vehicle Diesel	Logging Equipment	Shredders > 6HP
2270007015	Off-highway Vehicle Diesel	Logging Equipment	Forest Eqp – Fellers/Bunch/Skidder
2270007020	Off-highway Vehicle Diesel	Logging Equipment	Fellers/Bunchers ** (see 22-70-007-015)
2270009000	Off-highway Vehicle Diesel	Underground Mining Equipment	All
2270009010	Off-highway Vehicle Diesel	Underground Mining Equipment	Other Underground Mining Equipment
2270010000	Off-highway Vehicle Diesel	Industrial Equipment	All
2270010010	Off-highway Vehicle Diesel	Industrial Equipment	Other Oil Field Equipment
Industrial Sector-LPG			
2267002000	LPG	Construction and Mining Equipment	All
2267002003	LPG	Construction and Mining Equipment	Pavers
2267002006	LPG	Construction and Mining Equipment	Tampers/Rammers
2267002009	LPG	Construction and Mining Equipment	Plate Compactors
2267002015	LPG	Construction and Mining Equipment	Rollers
2267002018	LPG	Construction and Mining Equipment	Scrapers
2267002021	LPG	Construction and Mining Equipment	Paving Equipment
2267002024	LPG	Construction and Mining Equipment	Surfacing Equipment
2267002027	LPG	Construction and Mining Equipment	Signal Boards/Light Plants
2267002030	LPG	Construction and Mining Equipment	Trenchers
2267002033	LPG	Construction and Mining Equipment	Bore/Drill Rigs
2267002036	LPG	Construction and Mining Equipment	Excavators
2267002039	LPG	Construction and Mining Equipment	Concrete/Industrial Saws
2267002042	LPG	Construction and Mining Equipment	Cement and Mortar Mixers
2267002045	LPG	Construction and Mining Equipment	Cranes
2267002048	LPG	Construction and Mining Equipment	Graders
2267002051	LPG	Construction and Mining Equipment	Off-highway Trucks

SCC	Description_2	Description_3	Description_4
2267002054	LPG	Construction and Mining Equipment	Crushing/Processing Equipment
2267002057	LPG	Construction and Mining Equipment	Rough Terrain Forklifts
2267002060	LPG	Construction and Mining Equipment	Rubber Tire Loaders
2267002063	LPG	Construction and Mining Equipment	Rubber Tire Tractors/Dozers
2267002066	LPG	Construction and Mining Equipment	Tractors/Loaders/Backhoes
2267002069	LPG	Construction and Mining Equipment	Crawler Tractor/Dozers
2267002072	LPG	Construction and Mining Equipment	Skid Steer Loaders
2267002075	LPG	Construction and Mining Equipment	Off-Highway Tractors
2267002078	LPG	Construction and Mining Equipment	Dumpers/Tenders
2267002081	LPG	Construction and Mining Equipment	Other Construction Equipment
2267003000	LPG	Industrial Equipment	All
2267003010	LPG	Industrial Equipment	Aerial Lifts
2267003020	LPG	Industrial Equipment	Forklifts
2267003030	LPG	Industrial Equipment	Sweepers/Scrubbers
2267003040	LPG	Industrial Equipment	Other General Industrial Equipment
2267003050	LPG	Industrial Equipment	Other Material Handling Equipment
2267003060	LPG	Industrial Equipment	AC\Refrigeration
2267003070	LPG	Industrial Equipment	Terminal Tractors
2267005000	LPG	Agricultural Equipment	All
2267005010	LPG	Agricultural Equipment	2-Wheel Tractors
2267005015	LPG	Agricultural Equipment	Agricultural Tractors
2267005020	LPG	Agricultural Equipment	Combines
2267005025	LPG	Agricultural Equipment	Balers
2267005030	LPG	Agricultural Equipment	Agricultural Mowers
2267005035	LPG	Agricultural Equipment	Sprayers
2267005040	LPG	Agricultural Equipment	Tillers >6 HP
2267005045	LPG	Agricultural Equipment	Swathers
2267005050	LPG	Agricultural Equipment	Hydro-power Units
2267005055	LPG	Agricultural Equipment	Other Agricultural Equipment

SCC	Description_2	Description_3	Description_4
2267005060	LPG	Agricultural Equipment	Irrigation Sets
2267007000	LPG	Logging Equipment	All
2267007005	LPG	Logging Equipment	Chain Saws > 6 HP
2267007010	LPG	Logging Equipment	Shredders > 6 HP
2267007015	LPG	Logging Equipment	Forest Eqp – Feller/Bunch/Skidder
2267009000	LPG	Underground Mining Equipment	All
2267009010	LPG	Underground Mining Equipment	Other Underground Mining Equipment
2267010000	LPG	Industrial Equipment	All
2267010010	LPG	Industrial Equipment	Other Oil Field Equipment
Commercial Sector-Distillate			
2270004000	Off-highway Vehicle Diesel	Lawn and Garden Equipment	All
2270004011	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Lawn Mowers (Commercial)
2270004016	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Rotary Tillers < 6HP (Commercial)
2270004021	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Chain Saws < 6 HP (Commercial)
2270004026	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters (Commercial)
2270004031	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Leafblowers/Vacuums (Commercial)
2270004036	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Snowblowers (Commercial)
2270004041	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Rear Engine Riding Mowers (Commercial)
2270004046	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Front Mowers (Commercial)
2270004051	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Shredders < 6 HP (Commercial)
2270004056	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Lawn and Garden Tractors (Commercial)
2270004061	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Wood Splitters (Commercial)
2270004066	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Chippers/Stump Grinders (Commercial)
2270004070	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Commercial Turf Equipment ** (use 22-70-004-71)
2270004071	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Turf Equipment (Commercial)
2270004076	Off-highway Vehicle Diesel	Lawn and Garden Equipment	Other Lawn and Garden Equipment (Commercial)
2270006000	Off-highway Vehicle Diesel	Commercial Equipment	Total
2270006005	Off-highway Vehicle Diesel	Commercial Equipment	Generator Sets
2270006010	Off-highway Vehicle Diesel	Commercial Equipment	Pumps

SCC	Description_2	Description_3	Description_4
2270006015	Off-highway Vehicle Diesel	Commercial Equipment	Air Compressors
2270006020	Off-highway Vehicle Diesel	Commercial Equipment	Gas Compressors
2270006025	Off-highway Vehicle Diesel	Commercial Equipment	Welders
2270006030	Off-highway Vehicle Diesel	Commercial Equipment	Pressure Washers
2270008000	Off-highway Vehicle Diesel	Airport Ground Support Equipment	Total
2270008005	Off-highway Vehicle Diesel	Airport Ground Support Equipment	Airport Ground Support Equipment
2270008010	Off-highway Vehicle Diesel	Airport Ground Support Equipment	Terminal Tractors
Commercial Sector-LPG			
22670004011	LPG	Lawn and Garden Equipment	Lawn Mowers (Commercial)
22670004016	LPG	Lawn and Garden Equipment	Rotary Tillers < 6 HP (Commercial)
22670004021	LPG	Lawn and Garden Equipment	Chain Saws < 6 HP (Commercial)
22670004026	LPG	Lawn and Garden Equipment	Trimmers/Edgers/Brush Cutters (Commercial)
22670004031	LPG	Lawn and Garden Equipment	Leafblowers/Vacuums (Commercial)
22670004036	LPG	Lawn and Garden Equipment	Snowblowers (Commercial)
22670004041	LPG	Lawn and Garden Equipment	Rear Engine Riding Mowers (Commercial)
22670004046	LPG	Lawn and Garden Equipment	Front Mowers (Commercial)
22670004051	LPG	Lawn and Garden Equipment	Shredders < 6 HP (Commercial)
22670004056	LPG	Lawn and Garden Equipment	Lawn and Garden Tractors (Commercial)
22670004061	LPG	Lawn and Garden Equipment	Wood Splitters (Commercial)
22670004066	LPG	Lawn and Garden Equipment	Chippers/Stump Grinders (Commercial)
22670004071	LPG	Lawn and Garden Equipment	Turf Equipment (Commercial)
22670004076	LPG	Lawn and Garden Equipment	Other Lawn and Garden Equipment (Commercial)
22670006000	LPG	Commercial Equipment	All
22670006005	LPG	Commercial Equipment	Generator Sets
22670006010	LPG	Commercial Equipment	Pumps
22670006015	LPG	Commercial Equipment	Air Compressors
22670006020	LPG	Commercial Equipment	Gas Compressors
22670006025	LPG	Commercial Equipment	Welders
22670006030	LPG	Commercial Equipment	Pressure Washers

4. Point Source Energy Consumption

To ensure that energy consumption is not double-counted in the point source inventory, it will also be necessary to subtract point source inventory fuel use from the fuel consumption estimates developed from the aforementioned data sources. To assist in the point source subtractions, Pechan has developed two crosswalks: one between each Industrial fuel combustion area SCC and associated point SCCs (Table 4), and an analogous crosswalk for Commercial/Institutional fuel combustion (Table 5). Pechan requests CENRAP comments on the point SCCs included in these crosswalks.

In addition, a summary analysis was performed on the throughput data reported in the 2002 point source inventory compiled for CENRAP (Pechan/CEP, 2005). The Attachment to this memorandum provides a summary of the 2002 annual point source throughput data associated with the ICI area source categories (reflecting use of the Table 4 and 5 crosswalks). As indicated by this summary, there appear to be numerous potential reporting errors in the CENRAP point source inventory throughput information. These errors include throughput reported using inappropriate units (e.g., reporting natural gas throughput in tons and distillate fuel throughput in million cubic feet), and throughput reported using an inappropriate material code (e.g., reporting a distillate fuel combustion category's throughput as water). There are also records with emissions that report throughput as zero and throughput data reported without any unit identifiers. Pechan requests guidance from CENRAP States as to revisions to the throughput information to ensure the validity of the data that are used in the point source subtractions. For States/source categories with suspect values for which revisions are not available, Pechan will estimate throughput by dividing point source emissions by the carbon monoxide (CO) emission factors listed in the next section. The CO-based approach will also be used for all States that do not report any throughput data for ICI point source fuel combustion categories (i.e., Louisiana and Texas).

To ensure that the methodology results in accurate estimates of point source throughput, Pechan will supply States with the SEDS energy consumption estimates by fuel type and the point source energy consumption by fuel type computed using the throughput or CO emissions-based approach. Pechan will wait for State approval of these estimates before final use in the point source subtraction procedure.

Table 4. Industrial Fuel Combustion Crosswalk for Point Source Subtractions

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
2102001000 & 2102002000 – Industrial; Anthracite Coal; Total: All Boiler Types and Bituminous/Subbituminous Coal; Total: All Boiler Types				
10200101	External Combustion Boilers	Industrial	Anthracite Coal	Pulverized Coal
10200104	External Combustion Boilers	Industrial	Anthracite Coal	Traveling Grate (Overfeed) Stoker
10200107	External Combustion Boilers	Industrial	Anthracite Coal	Hand-fired
10200117	External Combustion Boilers	Industrial	Anthracite Coal	Fluidized Bed Boiler Burning Anthracite-Culm Fuel
39000189	Industrial Processes	In-process Fuel Use	Anthracite Coal	General
39000199	Industrial Processes	In-process Fuel Use	Anthracite Coal	General
10200201	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Pulverized Coal: Wet Bottom
10200202	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Pulverized Coal: Dry Bottom
10200203	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Cyclone Furnace
10200204	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Spreader Stoker
10200205	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Overfeed Stoker
10200206	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Underfeed Stoker
10200210	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Overfeed Stoker **
10200212	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Pulverized Coal: Dry Bottom (Tangential)
10200213	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Wet Slurry
10200217	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Atmospheric Fluidized Bed Combustion: Bubbling Bed (Bituminous Coal)
10200218	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Atmospheric Fluidized Bed Combustion: Circulating Bed (Bitum. Coal)
10200219	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Cogeneration (Bituminous Coal)
10200221	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Pulverized Coal: Wet Bottom (Subbituminous Coal)
10200222	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Pulverized Coal: Dry Bottom (Subbituminous Coal)
10200223	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Cyclone Furnace (Subbituminous Coal)
10200224	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Spreader Stoker (Subbituminous Coal)
10200225	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Traveling Grate (Overfeed) Stoker (Subbituminous Coal)
10200226	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Pulverized Coal: Dry Bottom Tangential (Subbituminous Coal)
10200229	External Combustion Boilers	Industrial	Bituminous/Subbituminous Coal	Cogeneration (Subbituminous Coal)
10500102	External Combustion Boilers	Space Heaters	Industrial	Coal **
39000201	Industrial Processes	In-process Fuel Use	Bituminous Coal	Cement Kiln/Dryer (Bituminous Coal)
39000203	Industrial Processes	In-process Fuel Use	Bituminous Coal	Lime Kiln (Bituminous)
39000288	Industrial Processes	In-process Fuel Use	Bituminous Coal	General (Subbituminous)
39000289	Industrial Processes	In-process Fuel Use	Bituminous Coal	General (Bituminous)
39000299	Industrial Processes	In-process Fuel Use	Bituminous Coal	General (Bituminous)
50390002	Waste Disposal	Solid Waste Disposal - Industrial	Auxiliary Fuel/No Emissions	Coal

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
2102004000 – Industrial; Distillate Oil; Total: Boilers and IC Engines				
10200501	External Combustion Boilers	Industrial	Distillate Oil	Grades 1 and 2 Oil
10200502	External Combustion Boilers	Industrial	Distillate Oil	10-100 Million Btu/hr **
10200503	External Combustion Boilers	Industrial	Distillate Oil	< 10 Million Btu/hr **
10200504	External Combustion Boilers	Industrial	Distillate Oil	Grade 4 Oil
10200505	External Combustion Boilers	Industrial	Distillate Oil	Cogeneration
10201403	External Combustion Boilers	Industrial	CO Boiler	Distillate Oil
10500105	External Combustion Boilers	Space Heaters	Industrial	Distillate Oil
20200101	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine
20200102	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating
20200103	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine: Cogeneration
20200104	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating: Cogeneration
20200105	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating: Crankcase Blowby
20200106	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20200107	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Reciprocating: Exhaust
20200108	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)
20200109	Internal Combustion Engines	Industrial	Distillate Oil (Diesel)	Turbine: Exhaust
20200401	Internal Combustion Engines	Industrial	Large Bore Engine	Diesel
20200405	Internal Combustion Engines	Industrial	Large Bore Engine	Crankcase Blowby
20200406	Internal Combustion Engines	Industrial	Large Bore Engine	Evaporative Losses (Fuel Storage and Delivery System)
20200407	Internal Combustion Engines	Industrial	Large Bore Engine	Exhaust
27000320	Internal Combustion Engines	Off-highway Diesel Engines	Industrial Equipment	Industrial Fork Lift: Diesel
30190001	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30190011	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30190021	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30290001	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30390001	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30390011	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30390021	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30400406	Industrial Processes	Secondary Metal Production	Lead	Pot Furnace Heater: Distillate Oil
30490001	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30490011	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30490021	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30490031	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Distillate Oil (No. 2): Furnaces
30500208	Industrial Processes	Mineral Products	Asphalt Concrete	Asphalt Heater: Distillate Oil
30505022	Industrial Processes	Mineral Products	Asphalt Processing (Blowing)	Asphalt Heater: Distillate Oil
30590001	Industrial Processes	Mineral Products	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30590011	Industrial Processes	Mineral Products	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30590021	Industrial Processes	Mineral Products	Fuel Fired Equipment	Distillate Oil (No. 2): Flares

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
30600901	Industrial Processes	Petroleum Industry	Flares	Distillate Oil
30609901	Industrial Processes	Petroleum Industry	Incinerators	Distillate Oil (No. 2)
30790001	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30790011	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30790021	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30890001	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30890011	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
30890021	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
30990001	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Distillate Oil (No. 2): Process Heaters
30990011	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
31000401	Industrial Processes	Oil and Gas Production	Process Heaters	Distillate Oil (No. 2)
31000411	Industrial Processes	Oil and Gas Production	Process Heaters	Distillate Oil (No. 2): Steam Generators
31390001	Industrial Processes	Electrical Equipment	Process Heaters	Distillate Oil (No. 2)
39000501	Industrial Processes	In-process Fuel Use	Distillate Oil	Asphalt Dryer **
39000502	Industrial Processes	In-process Fuel Use	Distillate Oil	Cement Kiln/Dryer
39000503	Industrial Processes	In-process Fuel Use	Distillate Oil	Lime Kiln
39000589	Industrial Processes	In-process Fuel Use	Distillate Oil	General
39000598	Industrial Processes	In-process Fuel Use	Distillate Oil	Grade 4 Oil: General
39000599	Industrial Processes	In-process Fuel Use	Distillate Oil	General
39900501	Industrial Processes	Miscellaneous Manufacturing Industries	Process Heater/Furnace	Distillate Oil
39990001	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Distillate Oil (No. 2): Process Heaters
39990011	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Distillate Oil (No. 2): Incinerators
39990021	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Distillate Oil (No. 2 Oil): Flares
40201002	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Distillate Oil
40290011	Petroleum and Solvent Evaporation	Surface Coating Operations	Fuel Fired Equipment	Distillate Oil: Incinerator/Afterburner
49090011	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Distillate Oil (No. 2): Incinerators
49090021	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Distillate Oil (No. 2): Flares
50390005	Waste Disposal	Solid Waste Disposal - Industrial	Auxiliary Fuel/No Emissions	Distillate Oil
2102005000 – Industrial; Residual Oil; Total: All Boiler Types				
10200401	External Combustion Boilers	Industrial	Residual Oil	Grade 6 Oil

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
10200402	External Combustion Boilers	Industrial	Residual Oil	10-100 Million Btu/hr **
10200403	External Combustion Boilers	Industrial	Residual Oil	< 10 Million Btu/hr **
10200404	External Combustion Boilers	Industrial	Residual Oil	Grade 5 Oil
10200405	External Combustion Boilers	Industrial	Residual Oil	Cogeneration
10201404	External Combustion Boilers	Industrial	CO Boiler	Residual Oil
20200501	Internal Combustion Engines	Industrial	Residual/Crude Oil	Reciprocating
20200505	Internal Combustion Engines	Industrial	Residual/Crude Oil	Reciprocating: Crankcase Blowby
20200506	Internal Combustion Engines	Industrial	Residual/Crude Oil	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20200507	Internal Combustion Engines	Industrial	Residual/Crude Oil	Reciprocating: Exhaust
30190002	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Residual Oil: Process Heaters
30190012	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Residual Oil: Incinerators
30190022	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Residual Oil: Flares
30290002	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Residual Oil: Process Heaters
30390002	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Residual Oil: Process Heaters
30390012	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Residual Oil: Incinerators
30390022	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Residual Oil: Flares
30490002	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Residual Oil: Process Heaters
30490012	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Residual Oil: Incinerators
30490022	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Residual Oil: Flares
30490032	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Residual Oil: Furnaces
30500207	Industrial Processes	Mineral Products	Asphalt Concrete	Asphalt Heater: Residual Oil
30505021	Industrial Processes	Mineral Products	Asphalt Processing (Blowing)	Asphalt Heater: Residual Oil
30590002	Industrial Processes	Mineral Products	Fuel Fired Equipment	Residual Oil: Process Heaters
30590012	Industrial Processes	Mineral Products	Fuel Fired Equipment	Residual Oil: Incinerators
30600111	Industrial Processes	Petroleum Industry	Process Heaters	Oil-fired (No. 6 Oil) > 100 Million Btu Capacity
30600902	Industrial Processes	Petroleum Industry	Flares	Residual Oil
30609902	Industrial Processes	Petroleum Industry	Incinerators	Residual Oil
30790002	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Residual Oil: Process Heaters
30790012	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Residual Oil: Incinerators
30790022	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Residual Oil: Flares
30890002	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Residual Oil: Process Heaters
30890012	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Residual Oil: Incinerators
30890022	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Residual Oil: Flares
30990002	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Residual Oil: Process Heaters
30990012	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Residual Oil: Incinerators
31000402	Industrial Processes	Oil and Gas Production	Process Heaters	Residual Oil

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
31000412	Industrial Processes	Oil and Gas Production	Process Heaters	Residual Oil: Steam Generators
31390002	Industrial Processes	Electrical Equipment	Process Heaters	Residual Oil
39000402	Industrial Processes	In-process Fuel Use	Residual Oil	Cement Kiln/Dryer
39000403	Industrial Processes	In-process Fuel Use	Residual Oil	Lime Kiln
39000489	Industrial Processes	In-process Fuel Use	Residual Oil	General
39000499	Industrial Processes	In-process Fuel Use	Residual Oil	General
39990002	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Residual Oil: Process Heaters
39990012	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Residual Oil: Incinerators
39990022	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Residual Oil: Flares
40201003	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Residual Oil
40290012	Petroleum and Solvent Evaporation	Surface Coating Operations	Fuel Fired Equipment	Residual Oil: Incinerator/Afterburner
49090012	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Residual Oil: Incinerators
49090022	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Residual Oil: Flares
2102006000 – Industrial; Natural Gas; Total: Boilers and IC Engines				
10200601	External Combustion Boilers	Industrial	Natural Gas	> 100 Million Btu/hr
10200602	External Combustion Boilers	Industrial	Natural Gas	10-100 Million Btu/hr
10200603	External Combustion Boilers	Industrial	Natural Gas	< 10 Million Btu/hr
10200604	External Combustion Boilers	Industrial	Natural Gas	Cogeneration
10201401	External Combustion Boilers	Industrial	CO Boiler	Natural Gas
10500106	External Combustion Boilers	Space Heaters	Industrial	Natural Gas
20200201	Internal Combustion Engines	Industrial	Natural Gas	Turbine
20200202	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating
20200203	Internal Combustion Engines	Industrial	Natural Gas	Turbine: Cogeneration
20200204	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating: Cogeneration
20200205	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating: Crankcase Blowby
20200206	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating: Evaporative Losses (Fuel Delivery System)
20200207	Internal Combustion Engines	Industrial	Natural Gas	Reciprocating: Exhaust
20200208	Internal Combustion Engines	Industrial	Natural Gas	Turbine: Evaporative Losses (Fuel Delivery System)
20200209	Internal Combustion Engines	Industrial	Natural Gas	Turbine: Exhaust
20200252	Internal Combustion Engines	Industrial	Natural Gas	2-cycle Lean Burn
20200253	Internal Combustion Engines	Industrial	Natural Gas	4-cycle Rich Burn
20200254	Internal Combustion Engines	Industrial	Natural Gas	4-cycle Lean Burn
20200255	Internal Combustion Engines	Industrial	Natural Gas	2-cycle Clean Burn
20200256	Internal Combustion Engines	Industrial	Natural Gas	4-cycle Clean Burn
30190003	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Natural Gas: Process Heaters

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
30190013	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Natural Gas: Incinerators
30190023	Industrial Processes	Chemical Manufacturing	Fuel Fired Equipment	Natural Gas: Flares
30290003	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Natural Gas: Process Heaters
30291001	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Broiling Food: Natural Gas
30390003	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Natural Gas: Process Heaters
30390013	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Natural Gas: Incinerators
30390023	Industrial Processes	Primary Metal Production	Fuel Fired Equipment	Natural Gas: Flares
30400407	Industrial Processes	Secondary Metal Production	Lead	Pot Furnace Heater: Natural Gas
30490003	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Natural Gas: Process Heaters
30490013	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Natural Gas: Incinerators
30490023	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Natural Gas: Flares
30490033	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Natural Gas: Furnaces
30500206	Industrial Processes	Mineral Products	Asphalt Concrete	Asphalt Heater: Natural Gas
30505020	Industrial Processes	Mineral Products	Asphalt Processing (Blowing)	Asphalt Heater: Natural Gas
30590003	Industrial Processes	Mineral Products	Fuel Fired Equipment	Natural Gas: Process Heaters
30590013	Industrial Processes	Mineral Products	Fuel Fired Equipment	Natural Gas: Incinerators
30590023	Industrial Processes	Mineral Products	Fuel Fired Equipment	Natural Gas: Flares
30790003	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Natural Gas: Process Heaters
30790013	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Natural Gas: Incinerators
30790023	Industrial Processes	Pulp and Paper and Wood Products	Fuel Fired Equipment	Natural Gas: Flares
30890003	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Natural Gas: Process Heaters
30890013	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Natural Gas: Incinerators
30890023	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Natural Gas: Flares
30990003	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Natural Gas: Process Heaters
30990013	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Natural Gas: Incinerators
30990023	Industrial Processes	Fabricated Metal Products	Fuel Fired Equipment	Natural Gas: Flares
31000404	Industrial Processes	Oil and Gas Production	Process Heaters	Natural Gas
31000414	Industrial Processes	Oil and Gas Production	Process Heaters	Natural Gas: Steam Generators
31390003	Industrial Processes	Electrical Equipment	Process Heaters	Natural Gas
39000602	Industrial Processes	In-process Fuel Use	Natural Gas	Cement Kiln/Dryer
39000603	Industrial Processes	In-process Fuel Use	Natural Gas	Lime Kiln
39000605	Industrial Processes	In-process Fuel Use	Natural Gas	Metal Melting **
39000689	Industrial Processes	In-process Fuel Use	Natural Gas	General
39000699	Industrial Processes	In-process Fuel Use	Natural Gas	General
39900601	Industrial Processes	Miscellaneous Manufacturing Industries	Process Heater/Furnace	Natural Gas
39990003	Industrial Processes	Miscellaneous Manufacturing	Miscellaneous Manufacturing	Natural Gas: Process Heaters

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
		Industries	Industries	
39990013	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Natural Gas: Incinerators
39990023	Industrial Processes	Miscellaneous Manufacturing Industries	Miscellaneous Manufacturing Industries	Natural Gas: Flares
40201001	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Natural Gas
40290013	Petroleum and Solvent Evaporation	Surface Coating Operations	Fuel Fired Equipment	Natural Gas: Incinerator/Afterburner
40290023	Petroleum and Solvent Evaporation	Surface Coating Operations	Fuel Fired Equipment	Natural Gas: Flares
49090013	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Natural Gas: Incinerators
49090023	Petroleum and Solvent Evaporation	Organic Solvent Evaporation	Fuel Fired Equipment	Natural Gas: Flares
50390006	Waste Disposal	Solid Waste Disposal - Industrial	Auxiliary Fuel/No Emissions	Natural Gas
2102007000 – Industrial; Liquified Petroleum Gas (LPG); Total: All Boiler Types				
10201001	External Combustion Boilers	Industrial	Liquified Petroleum Gas (LPG)	Butane
10201002	External Combustion Boilers	Industrial	Liquified Petroleum Gas (LPG)	Propane
10201003	External Combustion Boilers	Industrial	Liquified Petroleum Gas (LPG)	Butane/Propane Mixture: Specify Percent Butane in Comments
10500110	External Combustion Boilers	Space Heaters	Industrial	Liquified Petroleum Gas (LPG)
20201001	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Propane: Reciprocating
20201002	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Butane: Reciprocating
20201005	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating: Crankcase Blowby
20201006	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20201007	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating: Exhaust
20201008	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)
20201009	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Turbine: Exhaust
20201011	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Turbine
20201012	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating Engine
20201013	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Turbine: Cogeneration
20201014	Internal Combustion Engines	Industrial	Liquified Petroleum Gas (LPG)	Reciprocating Engine: Cogeneration
27300320	Internal Combustion Engines	Off-highway LPG-fueled Engines	Industrial Equipment	Industrial Fork Lift: Liquified Petroleum Gas (LPG)
30290005	Industrial Processes	Food and Agriculture	Fuel Fired Equipment	Liquified Petroleum Gas (LPG): Process Heaters
30490035	Industrial Processes	Secondary Metal Production	Fuel Fired Equipment	Propane: Furnaces
30500209	Industrial Processes	Mineral Products	Asphalt Concrete	Asphalt Heater: LPG
30505023	Industrial Processes	Mineral Products	Asphalt Processing (Blowing)	Asphalt Heater: LP Gas
30590005	Industrial Processes	Mineral Products	Fuel Fired Equipment	Liquified Petroleum Gas (LPG): Process Heaters
30600107	Industrial Processes	Petroleum Industry	Process Heaters	LPG-fired
30600905	Industrial Processes	Petroleum Industry	Flares	Liquified Petroleum Gas

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
30609905	Industrial Processes	Petroleum Industry	Incinerators	Liquified Petroleum Gas
30890004	Industrial Processes	Rubber and Miscellaneous Plastics Products	Fuel Fired Equipment	Liquified Petroleum Gas (LPG): Process Heaters
31000406	Industrial Processes	Oil and Gas Production	Process Heaters	Propane/Butane
39001089	Industrial Processes	In-process Fuel Use	Liquified Petroleum Gas	General
39001099	Industrial Processes	In-process Fuel Use	Liquified Petroleum Gas	General
39901001	Industrial Processes	Miscellaneous Manufacturing Industries	Process Heater/Furnace	LPG
40201004	Petroleum and Solvent Evaporation	Surface Coating Operations	Coating Oven Heater	Liquified Petroleum Gas (LPG)
50390010	Waste Disposal	Solid Waste Disposal - Industrial	Auxiliary Fuel/No Emissions	Liquified Petroleum Gas (LPG)
2102008000 – Industrial; Wood; Total: All Boiler Types				
10200902	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood/Bark-fired Boiler
10200903	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood-fired Boiler - Wet Wood (>=20% moisture)
10200905	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood/Bark-fired Boiler (< 50,000 Lb Steam) **
10200906	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood-fired Boiler (< 50,000 Lb Steam) **
10200907	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood Cogeneration
10200908	External Combustion Boilers	Industrial	Wood/Bark Waste	Wood-fired Boiler - Dry Wood (<20% moisture)
10200910	External Combustion Boilers	Industrial	Wood/Bark Waste	Fuel cell/Dutch oven boilers **
10200911	External Combustion Boilers	Industrial	Wood/Bark Waste	Stoker boilers **
10200912	External Combustion Boilers	Industrial	Wood/Bark Waste	Fluidized bed combustion boiler
39000989	Industrial Processes	In-process Fuel Use	Wood	General
39000999	Industrial Processes	In-process Fuel Use	Wood	General: Wood
2102011000 – Industrial; Kerosene; Total: All Boiler Types				
20200901	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Turbine
20200902	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Reciprocating
20200905	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Reciprocating: Crankcase Blowby
20200906	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20200907	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Reciprocating: Exhaust
20200908	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)
20200909	Internal Combustion Engines	Industrial	Kerosene/Naphtha (Jet Fuel)	Turbine: Exhaust

Table 5. Commercial/Institutional Fuel Combustion Crosswalk for Point Source Subtractions

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
2103001000 & 2103002000 -- Commercial/Institutional; Anthracite Coal; Total: All Boiler Types and Bituminous/Subbituminous Coal; Total: All Boiler Types				
10300101	External Combustion Boilers	Commercial/Institutional	Anthracite Coal	Pulverized Coal
10300102	External Combustion Boilers	Commercial/Institutional	Anthracite Coal	Traveling Grate (Overfeed) Stoker
10300103	External Combustion Boilers	Commercial/Institutional	Anthracite Coal	Hand-fired
10300203	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Cyclone Furnace (Bituminous Coal)
10300205	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Pulverized Coal: Wet Bottom (Bituminous Coal)
10300206	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Pulverized Coal: Dry Bottom (Bituminous Coal)
10300207	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Overfeed Stoker (Bituminous Coal)
10300208	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Underfeed Stoker (Bituminous Coal)
10300209	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Spreader Stoker (Bituminous Coal)
10300211	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Overfeed Stoker **
10300214	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Hand-fired (Bituminous Coal)
10300216	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Pulverized Coal: Dry Bottom (Tangential) (Bituminous Coal)
10300217	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Atmospheric Fluidized Bed Combustion: Bubbling Bed (Bituminous Coal)
10300218	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Atmospheric Fluidized Bed Combustion: Circulating Bed (Bitum. Coal)
10300221	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Pulverized Coal: Wet Bottom (Subbituminous Coal)
10300222	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Pulverized Coal: Dry Bottom (Subbituminous Coal)
10300223	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Cyclone Furnace (Subbituminous Coal)
10300224	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Spreader Stoker (Subbituminous Coal)
10300225	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Traveling Grate (Overfeed) Stoker (Subbituminous Coal)
10300226	External Combustion Boilers	Commercial/Institutional	Bituminous/Subbituminous Coal	Pulverized Coal: Dry Bottom Tangential (Subbituminous Coal)
10500202	External Combustion Boilers	Space Heaters	Commercial/Institutional	Coal **
50190002	Waste Disposal	Solid Waste Disposal - Government	Auxiliary Fuel/No Emissions	Coal
50290002	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxiliary Fuel/No Emissions	Coal
2103004000 -- Commercial/Institutional; Distillate Oil; Total: Boilers and IC Engines				
10300501	External Combustion Boilers	Commercial/Institutional	Distillate Oil	Grades 1 and 2 Oil
10300502	External Combustion Boilers	Commercial/Institutional	Distillate Oil	10-100 Million Btu/hr **
10300503	External Combustion Boilers	Commercial/Institutional	Distillate Oil	< 10 Million Btu/hr **
10300504	External Combustion Boilers	Commercial/Institutional	Distillate Oil	Grade 4 Oil
10500205	External Combustion Boilers	Space Heaters	Commercial/Institutional	Distillate Oil
20300101	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating
20300102	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Turbine

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
20300105	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating: Crankcase Blowby
20300106	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20300107	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Reciprocating: Exhaust
20300108	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)
20300109	Internal Combustion Engines	Commercial/Institutional	Distillate Oil (Diesel)	Turbine: Exhaust
50190005	Waste Disposal	Solid Waste Disposal - Government	Auxiliary Fuel/No Emissions	Distillate Oil
50290005	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxiliary Fuel/No Emissions	Distillate Oil
2103005000 -- Commercial/Institutional; Residual Oil; Total: All Boiler Types				
10300401	External Combustion Boilers	Commercial/Institutional	Residual Oil	Grade 6 Oil
10300402	External Combustion Boilers	Commercial/Institutional	Residual Oil	10-100 Million Btu/hr **
10300403	External Combustion Boilers	Commercial/Institutional	Residual Oil	< 10 Million Btu/hr **
10300404	External Combustion Boilers	Commercial/Institutional	Residual Oil	Grade 5 Oil
2103006000 -- Commercial/Institutional; Natural Gas; Total: Boilers and IC Engines				
10300601	External Combustion Boilers	Commercial/Institutional	Natural Gas	> 100 Million Btu/hr
10300602	External Combustion Boilers	Commercial/Institutional	Natural Gas	10-100 Million Btu/hr
10300603	External Combustion Boilers	Commercial/Institutional	Natural Gas	< 10 Million Btu/hr
10500206	External Combustion Boilers	Space Heaters	Commercial/Institutional	Natural Gas
20300201	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Reciprocating
20300202	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Turbine
20300203	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Turbine: Cogeneration
20300204	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Cogeneration
20300205	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Reciprocating: Crankcase Blowby
20300206	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Reciprocating: Evaporative Losses (Fuel Delivery System)
20300207	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Reciprocating: Exhaust
20300208	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Turbine: Evaporative Losses (Fuel Delivery System)
20300209	Internal Combustion Engines	Commercial/Institutional	Natural Gas	Turbine: Exhaust
50190006	Waste Disposal	Solid Waste Disposal - Government	Auxiliary Fuel/No Emissions	Natural Gas
50290006	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxiliary Fuel/No Emissions	Natural Gas
2103007000 -- Commercial/Institutional; Liquid Petroleum Gas; Total: All Combustor Types				
10301001	External Combustion Boilers	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Butane
10301002	External Combustion Boilers	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Propane
10301003	External Combustion Boilers	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Butane/Propane Mixture: Specify Percent Butane in Comments
10500210	External Combustion Boilers	Space Heaters	Commercial/Institutional	Liquified Petroleum Gas (LPG)
20301001	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Propane: Reciprocating
20301002	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Butane: Reciprocating

Point SCC	SCC1 DESC	SCC3 DESC	SCC6 DESC	SCC8 DESC
20301005	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Reciprocating: Crankcase Blowby
20301006	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Reciprocating: Evaporative Losses (Fuel Storage and Delivery System)
20301007	Internal Combustion Engines	Commercial/Institutional	Liquified Petroleum Gas (LPG)	Reciprocating: Exhaust
50190010	Waste Disposal	Solid Waste Disposal - Government	Auxiliary Fuel/No Emissions	Liquified Petroleum Gas (LPG)
50290010	Waste Disposal	Solid Waste Disposal - Commercial/Institutional	Auxiliary Fuel/No Emissions	Liquified Petroleum Gas (LPG)
2103008000 -- Commercial/Institutional; Wood; Total: All Boiler Types				
10300902	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Wood/Bark-fired Boiler
10300903	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Wood-fired Boiler - Wet Wood (>=20% moisture)
10300908	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Wood-fired Boiler - Dry Wood (<20% moisture)
10300910	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Fuel cell/Dutch oven boilers **
10300911	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Stoker boilers **
10300912	External Combustion Boilers	Commercial/Institutional	Wood/Bark Waste	Fluidized bed combustion boilers
10500209	External Combustion Boilers	Space Heaters	Commercial/Institutional	Wood
2103011000 -- Commercial/Institutional; Kerosene; Total: All Combustor Types				
20300901	Internal Combustion Engines	Commercial/Institutional	Kerosene/Naphtha (Jet Fuel)	Turbine: JP-4
20300908	Internal Combustion Engines	Commercial/Institutional	Kerosene/Naphtha (Jet Fuel)	Turbine: Evaporative Losses (Fuel Storage and Delivery System)
20300909	Internal Combustion Engines	Commercial/Institutional	Kerosene/Naphtha (Jet Fuel)	Turbine: Exhaust
50100603	Waste Disposal	Solid Waste Disposal - Government	Fire Fighting	Structure: Kerosene

5. Emission Factors

Table 6 presents the criteria pollutant emission factors that will be applied to fuel consumption estimates to calculate ICI combustion area source emissions. Except as noted below, all criteria air pollutant emission factors were from an EPA database of emission factors that will be used in preparing the 2008 nonpoint source NEI (Huntley, 2009).[2] Wood combustion emission factors were compiled from *AP-42* (EPA, 2003). Because there are no NH_3 emission factors for ICI fuel combustion available in the 2008 NEI emission factor database, *AP-42,* or EPA's WebFIRE, Pechan will use emission factors reported in an NH_3 emissions Emission Inventory Improvement Program (EIIP) guidance document (Pechan, 2004). Pechan compared the 2008 NEI emission factors with those used to develop the last area source NEI (2002), as well as those listed by the Eastern Regional Technical Advisory Committee (ERTAC) for potential use by States in developing their area source inventories (ERTAC, 2009). With a few notable exceptions, the 2008 NEI emission factors are the same as those used for the 2002 NEI.[3] The PM emission factors for natural gas and LPG combustion are the major exceptions. Because the 2002 emission factors were deemed too high because of artifact formation in the test method (method 202) during stack testing, EPA developed a set of SCC-specific adjustment factors to apply to the 2002 NEI to better reflect PM emissions from these fuels.[4] In preparation for the 2008 NEI, EPA developed revised natural gas and LPG PM emission factors by applying these adjustment factors to the 2002 NEI emission factors.

Pechan does not plan to use the ERTAC emission factors that differ from the 2008 NEI factors because of the lack of documentation as to the source of the ERTAC factors. For PM emissions from ICI bituminous coal combustion, ERTAC specifically notes that their proposed emission factors reflect combustion in an uncontrolled overfeed stoker. The EPA PM emission factors for these categories, which were obtained from *AP-42*, reflect coal-fired boilers with controls (specifically, multiple cyclones with or without fly ash reinjection). Because an analysis of an EPA boiler database indicates that most small coal-fired boilers have PM controls (with cyclones as the most common type of control), EPA's PM emission factors will be used in preparing the CENRAP emission inventory (ERG, 2002).

For greenhouse gases (GHGs), Pechan will use the emission factors from EPA's State Greenhouse Gas Inventory Tool, which incorporates the EIIP's GHG emissions inventory guidelines for States (EPA, 2009). Table 7 displays the State-specific CO_2 emission factors for each ICI combustion area source category, and Table 8 presents the N_2O and CH_4 emission factors by source category. Because SIT assumes that CO_2 emissions from U.S. biomass combustion need not be inventoried, the SIT does not provide CO_2 emission factors for ICI wood combustion.[5] Therefore, Pechan will use the wood combustion CO_2 emission factors reported in *AP-42* (EPA, 2003).

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[2] All criteria pollutant emission factors were rounded to two decimal places.

[3] The 2002 NEI documentation provides citations to the *AP-42* source for each emission factor (Pechan, 2006).

[4] These factors reduce PM emissions by more than 90 percent.

[5] As stated in the EIIP fossil fuel combustion CO_2 emissions guidance: "…biomass fuels are generally grown on a sustainable basis. … In cases where biomass fuels are not grown sustainably, GHG emissions are captured as a land use change."

Table 6. Criteria Pollutant Emission Factors for ICI Combustion Area Source Categories

SCC	Description	Emission Factor Units	VOC	NO_x	CO	SO_2	PM2.5-FIL	PM10-FIL	PM-CON	NH_3
2102001000	Industrial Anthracite Coal	lb/ton	0.3	9	0.6	39 * S%	0.48 * A%	1.1 * A%	0.08	0.03
2102002000	Industrial Bitum/Subbitum Coal	lb/ton	0.05	11	5	38 * S%	1.4	12	1.04	0.03
2102004000	Industrial Distillate Oil	lb/1000 gal	0.2	20	5	142 * S%	0.25	1	1.3	0.8
2102005000	Industrial Residual Oil	lb/1000 gal	0.28	55	5	157 * S%	4.67 * (1.12 * S% + 0.37)	7.17 * (1.12 * S% + 0.37)	1.5	0.8
2102006000	Industrial Natural Gas	lb/MMcf	5.5	100	84	0.6	0.11	0.13	0.32	3.2
2102007000	Industrial LPG [1]	lb/1000 bbl	20.09	365.32	306.87	2.19	0.39	0.47	1.18	1.79
2102008000	Industrial Wood [2]	lb/MMBtu	0.017	0.22	0.6	0.025	0.43	0.5	0.017	0.086[3]
2102011000	Industrial Kerosene	lb/1000 gal	0.19	19.29	4.82	142 * S%	0.24	0.96	1.25	0.771
2103001000	Comm/Inst Anthracite Coal	lb/ton	0.3	9	0.6	39 * S%	0.48 * A%	1.1 * A%	0.08	0.03
2103002000	Comm/Inst Bitum/Subbitum Coal	lb/ton	0.05	11	5	38 * S%	1.4	12	1.04	0.03
2103004000	Comm/Inst Distillate Oil	lb/1000 gal	0.34	20	5	142 * S%	0.83	1.08	1.3	0.8
2103005000	Comm/Inst Residual Oil	lb/1000 gal	1.13	55	5	157 * S%	1.92 * (1.12 * S% + 0.37)	5.17 * (1.12 * S% + 0.37)	1.5	0.8
2103006000	Comm/Inst Natural Gas	lb/MMcf	5.5	100	84	0.6	0.11	0.13	0.32	0.49
2103007000	Comm/Inst LPG	lb/1000 bbl	20.09	365.32	306.87	2.19	0.39	0.47	1.18	1.79
2103008000	Comm/Inst Wood [1]	lb/MMBtu	0.017	0.22	0.6	0.025	0.43	0.5	0.017	0.086[3]
2103011000	Comm/Inst Kerosene	lb/1000 gal	0.33	19.29	4.82	142 * S%	0.8	1.04	1.25	0.771

Source: Unless otherwise noted, 2008 nonpoint source NEI (Huntley, 2009).

Notes: [1] Emission factors from Commercial/Institutional LPG.
[2] Emission factors from *AP-42*, Section 1.6 (Wood Residue Combustion in Boilers).
[3] Emission factor from Pechan, 2004; reported in lb/tons.
In addition to above, PM2.5-PRI and PM10-PRI will be computed as the sum of condensable PM emissions and PM25-FIL/PM10-FIL emissions.
lb = ton
gal = gallon
MMcf = million cubic feet
MMBtu = million British thermal units
bbl = barrels
S = sulfur content
A = ash content

Table 7. Carbon Dioxide Emission Factors for Industrial and Commercial/Institutional Coal Combustion (lb/MMBtu)

State	Industrial CO_2	Commercial/Institutional CO_2
Arkansas	205.70	227.41
Iowa	207.72	204.42
Kansas	203.02	204.89
Louisiana	204.78	227.41
Minnesota	209.70	208.27
Missouri	203.98	204.53
Nebraska	209.66	212.70
Oklahoma	205.99	205.92
Texas	210.39	206.25

Source: EPA State Greenhouse Gas Inventory Tool (EPA, 2009).

Table 8. Additional Greenhouse Gas Emission Factors for ICI Combustion Area Source Categories (lb/MMBtu)

SCC	Description	CO_2	CH_4	N_2O
2102001000	Industrial Anthracite Coal	see above	0.02210	0.00331
2102002000	Industrial Bitum/Subbitum Coal	see above	0.02210	0.00331
2102004000	Industrial Distillate Oil	161.11	0.00663	0.00133
2102005000	Industrial Residual Oil	173.54	0.00663	0.00133
2102006000	Industrial Natural Gas	116.86	0.00209	0.00021
2103007000	Industrial LPG	137.32	0.00663	0.00133
2102008000	Industrial Wood [1]	195	0.06280	0.00837
2102011000	Industrial Kerosene	159.28	0.00663	0.00133
2103001000	Comm/Inst Anthracite Coal	see above	0.02210	0.00331
2103002000	Comm/Inst Bitum/Subbitum Coal	see above	0.02210	0.00331
2103004000	Comm/Inst Distillate Oil	161.11	0.02210	0.00133
2103005000	Comm/Inst Residual Oil	173.54	0.02210	0.00133
2103006000	Comm/Inst Natural Gas	116.86	0.01047	0.00021
2103007000	Comm/Inst LPG	139.00	0.02210	0.00133
2103008000	Comm/Inst Wood [1]	195	0.62802	0.00837
2103011000	Comm/Inst Kerosene	159.28	0.02210	0.00133

Source: Unless otherwise noted, EPA State Greenhouse Gas Inventory Tool (EPA, 2009).
[1] CO_2 emission factors from *AP-42*, Section 1.6 - Wood Residue Combustion in Boilers.

6. Coal Sulfur Content

Under a forthcoming task (Task 4), Pechan will evaluate the reliability of various data sources for coal sulfur content before identifying the source(s) that will be used to estimate emissions in this project. Pechan will review potential coal sulfur content data sources, including:

(1) information reported in the point source inventories of each State;[6] (2) the USGS' U.S. Coal Quality Database (this is the ICI coal sulfur content source used in the 2002 NEI); (3) plant-level data from the Federal Energy Regulatory Commission's (FERC) Form 423;[7] and (4) State-level data reported in EIA's "Monthly Report of Cost and Quality of Fuels for Electric Plants." Pechan will evaluate these and any other identified alternative data sources for use in this project to ensure that the data are as representative as possible with respect to consuming sector, geography, and time-frame. Any data sets that are deemed equally representative will next be evaluated with respect to level of confidence (i.e., a data source for which estimated coal content is based on more data points than other data sources will be deemed to have higher confidence, and therefore, the preferred data source). Pechan will prepare a memorandum identifying the coal content data sources that were reviewed and a priority ranking of preferred sources based on an evaluation of the aforementioned criteria. The memorandum will identify the preferred approach for characterizing the sulfur content of coal consumption for each ICI area source combustion source category, which will be incorporated into the Excel calculation templates.

7. County Allocation Data

After computing State-level emissions using the data described above, the project requires allocating these emissions to individual counties. There are two allocation approaches that CENRAP is evaluating for this step. The first, which has been used in past inventory efforts including the 2002 NEI, is based on each county's proportion of total State employment for the energy-consuming sectors for each source category. The second is based on estimates of total energy consumption for each sector. For both approaches, the initial step is to identify the economic sectors associated with Industrial fuel combustion, and the economic sectors associated with Commercial/Institutional fuel combustion.

Commercial/Institutional

For area source Commercial/Institutional fuel combustion, the 2002 NEI used employment data in North American Industrial Classification System (NAICS) codes 42, 44-45, 51-54, 56, 61-62, 71-72, and 81 to allocate EIA State Commercial sector energy consumption data to counties.[8] These NAICS codes suggest that fuel combustion emissions for the following sectors are covered elsewhere in the NEI: Agriculture, Forestry, Fishing and Hunting; Mining; Construction; Manufacturing; Transportation and Warehousing; Management of Companies and Enterprises; and Public Administration. Meanwhile the EIIP area source method abstracts for Commercial/Institutional fuel combustion categories identify Standard Industrial Classification (SIC) codes 50-99 as representing the Commercial/Institutional sector. These SIC codes indicate that the following is the comprehensive list of non-Commercial sectors: Agriculture, Forestry, Fishing and Hunting; Mining; Construction; Manufacturing; and Transportation, Communications, Electric, Gas, and Sanitary Services.

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[6] Iowa has stated that they did not report coal sulfur content information in their 2002 point source inventory.

[7] Note that these data include Commercial and Industrial combined heat and power producers whose total fossil-fueled nameplate generating capacity is 50 or more megawatts.

[8] These NAICS codes are also listed in ERTAC's area source methodology worksheet (ERTAC, 2009).

Documentation for the SEDS is not entirely clear on the NAICS codes associated with the Commercial sector, defining the Commercial sector as "an energy-consuming sector that consists of service-providing facilities and equipment of: businesses; Federal, State, and local governments; and other private and public organizations, such as religious, social, or fraternal groups. The Commercial sector includes institutional living quarters. It also includes sewage treatment facilities." In an attempt to further clarify the NAICS codes associated with this sector, Pechan performed additional research into the original data sources that are used to create the SEDS.

Because data for the SEDS originates with data collected from EIA fuel sector-specific surveys of energy suppliers,[9] Pechan reviewed these survey forms/instructions for further details on what SEDS considers Commercial sector use of each fuel. This review found that the surveys/guidance do not always provide further clarity. In addition, the EIA has admitted that energy suppliers may use their own account classifications as well as EIA guidance in determining whether a particular account belongs in the Residential, Commercial, Industrial, or Transportation sector. The only source of NAICS-code based EIA definitions of the Commercial energy sector is a "rough crosswalk" between Commercial building types and NAICS codes developed for EIA's Commercial Building Energy Consumption Survey (CBECS). With the exception of NAICS code 814 (Private Households), this crosswalk links all NAICS codes between 42 and 92 with Commercial building energy consumption, suggesting that both the EIIP guidance and NEI definitions of the Commercial fuel combustion source category are missing some sectors, while also including one sector that should not be included (Private Households). In lieu of additional information, data for the CBECS-identified NAICS codes (42 though 92 with exception of 814) will be used to allocate SEDS energy consumption data to individual counties.

Industrial

Although there are no EIIP guidance documents for area source Industrial fuel combustion, the 2002 NEI used the Manufacturing sector NAICS codes (31-33) to represent this category. Unlike the Commercial sector, the SEDS documentation provides a clear listing of the NAICS codes associated with SEDS Industrial energy consumption data: "the industrial sector encompasses the following types of activity: Manufacturing (NAICS codes 31–33); Agriculture, Forestry, Fishing and Hunting (NAICS code 11); Mining, including Oil and Gas Extraction (NAICS code 21); and Construction (NAICS code 23)." As noted earlier, this indicates that a portion of Industrial sector consumption is already accounted for in other emission inventory sectors. It is expected that non-Manufacturing sector Industrial fuel consumption will largely be eliminated via the nonroad subtractions described earlier. Therefore, Pechan will not expand the list of NAICS codes used to represent the area source Industrial fuel combustion category beyond the Manufacturing sector NAICS codes (31-33).

<u>Standard Employment-Based Approach</u>

[9] For natural gas, for example – EIA-176 "Annual Report of Natural and Supplemental Gas Supply and Disposition."

In keeping with EIIP guidance and past EPA practice, employment data can be used to allocate State-level emission estimates to counties. Each year the Census Bureau releases *County Business Patterns* (CBP), a county level data set of employment by NAICS code (Census, 2009). The CBP county-level employment estimates for 2002 can be compiled for the appropriate NAICS codes noted above. Due to concerns with releasing confidential business information, the CBP withholds values for a given county/NAICS code if it would be possible to identify individual businesses from these values. In such cases, the CBP reports a letter code, representing a particular employment size range. To estimate data for withheld counties/NAICS codes, Pechan used the following procedure.

1. County-level employment for counties with reported values are totaled by State for the applicable NAICS code.
2. Value from step 1 is subtracted from the State employment value for the NAICS code.
3. Each of the withheld counties is assigned an initial employment estimate reflecting the midpoint of the CBP range code (e.g., code A, which reflects 1-19 employees, is assigned an estimate of 10 employees).
4. The initial employment estimates from step 3 are then summed to the State level.
5. The value from step 2 is divided by the value from step 4 to yield an adjustment factor to apply to the initial employment estimates to yield employment values that will sum to the State employment total for the applicable NAICS code.
6. The final county-level employment values are estimated by multiplying the initial employment estimates from step 3 by the step 5 adjustment factors.

Example: NAICS 31-33 (Manufacturing)

fipsstate	fipscty	naics	empflag	emp
23	001	31----		6,774
23	003	31----		3,124
23	005	31----		10,333
23	007	31----		1,786
23	009	31----		1,954
23	011	31----		2,535
23	013	31----		1,418
23	015	31----	F	0
23	017	31----		2,888
23	019	31----		4,522
23	021	31----		948
23	023	31----	I	0
23	025	31----		4,322
23	027	31----		1,434
23	029	31----		1,014
23	031	31----		9,749

1. The total of employees not including counties 015 and 023 is 52,801.
2. The State-level CBP reports 59,322 employees in NAICS 31----the difference is 6,521.
3. County 015 is given a midpoint of 1,750 (since range code F is 1,000-2,499) and County 023 is given a midpoint of 17,500.

4. State total for these two counties is 19,250.
5. 6,521/19,250 = 0.33875.
6. The final employment estimate for county 015 is 1,750 * 0.33875 = 593. The county 023 final employment estimate is computed as 17,500 * 0.33875 = 5,928.

Energy Intensity-Adjusted Approach

Employment-based county allocation methods lead to overrepresentation of energy consumption in counties with sectors that have high employment but low energy intensities (measured on a Btu per employee basis), and vice-versa. Therefore, Pechan recommended that CENRAP consider utilizing energy use per employee values by NAICS code to refine the employment-based county allocation approach. Because State/NAICS code-level energy use data are not available, this approach relies on 2002 national energy consumption data by NAICS code as reported by EIA in *Annual Energy Outlook* (EIA, 2005). Energy intensity values are computed by dividing these Btu-based energy consumption estimates by 2002 national employment data by NAICS code. The resulting intensity values are then multiplied by county/NAICS code-level employment estimates to estimate total county energy consumption by NAICS code. These values are then summed for the appropriate Industrial and Commercial/Institutional fuel combustion NAICS codes. The resulting county-level total Industrial and total Commercial/Institutional energy consumption estimates can then be used to apportion State-level Industrial fuel combustion emissions and State-level Commercial/Institutional fuel combustion emissions to each county.

Table 9 displays a comparison of the county-level allocation percentages computed for Missouri from the two methods. This table is sorted in descending order based on each county's Industrial fuel combustion employment-based allocation percentage. The cells shaded in green indicate that the energy intensity-adjusted approach reflects a greater than 50 percent higher allocation of activity/emissions to the given county versus the employment-based approach. Similarly, cells shaded in tan indicate that the energy-based approach reflects an allocation that is more than 50 percent lower than that resulting from the employment-based approach. The table shows that the Industrial sector allocations differ more substantially between the two methods in Missouri. Focusing on the Industrial sector allocation percentages for Jackson county, for example, overall Manufacturing sector employment is approximately 10 percent of the Missouri total. However, a much higher percentage of Missouri total Industrial sector energy consumption is estimated for this county (~17 percent). A closer look at the underlying data indicates that this county has a relatively high proportion of total State employment in the Chemicals and Paper industries that are the third and fifth highest energy-intensive manufacturing sector industries. Pechan will provide the information in Table 9 for all CENRAP States when it submits the Task 3 State-level fuel consumption estimates, which are due by April 17.

Table 9. Comparison of County Allocation Approaches for Missouri

County	Industrial				Commercial/Institutional		
	Employment	Energy	Ratio		Employment	Energy	Ratio
St. Louis	17.3%	14.9%	0.9		25.2%	21.8%	0.9
Jackson	10.3%	16.5%	1.6		16.2%	15.2%	0.9
City of St. Louis	8.3%	8.9%	1.1		11.9%	11.4%	1.0
Greene	5.2%	4.5%	0.9		6.0%	6.1%	1.0
St. Charles	4.6%	2.3%	0.5		4.0%	4.1%	1.0
Clay	4.6%	3.4%	0.7		3.3%	3.6%	1.1
Jasper	3.4%	2.5%	0.7		2.0%	2.0%	1.0
Franklin	3.2%	2.5%	0.8		1.0%	1.1%	1.1
Buchanan	2.3%	5.1%	2.2		1.5%	1.5%	1.0
Barry	2.0%	1.3%	0.6		0.4%	0.4%	1.0
Boone	1.7%	0.7%	0.4		2.8%	2.7%	0.9
Pettis	1.6%	1.6%	1.0		0.6%	0.7%	1.2
Cape Girardeau	1.6%	5.5%	3.4		1.6%	1.5%	1.0
Laclede	1.6%	0.4%	0.3		0.3%	0.4%	1.1
Jefferson	1.4%	2.4%	1.7		1.5%	1.8%	1.2
Newton	1.4%	1.2%	0.9		0.5%	0.6%	1.2
Howell	1.2%	0.3%	0.3		0.5%	0.6%	1.2
Cole	1.1%	0.5%	0.4		1.6%	1.5%	0.9
Butler	1.1%	0.4%	0.4		0.6%	0.6%	1.1
Perry	0.9%	0.5%	0.5		0.2%	0.2%	1.0
McDonald	0.9%	0.7%	0.7		0.1%	0.1%	1.3
Marion	0.8%	1.5%	1.8		0.4%	0.5%	1.1
St. Francois	0.8%	1.0%	1.3		0.7%	0.8%	1.0
New Madrid	0.8%	1.7%	2.1		0.1%	0.2%	1.6
Scott	0.8%	0.5%	0.6		0.6%	0.7%	1.1
Stoddard	0.8%	0.4%	0.5		0.3%	0.4%	1.3
Christian	0.7%	0.3%	0.4		0.4%	0.5%	1.2
Nodaway	0.6%	0.6%	1.0		0.3%	0.3%	1.1
Platte	0.6%	0.3%	0.5		1.8%	1.6%	0.9
Audrain	0.6%	0.3%	0.5		0.3%	0.3%	1.1
Phelps	0.6%	0.3%	0.4		0.6%	0.7%	1.3
Linn	0.6%	0.2%	0.4		0.1%	0.2%	1.1
Henry	0.5%	0.3%	0.5		0.2%	0.3%	1.3
Johnson	0.5%	0.3%	0.5		0.4%	0.5%	1.3
Crawford	0.5%	0.2%	0.4		0.2%	0.2%	1.3
Warren	0.5%	0.5%	0.9		0.2%	0.2%	1.1
Ste. Genevieve	0.5%	0.4%	0.8		0.1%	0.2%	1.2
Sullivan	0.5%	0.6%	1.2		0.0%	0.1%	1.4
Barton	0.5%	0.3%	0.6		0.1%	0.2%	1.4
Cass	0.5%	0.5%	1.1		0.7%	0.8%	1.2
Gasconade	0.5%	0.2%	0.5		0.1%	0.2%	1.3
Saline	0.5%	0.4%	0.8		0.3%	0.3%	1.2

County	Industrial				Commercial/Institutional		
	Employment	Energy	Ratio		Employment	Energy	Ratio
Lawrence	0.5%	0.2%	0.5		0.2%	0.4%	1.5
Randolph	0.5%	0.2%	0.5		0.3%	0.4%	1.1
Grundy	0.4%	0.3%	0.7		0.1%	0.2%	1.5
Adair	0.4%	0.2%	0.6		0.3%	0.4%	1.1
Lincoln	0.3%	0.1%	0.4		0.3%	0.4%	1.3
Vernon	0.3%	0.2%	0.4		0.2%	0.3%	1.4
Camden	0.3%	0.1%	0.4		0.6%	0.6%	1.1
Dunklin	0.3%	0.3%	0.8		0.3%	0.4%	1.2
Lafayette	0.3%	0.3%	0.9		0.3%	0.4%	1.2
Osage	0.3%	0.1%	0.4		0.1%	0.1%	1.4
Texas	0.3%	0.2%	0.5		0.2%	0.2%	1.5
Monroe	0.3%	0.1%	0.4		0.1%	0.1%	1.9
Miller	0.3%	0.1%	0.2		0.2%	0.3%	1.2
Webster	0.3%	0.6%	2.2		0.2%	0.2%	1.3
Moniteau	0.3%	0.2%	0.8		0.1%	0.1%	1.3
Callaway	0.3%	0.1%	0.4		0.4%	0.5%	1.2
Pemiscot	0.3%	0.3%	1.2		0.2%	0.2%	1.3
Polk	0.3%	0.1%	0.4		0.3%	0.4%	1.3
Dent	0.2%	0.6%	2.6		0.1%	0.2%	1.2
Livingston	0.2%	0.2%	0.9		0.2%	0.2%	1.2
Washington	0.2%	0.3%	1.3		0.1%	0.2%	1.6
Montgomery	0.2%	0.2%	0.9		0.1%	0.1%	1.4
Pike	0.2%	2.3%	10.5		0.2%	0.2%	1.4
Ripley	0.2%	0.1%	0.6		0.1%	0.1%	1.4
Wright	0.2%	0.1%	0.3		0.1%	0.2%	1.3
Morgan	0.2%	0.1%	0.3		0.1%	0.1%	1.3
Douglas	0.2%	0.1%	0.3		0.1%	0.1%	1.6
Ray	0.2%	0.4%	2.3		0.1%	0.2%	1.4
Cooper	0.2%	0.1%	0.5		0.2%	0.2%	1.3
Taney	0.2%	0.3%	1.5		0.9%	0.9%	1.0
Shannon	0.2%	0.1%	0.5		0.0%	0.0%	1.4
Macon	0.2%	0.3%	1.8		0.1%	0.2%	1.9
Ralls	0.2%	1.6%	10.4		0.1%	0.1%	1.6
Madison	0.2%	0.1%	0.6		0.1%	0.1%	1.3
Wayne	0.1%	0.1%	0.6		0.1%	0.1%	1.3
Dallas	0.1%	0.1%	0.8		0.1%	0.1%	1.0
Carroll	0.1%	0.1%	0.4		0.1%	0.1%	1.4
Bates	0.1%	0.1%	1.3		0.1%	0.2%	1.4
Lewis	0.1%	0.1%	0.5		0.1%	0.1%	1.5
Shelby	0.1%	0.1%	0.7		0.0%	0.1%	2.0
Benton	0.1%	0.1%	1.2		0.1%	0.1%	1.4
Reynolds	0.1%	0.1%	0.8		0.0%	0.1%	1.6
Oregon	0.1%	0.1%	0.8		0.1%	0.1%	1.4
Iron	0.1%	0.0%	0.4		0.1%	0.1%	1.4

County	Industrial				Commercial/Institutional		
	Employment	Energy	Ratio		Employment	Energy	Ratio
Mississippi	0.1%	0.0%	0.3		0.1%	0.1%	1.2
Gentry	0.1%	0.0%	0.3		0.1%	0.1%	1.3
Howard	0.1%	0.2%	2.1		0.1%	0.1%	1.4
Stone	0.1%	0.0%	0.3		0.2%	0.2%	1.2
Carter	0.1%	0.2%	2.7		0.0%	0.0%	1.4
Dade	0.1%	0.0%	0.5		0.1%	0.1%	1.6
Clinton	0.1%	0.0%	0.5		0.2%	0.2%	1.1
Pulaski	0.1%	0.0%	0.2		0.3%	0.4%	1.2
Cedar	0.1%	0.0%	0.5		0.1%	0.1%	1.4
Maries	0.1%	0.5%	8.7		0.1%	0.1%	1.4
Ozark	0.1%	0.0%	0.6		0.0%	0.1%	1.7
Daviess	0.0%	0.0%	0.2		0.0%	0.1%	1.6
Bollinger	0.0%	0.1%	2.3		0.1%	0.1%	1.5
Scotland	0.0%	0.0%	0.5		0.0%	0.1%	2.5
Holt	0.0%	0.2%	4.8		0.0%	0.1%	1.7
Clark	0.0%	0.0%	0.4		0.0%	0.1%	1.8
DeKalb	0.0%	0.2%	4.6		0.1%	0.1%	1.3
Putnam	0.0%	0.0%	1.7		0.0%	0.1%	2.0
Harrison	0.0%	0.0%	0.5		0.1%	0.1%	1.4
Chariton	0.0%	0.0%	0.5		0.1%	0.1%	1.5
Andrew	0.0%	0.0%	0.5		0.1%	0.1%	1.7
Atchison	0.0%	0.0%	0.5		0.1%	0.1%	1.3
Knox	0.0%	0.0%	0.5		0.0%	0.1%	1.8
Hickory	0.0%	0.0%	0.4		0.0%	0.1%	1.7
Worth	0.0%	0.0%	0.4		0.0%	0.0%	2.0
Caldwell	0.0%	0.0%	0.4		0.0%	0.1%	2.1
St. Clair	0.0%	0.0%	0.3		0.1%	0.1%	1.5
Mercer	0.0%	0.0%	0.5		0.0%	0.0%	1.5
Schuyler	0.0%	0.0%	0.2		0.0%	0.0%	2.1

8. Temporal Allocation Data

The EPA provides national default temporal allocation data via the "temporal allocation" section of their Emissions Modeling Clearinghouse (EMCH). For all Industrial sector fuel types, the EPA default is for an equal distribution of annual activity across months. For the Commercial sector, the EPA default is for an equal distribution of annual activity across months for LPG and kerosene, but the EPA default distribution for all other fuel types is as displayed in Table 10.

Table 10. EPA Default Commercial Fuel Combustion Sector Allocation

Month	% Allocation
January	11.7
February	11.7
March	8.3
April	8.3
May	8.3
June	5
July	5
August	5
September	8.3
October	8.3
November	8.3
December	11.7

Note: Excludes LPG and kerosene (equal distribution assumed throughout year).

Pechan researched the availability of more representative (sector, geographic, and/or time-specific) energy consumption data than that used to develop the EMCH's temporal allocation factors. The following summarizes the available information:

- Natural Gas – State-level volume delivered data are available by month and sector (Industrial versus Commercial) for 2002;
- Coal – national consumption data are available by month and sector (Industrial versus Commercial) for 2002; and
- Petroleum products (i.e., distillate, residual, LPG, kerosene) – regional level product supplied data are available by month for 2002.

Pechan was unable to identify a source reporting sub-annual consumption estimates for wood.

Pechan plans to use EIA's State-level natural gas deliveries data for 2002 to allocate the annual SEDS data to each month (EIA, 2009b). Given the limitations of the available coal and petroleum product data, and the lack of data for wood, Pechan plans to apply EPA's monthly default profiles to allocate annual activity/emissions for these fuel types. Because Pechan was unable to identify any source of sub-monthly estimates of ICI energy consumption, the EPA default allocation profiles will be used to develop average weekday, average weekend day, and average weekly emission estimates for each month.

C. CALCULATION TEMPLATES

This section summarizes the draft templates that Pechan has produced to develop the ICI combustion area source emission estimates for CENRAP. CENRAP should not review the actual data in these draft templates at this time because some entries are currently missing or represent "dummy" placeholder values. Pechan will provide completed templates for CENRAP review by April 17 as required under Task 5.

Template 1 – Adjust SEDS Fuel Consumption – this workbook, which reflects the discussion in sections B.1 through B.4, performs the following tasks:

- Computes Industrial sector State-level non-fuel energy consumption estimates by fuel type by applying MECS-based non-fuel percentages to the SEDS total Industrial sector energy consumption estimates;
- Subtracts Industrial and Commercial sector State-level distillate and LPG consumption estimates from a (forthcoming) NONROAD model run for 2002.
- Converts the result of the steps above from their original units to the emission factor units;
- Performs the point source subtractions using 2002 CENRAP point source inventory data and the ICI area source combustion SCC to point source SCC crosswalk;

Template 2 – Apply Emission Factors – this workbook accompanies the discussion in Sections B.5 and B.6 of criteria pollutant and GHG emission factors and associated coal sulfur content assumptions. Reflecting the fact that some emission factors differ by type of coal, this template also estimates the proportion of Industrial and Commercial/Institutional coal that is anthracite versus bituminous/subbituminous in each State. This template will ultimately report the estimated sulfur content of coal consumed in each State.

Template 3 – County Allocations – this workbook, which reflects the Section B.7 discussion, contains the data used to compute both sets of county allocation data (i.e., the county employment data and the total county energy consumption data). This template currently develops actual allocation data for Missouri counties. Ultimately, this template will only include county data for the allocation method that CENRAP chooses to implement in this project. This template also calculates county-level emissions from the Template 2 State-level emission estimates.

Template 4 – Temporal Allocation – this workbook, which reflects the discussion in Section B.8, provides the data that will be used to allocate annual county emissions to monthly, average weekly, average weekday, and average weekend day time periods. It will ultimately perform the necessary calculations to estimate emissions in each period.

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ATTACHMENT: PRELIMINARY SUMMARY OF 2002 POINT SOURCE ANNUAL THROUGHPUT DATA

The following table reports 2002 annual point source throughput data associated with the ICI area source categories. The table is sorted in descending order by CENRAP State and area SCC. Cells that are shaded in light blue indicate potentially suspect entries.

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102001000	Industrial	Anthracite Coal	ARKANSAS	1,167,890	TON	640	Anthracite
2102002000	Industrial	Bituminous/Subbituminous Coal	ARKANSAS	3,153,027	TON	663	Bituminous Coal
2102004000	Industrial	Distillate Oil	ARKANSAS	8,255,280	E3GAL	44	Diesel
2102004000	Industrial	Distillate Oil	ARKANSAS	0	E3GAL	57	Distillate Oil (Diesel)
2102004000	Industrial	Distillate Oil	ARKANSAS		E3GAL	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	ARKANSAS	2,136,217	E3GAL	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	ARKANSAS	6,408,642	E3GAL	825	Distillate Oil (No. 4)
2102005000	Industrial	Residual Oil	ARKANSAS	224,941	E3GAL	279	Residual Oil
2102005000	Industrial	Residual Oil	ARKANSAS	13,587,658	E3GAL	923	Residual Oil (No. 6)
2102005000	Industrial	Residual Oil	ARKANSAS		E3GAL	924	Residual/Crude Oil
2102006000	Industrial	Natural Gas	ARKANSAS	184,838,095	E6FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	ARKANSAS				
2102007000	Industrial	Liquified Petroleum Gas (LPG)	ARKANSAS		E3GAL	178	Liquified Petroleum Gas (LPG)
2102008000	Industrial	Wood	ARKANSAS	56,092,213	TON	15	Wood
2102008000	Industrial	Wood	ARKANSAS	21,798,710	TON	943	Wood/Bark
2103004000	Commercial/Institutional	Distillate Oil	ARKANSAS		E3GAL	57	Distillate Oil (Diesel)
2103006000	Commercial/Institutional	Natural Gas	ARKANSAS	23,912,086	E6FT3	209	Natural Gas
2103008000	Commercial/Institutional	Wood	ARKANSAS	7,655,765	TON	15	Wood
2102001000	Industrial	Anthracite Coal	IOWA	24	E3GAL	255	Propane
2102001000	Industrial	Anthracite Coal	IOWA	98,368	TON	645	Ash
2102002000	Industrial	Bituminous/Subbituminous Coal	IOWA	30,950,000	LB	561	Sludge
2102002000	Industrial	Bituminous/Subbituminous Coal	IOWA	87,110	TON	323	Subbituminous Coal
2102002000	Industrial	Bituminous/Subbituminous Coal	IOWA	3,741,706	TON	717	Coal
2102004000	Industrial	Distillate Oil	IOWA	1,039	E3GAL	44	Diesel
2102004000	Industrial	Distillate Oil	IOWA	0	E3GAL	56	Distillate Oil
2102004000	Industrial	Distillate Oil	IOWA	926	E3GAL	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	IOWA	2	E3GAL	255	Propane
2102004000	Industrial	Distillate Oil	IOWA	42	E3GAL	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	IOWA	0	E3LB	44	Diesel
2102004000	Industrial	Distillate Oil	IOWA	5,599	E6BTU	44	Diesel
2102004000	Industrial	Distillate Oil	IOWA	0	E6BTU	56	Distillate Oil
2102004000	Industrial	Distillate Oil	IOWA	0	E6BTU	209	Natural Gas
2102004000	Industrial	Distillate Oil	IOWA	42	E6BTU	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	IOWA	90	E6FT3	209	Natural Gas

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102004000	Industrial	Distillate Oil	IOWA	8	E6GAL	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	IOWA	2	E6GAL	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	IOWA	341,800,000	FT3	209	Natural Gas
2102004000	Industrial	Distillate Oil	IOWA	4,758	GAL	5	Water
2102004000	Industrial	Distillate Oil	IOWA	35,967	GAL	44	Diesel
2102004000	Industrial	Distillate Oil	IOWA	613	GAL	56	Distillate Oil
2102004000	Industrial	Distillate Oil	IOWA	459	GAL	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	IOWA	330	GAL	209	Natural Gas
2102004000	Industrial	Distillate Oil	IOWA	10,262	GAL	255	Propane
2102004000	Industrial	Distillate Oil	IOWA	339	GAL	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	IOWA	14,123	HP-HR	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	IOWA	2,681	HR	44	Diesel
2102004000	Industrial	Distillate Oil	IOWA	29	HR	209	Natural Gas
2102004000	Industrial	Distillate Oil	IOWA	138	HR	268	Raw Material
2102004000	Industrial	Distillate Oil	IOWA	0	KL	44	Diesel
2102004000	Industrial	Distillate Oil	IOWA	0	TON	44	Diesel
2102004000	Industrial	Distillate Oil	IOWA	0	TON	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	IOWA	1,628	TON	268	Raw Material
2102004000	Industrial	Distillate Oil	IOWA				
2102005000	Industrial	Residual Oil	IOWA	14	E3GAL	44	Diesel
2102005000	Industrial	Residual Oil	IOWA	0	E3GAL	923	Residual Oil (No. 6)
2102005000	Industrial	Residual Oil	IOWA	438	E3GAL		
2102005000	Industrial	Residual Oil	IOWA	0	GAL	127	Gasoline
2102005000	Industrial	Residual Oil	IOWA	978,215	GAL	279	Residual Oil
2102005000	Industrial	Residual Oil	IOWA	6,000	GAL	823	Distillate Oil (No. 1 & 2)
2102005000	Industrial	Residual Oil	IOWA	188,565	GAL	923	Residual Oil (No. 6)
2102005000	Industrial	Residual Oil	IOWA				
2102006000	Industrial	Natural Gas	IOWA	6,690	E3FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	IOWA	11	E3GAL	58	Distillate Oil (No. 2)
2102006000	Industrial	Natural Gas	IOWA	18,353,512	E6BTU	209	Natural Gas
2102006000	Industrial	Natural Gas	IOWA	248,378	E6BTU	268	Raw Material
2102006000	Industrial	Natural Gas	IOWA	69,899	E6FT3	127	Gasoline
2102006000	Industrial	Natural Gas	IOWA	2,851,074	E6FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	IOWA	0	E6FT3	225	Paint
2102006000	Industrial	Natural Gas	IOWA	21	E6FT3	268	Raw Material

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102006000	Industrial	Natural Gas	IOWA	119	E6FT3	315	Starch
2102006000	Industrial	Natural Gas	IOWA	0	E6LB	268	Raw Material
2102006000	Industrial	Natural Gas	IOWA	0	E6LB	281	Resin
2102006000	Industrial	Natural Gas	IOWA	1,818,653,437	FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	IOWA	1,335,666,448	FT3S	209	Natural Gas
2102006000	Industrial	Natural Gas	IOWA	1,320	GAL	189	Material
2102006000	Industrial	Natural Gas	IOWA	73,408	GAL	225	Paint
2102006000	Industrial	Natural Gas	IOWA	46	GAL	255	Propane
2102006000	Industrial	Natural Gas	IOWA	0	GAL	268	Raw Material
2102006000	Industrial	Natural Gas	IOWA	4	GAL	952	Solvents: All
2102006000	Industrial	Natural Gas	IOWA	0	GAL	973	ABS Polymer
2102006000	Industrial	Natural Gas	IOWA	30,621	HR	516	Metal
2102006000	Industrial	Natural Gas	IOWA	7,000	LB	189	Material
2102006000	Industrial	Natural Gas	IOWA	0	LB	225	Paint
2102006000	Industrial	Natural Gas	IOWA	13,848	LB	268	Raw Material
2102006000	Industrial	Natural Gas	IOWA	0	LB	281	Resin
2102006000	Industrial	Natural Gas	IOWA	317	LB	516	Metal
2102006000	Industrial	Natural Gas	IOWA	344,238	TON	209	Natural Gas
2102006000	Industrial	Natural Gas	IOWA	14	TON	225	Paint
2102006000	Industrial	Natural Gas	IOWA	40,230	TON	268	Raw Material
2102006000	Industrial	Natural Gas	IOWA	0	TON	289	Sand
2102006000	Industrial	Natural Gas	IOWA	54	TON	303	Soil
2102006000	Industrial	Natural Gas	IOWA	162	TON	315	Starch
2102006000	Industrial	Natural Gas	IOWA	0	TON	561	Sludge
2102006000	Industrial	Natural Gas	IOWA	0	TON	580	Sulfur Dioxide
2102006000	Industrial	Natural Gas	IOWA			209	Natural Gas
2102006000	Industrial	Natural Gas	IOWA				
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA	0	E3GAL	178	Liquified Petroleum Gas (LPG)
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA	0	E3GAL	255	Propane
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA	2,977	E6BTU	209	Natural Gas
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA	0	E6BTU	255	Propane
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA	0	E6FT3	209	Natural Gas
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA	0	E6LB	268	Raw Material
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA	3	E6LB	281	Resin
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA	7,399	GAL	255	Propane

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102007000	Industrial	Liquified Petroleum Gas (LPG)	IOWA				
2102008000	Industrial	Wood	IOWA	13,154	HR	124	Fuel
2102008000	Industrial	Wood	IOWA	6,497	TON	268	Raw Material
2102008000	Industrial	Wood	IOWA	0	TON-YR	717	Coal
2102011000	Industrial	Kerosene	IOWA	0	E3GAL	162	Kerosene
2102011000	Industrial	Kerosene	IOWA	13,717	TON	189	Material
2103002000	Commercial/Institutional	Bituminous/Subbituminous Coal	IOWA	142,485	TON	717	Coal
2103004000	Commercial/Institutional	Distillate Oil	IOWA	26	E3GAL	44	Diesel
2103004000	Commercial/Institutional	Distillate Oil	IOWA	0	E3GAL	56	Distillate Oil
2103004000	Commercial/Institutional	Distillate Oil	IOWA	0	E3GAL	58	Distillate Oil (No. 2)
2103004000	Commercial/Institutional	Distillate Oil	IOWA	18	E3GAL	268	Raw Material
2103004000	Commercial/Institutional	Distillate Oil	IOWA	162	E3GAL	823	Distillate Oil (No. 1 & 2)
2103004000	Commercial/Institutional	Distillate Oil	IOWA	1,033	GAL	44	Diesel
2103004000	Commercial/Institutional	Distillate Oil	IOWA	34,758	GAL	58	Distillate Oil (No. 2)
2103004000	Commercial/Institutional	Distillate Oil	IOWA	0	TON	44	Diesel
2103004000	Commercial/Institutional	Distillate Oil	IOWA				
2103005000	Commercial/Institutional	Residual Oil	IOWA	1	E3GAL	58	Distillate Oil (No. 2)
2103005000	Commercial/Institutional	Residual Oil	IOWA	21	E3GAL		
2103005000	Commercial/Institutional	Residual Oil	IOWA	332,184	GAL	279	Residual Oil
2103005000	Commercial/Institutional	Residual Oil	IOWA	4,340	GAL	923	Residual Oil (No. 6)
2103006000	Commercial/Institutional	Natural Gas	IOWA	51,606	BTU	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	IOWA	719,333	E3FT3	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	IOWA	1	E3GAL	58	Distillate Oil (No. 2)
2103006000	Commercial/Institutional	Natural Gas	IOWA	6	E3GAL	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	IOWA	0	E6BTU	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	IOWA	28	E6FT3	127	Gasoline
2103006000	Commercial/Institutional	Natural Gas	IOWA	28	E6FT3	189	Material
2103006000	Commercial/Institutional	Natural Gas	IOWA	465,334	E6FT3	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	IOWA	16	E6FT3	268	Raw Material
2103006000	Commercial/Institutional	Natural Gas	IOWA	0	E6GAL	823	Distillate Oil (No. 1 & 2)
2103006000	Commercial/Institutional	Natural Gas	IOWA	8,169,622	FT3	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	IOWA	576	GAL	58	Distillate Oil (No. 2)
2103006000	Commercial/Institutional	Natural Gas	IOWA	0	GAL	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	IOWA	831	GAL	255	Propane
2103006000	Commercial/Institutional	Natural Gas	IOWA	24	HR	44	Diesel

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2103006000	Commercial/Institutional	Natural Gas	IOWA	13,632	TON	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	IOWA	0	TON	225	Paint
2103006000	Commercial/Institutional	Natural Gas	IOWA	16,178	TON	724	Coke
2103006000	Commercial/Institutional	Natural Gas	IOWA				
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	IOWA	0	E3GAL	178	Liquified Petroleum Gas (LPG)
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	IOWA	0	E3GAL	255	Propane
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	IOWA	0	E3GAL	268	Raw Material
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	IOWA	15	E6FT3	209	Natural Gas
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	IOWA	0	E6GAL	268	Raw Material
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	IOWA	88,575	GAL	255	Propane
2103008000	Commercial/Institutional	Wood	IOWA	7,142	TON	15	Wood
2102004000	Industrial	Distillate Oil	KANSAS	1,148	E3GAL	44	Diesel
2102004000	Industrial	Distillate Oil	KANSAS	92,275	E3GAL	56	Distillate Oil
2102004000	Industrial	Distillate Oil	KANSAS	83	E3GAL	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	KANSAS	2,437	E3HP-HR	945	Work
2102004000	Industrial	Distillate Oil	KANSAS	22,979	E6BTU	44	Diesel
2102004000	Industrial	Distillate Oil	KANSAS	488	E6BTU	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	KANSAS	1,082,040	HP-HR	945	Work
2102004000	Industrial	Distillate Oil	KANSAS	233	HR	209	Natural Gas
2102004000	Industrial	Distillate Oil	KANSAS	716	HR	945	Work
2102004000	Industrial	Distillate Oil	KANSAS	10,248,064	KW-HR	828	Electricity
2102004000	Industrial	Distillate Oil	KANSAS	0			
2102005000	Industrial	Residual Oil	KANSAS	380	E3GAL	922	Residual Oil (No. 5)
2102005000	Industrial	Residual Oil	KANSAS	3,402	E3GAL	923	Residual Oil (No. 6)
2102005000	Industrial	Residual Oil	KANSAS	48	E6BTU	923	Residual Oil (No. 6)
2102006000	Industrial	Natural Gas	KANSAS	287	E3FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	KANSAS	19	E3GAL	189	Material
2102006000	Industrial	Natural Gas	KANSAS	2,594,753	E3HP-HR	945	Work
2102006000	Industrial	Natural Gas	KANSAS	17,010,214	E6BTU	209	Natural Gas
2102006000	Industrial	Natural Gas	KANSAS	282,631	E6FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	KANSAS	39	EACH	189	Material
2102006000	Industrial	Natural Gas	KANSAS	288,425,458	HP-HR	945	Work
2102006000	Industrial	Natural Gas	KANSAS	100	HR	127	Gasoline
2102006000	Industrial	Natural Gas	KANSAS	856,039	HR	209	Natural Gas
2102006000	Industrial	Natural Gas	KANSAS	100,217	HR	945	Work

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102006000	Industrial	Natural Gas	KANSAS	269	LB	209	Natural Gas
2102006000	Industrial	Natural Gas	KANSAS	10,000	LB	635	Ammonia
2102006000	Industrial	Natural Gas	KANSAS	7	TON	209	Natural Gas
2102006000	Industrial	Natural Gas	KANSAS	25	TON	305	Solvent
2102006000	Industrial	Natural Gas	KANSAS	0			
2102007000	Industrial	Liquified Petroleum Gas (LPG)	KANSAS	5	E3GAL	178	Liquified Petroleum Gas (LPG)
2102007000	Industrial	Liquified Petroleum Gas (LPG)	KANSAS	54	E3GAL	178	Liquified Petroleum Gas (LPG)
2102007000	Industrial	Liquified Petroleum Gas (LPG)	KANSAS	0	E3GAL	189	Material
2102007000	Industrial	Liquified Petroleum Gas (LPG)	KANSAS	99	E3GAL	255	Propane
2103004000	Commercial/Institutional	Distillate Oil	KANSAS	22	E3GAL	44	Diesel
2103004000	Commercial/Institutional	Distillate Oil	KANSAS	29	E3GAL	823	Distillate Oil (No. 1 & 2)
2103004000	Commercial/Institutional	Distillate Oil	KANSAS	0			
2103006000	Commercial/Institutional	Natural Gas	KANSAS	3,150	E6FT3	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	KANSAS	0	EACH	189	Material
2103006000	Commercial/Institutional	Natural Gas	KANSAS	107,768	HR	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	KANSAS	7,200	HR	945	Work
2103006000	Commercial/Institutional	Natural Gas	KANSAS	0			
2102002000	Industrial	Bituminous/Subbituminous Coal	LOUISIANA				
2102004000	Industrial	Distillate Oil	LOUISIANA				
2102005000	Industrial	Residual Oil	LOUISIANA				
2102006000	Industrial	Natural Gas	LOUISIANA				
2102007000	Industrial	Liquified Petroleum Gas (LPG)	LOUISIANA				
2102008000	Industrial	Wood	LOUISIANA				
2103004000	Commercial/Institutional	Distillate Oil	LOUISIANA				
2103005000	Commercial/Institutional	Residual Oil	LOUISIANA				
2103006000	Commercial/Institutional	Natural Gas	LOUISIANA				
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	LOUISIANA				
2102002000	Industrial	Bituminous/Subbituminous Coal	MINNESOTA	6,138,274	E6BTU	142	Heat
2102002000	Industrial	Bituminous/Subbituminous Coal	MINNESOTA	10,584	HR	830	Equipment
2102002000	Industrial	Bituminous/Subbituminous Coal	MINNESOTA	582,249	TON	323	Subbituminous Coal
2102002000	Industrial	Bituminous/Subbituminous Coal	MINNESOTA	81,870	TON	663	Bituminous Coal
2102004000	Industrial	Distillate Oil	MINNESOTA	232	E3GAL	44	Diesel
2102004000	Industrial	Distillate Oil	MINNESOTA	4,003	E3GAL	57	Distillate Oil (Diesel)
2102004000	Industrial	Distillate Oil	MINNESOTA	1,071	E3GAL	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	MINNESOTA	535	E3GAL	825	Distillate Oil (No. 4)

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102004000	Industrial	Distillate Oil	MINNESOTA	586	E6BTU	142	Heat
2102004000	Industrial	Distillate Oil	MINNESOTA	1,353,017	GAL	57	Distillate Oil (Diesel)
2102004000	Industrial	Distillate Oil	MINNESOTA	342,565	GAL	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	MINNESOTA				
2102005000	Industrial	Residual Oil	MINNESOTA	362	E3GAL	279	Residual Oil
2102005000	Industrial	Residual Oil	MINNESOTA	370	E3GAL	922	Residual Oil (No. 5)
2102005000	Industrial	Residual Oil	MINNESOTA	21,526	E3GAL	923	Residual Oil (No. 6)
2102005000	Industrial	Residual Oil	MINNESOTA	34,637	E6BTU	142	Heat
2102006000	Industrial	Natural Gas	MINNESOTA	6,400,498	E6BTU	142	Heat
2102006000	Industrial	Natural Gas	MINNESOTA	39,046	E6FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	MINNESOTA	7,395,200	FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	MINNESOTA	19,936,121,225	GAL	209	Natural Gas
2102006000	Industrial	Natural Gas	MINNESOTA	155,328	HR	830	Equipment
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MINNESOTA	94,000	BTU	142	Heat
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MINNESOTA	1,212	E3GAL	255	Propane
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MINNESOTA	209	E3GAL	675	Butane
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MINNESOTA	274	E6BTU	142	Heat
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MINNESOTA	266,584	GAL	255	Propane
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MINNESOTA	626	HR	830	Equipment
2102008000	Industrial	Wood	MINNESOTA	4,675,962	E6BTU	142	Heat
2102008000	Industrial	Wood	MINNESOTA	16,467	HR	830	Equipment
2102008000	Industrial	Wood	MINNESOTA	120,057	TON	15	Wood
2102008000	Industrial	Wood	MINNESOTA	89,216	TON	943	Wood/Bark
2102011000	Industrial	Kerosene	MINNESOTA	12	E3GAL	159	Jet Fuel
2103001000	Commercial/Institutional	Anthracite Coal	MINNESOTA				
2103002000	Commercial/Institutional	Bituminous/Subbituminous Coal	MINNESOTA	2,648	E6BTU	142	Heat
2103002000	Commercial/Institutional	Bituminous/Subbituminous Coal	MINNESOTA	184,324	TON	323	Subbituminous Coal
2103002000	Commercial/Institutional	Bituminous/Subbituminous Coal	MINNESOTA	51,658	TON	663	Bituminous Coal
2103004000	Commercial/Institutional	Distillate Oil	MINNESOTA	1,197	E3GAL	57	Distillate Oil (Diesel)
2103004000	Commercial/Institutional	Distillate Oil	MINNESOTA	1,334	E3GAL	823	Distillate Oil (No. 1 & 2)
2103004000	Commercial/Institutional	Distillate Oil	MINNESOTA	29	E3GAL	825	Distillate Oil (No. 4)
2103005000	Commercial/Institutional	Residual Oil	MINNESOTA	1,695	E3GAL	922	Residual Oil (No. 5)
2103005000	Commercial/Institutional	Residual Oil	MINNESOTA	3,303	E3GAL	923	Residual Oil (No. 6)
2103006000	Commercial/Institutional	Natural Gas	MINNESOTA	8,623,850	E6BTU	142	Heat
2103006000	Commercial/Institutional	Natural Gas	MINNESOTA	19,921	E6FT3	209	Natural Gas

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2103006000	Commercial/Institutional	Natural Gas	MINNESOTA	174,979	HR	830	Equipment
2103006000	Commercial/Institutional	Natural Gas	MINNESOTA				
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	MINNESOTA	3,033	E3GAL	255	Propane
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	MINNESOTA	4,614	E6BTU	142	Heat
2103008000	Commercial/Institutional	Wood	MINNESOTA	1,096	TON	15	Wood
2103008000	Commercial/Institutional	Wood	MINNESOTA	246,551	TON	943	Wood/Bark
2102002000	Industrial	Bituminous/Subbituminous Coal	MISSOURI	20,843	TON	174	Lime
2102002000	Industrial	Bituminous/Subbituminous Coal	MISSOURI	0	TON	189	Material
2102002000	Industrial	Bituminous/Subbituminous Coal	MISSOURI	271,022	TON	663	Bituminous Coal
2102002000	Industrial	Bituminous/Subbituminous Coal	MISSOURI				
2102004000	Industrial	Distillate Oil	MISSOURI	0	E2LB	253	Product
2102004000	Industrial	Distillate Oil	MISSOURI	77,335	E3GAL	44	Diesel
2102004000	Industrial	Distillate Oil	MISSOURI	1,146	E3GAL	56	Distillate Oil
2102004000	Industrial	Distillate Oil	MISSOURI	3,922	E3GAL	57	Distillate Oil (Diesel)
2102004000	Industrial	Distillate Oil	MISSOURI	1,462,931	E3GAL	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	MISSOURI	0	E3GAL	352	Toluene
2102004000	Industrial	Distillate Oil	MISSOURI	641	E3GAL	823	Distillate Oil (No. 1 & 2)
2102004000	Industrial	Distillate Oil	MISSOURI	0	E3GAL	825	Distillate Oil (No. 4)
2102004000	Industrial	Distillate Oil	MISSOURI	0	E3GAL	868	Liquid
2102004000	Industrial	Distillate Oil	MISSOURI	0	E3GAL	908	Petroleum Distillate
2102004000	Industrial	Distillate Oil	MISSOURI	27	E3GAL-YR	58	Distillate Oil (No. 2)
2102004000	Industrial	Distillate Oil	MISSOURI	0	E3GAL-YR	127	Gasoline
2102004000	Industrial	Distillate Oil	MISSOURI	10	E3GAL-YR	192	Methanol
2102004000	Industrial	Distillate Oil	MISSOURI	20	E6FT3	209	Natural Gas
2102004000	Industrial	Distillate Oil	MISSOURI	1	E6GAL	4	Wastewater
2102004000	Industrial	Distillate Oil	MISSOURI	0	EACH	364	Unit
2102004000	Industrial	Distillate Oil	MISSOURI	235	MILE	368	Vehicle
2102004000	Industrial	Distillate Oil	MISSOURI	24	TON	133	Grain
2102004000	Industrial	Distillate Oil	MISSOURI	0	TON	174	Lime
2102004000	Industrial	Distillate Oil	MISSOURI	1,462,933	TON	189	Material
2102004000	Industrial	Distillate Oil	MISSOURI	1	TON	189	Material
2102004000	Industrial	Distillate Oil	MISSOURI	13	TON	253	Product
2102004000	Industrial	Distillate Oil	MISSOURI	226	TON	268	Raw Material
2102004000	Industrial	Distillate Oil	MISSOURI	0	TON	311	Soybean Meal
2102004000	Industrial	Distillate Oil	MISSOURI	5	TON	849	Hot Mix Asphalt

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102004000	Industrial	Distillate Oil	MISSOURI				
2102005000	Industrial	Residual Oil	MISSOURI	345	E3GAL	279	Residual Oil
2102005000	Industrial	Residual Oil	MISSOURI	9	E3GAL	922	Residual Oil (No. 5)
2102005000	Industrial	Residual Oil	MISSOURI	1,512	E3GAL	923	Residual Oil (No. 6)
2102005000	Industrial	Residual Oil	MISSOURI	2	E3GAL	924	Residual/Crude Oil
2102005000	Industrial	Residual Oil	MISSOURI	30	TON	174	Lime
2102005000	Industrial	Residual Oil	MISSOURI	0	TON	189	Material
2102005000	Industrial	Residual Oil	MISSOURI	0	TON	849	Hot Mix Asphalt
2102005000	Industrial	Residual Oil	MISSOURI				
2102006000	Industrial	Natural Gas	MISSOURI	84	ACRE-YR	320	Storage Area
2102006000	Industrial	Natural Gas	MISSOURI	0	BALE	740	Cotton
2102006000	Industrial	Natural Gas	MISSOURI	25	E2LB	253	Product
2102006000	Industrial	Natural Gas	MISSOURI	16	E3EACH	654	Batteries
2102006000	Industrial	Natural Gas	MISSOURI	0	E3FT3	189	Material
2102006000	Industrial	Natural Gas	MISSOURI	15	E3GAL	44	Diesel
2102006000	Industrial	Natural Gas	MISSOURI	63	E3GAL	56	Distillate Oil
2102006000	Industrial	Natural Gas	MISSOURI	233	E3GAL	57	Distillate Oil (Diesel)
2102006000	Industrial	Natural Gas	MISSOURI	56	E3GAL	58	Distillate Oil (No. 2)
2102006000	Industrial	Natural Gas	MISSOURI	21	E3GAL	178	Liquified Petroleum Gas (LPG)
2102006000	Industrial	Natural Gas	MISSOURI	24	E3GAL	189	Material
2102006000	Industrial	Natural Gas	MISSOURI	133	E3GAL	255	Propane
2102006000	Industrial	Natural Gas	MISSOURI	123	E3GAL	823	Distillate Oil (No. 1 & 2)
2102006000	Industrial	Natural Gas	MISSOURI	0	E3GAL-YR	58	Distillate Oil (No. 2)
2102006000	Industrial	Natural Gas	MISSOURI	79	E3GAL-YR	127	Gasoline
2102006000	Industrial	Natural Gas	MISSOURI	2	E3GAL-YR	374	Crude Oil
2102006000	Industrial	Natural Gas	MISSOURI	11	E3GAL-YR	865	Jet Kerosene
2102006000	Industrial	Natural Gas	MISSOURI	190	E3GAL-YR	868	Liquid
2102006000	Industrial	Natural Gas	MISSOURI	5,202	E3GAL-YR	908	Petroleum Distillate
2102006000	Industrial	Natural Gas	MISSOURI	254,692	E6FT3	209	Natural Gas
2102006000	Industrial	Natural Gas	MISSOURI	0	EACH	364	Unit
2102006000	Industrial	Natural Gas	MISSOURI	206	EACH	368	Vehicle
2102006000	Industrial	Natural Gas	MISSOURI	97	EACH	712	Circuit Boards
2102006000	Industrial	Natural Gas	MISSOURI	26	GAL	151	Ink
2102006000	Industrial	Natural Gas	MISSOURI	12	GAL	189	Material
2102006000	Industrial	Natural Gas	MISSOURI	9	GAL	305	Solvent

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102006000	Industrial	Natural Gas	MISSOURI	375	GAL	720	Coating
2102006000	Industrial	Natural Gas	MISSOURI	5	MILE	368	Vehicle
2102006000	Industrial	Natural Gas	MISSOURI	32	TON	93	Ethylene Oxide
2102006000	Industrial	Natural Gas	MISSOURI	59	TON	133	Grain
2102006000	Industrial	Natural Gas	MISSOURI	153	TON	174	Lime
2102006000	Industrial	Natural Gas	MISSOURI	1,780	TON	189	Material
2102006000	Industrial	Natural Gas	MISSOURI	456	TON	189	Material
2102006000	Industrial	Natural Gas	MISSOURI	15	TON	224	P2O5
2102006000	Industrial	Natural Gas	MISSOURI	121	TON	253	Product
2102006000	Industrial	Natural Gas	MISSOURI	73	TON	268	Raw Material
2102006000	Industrial	Natural Gas	MISSOURI	2	TON	289	Sand
2102006000	Industrial	Natural Gas	MISSOURI	293	TON	305	Solvent
2102006000	Industrial	Natural Gas	MISSOURI	348	TON	306	Solvent in Coating
2102006000	Industrial	Natural Gas	MISSOURI	65	TON	311	Soybean Meal
2102006000	Industrial	Natural Gas	MISSOURI	0	TON	315	Starch
2102006000	Industrial	Natural Gas	MISSOURI	6	TON	516	Metal
2102006000	Industrial	Natural Gas	MISSOURI	116	TON	516	Metal
2102006000	Industrial	Natural Gas	MISSOURI	0	TON	673	Brick
2102006000	Industrial	Natural Gas	MISSOURI	1	TON	699	Charge
2102006000	Industrial	Natural Gas	MISSOURI	13	TON	723	Coating Mix
2102006000	Industrial	Natural Gas	MISSOURI				
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	4,610	E3GAL	178	Liquified Petroleum Gas (LPG)
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	12,560	E3GAL	255	Propane
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	9	E3GAL-YR	374	Crude Oil
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	122	E3GAL-YR	908	Petroleum Distillate
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	2	E3LB	77	Electrode
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	9	GAL	305	Solvent
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	39	GAL	720	Coating
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	186	MILE	368	Vehicle
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	0	TON	15	Wood
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	0	TON	133	Grain
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	37	TON	189	Material
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	29	TON	268	Raw Material
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	10	TON	291	Sawdust
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	0	TON	306	Solvent in Coating

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	0	TON	723	Coating Mix
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI	0	TON	849	Hot Mix Asphalt
2102007000	Industrial	Liquified Petroleum Gas (LPG)	MISSOURI				
2102008000	Industrial	Wood	MISSOURI	13,640	MILE	368	Vehicle
2102008000	Industrial	Wood	MISSOURI	435,597	TON	15	Wood
2102008000	Industrial	Wood	MISSOURI	366	TON	18	Wood Waste
2102008000	Industrial	Wood	MISSOURI	133,848	TON	943	Wood/Bark
2102011000	Industrial	Kerosene	MISSOURI	115	E3GAL	159	Jet Fuel
2102011000	Industrial	Kerosene	MISSOURI	0	GAL	305	Solvent
2102011000	Industrial	Kerosene	MISSOURI	0	MILE	368	Vehicle
2102011000	Industrial	Kerosene	MISSOURI				
2103002000	Commercial/Institutional	Bituminous/Subbituminous Coal	MISSOURI	20,339	TON	663	Bituminous Coal
2103002000	Commercial/Institutional	Bituminous/Subbituminous Coal	MISSOURI				
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	0	E3GAL	44	Diesel
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	423	E3GAL	56	Distillate Oil
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	1,295	E3GAL	57	Distillate Oil (Diesel)
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	8	E3GAL	127	Gasoline
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	26,744	E3GAL	823	Distillate Oil (No. 1 & 2)
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	6	E3GAL	825	Distillate Oil (No. 4)
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	12	E6FT3	209	Natural Gas
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	0	MILE	368	Vehicle
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	1	TON	180	Logs
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	0	TON	253	Product
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	1	TON	291	Sawdust
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI	0	TON	306	Solvent in Coating
2103004000	Commercial/Institutional	Distillate Oil	MISSOURI				
2103005000	Commercial/Institutional	Residual Oil	MISSOURI	719	E3GAL	279	Residual Oil
2103005000	Commercial/Institutional	Residual Oil	MISSOURI	11	E3GAL	922	Residual Oil (No. 5)
2103005000	Commercial/Institutional	Residual Oil	MISSOURI	32	E3GAL	923	Residual Oil (No. 6)
2103005000	Commercial/Institutional	Residual Oil	MISSOURI	4	E3GAL-YR	58	Distillate Oil (No. 2)
2103005000	Commercial/Institutional	Residual Oil	MISSOURI	2	E6FT3	209	Natural Gas
2103005000	Commercial/Institutional	Residual Oil	MISSOURI				
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	8	ACRE-YR	320	Storage Area
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	125	E3GAL	57	Distillate Oil (Diesel)
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	60	E3GAL	58	Distillate Oil (No. 2)

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	1	E3GAL	127	Gasoline
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	1	E3GAL	305	Solvent
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	282	E3GAL-YR	58	Distillate Oil (No. 2)
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	69	E3GAL-YR	127	Gasoline
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	40,033	E6FT3	209	Natural Gas
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	62	GAL	189	Material
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	141	GAL	720	Coating
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	95	MILE	368	Vehicle
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	30	TON	65	Dried Sludge
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	5	TON	129	Glaze
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	29	TON	133	Grain
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	17	TON	151	Ink
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	0	TON	180	Logs
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	41	TON	189	Material
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	6	TON	224	P2O5
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	16	TON	253	Product
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	355	TON	306	Solvent in Coating
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	39	TON	308	Solvent in Ink
2103006000	Commercial/Institutional	Natural Gas	MISSOURI	8	TON	874	Medical Waste
2103006000	Commercial/Institutional	Natural Gas	MISSOURI				
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	MISSOURI	25	E3GAL	178	Liquified Petroleum Gas (LPG)
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	MISSOURI	24,781	E3GAL	255	Propane
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	MISSOURI	9	E6FT3	209	Natural Gas
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	MISSOURI	1	TON	253	Product
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	MISSOURI				
2103008000	Commercial/Institutional	Wood	MISSOURI	25,448	TON	15	Wood
2103008000	Commercial/Institutional	Wood	MISSOURI	128	TON	943	Wood/Bark
2102002000	Industrial	Bituminous/Subbituminous Coal	NEBRASKA	45,820	TON		
2102004000	Industrial	Distillate Oil	NEBRASKA	137,269	E3GAL		
2102004000	Industrial	Distillate Oil	NEBRASKA				
2102005000	Industrial	Residual Oil	NEBRASKA	268	E3GAL		
2102006000	Industrial	Natural Gas	NEBRASKA	319,058	E3FT3		
2102006000	Industrial	Natural Gas	NEBRASKA	7,733,748	E6FT3		
2102006000	Industrial	Natural Gas	NEBRASKA	232	MASS	1	Waste Material
2102006000	Industrial	Natural Gas	NEBRASKA				

Area_SCC	SCC_2	Area SCC_3	StateName	Throughput	ThroughputUnits	Material Code	Material
2102007000	Industrial	Liquified Petroleum Gas (LPG)	NEBRASKA	48	E3GAL		
2102008000	Industrial	Wood	NEBRASKA	1,141	TON		
2103004000	Commercial/Institutional	Distillate Oil	NEBRASKA	0	E3GAL		
2103006000	Commercial/Institutional	Natural Gas	NEBRASKA	168,142	E6FT3		
2103006000	Commercial/Institutional	Natural Gas	NEBRASKA	22	MASS	1	Waste Material
2103006000	Commercial/Institutional	Natural Gas	NEBRASKA				
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	NEBRASKA	4,866	E3GAL		
2103008000	Commercial/Institutional	Wood	NEBRASKA	9,398	TON		
2102001000	Industrial	Anthracite Coal	OKLAHOMA	645			
2102002000	Industrial	Bituminous/Subbituminous Coal	OKLAHOMA	2,181,492			
2102004000	Industrial	Distillate Oil	OKLAHOMA	25,021			
2102005000	Industrial	Residual Oil	OKLAHOMA	1,463			
2102006000	Industrial	Natural Gas	OKLAHOMA	10,908,513			
2102007000	Industrial	Liquified Petroleum Gas (LPG)	OKLAHOMA	0			
2102008000	Industrial	Wood	OKLAHOMA	114,619			
2103004000	Commercial/Institutional	Distillate Oil	OKLAHOMA	21			
2103006000	Commercial/Institutional	Natural Gas	OKLAHOMA	228,899			
2102002000	Industrial	Bituminous/Subbituminous Coal	TEXAS				
2102004000	Industrial	Distillate Oil	TEXAS				
2102005000	Industrial	Residual Oil	TEXAS				
2102006000	Industrial	Natural Gas	TEXAS				
2102007000	Industrial	Liquified Petroleum Gas (LPG)	TEXAS				
2102008000	Industrial	Wood	TEXAS				
2102011000	Industrial	Kerosene	TEXAS				
2103004000	Commercial/Institutional	Distillate Oil	TEXAS				
2103006000	Commercial/Institutional	Natural Gas	TEXAS				
2103007000	Commercial/Institutional	Liquified Petroleum Gas (LPG)	TEXAS				
2103008000	Commercial/Institutional	Wood	TEXAS				
2103011000	Commercial/Institutional	Kerosene	TEXAS				

Appendix F

Emissions Inventories for the Illinois Portion of the St. Louis Nonattainment Area for 2002, 2008, 2017, and 2025

Appendix F-1	**Illinois Emissions Inventory Summaries**
Appendix F-2	**Illinois Point Source Emissions for 2002, 2008, 2017, and 2022**
Appendix F-3	**Illinois Area Source Emissions for 2002, 2008, 2017, and 2022**
Appendix F-4	**Illinois On-Road Mobile Source Emissions for 2002, 2008, 2017, and 2022**
Appendix F-5	**Illinois Off-Road Mobile Source Emissions for 2002, 2008, 2017, and 2022**

Appendix F-1 Illinois Emissions Inventory Summaries

Tables F-1 through F-5 display summaries of the emissions inventories for the Illinois portion of the St. Louis nonattainment area for the years 2002, 2008, 2017, and 2025. Tables F-2 and F-3 differ due to a transition between the mobile emissions model used to calculate the emissions from the on-road mobile source category. Appendices F-2 through F-5 give additional documentation regarding the development of the Illinois Emissions Inventories for the point, area, on-road mobile, and off-road mobile source categories, respectively.

Table F-1 2002 Emissions Inventory Summary for the Illinois Portion of the St. Louis Nonattainment Area (tons/year)

County Name	Source Category	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	Point Sources	26.21	11,623.99	1,264.84	26,705.66	3,673.85
Monroe		0.01	3.19	0.01	0.08	21.20
St. Clair		15.47	429.99	10.73	1,540.93	1,061.60
Randolph		2.50	22,396.13	1,038.35	26,295.22	337.83
Totals		**44.19**	**34,453.30**	**2,313.93**	**54,541.89**	**5,094.48**
Madison	Area Sources	1,411.64	2,025.70	3,273.43	215.92	12,137.24
Monroe		1,034.67	163.60	1,669.51	22.43	3,340.62
St. Clair		1,298.54	1,412.89	2,873.36	148.97	9,116.25
Randolph		42.30	3.90	102.62	0.53	92.81
Totals		**3,787.15**	**3,606.09**	**7,918.92**	**387.85**	**24,686.92**
Madison	On-Road Mobile Sources	280.65	7,877.35	156.48	296.47	3,859.66
Monroe		34.15	976.75	19.04	36.08	521.51
St. Clair		267.83	7,519.49	149.34	282.93	3,683.91
Randolph		0.55	16.31	0.31	0.59	10.19
Totals		**583.18**	**16,389.90**	**325.17**	**616.07**	**8,075.27**
Madison	Off-Road Mobile Sources	2.04	3,547.88	177.83	189.38	1,436.56
Monroe		1.02	1,972.23	74.87	133.93	213.41
St. Clair		0.92	1,582.33	124.36	50.23	1,104.78
Randolph		0.15	308.85	15.52	20.74	86.27
Totals		**4.13**	**7,411.29**	**392.58**	**394.28**	**2,841.02**
Illinois NAA Grand Total		**4,418.65**	**61,860.58**	**10,950.60**	**55,940.09**	**40,697.69**

Table F-2 2008 Emissions Inventory Summary for the Illinois Portion of the St. Louis Nonattainment Area (On-Road Mobile Source Category Calculated with Mobile 6) (tons/year)

County Name	Source Category	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	Point Sources	82.98	11,726.65	1,603.26	25,004.40	3,212.45
Monroe		0.12	10.64	0.35	0.14	17.74
St. Clair		22.32	316.41	28.39	123.64	695.92
Randolph		102.89	4,927.81	816.15	25,602.42	351.61
Totals		**208.31**	**16,981.51**	**2,448.15**	**50,730.60**	**4,277.72**
Madison	Area Sources	1,233.35	799.86	2,270.43	129.72	3,778.09
Monroe		870	81.22	730.88	13.91	636.95
St. Clair		1,196.67	755.69	2,109.27	102.8	3,346.74
Randolph		54.11	1.59	51.18	0.24	34.56
Totals		**3,354.13**	**1,638.36**	**5,161.76**	**246.67**	**7,796.34**
Madison	On-Road Mobile Sources	284.9	5656.45	107.45	28.61	2653.63
Monroe		36.2	745.39	13.65	3.64	358.63
St. Clair		267.55	5312.91	100.92	26.87	2492.26
Randolph		1.41	28.21	0.53	0.14	14.88
Totals		**590.06**	**11,742.96**	**222.55**	**59.26**	**5,519.40**
Madison	Off-Road Mobile Sources	1.49	4,258.14	204.59	179.7	1,503.89
Monroe		0.8	1,843.81	73.06	72.99	393.45
St. Clair		0.47	2,112.84	138.98	34.41	990.2
Randolph		0.13	260.45	9.08	13.62	85.23
Totals		**2.89**	**8,475.24**	**425.71**	**300.72**	**2,972.77**
Grand Total		**4,155.39**	**38,838.07**	**8,258.17**	**51,337.25**	**20,566.23**

Table F-3 2008 Emissions Inventory Summary for the Illinois Portion of the St. Louis Nonattainment Area (On-Road Mobile Source Category Calculated with MOVES) (tons/year)

County Name	Source Category	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	Point Sources	82.98	11,726.65	1,603.26	25,004.40	3,212.45
Monroe		0.12	10.64	0.35	0.14	17.74
St. Clair		22.32	316.41	28.39	123.64	695.92
Randolph		102.89	4,927.81	816.15	25,602.42	351.61
Totals		**208.31**	**16,981.51**	**2,448.15**	**50,730.60**	**4,277.72**
Madison	Area Sources	1233.35	799.86	2270.43	129.72	3778.09
Monroe		870	81.22	730.88	13.91	636.95
St. Clair		1196.67	755.69	2109.27	102.8	3346.74
Randolph		54.11	1.59	51.18	0.24	34.56
Totals		**3,354.13**	**1,638.36**	**5,161.76**	**246.67**	**7,796.34**
Madison	On-Road Mobile Sources *	250.58	15,012.94	577.99	116.76	5,069.55
Monroe						
St. Clair						
Randolph						
Totals		**250.58**	**15,012.94**	**577.99**	**116.76**	**5,069.55**
Madison	Off-Road Mobile Sources	1.49	4,258.14	204.59	179.7	1,503.89
Monroe		0.8	1,843.81	73.06	72.99	393.45
St. Clair		0.47	2,112.84	138.98	34.41	990.2
Randolph		0.13	260.45	9.08	13.62	85.23
Totals		**2.89**	**8,475.24**	**425.71**	**300.72**	**2,972.77**
Grand Total		**3,815.91**	**42,108.05**	**8,613.61**	**51,394.75**	**20,116.38**

*Note: MOVES based on-road mobile sources were calculated for the entire Illinois portion of the nonattainment area; therefore, county-level emissions are not provided.

Table F-4 2017 Emissions Inventory Summary for the Illinois Portion of the St. Louis Nonattainment Area (On-Road Mobile Source Category Calculated with MOVES) (tons/year)

County Name	Source Category	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	Point Sources	88.50	6,338.98	1,719.32	14,858.82	3,715.91
Monroe		0.13	12.43	0.43	0.15	20.48
St. Clair		25.52	416.64	33.68	140.73	860.40
Randolph		106.97	5,123.26	848.52	5,221.48	365.55
Totals		**221.12**	**11,891.31**	**2,601.95**	**20,221.18**	**4,962.34**
Madison	Area Sources	1,238.78	829.43	2,106.91	136.11	4,185.57
Monroe		870.32	80.99	653.33	14.24	711.14
St. Clair		1,201.11	782.72	1,900.74	107.76	3,671.51
Randolph		54.11	1.68	45.65	0.25	39.48
Totals		**3,364.32**	**1,694.82**	**4,706.63**	**258.36**	**8,607.70**
Madison	On-Road Mobile Sources *	186.79	5,623.42	231.68	49.31	2,364.85
Monroe						
St. Clair						
Randolph						
Totals		**186.79**	**5,623.42**	**231.68**	**49.31**	**2,364.85**
Madison	Off-Road Mobile Sources	1.78	4,110.74	166.09	212.27	986.41
Monroe		0.96	2,048.86	67.78	86.63	249.67
St. Clair		0.57	2,211.33	127.54	75.73	1,013.21
Randolph		0.15	302.82	8.87	16.16	54.14
Totals		**3.46**	**8,673.75**	**370.28**	**390.79**	**2,303.43**
Grand Total		**3,775.69**	**27,883.30**	**7,910.54**	**20,919.64**	**18,238.32**

*Note: MOVES based on-road mobile sources were calculated for the entire Illinois portion of the nonattainment area; therefore, county-level emissions are not provided.

Table F-5 2025 Emissions Inventory Summary for the Illinois Portion of the St. Louis Nonattainment Area (On-Road Mobile Source Category Calculated with MOVES) (tons/year)

County Name	Source Category	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	Point Sources	93.89	6,590.75	1,871.77	15,821.23	4,141.84
Monroe		0.15	14.04	0.51	0.15	22.59
St. Clair		28.20	449.29	37.42	152.68	965.72
Randolph		120.45	5,768.86	955.49	5,879.50	411.65
Totals		**242.69**	**12,822.94**	**2,865.19**	**21,853.56**	**5,541.80**
Madison	Area Sources	1,244.03	850.27	2,106.51	141.5	4,510.38
Monroe		870.65	81.03	621.25	14.65	771.41
St. Clair		1,205.37	802.13	1,898.63	111.63	3,924.27
Randolph		54.12	1.77	41.76	0.26	43.69
Totals		**3,374.17**	**1,735.20**	**4,668.15**	**268.04**	**9,249.75**
Madison	On-Road Mobile Sources *	178.80	3,616.52	181.73	49.15	1,592.92
Monroe						
St. Clair						
Randolph						
Totals		**178.80**	**3,616.52**	**181.73**	**49.15**	**1,592.92**
Madison	Off-Road Mobile Sources	2.03	4,272.16	145.45	239.99	840.06
Monroe		1.12	2,254.51	67.33	98.35	207.63
St. Clair		0.67	2,164.93	109.38	81.37	953.88
Randolph		0.17	336.43	9.04	18.31	35.53
Totals		**3.99**	**9,028.03**	**331.20**	**438.02**	**2,037.10**
Grand Total		**3,799.65**	**27,202.69**	**8,046.27**	**22,608.77**	**18,421.57**

*Note: MOVES based on-road mobile sources were calculated for the entire Illinois portion of the nonattainment area; therefore, county-level emissions are not provided.

Appendix F-2 Illinois Point Source Emissions for 2002, 2008, 2017, and 2022

The point source emissions inventory data for the Illinois portion of the nonattainment area that was used in this plan was provided by Illinois EPA to the Air Program. Illinois provided the 2008 point source emissions inventory to the Air Program on September 24, 2013, and the future year point source inventories (2017 and 2025) were provided to the Air Program on October 18, 2013. The 2002 point source emissions data was based on actual emissions levels pulled from the Illinois Base Year Particulate Matter and Haze Inventory for 2002. The 2008 Emissions Inventory was based on actual reported emissions data. The 2017 and 2025 emissions were calculated by Illinois EPA by growing the 2008 emissions to these future years using EGAS 4.0 growth factors. Because EGAS 4.0 only includes annual growth factors through 2020, the annual growth factor projected by EGAS from 2019 to 2020 was used to grow the emissions from 2020 to 2025. Illinois also compared 2009 point source information to the 2008 data in order to capture any new point sources that came online in 2009. Illinois also reviewed their state rules, consent agreements and permits to determine any limits for emissions from point sources in the nonattainment area. Table F-6 provides the point source emissions summaries for 2002, 2008, 2017, and 2025 for the Illinois portion of the nonattainment area. Table F-7 provides the facility level emissions by emission point and process for the facilities included in the Illinois portion of the nonattainment area for 2008 (and 2009 for new sources) as well as the projected emissions for 2017 and 2025.

Table F-6 Point Source Emissions Summaries for the Illinois Nonattainment Area in 2002, 2008, 2017, and 2025

County Name	Year	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	2002	26.21	11,623.99	1,264.84	26,705.66	3,673.85
Monroe		0.01	3.19	0.01	0.08	21.20
St. Clair		15.47	429.99	10.73	1,540.93	1,061.60
Randolph		2.50	22,396.13	1,038.35	26,295.22	337.83
2002 Totals		**44.19**	**34,453.30**	**2,313.93**	**54,541.89**	**5,094.48**
Madison	2008	82.98	11,726.65	1,603.26	25,004.40	3,212.45
Monroe		0.12	10.64	0.35	0.14	17.74
St. Clair		22.32	316.41	28.39	123.64	695.92
Randolph		102.89	4,927.81	816.15	25,602.42	351.61
2008 Totals		**208.31**	**16,981.51**	**2,448.15**	**50,730.60**	**4,277.72**
Madison	2017	88.50	6,338.98	1,719.32	14,858.82	3,715.91
Monroe		0.13	12.43	0.43	0.15	20.48
St. Clair		25.52	416.64	33.68	140.73	860.40
Randolph		106.97	5,123.26	848.52	5,221.48	365.55
2017 Totals		**221.12**	**11,891.31**	**2,601.95**	**20,221.18**	**4,962.34**
Madison	2025	93.89	6,590.75	1,871.77	15,821.23	4,141.84
Monroe		0.15	14.04	0.51	0.15	22.59
St. Clair		28.20	449.29	37.42	152.68	965.72
Randolph		120.45	5,768.86	955.49	5,879.50	411.65
2025 Totals		**242.69**	**12,822.94**	**2,865.19**	**21,853.56**	**5,541.80**

Table F-7 Facility Level Emissions by Point and Process for the Illinois Nonattainment Area in 2008, (2009 for New Sources) 2017, and 2025

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119010AAE	0027	01	30300908	NOX	136.91		180.92	214.97
17119	Madison	119010AAE	0027	01	30300908	PM2.5	28.94		38.24	45.44
17119	Madison	119010AAE	0027	01	30300908	SO2	123.17		162.76	193.40
17119	Madison	119010AAE	0027	01	30300908	VOM	29.35		38.78	46.08
17119	Madison	119010AAE	0029	01	30300908	NOX	0.00		0.00	0.00
17119	Madison	119010AAE	0029	01	30300908	PM2.5	0.00		0.00	0.00
17119	Madison	119010AAE	0029	01	30300908	SO2	0.00		0.00	0.00
17119	Madison	119010AAE	0029	01	30300908	VOM	0.00		0.00	0.00
17119	Madison	119010AAE	0031	01	30300922	NOX	2.73		3.61	4.29
17119	Madison	119010AAE	0031	01	30300922	PM2.5	0.22		0.29	0.35
17119	Madison	119010AAE	0031	01	30300922	SO2	0.02		0.03	0.03
17119	Madison	119010AAE	0031	01	30300922	VOM	0.15		0.20	0.24
17119	Madison	119010AAE	0033	01	30300933	NH3	0.76		1.00	1.19
17119	Madison	119010AAE	0033	01	30300933	NOX	66.40		33.30	39.57
17119	Madison	119010AAE	0033	01	30300933	PM2.5	1.79		2.37	2.81
17119	Madison	119010AAE	0033	01	30300933	SO2	0.15		0.20	0.24
17119	Madison	119010AAE	0033	01	30300933	VOM	1.30		1.72	2.04
17119	Madison	119010AAE	0034	01	30300931	NOX	0.00		0.00	0.00
17119	Madison	119010AAE	0034	01	30300931	SO2	0.00		0.00	0.00
17119	Madison	119010AAE	0034	01	30300931	VOM	0.00		0.00	0.00
17119	Madison	119010AAE	0050	01	40301003	VOM	0.18		0.20	0.23
17119	Madison	119010AAE	0051	01	30510205	PM2.5	0.00		0.00	0.00
17119	Madison	119010AAE	0058	01	30400799	NOX	3.92		5.16	6.07
17119	Madison	119010AAE	0058	01	30400799	SO2	19.49		25.64	30.16
17119	Madison	119010AAE	0058	01	30400799	VOM	1.67		2.20	2.58
17119	Madison	119010AAE	0059	01	30400721	PM2.5	0.00		0.00	0.00
17119	Madison	119010AAE	0060	01	30388801	PM2.5	0.01		0.01	0.01
17119	Madison	119010AAL	0008	01	40600306	VOM	0.00		0.00	0.00
17119	Madison	119010AAO	0006	01	10300602	NH3	0.07		0.07	0.07
17119	Madison	119010AAO	0006	01	10300602	NOX	2.27		2.35	2.32
17119	Madison	119010AAO	0006	01	10300602	PM2.5	0.18		0.18	0.18
17119	Madison	119010AAO	0006	01	10300602	SO2	0.01		0.01	0.01
17119	Madison	119010AAO	0006	01	10300602	VOM	0.13		0.13	0.13
17119	Madison	119010AAO	0006	02	10300501	NH3	0.00		0.00	0.00
17119	Madison	119010AAO	0006	02	10300501	NOX	0.00		0.00	0.00
17119	Madison	119010AAO	0006	02	10300501	PM2.5	0.00		0.00	0.00
17119	Madison	119010AAO	0006	02	10300501	SO2	0.00		0.00	0.00
17119	Madison	119010AAO	0006	02	10300501	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119010ABK	0041	01	10200602	NH3	0.04		0.05	0.06
17119	Madison	119010ABK	0041	01	10200602	NOX	1.18		1.43	1.68
17119	Madison	119010ABK	0041	01	10200602	PM2.5	0.09		0.11	0.13
17119	Madison	119010ABK	0041	01	10200602	SO2	0.01		0.01	0.01
17119	Madison	119010ABK	0041	01	10200602	VOM	0.07		0.08	0.10
17119	Madison	119010ABK	0054	01	30200560	PM2.5	0.04		0.05	0.05
17119	Madison	119010ABK	0055	01	30200563	PM2.5	0.00		0.00	0.00
17119	Madison	119010ABK	0056	01	30200563	PM2.5	0.00		0.00	0.00
17119	Madison	119010ACK	0002	01	10300602	NH3	0.01		0.01	0.01
17119	Madison	119010ACK	0002	01	10300602	NOX	1.62		1.68	1.66
17119	Madison	119010ACK	0002	01	10300602	PM2.5	0.12		0.12	0.12
17119	Madison	119010ACK	0002	01	10300602	SO2	0.01		0.01	0.01
17119	Madison	119010ACK	0002	01	10300602	VOM	0.09		0.09	0.09
17119	Madison	119010ACK	0002	02	10300501	NH3	0.00		0.00	0.00
17119	Madison	119010ACK	0002	02	10300501	NOX	0.00		0.00	0.00
17119	Madison	119010ACK	0002	02	10300501	PM2.5	0.00		0.00	0.00
17119	Madison	119010ACK	0002	02	10300501	SO2	0.02		0.02	0.02
17119	Madison	119010ACK	0002	02	10300501	VOM	0.00		0.00	0.00
17119	Madison	119010ACK	0006	01	40301019	VOM	0.00		0.00	0.00
17119	Madison	119010ADC	0001	01	40301009	VOM	0.01		0.01	0.01
17119	Madison	119010ADC	0002	01	40301019	VOM	0.01		0.01	0.01
17119	Madison	119010ADG	0005	01	30502006	PM2.5	0.00		0.00	0.00
17119	Madison	119010ADK	0005	01	30102107	NOX	0.33		0.38	0.41
17119	Madison	119010ADK	0005	01	30102107	VOM	0.02		0.02	0.03
17119	Madison	119010ADL	0002	01	30502006	PM2.5	0.00		0.00	0.00
17119	Madison	119010ADP	0004	01	10300602	NH3	0.01		0.01	0.01
17119	Madison	119010ADP	0004	01	10300602	NOX	0.55		0.57	0.56
17119	Madison	119010ADP	0004	01	10300602	PM2.5	0.04		0.04	0.04
17119	Madison	119010ADP	0004	01	10300602	SO2	0.00		0.00	0.00
17119	Madison	119010ADP	0004	01	10300602	VOM	0.02		0.02	0.02
17119	Madison	119010ADP	0004	02	10300501	NH3	0.02		0.02	0.02
17119	Madison	119010ADP	0004	02	10300501	NOX	0.35		0.33	0.30
17119	Madison	119010ADP	0004	02	10300501	PM2.5	0.03		0.03	0.02
17119	Madison	119010ADP	0004	02	10300501	SO2	0.01		0.01	0.01
17119	Madison	119010ADP	0004	02	10300501	VOM	0.00		0.00	0.00
17119	Madison	119010ADP	0006	01	31502001	VOM	0.07		0.08	0.09
17119	Madison	119010ADU	0001	01	20300101	NOX	0.01		0.01	0.01
17119	Madison	119010ADU	0001	01	20300101	PM2.5	0.00		0.00	0.00
17119	Madison	119010ADU	0001	01	20300101	SO2	0.12		0.11	0.10
17119	Madison	119010ADY	0005	01	10200603	NH3	0.00		0.00	0.00
17119	Madison	119010ADY	0005	01	10200603	NOX	0.13		0.16	0.19

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119010ADY	0005	01	10200603	PM2.5	0.00		0.00	0.00
17119	Madison	119010ADY	0005	01	10200603	SO2	0.00		0.00	0.00
17119	Madison	119010ADY	0005	01	10200603	VOM	0.00		0.00	0.00
17119	Madison	119020AAC	0001	01	30900202	PM2.5	0.02		0.03	0.04
17119	Madison	119020AAE	0001	01	10100202	NH3	0.46		0.48	0.54
17119	Madison	119020AAE	0001	01	10100202	NOX	2066.99		1230.64	1385.86
17119	Madison	119020AAE	0001	01	10100202	PM2.5	71.55		74.39	83.77
17119	Madison	119020AAE	0001	01	10100202	SO2	5466.69		5683.44	6400.29
17119	Madison	119020AAE	0001	01	10100202	VOM	46.42		48.26	54.35
17119	Madison	119020AAE	0001	02	10100604	NH3	0.03		0.05	0.06
17119	Madison	119020AAE	0001	02	10100604	NOX	1.83		3.12	3.96
17119	Madison	119020AAE	0001	02	10100604	PM2.5	0.02		0.03	0.04
17119	Madison	119020AAE	0001	02	10100604	SO2	0.01		0.02	0.02
17119	Madison	119020AAE	0001	02	10100604	VOM	0.06		0.10	0.13
17119	Madison	119020AAE	0001	03	10100501	NH3	0.00		0.00	0.00
17119	Madison	119020AAE	0001	03	10100501	NOX	0.00		0.00	0.00
17119	Madison	119020AAE	0001	03	10100501	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAE	0001	03	10100501	SO2	0.00		0.00	0.00
17119	Madison	119020AAE	0001	03	10100501	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0002	01	10100501	NH3	0.00		0.00	0.00
17119	Madison	119020AAE	0002	01	10100501	NOX	0.00		0.00	0.00
17119	Madison	119020AAE	0002	01	10100501	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAE	0002	01	10100501	SO2	0.00		0.00	0.00
17119	Madison	119020AAE	0002	01	10100501	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0002	02	10100601	NH3	0.00		0.00	0.00
17119	Madison	119020AAE	0002	02	10100601	NOX	0.00		0.00	0.00
17119	Madison	119020AAE	0002	02	10100601	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAE	0002	02	10100601	SO2	0.00		0.00	0.00
17119	Madison	119020AAE	0002	02	10100601	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0003	01	10100202	NH3	0.10		0.10	0.12
17119	Madison	119020AAE	0003	01	10100202	NOX	435.17		267.14	300.84
17119	Madison	119020AAE	0003	01	10100202	PM2.5	14.79		15.38	17.32
17119	Madison	119020AAE	0003	01	10100202	SO2	1406.27		1462.03	1646.43
17119	Madison	119020AAE	0003	01	10100202	VOM	10.96		11.39	12.83
17119	Madison	119020AAE	0003	02	10100604	NH3	0.01		0.02	0.02
17119	Madison	119020AAE	0003	02	10100604	NOX	0.55		0.94	1.19
17119	Madison	119020AAE	0003	02	10100604	PM2.5	0.01		0.02	0.02
17119	Madison	119020AAE	0003	02	10100604	SO2	0.00		0.00	0.00
17119	Madison	119020AAE	0003	02	10100604	VOM	0.02		0.03	0.04
17119	Madison	119020AAE	0003	03	10100501	NH3	0.00		0.00	0.00
17119	Madison	119020AAE	0003	03	10100501	NOX	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119020AAE	0003	03	10100501	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAE	0003	03	10100501	SO2	0.00		0.00	0.00
17119	Madison	119020AAE	0003	03	10100501	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0006	01	40301019	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0007	01	40301019	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0008	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0009	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0010	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0015	01	40301008	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0018	01	40301028	VOM	0.00		0.00	0.00
17119	Madison	119020AAE	0019	01	40301021	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0032	01	30490003	NH3	0.00		0.00	0.00
17119	Madison	119020AAG	0032	01	30490003	NOX	0.00		0.00	0.00
17119	Madison	119020AAG	0032	01	30490003	PM2.5	0.05		0.05	0.06
17119	Madison	119020AAG	0032	01	30490003	SO2	0.00		0.00	0.00
17119	Madison	119020AAG	0032	01	30490003	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0043	01	30405101	PM2.5	0.01		0.01	0.02
17119	Madison	119020AAG	0043	02	30490003	NOX	0.00		0.00	0.00
17119	Madison	119020AAG	0043	02	30490003	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0043	02	30490003	SO2	0.00		0.00	0.00
17119	Madison	119020AAG	0043	02	30490003	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0046	01	30400499	PM2.5	0.05		0.07	0.08
17119	Madison	119020AAG	0047	01	30499999	PM2.5	0.04		0.05	0.06
17119	Madison	119020AAG	0079	01	30999999	NOX	3.76		4.97	5.89
17119	Madison	119020AAG	0097	01	30102505	PM2.5	0.19		0.22	0.24
17119	Madison	119020AAG	0101	01	10200602	NH3	0.80		0.97	1.14
17119	Madison	119020AAG	0101	01	10200602	NOX	25.13		30.39	35.85
17119	Madison	119020AAG	0101	01	10200602	PM2.5	1.91		2.31	2.72
17119	Madison	119020AAG	0101	01	10200602	SO2	0.15		0.18	0.21
17119	Madison	119020AAG	0101	01	10200602	VOM	1.38		1.67	1.97
17119	Madison	119020AAG	0101	02	10200501	NH3	0.00		0.00	0.00
17119	Madison	119020AAG	0101	02	10200501	NOX	0.00		0.00	0.00
17119	Madison	119020AAG	0101	02	10200501	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0101	02	10200501	SO2	0.00		0.00	0.00
17119	Madison	119020AAG	0101	02	10200501	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0124	01	30400499	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0131	01	40202599	VOM	1.29		1.70	2.02
17119	Madison	119020AAG	0133	01	40202599	VOM	0.01		0.01	0.02
17119	Madison	119020AAG	0133	02	40202599	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0134	02	40202599	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0143	01	40202599	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119020AAG	0148	01	40202599	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0149	01	40202599	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0150	01	40202599	VOM	0.02		0.03	0.03
17119	Madison	119020AAG	0158	01	30405001	PM2.5	0.08		0.11	0.13
17119	Madison	119020AAG	0158	02	30405001	PM2.5	0.02		0.03	0.03
17119	Madison	119020AAG	0161	01	30400299	PM2.5	0.00		0.01	0.01
17119	Madison	119020AAG	0190	01	30901018	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0195	01	40301008	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0234	01	30490035	NOX	0.01		0.01	0.01
17119	Madison	119020AAG	0234	01	30490035	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0234	01	30490035	SO2	0.00		0.00	0.00
17119	Madison	119020AAG	0234	01	30490035	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0275	01	30490003	NH3	0.00		0.00	0.00
17119	Madison	119020AAG	0275	01	30490003	NOX	0.00		0.00	0.00
17119	Madison	119020AAG	0275	01	30490003	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0275	01	30490003	SO2	0.00		0.00	0.00
17119	Madison	119020AAG	0275	01	30490003	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0284	01	30999999	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0306	01	30499999	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0307	01	30499999	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0308	01	30499999	PM2.5	0.01		0.01	0.02
17119	Madison	119020AAG	0309	01	30499999	NOX	0.00		0.00	0.00
17119	Madison	119020AAG	0311	01	30199998	NOX	0.51		0.58	0.64
17119	Madison	119020AAG	0314	01	40202501	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0316	01	30499999	VOM	0.13		0.17	0.20
17119	Madison	119020AAG	0317	01	30499999	VOM	1.41		1.86	2.21
17119	Madison	119020AAG	0318	01	30499999	VOM	0.20		0.26	0.31
17119	Madison	119020AAG	0319	01	30499999	VOM	12.73		16.79	19.94
17119	Madison	119020AAG	0320	01	30499999	VOM	1.99		2.62	3.12
17119	Madison	119020AAG	0321	01	30499999	VOM	0.04		0.05	0.06
17119	Madison	119020AAG	0322	01	30499999	VOM	0.00		0.00	0.00
17119	Madison	119020AAG	0323	01	30499999	VOM	0.05		0.07	0.08
17119	Madison	119020AAG	0324	01	30499999	VOM	4.83		6.37	7.57
17119	Madison	119020AAG	0325	01	30499999	VOM	0.09		0.12	0.14
17119	Madison	119020AAG	0326	01	30499999	VOM	20.73		27.34	32.47
17119	Madison	119020AAG	0327	01	30510205	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0328	01	30488801	PM2.5	1.93		2.55	3.02
17119	Madison	119020AAG	0330	01	30499999	PM2.5	0.00		0.00	0.00
17119	Madison	119020AAG	0331	01	30488801	VOM	0.00		0.00	0.00
17119	Madison	119020ABC	0002	01	40202499	VOM	7.66		10.12	12.01
17119	Madison	119020ABF	0001	01	40400107	VOM	0.02		0.02	0.02

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119020ABG	0001	01	30499999	NOX	6.34		8.36	9.93
17119	Madison	119020ABG	0001	01	30499999	PM2.5	1.76		2.32	2.76
17119	Madison	119020ABG	0001	01	30499999	SO2	0.42		0.55	0.66
17119	Madison	119020ABG	0001	01	30499999	VOM	0.42		0.55	0.66
17119	Madison	119020ABG	0002	01	30499999	PM2.5	32.13		42.37	50.33
17119	Madison	119020ABG	0002	01	30499999	SO2	0.42		0.55	0.66
17119	Madison	119020ABG	0002	01	30499999	VOM	0.42		0.55	0.66
17119	Madison	119020ABG	0003	01	30499999	PM2.5	0.37		0.49	0.58
17119	Madison	119020ABG	0004	01	30499999	PM2.5	0.01		0.01	0.02
17119	Madison	119020ABG	0005	01	30499999	NOX	0.00		0.00	0.00
17119	Madison	119020ABG	0005	01	30499999	PM2.5	0.01		0.01	0.02
17119	Madison	119020ABG	0005	01	30499999	SO2	0.00		0.00	0.00
17119	Madison	119020ABG	0005	01	30499999	VOM	0.03		0.04	0.05
17119	Madison	119020ABG	0006	01	10201201	NOX	2.14		2.39	2.55
17119	Madison	119020ABG	0006	01	10201201	PM2.5	0.45		0.50	0.54
17119	Madison	119020ABG	0006	01	10201201	SO2	0.19		0.21	0.23
17119	Madison	119020ABG	0006	01	10201201	VOM	0.08		0.09	0.10
17119	Madison	119020ABG	0007	01	30499999	PM2.5	1.17		1.54	1.83
17119	Madison	119020ABG	0008	01	30499999	PM2.5	0.01		0.01	0.02
17119	Madison	119020ABG	0009	01	30400299	NH3	0.46		0.61	0.72
17119	Madison	119020ABG	0009	01	30400299	NOX	14.10		18.60	22.03
17119	Madison	119020ABG	0009	01	30400299	PM2.5	1.07		1.41	1.67
17119	Madison	119020ABG	0009	01	30400299	SO2	0.08		0.11	0.12
17119	Madison	119020ABG	0009	01	30400299	VOM	0.78		1.03	1.22
17119	Madison	119020ABG	0010	01	30400299	PM2.5	2.21		2.92	3.45
17119	Madison	119020ABG	0011	01	30400299	PM2.5	8.82		11.64	13.78
17119	Madison	119020ABG	0012	01	30499999	PM2.5	0.01		0.01	0.01
17119	Madison	119020ABG	0013	01	30499999	VOM	0.47		0.62	0.74
17119	Madison	119020ABG	0014	01	30400299	PM2.5	1.76		2.32	2.75
17119	Madison	119020ABG	0015	01	30400299	NH3	0.23		0.30	0.36
17119	Madison	119020ABG	0015	01	30400299	NOX	23.18		30.59	36.22
17119	Madison	119020ABG	0015	01	30400299	PM2.5	0.48		0.63	0.75
17119	Madison	119020ABG	0015	01	30400299	SO2	0.16		0.21	0.25
17119	Madison	119020ABG	0015	01	30400299	VOM	0.34		0.45	0.53
17119	Madison	119020ABG	0016	01	30400299	PM2.5	0.73		0.96	1.14
17119	Madison	119020ABG	0017	01	30499999	PM2.5	0.00		0.00	0.00
17119	Madison	119020ABG	0018	01	30499999	PM2.5	0.03		0.04	0.05
17119	Madison	119020ABG	0019	01	30499999	PM2.5	0.02		0.03	0.03
17119	Madison	119020ABG	0021	01	30499999	PM2.5	0.00		0.00	0.00
17119	Madison	119020ABG	0023	01	30499999	PM2.5	0.00		0.00	0.00
17119	Madison	119020ABG	0024	01	30499999	PM2.5	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119020ABG	0026	01	30499999	PM2.5	3.04		4.01	4.76
17119	Madison	119020ABG	0027	01	30499999	NH3	0.06		0.08	0.09
17119	Madison	119020ABG	0027	01	30499999	NOX	7.14		9.42	11.18
17119	Madison	119020ABG	0027	01	30499999	PM2.5	0.15		0.20	0.23
17119	Madison	119020ABG	0027	01	30499999	SO2	0.05		0.07	0.08
17119	Madison	119020ABG	0027	01	30499999	VOM	0.11		0.15	0.17
17119	Madison	119020ABG	0028	01	30499999	NH3	0.07		0.09	0.11
17119	Madison	119020ABG	0028	01	30499999	NOX	7.67		10.11	12.01
17119	Madison	119020ABG	0028	01	30499999	PM2.5	0.16		0.21	0.25
17119	Madison	119020ABG	0028	01	30499999	SO2	0.05		0.07	0.08
17119	Madison	119020ABG	0028	01	30499999	VOM	0.11		0.15	0.17
17119	Madison	119020ABG	0029	01	30499999	PM2.5	0.02		0.03	0.03
17119	Madison	119020ABG	0030	01	30499999	PM2.5	0.07		0.09	0.11
17119	Madison	119020ABG	0031	01	40100399	VOM	0.56		0.74	0.88
17119	Madison	119020ABG	0032	01	30499999	VOM	5.72		7.54	8.96
17119	Madison	119020ABG	0033	01	30903007	VOM	0.00		0.00	0.00
17119	Madison	119020ABG	0034	01	30999999	VOM	0.06		0.08	0.09
17119	Madison	119020ABG	0035	01	30999999	VOM	0.95		1.26	1.49
17119	Madison	119020ABG	0036	01	30900198	VOM	1.91		2.52	2.99
17119	Madison	119020ABG	0037	01	49099998	VOM	21.46		24.45	26.83
17119	Madison	119020ABG	0038	01	40202502	VOM	6.93		9.15	10.86
17119	Madison	119020ABG	0039	01	30488801	PM2.5	1.16		1.53	1.82
17119	Madison	119020ABG	0040	01	30488801	PM2.5	0.48		0.63	0.75
17119	Madison	119020ABG	0041	01	30488801	PM2.5	0.01		0.01	0.02
17119	Madison	119020ABG	0042	01	30488801	PM2.5	3.82		5.04	5.98
17119	Madison	119020ABG	0043	01	30488801	PM2.5	0.07		0.09	0.11
17119	Madison	119020ABG	0044	01	30488801	PM2.5	0.03		0.04	0.05
17119	Madison	119020ABG	0045	01	38500102	PM2.5	2.31		2.91	3.38
17119	Madison	119020ABG	0046	01	38500102	PM2.5	1.39		1.75	2.03
17119	Madison	119020ABG	0047	01	40600706	VOM	0.00		0.00	0.01
17119	Madison	119025AAS	0001	01	40301019	VOM	0.16		0.18	0.20
17119	Madison	119025AAS	0002	01	40301001	VOM	0.02		0.02	0.03
17119	Madison	119025AAW	0005	01	10200603	NH3	0.00		0.00	0.00
17119	Madison	119025AAW	0005	01	10200603	NOX	0.00		0.00	0.00
17119	Madison	119025AAW	0005	01	10200603	PM2.5	0.00		0.00	0.00
17119	Madison	119025AAW	0005	01	10200603	SO2	0.00		0.00	0.00
17119	Madison	119025AAW	0005	01	10200603	VOM	0.00		0.00	0.00
17119	Madison	119025AAY	0001	01	50410405	VOM	0.00		0.00	0.00
17119	Madison	119025AAZ	0002	01	30125010	VOM	0.17		0.19	0.21
17119	Madison	119025ABA	0001	01	30500205	NOX	12.16		13.44	14.08
17119	Madison	119025ABA	0001	01	30500205	PM2.5	0.16		0.18	0.19

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119025ABA	0001	01	30500205	SO2	11.78		13.02	13.64
17119	Madison	119025ABA	0001	01	30500205	VOM	8.50		9.39	9.84
17119	Madison	119025ABA	0002	01	40301007	VOM	1.41		1.60	1.78
17119	Madison	119025ABA	0003	01	30500214	PM2.5	0.00		0.00	0.00
17119	Madison	119025ABA	0003	01	30500214	VOM	0.00		0.00	0.00
17119	Madison	119025ABA	0004	01	10200602	NH3	0.00		0.00	0.00
17119	Madison	119025ABA	0004	01	10200602	NOX	0.00		0.00	0.00
17119	Madison	119025ABA	0004	01	10200602	PM2.5	0.00		0.00	0.00
17119	Madison	119025ABA	0004	01	10200602	SO2	0.00		0.00	0.00
17119	Madison	119025ABA	0004	01	10200602	VOM	0.00		0.00	0.00
17119	Madison	119025ABA	0006	01	20200101	NOX	0.00		0.00	0.00
17119	Madison	119025ABA	0006	01	20200101	PM2.5	0.00		0.00	0.00
17119	Madison	119025ABA	0006	01	20200101	SO2	0.00		0.00	0.00
17119	Madison	119025ABA	0006	01	20200101	VOM	0.00		0.00	0.00
17119	Madison	119030AAB	0003	01	30501199	NOX	0.50		0.66	0.78
17119	Madison	119030AAB	0004	01	30501199	NOX	0.50		0.66	0.78
17119	Madison	119040AAC	0012	01	30400701	NOX	4.94		6.50	7.64
17119	Madison	119040AAC	0012	01	30400701	SO2	6.17		8.12	9.55
17119	Madison	119040AAC	0012	01	30400701	VOM	8.63		11.36	13.35
17119	Madison	119040AAC	0013	01	30400701	NOX	4.94		6.50	7.64
17119	Madison	119040AAC	0013	01	30400701	SO2	6.17		8.12	9.55
17119	Madison	119040AAC	0013	01	30400701	VOM	8.63		11.36	13.35
17119	Madison	119040AAC	0015	01	30400720	NOX	1.20		1.58	1.86
17119	Madison	119040AAC	0023	01	30400706	VOM	5.85		7.70	9.05
17119	Madison	119040AAC	0029	01	40200101	VOM	7.87		9.92	11.51
17119	Madison	119040AAC	0031	01	30490003	NOX	0.00		0.00	0.00
17119	Madison	119040AAC	0031	01	30490003	PM2.5	0.00		0.00	0.00
17119	Madison	119040AAC	0031	01	30490003	SO2	0.00		0.00	0.00
17119	Madison	119040AAC	0031	01	30490003	VOM	0.00		0.00	0.00
17119	Madison	119040AAC	0037	01	30400350	VOM	10.56		13.89	16.34
17119	Madison	119040AAC	0038	01	30400399	VOM	0.00		0.00	0.00
17119	Madison	119040AAC	0041	01	30400731	VOM	14.61		19.22	22.61
17119	Madison	119040AAC	0042	01	30400731	VOM	4.86		6.39	7.52
17119	Madison	119040AAC	0045	01	30300922	NOX	0.25		0.33	0.39
17119	Madison	119040AAC	0045	01	30300922	SO2	0.51		0.67	0.80
17119	Madison	119040AAC	0045	01	30300922	VOM	3.54		4.68	5.56
17119	Madison	119040AAC	0051	01	30300933	NOX	1.19		1.57	1.87
17119	Madison	119040AAC	0051	01	30300933	SO2	0.01		0.01	0.01
17119	Madison	119040AAC	0051	01	30300933	VOM	0.07		0.09	0.11
17119	Madison	119040AAC	0055	01	30499999	VOM	14.25		18.79	22.32
17119	Madison	119040AAC	0063	01	30300834	VOM	12.44		16.44	19.53

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119040AAC	0066	01	30300621	VOM	0.00		0.00	0.00
17119	Madison	119040AAC	0068	01	30400799	VOM	18.57		24.43	28.74
17119	Madison	119040AAC	0069	01	30400799	VOM	0.00		0.00	0.00
17119	Madison	119040AAC	0070	01	30400706	VOM	21.34		28.08	33.02
17119	Madison	119040AAC	0072	01	30490003	NH3	0.00		0.00	0.00
17119	Madison	119040AAC	0072	01	30490003	NOX	0.00		0.00	0.00
17119	Madison	119040AAC	0072	01	30490003	PM2.5	0.00		0.00	0.00
17119	Madison	119040AAC	0072	01	30490003	SO2	0.00		0.00	0.00
17119	Madison	119040AAC	0072	01	30490003	VOM	0.00		0.00	0.00
17119	Madison	119040AAC	0073	01	30490003	NH3	0.55		0.60	0.63
17119	Madison	119040AAC	0073	01	30490003	NOX	17.14		18.79	19.75
17119	Madison	119040AAC	0073	01	30490003	PM2.5	0.54		0.59	0.62
17119	Madison	119040AAC	0073	01	30490003	SO2	0.10		0.11	0.12
17119	Madison	119040AAC	0073	01	30490003	VOM	0.94		1.03	1.08
17119	Madison	119040AAO	0001	01	10200602	NH3	0.01		0.01	0.01
17119	Madison	119040AAO	0001	01	10200602	NOX	0.24		0.29	0.34
17119	Madison	119040AAO	0001	01	10200602	PM2.5	0.02		0.02	0.03
17119	Madison	119040AAO	0001	01	10200602	SO2	0.00		0.00	0.00
17119	Madison	119040AAO	0001	01	10200602	VOM	0.01		0.01	0.01
17119	Madison	119040AAO	0024	01	30182002	VOM	3.76		4.28	4.70
17119	Madison	119040AAO	0085	01	40301099	VOM	1.57		1.79	1.98
17119	Madison	119040AAO	0086	01	30190003	NH3	0.00		0.00	0.00
17119	Madison	119040AAO	0086	01	30190003	NOX	0.00		0.00	0.00
17119	Madison	119040AAO	0086	01	30190003	PM2.5	0.00		0.00	0.00
17119	Madison	119040AAO	0086	01	30190003	SO2	0.00		0.00	0.00
17119	Madison	119040AAO	0086	01	30190003	VOM	0.00		0.00	0.00
17119	Madison	119040AAO	0087	01	30184001	VOM	0.00		0.00	0.00
17119	Madison	119040AAO	0088	01	30190003	NH3	0.00		0.00	0.00
17119	Madison	119040AAO	0088	01	30190003	NOX	0.00		0.00	0.00
17119	Madison	119040AAO	0088	01	30190003	PM2.5	0.00		0.00	0.00
17119	Madison	119040AAO	0088	01	30190003	SO2	0.00		0.00	0.00
17119	Madison	119040AAO	0088	01	30190003	VOM	0.00		0.00	0.00
17119	Madison	119040AAQ	0006	01	10300501	NH3	0.08		0.08	0.07
17119	Madison	119040AAQ	0006	01	10300501	NOX	0.79		0.75	0.67
17119	Madison	119040AAQ	0006	01	10300501	PM2.5	0.00		0.00	0.00
17119	Madison	119040AAQ	0006	01	10300501	SO2	0.01		0.01	0.01
17119	Madison	119040AAQ	0006	01	10300501	VOM	0.01		0.01	0.01
17119	Madison	119040AAQ	0006	02	10300602	NH3	0.05		0.05	0.05
17119	Madison	119040AAQ	0006	02	10300602	NOX	3.25		3.36	3.32
17119	Madison	119040AAQ	0006	02	10300602	PM2.5	0.00		0.00	0.00
17119	Madison	119040AAQ	0006	02	10300602	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119040AAQ	0006	02	10300602	VOM	0.21		0.22	0.21
17119	Madison	119040AAT	0033	01	30190003	NH3	0.06		0.06	0.07
17119	Madison	119040AAT	0033	01	30190003	NOX	1.42		1.48	1.55
17119	Madison	119040AAT	0033	01	30190003	PM2.5	0.11		0.11	0.12
17119	Madison	119040AAT	0033	01	30190003	SO2	0.01		0.01	0.01
17119	Madison	119040AAT	0033	01	30190003	VOM	0.08		0.08	0.09
17119	Madison	119040AAT	0056	01	30510604	PM2.5	2.64		3.06	3.53
17119	Madison	119040AAT	0057	01	30510604	PM2.5	3.96		4.59	5.29
17119	Madison	119040AAT	0058	01	30599999	PM2.5	0.53		0.62	0.70
17119	Madison	119040AAT	0059	01	30510604	PM2.5	1.58		1.83	2.11
17119	Madison	119040AAT	0060	01	30510604	PM2.5	0.53		0.61	0.71
17119	Madison	119040AAT	0061	01	30502740	PM2.5	0.63		0.73	0.84
17119	Madison	119040AAT	0062	01	30510599	PM2.5	1.06		1.23	1.42
17119	Madison	119040AAT	0063	01	30510599	PM2.5	0.79		0.92	1.06
17119	Madison	119040AAT	0064	01	30510599	PM2.5	0.16		0.19	0.21
17119	Madison	119040AAT	0065	01	30510599	PM2.5	0.04		0.05	0.05
17119	Madison	119040AAT	0067	01	10500106	NH3	0.00		0.00	0.00
17119	Madison	119040AAT	0067	01	10500106	NOX	0.01		0.01	0.01
17119	Madison	119040AAT	0067	01	10500106	PM2.5	0.00		0.00	0.00
17119	Madison	119040AAT	0067	01	10500106	SO2	0.00		0.00	0.00
17119	Madison	119040AAT	0067	01	10500106	VOM	0.00		0.00	0.00
17119	Madison	119040ABI	0003	01	10200603	NH3	0.10		0.12	0.14
17119	Madison	119040ABI	0003	01	10200603	NOX	3.16		3.82	4.51
17119	Madison	119040ABI	0003	01	10200603	PM2.5	0.24		0.29	0.34
17119	Madison	119040ABI	0003	01	10200603	SO2	0.00		0.00	0.00
17119	Madison	119040ABI	0003	01	10200603	VOM	0.20		0.25	0.29
17119	Madison	119040ABI	0004	01	10200501	NH3	0.02		0.02	0.02
17119	Madison	119040ABI	0004	01	10200501	NOX	0.39		0.43	0.47
17119	Madison	119040ABI	0004	01	10200501	PM2.5	0.01		0.01	0.01
17119	Madison	119040ABI	0004	01	10200501	SO2	0.02		0.02	0.03
17119	Madison	119040ABI	0004	01	10200501	VOM	0.01		0.01	0.01
17119	Madison	119040ABI	0004	02	10200603	NH3	0.01		0.01	0.01
17119	Madison	119040ABI	0004	02	10200603	NOX	0.28		0.33	0.39
17119	Madison	119040ABI	0004	02	10200603	PM2.5	0.01		0.02	0.02
17119	Madison	119040ABJ	0009	01	30490003	NH3	0.00		0.00	0.00
17119	Madison	119040ABJ	0009	01	30490003	NOX	0.00		0.00	0.00
17119	Madison	119040ABJ	0009	01	30490003	PM2.5	0.00		0.00	0.00
17119	Madison	119040ABJ	0010	01	30400499	NOX	0.01		0.01	0.02
17119	Madison	119040ADI	0014	01	10200603	NH3	0.12		0.15	0.17
17119	Madison	119040ADI	0014	01	10200603	NOX	3.78		4.57	5.39
17119	Madison	119040ADI	0014	01	10200603	PM2.5	0.29		0.35	0.41

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119040ADI	0014	01	10200603	SO2	0.02		0.03	0.03
17119	Madison	119040ADI	0014	01	10200603	VOM	0.06		0.07	0.09
17119	Madison	119040ADI	0015	01	40301022	VOM	0.15		0.17	0.19
17119	Madison	119040ADM	0012	01	10200602	NH3	0.01		0.01	0.01
17119	Madison	119040ADM	0012	01	10200602	NOX	0.44		0.53	0.63
17119	Madison	119040ADM	0012	01	10200602	PM2.5	0.03		0.04	0.04
17119	Madison	119040ADM	0012	01	10200602	SO2	0.00		0.00	0.00
17119	Madison	119040ADM	0012	01	10200602	VOM	0.02		0.02	0.03
17119	Madison	119040ADM	0014	01	40201801	NOX	8.25		10.90	12.92
17119	Madison	119040ADM	0014	01	40201801	SO2	0.05		0.07	0.08
17119	Madison	119040ADM	0014	01	40201801	VOM	49.62		65.58	77.68
17119	Madison	119040ADR	0002	01	10200603	NH3	0.04		0.05	0.06
17119	Madison	119040ADR	0002	01	10200603	NOX	1.32		1.59	1.88
17119	Madison	119040ADR	0002	01	10200603	PM2.5	0.10		0.12	0.14
17119	Madison	119040ADR	0002	01	10200603	SO2	0.01		0.01	0.01
17119	Madison	119040ADR	0002	01	10200603	VOM	0.07		0.09	0.10
17119	Madison	119040ADS	0001	01	10200602	NH3	0.05		0.06	0.07
17119	Madison	119040ADS	0001	01	10200602	NOX	1.68		2.03	2.40
17119	Madison	119040ADS	0001	01	10200602	PM2.5	0.13		0.15	0.18
17119	Madison	119040ADS	0001	01	10200602	SO2	0.01		0.01	0.01
17119	Madison	119040ADS	0001	01	10200602	VOM	0.09		0.11	0.13
17119	Madison	119040ADX	0001	01	40301201	VOM	0.00		0.00	0.00
17119	Madison	119040AEA	0001	01	50410310	VOM	0.00		0.00	0.00
17119	Madison	119040AEB	0001	01	30300334	VOM	0.03		0.04	0.05
17119	Madison	119040AED	0015	01	30999999	NOX	0.00		0.00	0.00
17119	Madison	119040AED	0015	01	30999999	VOM	0.00		0.00	0.00
17119	Madison	119040ASW	0001	01	10200602	NH3	0.25		0.30	0.36
17119	Madison	119040ASW	0001	01	10200602	NOX	7.90		9.55	11.27
17119	Madison	119040ASW	0001	01	10200602	PM2.5	0.59		0.71	0.84
17119	Madison	119040ASW	0001	01	10200602	SO2	0.04		0.05	0.06
17119	Madison	119040ASW	0001	01	10200602	VOM	0.42		0.51	0.60
17119	Madison	119040ASZ	0002	01	40201601	VOM	2.16		2.86	3.39
17119	Madison	119040ASZ	0002	02	40200901	VOM	0.68		0.86	1.00
17119	Madison	119040ATC	0002	02	40201899	NOX	0.22		0.29	0.34
17119	Madison	119040ATC	0002	02	40201899	VOM	0.01		0.01	0.02
17119	Madison	119040ATC	0003	01	40202501	VOM	1.71		2.26	2.68
17119	Madison	119040ATC	0004	01	40201001	NH3	0.05		0.06	0.07
17119	Madison	119040ATC	0004	01	40201001	NOX	1.45		1.75	2.07
17119	Madison	119040ATC	0004	01	40201001	PM2.5	0.08		0.10	0.11
17119	Madison	119040ATC	0004	01	40201001	SO2	0.06		0.07	0.09
17119	Madison	119040ATC	0004	01	40201001	VOM	0.08		0.10	0.11

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119040ATC	0006	01	40200701	VOM	0.80		1.01	1.17
17119	Madison	119040ATC	0007	01	10200602	NH3	0.01		0.01	0.01
17119	Madison	119040ATC	0007	01	10200602	NOX	0.11		0.13	0.16
17119	Madison	119040ATC	0007	01	10200602	PM2.5	0.01		0.01	0.01
17119	Madison	119040ATC	0007	01	10200602	SO2	0.00		0.00	0.00
17119	Madison	119040ATC	0007	01	10200602	VOM	0.01		0.01	0.01
17119	Madison	119040ATC	0008	01	40290013	NOX	0.79		0.96	1.13
17119	Madison	119040ATC	0008	01	40290013	PM2.5	0.04		0.05	0.06
17119	Madison	119040ATC	0008	01	40290013	SO2	0.01		0.01	0.01
17119	Madison	119040ATC	0008	01	40290013	VOM	0.04		0.05	0.06
17119	Madison	119040ATD	0001	01	40500301	VOM	0.84		0.96	1.05
17119	Madison	119040ATD	0001	02	40500315	VOM	1.53		1.74	1.92
17119	Madison	119040ATD	0001	03	40500314	VOM	6.36		7.24	7.98
17119	Madison	119040ATD	0001	04	40500318	VOM	0.06		0.07	0.08
17119	Madison	119040ATD	0002	01	40500301	VOM	0.06		0.07	0.08
17119	Madison	119040ATD	0003	01	40500315	VOM	0.34		0.39	0.43
17119	Madison	119040ATF	0003	01	30502002	PM2.5	0.00		0.00	0.00
17119	Madison	119040ATF	0005	01	30502006	PM2.5	0.00		0.01	0.01
17119	Madison	119040ATG	0001	01	30600508	VOM	0.31		0.35	0.39
17119	Madison	119040ATH	0001	01	10200602	NH3	0.01		0.01	0.01
17119	Madison	119040ATH	0001	01	10200602	NOX	0.17		0.21	0.25
17119	Madison	119040ATH	0001	01	10200602	PM2.5	0.00		0.00	0.00
17119	Madison	119040ATH	0001	01	10200602	SO2	0.00		0.00	0.00
17119	Madison	119040ATH	0001	01	10200602	VOM	0.01		0.01	0.01
17119	Madison	119040ATI	0001	01	30500212	SO2	3.12		3.45	3.61
17119	Madison	119040ATI	0001	01	30500212	VOM	0.12		0.14	0.14
17119	Madison	119040ATI	0002	01	30500130	VOM	0.06		0.07	0.07
17119	Madison	119040ATI	0003	01	30500214	VOM	0.00		0.00	0.00
17119	Madison	119040ATJ	0001	01	10200602	NH3	0.00		0.00	0.00
17119	Madison	119040ATJ	0001	01	10200602	NOX	0.46		0.55	0.65
17119	Madison	119040ATJ	0001	01	10200602	PM2.5	0.03		0.04	0.05
17119	Madison	119040ATJ	0001	01	10200602	SO2	0.00		0.00	0.00
17119	Madison	119040ATJ	0001	01	10200602	VOM	0.03		0.03	0.04
17119	Madison	119040ATN	0004	01	30300302	SO2		0.03	0.04	0.05
17119	Madison	119040ATN	0004	01	30300302	VOM		0.23	0.29	0.35
17119	Madison	119040ATN	0005	01	30300314	NOX		97.50	124.26	147.66
17119	Madison	119040ATN	0005	01	30300314	SO2		177.61	226.36	268.98
17119	Madison	119040ATN	0005	01	30300314	VOM		4.37	5.57	6.62
17119	Madison	119040ATN	0006	01	30300314	NOX		16.22	20.67	24.56
17119	Madison	119040ATN	0006	01	30300314	SO2		296.01	377.26	448.29
17119	Madison	119040ATN	0006	01	30300314	VOM		0.70	0.89	1.06

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119040ATN	0007	01	30300303	NOX		1.87	2.38	2.83
17119	Madison	119040ATN	0007	01	30300303	SO2		9.59	12.22	14.52
17119	Madison	119040ATN	0007	01	30300303	VOM		1.95	2.49	2.95
17119	Madison	119050AAA	0023	01	40400148	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0028	01	30600503	VOM	0.13		0.15	0.16
17119	Madison	119050AAA	0054	01	50100410	NOX	0.00		0.00	0.00
17119	Madison	119050AAA	0054	01	50100410	PM2.5	0.00		0.00	0.00
17119	Madison	119050AAA	0054	01	50100410	SO2	0.00		0.00	0.00
17119	Madison	119050AAA	0054	01	50100410	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0055	01	30600903	NOX	0.00		0.00	0.00
17119	Madison	119050AAA	0055	01	30600903	PM2.5	0.00		0.00	0.00
17119	Madison	119050AAA	0055	01	30600903	SO2	0.00		0.00	0.00
17119	Madison	119050AAA	0055	01	30600903	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0062	01	30688801	VOM	4.63		5.26	5.82
17119	Madison	119050AAA	0078	01	40400148	VOM	2.66		2.76	2.85
17119	Madison	119050AAA	0083	01	40400148	VOM	1.88		1.95	2.02
17119	Madison	119050AAA	0084	01	40400148	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0114	01	40729697	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0118	01	40400148	VOM	5.63		5.84	6.04
17119	Madison	119050AAA	0139	01	40600306	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0156	01	40301141	VOM	18.89		21.48	23.81
17119	Madison	119050AAA	0157	01	40400148	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0162	01	40301141	VOM	18.59		21.14	23.43
17119	Madison	119050AAA	0165	01	40400148	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0196	01	40400148	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0200	01	40400148	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0201	01	40400148	VOM	1.88		1.95	2.02
17119	Madison	119050AAA	0203	01	40400148	VOM	18.89		19.59	20.26
17119	Madison	119050AAA	0234	01	40400148	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0235	01	40400148	VOM	17.80		18.46	19.09
17119	Madison	119050AAA	0239	01	30610001	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0240	01	40703616	VOM	0.00		0.00	0.00
17119	Madison	119050AAA	0241	01	50410312	NOX	0.28		0.33	0.37
17119	Madison	119050AAA	0241	01	50410312	SO2	0.00		0.00	0.00
17119	Madison	119050AAA	0241	01	50410312	VOM	0.42		0.50	0.56
17119	Madison	119050AAD	0001	02	40400116	VOM	3.81		3.95	4.09
17119	Madison	119050AAD	0002	02	40400116	VOM	0.02		0.02	0.02
17119	Madison	119050AAD	0003	01	40400153	VOM	3.92		4.46	4.94
17119	Madison	119050AAD	0004	02	40729698	VOM	0.04		0.05	0.05
17119	Madison	119050AAD	0006	02	40400116	VOM	8.94		9.27	9.59
17119	Madison	119050AAD	0008	02	40301150	VOM	0.06		0.07	0.08

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119050AAD	0011	01	40301101	VOM	0.10		0.11	0.13
17119	Madison	119050AAD	0012	01	40301102	VOM	0.00		0.00	0.00
17119	Madison	119050AAE	0001	03	40400148	VOM	10.01		10.38	10.74
17119	Madison	119050AAE	0002	03	40301119	VOM	0.08		0.09	0.10
17119	Madison	119050AAE	0003	03	40400148	VOM	9.96		10.33	10.68
17119	Madison	119050AAE	0004	03	40301119	VOM	0.03		0.03	0.04
17119	Madison	119050AAE	0006	03	40301120	VOM	0.10		0.11	0.13
17119	Madison	119050AAE	0007	03	40301107	VOM	10.37		11.79	13.07
17119	Madison	119050AAE	0008	03	40301107	VOM	11.75		13.36	14.81
17119	Madison	119050AAE	0009	03	40301107	VOM	0.99		1.13	1.25
17119	Madison	119050AAE	0010	03	40700810	VOM	9.36		10.66	11.70
17119	Madison	119050AAE	0011	03	40301119	VOM	0.03		0.03	0.04
17119	Madison	119050AAE	0012	03	40301180	VOM	0.70		0.80	0.88
17119	Madison	119050AAE	0013	03	40301021	VOM	0.00		0.00	0.00
17119	Madison	119050AAE	0018	01	40400150	VOM	0.00		0.00	0.00
17119	Madison	119050AAE	0018	02	40301120	VOM	0.00		0.00	0.00
17119	Madison	119050AAE	0018	03	40400154	VOM	16.97		19.30	21.39
17119	Madison	119050AAE	0019	01	40301178	VOM	0.00		0.00	0.00
17119	Madison	119050AAK	0018	01	10200501	NH3	0.08		0.09	0.09
17119	Madison	119050AAK	0018	01	10200501	NOX	2.05		2.24	2.43
17119	Madison	119050AAK	0018	01	10200501	PM2.5	0.03		0.03	0.03
17119	Madison	119050AAK	0018	01	10200501	SO2	0.19		0.21	0.23
17119	Madison	119050AAK	0018	01	10200501	VOM	0.03		0.03	0.04
17119	Madison	119050AAK	0018	02	10201003	NOX	0.00		0.00	0.00
17119	Madison	119050AAK	0018	02	10201003	PM2.5	0.00		0.00	0.00
17119	Madison	119050AAK	0018	02	10201003	SO2	0.00		0.00	0.00
17119	Madison	119050AAK	0018	02	10201003	VOM	0.00		0.00	0.00
17119	Madison	119050AAL	0001	01	40301001	VOM	0.02		0.02	0.02
17119	Madison	119050AAL	0002	01	40301001	VOM	0.01		0.01	0.02
17119	Madison	119050AAL	0003	01	40703697	VOM	0.00		0.00	0.00
17119	Madison	119050AAL	0004	01	40301016	VOM	0.02		0.02	0.02
17119	Madison	119050AAL	0005	01	40301019	VOM	0.00		0.00	0.00
17119	Madison	119050AAL	0006	01	40301019	VOM	0.00		0.00	0.00
17119	Madison	119050AAL	0007	01	40301019	VOM	0.00		0.00	0.00
17119	Madison	119050AAL	0008	01	40714697	VOM	0.00		0.00	0.00
17119	Madison	119050AAL	0009	01	40600131	VOM	0.01		0.01	0.02
17119	Madison	119050AAL	0010	01	40301097	VOM	0.00		0.00	0.00
17119	Madison	119050AAM	0001	01	10200603	NH3	0.03		0.04	0.05
17119	Madison	119050AAM	0001	01	10200603	NOX	1.08		1.31	1.54
17119	Madison	119050AAM	0001	01	10200603	PM2.5	0.06		0.08	0.09
17119	Madison	119050AAM	0001	01	10200603	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119050AAM	0001	01	10200603	VOM	0.25		0.30	0.36
17119	Madison	119050AAM	0001	02	10200501	NH3	0.06		0.07	0.08
17119	Madison	119050AAM	0001	02	10200501	NOX	1.91		2.09	2.26
17119	Madison	119050AAM	0001	02	10200501	PM2.5	0.02		0.02	0.02
17119	Madison	119050AAM	0001	02	10200501	SO2	0.02		0.02	0.02
17119	Madison	119050AAM	0001	02	10200501	VOM	0.07		0.07	0.08
17119	Madison	119050AAN	0001	01	40301097	VOM	10.67		12.13	13.45
17119	Madison	119050AAN	0002	01	30688801	NOX	2.69		3.06	3.38
17119	Madison	119050AAN	0002	01	30688801	VOM	0.01		0.01	0.01
17119	Madison	119050AAN	0003	01	40301097	VOM	5.43		6.18	6.85
17119	Madison	119050AAN	0004	01	40301097	VOM	0.00		0.00	0.00
17119	Madison	119050AAN	0005	01	40400151	VOM	2.31		2.63	2.91
17119	Madison	119050AAO	0001	01	10200602	NH3	0.04		0.05	0.06
17119	Madison	119050AAO	0001	01	10200602	NOX	1.33		1.61	1.90
17119	Madison	119050AAO	0001	01	10200602	PM2.5	0.10		0.12	0.14
17119	Madison	119050AAO	0001	01	10200602	SO2	0.01		0.01	0.01
17119	Madison	119050AAO	0001	01	10200602	VOM	0.07		0.08	0.10
17119	Madison	119050AAQ	0006	01	40600135	VOM	0.07		0.08	0.09
17119	Madison	119050AAQ	0007	01	40700810	VOM	0.08		0.09	0.10
17119	Madison	119050AAQ	0013	01	40700810	VOM	0.27		0.31	0.34
17119	Madison	119050AAQ	0015	01	40400278	VOM	8.78		9.11	9.42
17119	Madison	119050AAQ	0016	01	40301021	VOM	1.37		1.56	1.73
17119	Madison	119050AAQ	0017	01	40301107	VOM	1.77		2.01	2.23
17119	Madison	119050AAQ	0018	01	40400211	VOM	0.23		0.24	0.25
17119	Madison	119050AAQ	0019	01	40400179	VOM	0.25		0.28	0.32
17119	Madison	119050AAQ	0020	01	50410420	VOM	0.00		0.00	0.00
17119	Madison	119050AAS	0002	01	50410310	VOM	0.82		0.97	1.09
17119	Madison	119050AAS	0003	01	30990003	NH3	0.08		0.10	0.11
17119	Madison	119050AAS	0003	01	30990003	NOX	2.43		2.89	3.19
17119	Madison	119050AAS	0003	01	30990003	PM2.5	0.18		0.21	0.24
17119	Madison	119050AAS	0003	01	30990003	SO2	0.02		0.02	0.03
17119	Madison	119050AAS	0003	01	30990003	VOM	2.63		3.13	3.45
17119	Madison	119050AAS	0004	01	49000299	VOM	0.00		0.00	0.00
17119	Madison	119050AAT	0001	01	50410310	VOM	0.00		0.00	0.00
17119	Madison	119055AAB	0001	01	40200101	VOM	0.06		0.07	0.09
17119	Madison	119055AAB	0002	01	40200801	VOM	0.04		0.05	0.06
17119	Madison	119055AAB	0003	01	40200101	VOM	2.09		2.63	3.05
17119	Madison	119055AAB	0004	01	40200801	VOM	0.04		0.05	0.06
17119	Madison	119055AAC	0003	01	10200603	NH3	0.00		0.00	0.00
17119	Madison	119055AAC	0003	01	10200603	NOX	0.04		0.05	0.06
17119	Madison	119055AAC	0003	01	10200603	PM2.5	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119055AAC	0003	01	10200603	SO2	0.07		0.09	0.10
17119	Madison	119055AAC	0003	01	10200603	VOM	0.00		0.00	0.00
17119	Madison	119055AAD	0007	01	20100101	NOX	0.47		0.43	0.38
17119	Madison	119055AAD	0007	01	20100101	SO2	0.01		0.01	0.01
17119	Madison	119055AAD	0007	01	20100101	VOM	0.01		0.01	0.01
17119	Madison	119055AAD	0008	01	20100101	NOX	0.58		0.53	0.47
17119	Madison	119055AAD	0008	01	20100101	SO2	0.01		0.01	0.01
17119	Madison	119055AAD	0008	01	20100101	VOM	0.14		0.13	0.11
17119	Madison	119055AAD	0009	01	20100101	NOX	1.06		0.97	0.85
17119	Madison	119055AAD	0009	01	20100101	SO2	0.02		0.02	0.02
17119	Madison	119055AAD	0009	01	20100101	VOM	0.26		0.24	0.21
17119	Madison	119055AAD	0010	01	20100101	NOX	1.06		0.97	0.85
17119	Madison	119055AAD	0010	01	20100101	SO2	0.02		0.02	0.02
17119	Madison	119055AAD	0010	01	20100101	VOM	0.27		0.25	0.22
17119	Madison	119055AAD	0011	01	20100101	NOX	0.31		0.28	0.25
17119	Madison	119055AAD	0011	01	20100101	SO2	0.00		0.00	0.00
17119	Madison	119055AAD	0012	01	20100101	NOX	0.29		0.27	0.23
17119	Madison	119055AAD	0012	01	20100101	SO2	0.00		0.00	0.00
17119	Madison	119055AAD	0012	01	20100101	VOM	0.01		0.01	0.01
17119	Madison	119055AAD	0013	01	20100101	NOX	0.30		0.27	0.24
17119	Madison	119055AAD	0013	01	20100101	SO2	0.00		0.00	0.00
17119	Madison	119055AAD	0013	01	20100101	VOM	0.01		0.01	0.01
17119	Madison	119055AAD	0014	01	20100101	NOX	0.47		0.43	0.38
17119	Madison	119055AAD	0014	01	20100101	SO2	0.01		0.01	0.01
17119	Madison	119055AAD	0014	01	20100101	VOM	0.12		0.11	0.10
17119	Madison	119055AAD	0015	01	20100101	NOX	0.03		0.03	0.02
17119	Madison	119055AAD	0015	01	20100101	SO2	0.00		0.00	0.00
17119	Madison	119055AAK	0001	01	40200101	VOM	0.00		0.00	0.00
17119	Madison	119055AAK	0005	01	30999999	NOX	0.40		0.53	0.63
17119	Madison	119055AAK	0006	01	30999999	NOX	0.20		0.27	0.32
17119	Madison	119055AAL	0005	01	40500601	VOM	0.27		0.31	0.34
17119	Madison	119055AAL	0006	01	40500511	VOM	9.99		11.38	12.53
17119	Madison	119055AAL	0007	01	30999999	VOM	0.44		0.58	0.68
17119	Madison	119055AAP	0007	01	30700401	VOM	0.72		0.82	0.91
17119	Madison	119055AAP	0018	01	10200602	NH3	0.07		0.08	0.10
17119	Madison	119055AAP	0018	01	10200602	NOX	2.36		2.85	3.37
17119	Madison	119055AAP	0018	01	10200602	PM2.5	0.18		0.22	0.26
17119	Madison	119055AAP	0018	01	10200602	SO2	0.01		0.01	0.01
17119	Madison	119055AAP	0018	01	10200602	VOM	0.13		0.16	0.19
17119	Madison	119055AAP	0019	01	30700401	VOM	4.80		5.46	6.07
17119	Madison	119055AAZ	0001	01	40500401	VOM	0.83		0.94	1.04

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119055ABD	0001	01	10200603	NH3	0.00		0.00	0.00
17119	Madison	119055ABD	0001	01	10200603	NOX	0.35		0.42	0.50
17119	Madison	119055ABD	0001	01	10200603	PM2.5	0.03		0.04	0.05
17119	Madison	119055ABD	0001	01	10200603	SO2	0.00		0.00	0.00
17119	Madison	119055ABD	0001	01	10200603	VOM	0.02		0.02	0.03
17119	Madison	119055ABD	0002	01	10200603	NH3	0.00		0.00	0.00
17119	Madison	119055ABD	0002	01	10200603	NOX	0.31		0.38	0.45
17119	Madison	119055ABD	0002	01	10200603	PM2.5	0.02		0.02	0.02
17119	Madison	119055ABD	0002	01	10200603	SO2	0.00		0.00	0.00
17119	Madison	119055ABD	0002	01	10200603	VOM	0.02		0.02	0.02
17119	Madison	119055ABE	0001	01	40202599	NOX	0.00		0.00	0.00
17119	Madison	119055ABE	0001	01	40202599	SO2	0.00		0.00	0.00
17119	Madison	119055ABE	0001	01	40202599	VOM	0.00		0.00	0.00
17119	Madison	119055ABE	0017	01	40200101	VOM	3.75		4.73	5.48
17119	Madison	119055ABE	0017	02	40202502	VOM	0.00		0.00	0.00
17119	Madison	119055ABE	0019	01	40202502	VOM	0.00		0.00	0.00
17119	Madison	119065AAG	0032	01	50410420	VOM	0.00		0.00	0.00
17119	Madison	119085AAB	0001	01	50410310	VOM	0.06		0.07	0.08
17119	Madison	119085AAB	0002	01	50400201	VOM	0.16		0.18	0.21
17119	Madison	119085AAC	0001	01	50410310	VOM	1.84		2.16	2.43
17119	Madison	119090AAA	0001	02	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0001	02	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0001	02	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0001	03	30600106	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0001	03	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0001	03	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0001	03	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0002	01	40301097	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0004	02	30600106	NOX	162.37		49.94	48.76
17119	Madison	119090AAA	0004	02	30600106	PM2.5	4.42		4.30	4.20
17119	Madison	119090AAA	0004	02	30600106	SO2	2.06		2.01	1.96
17119	Madison	119090AAA	0004	02	30600106	VOM	3.20		3.12	3.04
17119	Madison	119090AAA	0004	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0004	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0004	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0005	02	30600106	NOX	164.43		50.57	49.38
17119	Madison	119090AAA	0005	02	30600106	PM2.5	4.47		4.35	4.25
17119	Madison	119090AAA	0005	02	30600106	SO2	2.10		2.05	2.00
17119	Madison	119090AAA	0005	02	30600106	VOM	3.24		3.16	3.08
17119	Madison	119090AAA	0005	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0005	03	30600103	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0005	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0006	02	30600106	NOX	36.44		35.49	34.65
17119	Madison	119090AAA	0006	02	30600106	PM2.5	2.76		2.69	2.62
17119	Madison	119090AAA	0006	02	30600106	SO2	1.31		1.28	1.25
17119	Madison	119090AAA	0006	02	30600106	VOM	2.01		1.96	1.91
17119	Madison	119090AAA	0007	02	30600106	NOX	12.66		12.33	12.04
17119	Madison	119090AAA	0007	02	30600106	PM2.5	0.96		0.93	0.91
17119	Madison	119090AAA	0007	02	30600106	SO2	0.44		0.43	0.42
17119	Madison	119090AAA	0007	02	30600106	VOM	0.70		0.68	0.67
17119	Madison	119090AAA	0007	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0007	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0007	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0008	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0008	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0008	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0008	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0008	02	30600106	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0008	02	30600106	NOX	8.45		8.23	8.04
17119	Madison	119090AAA	0008	02	30600106	PM2.5	0.66		0.64	0.63
17119	Madison	119090AAA	0008	02	30600106	SO2	0.31		0.30	0.29
17119	Madison	119090AAA	0008	02	30600106	VOM	0.48		0.47	0.46
17119	Madison	119090AAA	0009	02	30600106	NOX	47.35		14.58	14.24
17119	Madison	119090AAA	0009	02	30600106	PM2.5	1.27		1.24	1.21
17119	Madison	119090AAA	0009	02	30600106	SO2	0.61		0.59	0.58
17119	Madison	119090AAA	0009	02	30600106	VOM	0.92		0.90	0.87
17119	Madison	119090AAA	0009	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0009	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0009	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0010	01	30600106	NOX	373.10		363.36	354.81
17119	Madison	119090AAA	0010	01	30600106	PM2.5	10.11		9.85	9.61
17119	Madison	119090AAA	0010	01	30600106	SO2	48.76		47.49	46.37
17119	Madison	119090AAA	0010	01	30600106	VOM	7.30		7.11	6.94
17119	Madison	119090AAA	0010	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0010	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0010	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0011	01	30600503	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0012	02	30600106	NOX	8.15		7.94	7.75
17119	Madison	119090AAA	0012	02	30600106	PM2.5	1.01		0.98	0.96
17119	Madison	119090AAA	0012	02	30600106	SO2	0.48		0.47	0.46
17119	Madison	119090AAA	0012	02	30600106	VOM	0.74		0.72	0.70
17119	Madison	119090AAA	0013	01	30600105	NH3	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0013	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0013	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0013	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0013	02	30600106	NOX	12.22		11.90	11.62
17119	Madison	119090AAA	0013	02	30600106	PM2.5	1.53		1.49	1.46
17119	Madison	119090AAA	0013	02	30600106	SO2	0.70		0.68	0.67
17119	Madison	119090AAA	0013	02	30600106	VOM	1.10		1.07	1.05
17119	Madison	119090AAA	0014	02	30600106	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0014	02	30600106	NOX	99.47		30.60	29.88
17119	Madison	119090AAA	0014	02	30600106	PM2.5	2.72		2.65	2.59
17119	Madison	119090AAA	0014	02	30600106	SO2	1.27		1.24	1.21
17119	Madison	119090AAA	0014	02	30600106	VOM	1.97		1.92	1.87
17119	Madison	119090AAA	0015	01	40400498	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0016	01	40400402	VOM	9.04		9.38	9.70
17119	Madison	119090AAA	0017	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0017	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0017	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0017	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0017	02	30600106	NOX	112.35		0.00	0.00
17119	Madison	119090AAA	0017	02	30600106	PM2.5	3.07		2.99	2.92
17119	Madison	119090AAA	0017	02	30600106	SO2	1.45		1.41	1.38
17119	Madison	119090AAA	0017	02	30600106	VOM	2.19		2.13	2.08
17119	Madison	119090AAA	0017	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0018	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0018	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0018	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0018	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0018	02	30600106	NOX	60.44		0.00	0.00
17119	Madison	119090AAA	0018	02	30600106	PM2.5	1.62		1.58	1.54
17119	Madison	119090AAA	0018	02	30600106	SO2	0.74		0.72	0.70
17119	Madison	119090AAA	0018	02	30600106	VOM	1.18		1.15	1.12
17119	Madison	119090AAA	0018	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0019	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0020	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0021	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0022	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0024	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0024	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0024	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0024	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0024	02	30600106	NOX	134.82		41.48	40.50

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0024	02	30600106	PM2.5	3.68		3.58	3.50
17119	Madison	119090AAA	0024	02	30600106	SO2	1.71		1.67	1.63
17119	Madison	119090AAA	0024	02	30600106	VOM	2.63		2.56	2.50
17119	Madison	119090AAA	0024	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0024	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0024	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0025	01	30600106	NOX	201.22		61.89	60.43
17119	Madison	119090AAA	0025	01	30600106	PM2.5	5.48		5.34	5.21
17119	Madison	119090AAA	0025	01	30600106	SO2	2.54		2.47	2.42
17119	Madison	119090AAA	0025	01	30600106	VOM	3.94		3.84	3.75
17119	Madison	119090AAA	0025	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0025	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0025	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0025	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0025	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0025	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0025	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0026	01	40301009	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0027	01	40301010	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0028	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0028	01	30600106	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0028	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0028	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0028	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0028	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0028	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0028	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0028	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0029	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0029	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0029	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0029	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0029	02	30600106	NOX	205.98		51.80	50.58
17119	Madison	119090AAA	0029	02	30600106	PM2.5	5.61		5.46	5.34
17119	Madison	119090AAA	0029	02	30600106	SO2	2.63		2.56	2.50
17119	Madison	119090AAA	0029	02	30600106	VOM	4.03		3.92	3.83
17119	Madison	119090AAA	0030	01	30600106	NOX	217.86		67.00	65.43
17119	Madison	119090AAA	0030	01	30600106	PM2.5	5.91		5.76	5.62
17119	Madison	119090AAA	0030	01	30600106	SO2	2.76		2.69	2.62
17119	Madison	119090AAA	0030	01	30600106	VOM	4.29		4.18	4.08
17119	Madison	119090AAA	0030	02	30600105	NH3	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0030	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0030	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0030	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0030	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0030	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0030	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0031	01	30600104	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0031	01	30600104	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0031	01	30600104	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0031	01	30600104	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0031	01	30600104	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0032	01	40301007	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0033	01	30600106	NOX	22.91		18.96	18.52
17119	Madison	119090AAA	0033	01	30600106	PM2.5	1.75		1.70	1.66
17119	Madison	119090AAA	0033	01	30600106	SO2	0.83		0.81	0.79
17119	Madison	119090AAA	0033	01	30600106	VOM	1.27		1.24	1.21
17119	Madison	119090AAA	0033	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0033	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0033	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0033	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0034	01	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0034	01	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0034	01	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0034	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0034	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0034	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0034	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0035	01	40301007	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0036	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0036	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0036	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0036	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0036	02	30600106	NOX	28.08		23.24	22.70
17119	Madison	119090AAA	0036	02	30600106	PM2.5	2.15		2.09	2.04
17119	Madison	119090AAA	0036	02	30600106	SO2	1.01		0.98	0.96
17119	Madison	119090AAA	0036	02	30600106	VOM	1.53		1.49	1.46
17119	Madison	119090AAA	0037	01	40301007	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0038	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0039	01	40400402	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0041	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0041	01	30600105	NOX	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0041	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0041	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0041	02	30600106	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0041	02	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0041	02	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0041	02	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0041	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0041	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0041	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0042	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0042	01	30600106	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0042	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0042	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0043	01	30600201	NH3	31.15		32.95	34.70
17119	Madison	119090AAA	0043	01	30600201	NOX	515.19		5.45	5.74
17119	Madison	119090AAA	0043	01	30600201	PM2.5	58.89		62.30	65.60
17119	Madison	119090AAA	0043	01	30600201	SO2	5876.90		62.17	65.46
17119	Madison	119090AAA	0043	01	30600201	VOM	6.49		6.87	7.23
17119	Madison	119090AAA	0045	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0046	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0046	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0046	01	30600105	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0046	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0046	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0047	01	30600201	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0047	01	30600201	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0047	01	30600201	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0047	01	30600201	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0047	01	30600201	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0047	02	30600201	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0047	02	30600201	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0047	02	30600201	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0047	02	30600201	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0047	03	30600201	NH3	31.05		32.85	34.59
17119	Madison	119090AAA	0047	03	30600201	NOX	607.94		12.86	13.54
17119	Madison	119090AAA	0047	03	30600201	PM2.5	36.92		39.06	41.13
17119	Madison	119090AAA	0047	03	30600201	SO2	4031.97		85.31	89.82
17119	Madison	119090AAA	0047	03	30600201	VOM	5.96		6.30	6.64
17119	Madison	119090AAA	0048	01	30600503	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0049	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0049	01	30600105	NOX	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0049	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0049	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0049	02	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0049	02	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0049	02	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0050	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0051	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0052	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0053	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0054	01	40301098	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0055	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0055	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0055	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0055	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0055	02	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0055	02	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0055	02	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0056	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0056	01	30600106	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0056	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0056	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0056	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0056	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0056	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0056	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0057	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0057	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0057	01	30600105	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0057	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0057	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0058	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0059	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0060	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0060	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0060	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0060	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0060	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0060	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0060	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0061	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0061	01	30600106	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0061	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0062	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0062	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0062	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0062	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0062	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0062	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0062	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0064	01	30600106	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0064	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0064	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0064	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0065	01	30600106	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0065	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0065	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0065	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0067	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0068	02	30600105	NH3	0.25		0.28	0.29
17119	Madison	119090AAA	0068	02	30600105	NOX	7.62		8.57	8.99
17119	Madison	119090AAA	0068	02	30600105	PM2.5	0.57		0.64	0.67
17119	Madison	119090AAA	0068	02	30600105	SO2	0.04		0.05	0.05
17119	Madison	119090AAA	0068	02	30600105	VOM	0.44		0.50	0.52
17119	Madison	119090AAA	0069	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0070	01	30600503	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0071	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0072	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0072	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0072	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0072	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0072	02	30600106	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0072	02	30600106	NOX	9.59		9.34	9.12
17119	Madison	119090AAA	0072	02	30600106	PM2.5	0.74		0.72	0.70
17119	Madison	119090AAA	0072	02	30600106	SO2	0.35		0.34	0.33
17119	Madison	119090AAA	0072	02	30600106	VOM	0.53		0.52	0.50
17119	Madison	119090AAA	0072	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0073	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0073	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0073	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0073	02	30600106	NOX	23.83		6.50	6.35
17119	Madison	119090AAA	0073	02	30600106	PM2.5	2.06		2.01	1.96
17119	Madison	119090AAA	0073	02	30600106	SO2	0.96		0.93	0.91

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0073	02	30600106	VOM	1.49		1.45	1.42
17119	Madison	119090AAA	0074	01	30600701	PM2.5	596.97		678.88	752.55
17119	Madison	119090AAA	0074	01	30600701	VOM	37.76		42.94	47.60
17119	Madison	119090AAA	0075	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0076	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0080	02	10200701	NOX	26.02		5.07	4.95
17119	Madison	119090AAA	0080	02	10200701	PM2.5	3.94		3.84	3.75
17119	Madison	119090AAA	0080	02	10200701	SO2	1.84		1.79	1.75
17119	Madison	119090AAA	0080	02	10200701	VOM	1.71		1.67	1.63
17119	Madison	119090AAA	0080	03	10201301	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0081	01	10200601	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0081	01	10200601	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0081	01	10200601	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0081	01	10200601	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0081	01	10200601	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0081	02	10200701	NOX	146.69		91.53	89.38
17119	Madison	119090AAA	0081	02	10200701	PM2.5	8.06		7.85	7.66
17119	Madison	119090AAA	0081	02	10200701	SO2	3.77		3.67	3.59
17119	Madison	119090AAA	0081	02	10200701	VOM	5.83		5.68	5.54
17119	Madison	119090AAA	0082	02	10200701	NOX	158.56		115.46	112.74
17119	Madison	119090AAA	0082	02	10200701	PM2.5	10.16		9.89	9.66
17119	Madison	119090AAA	0082	02	10200701	SO2	4.77		4.65	4.54
17119	Madison	119090AAA	0082	02	10200701	VOM	7.36		7.17	7.00
17119	Madison	119090AAA	0082	03	10201301	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0082	04	10201301	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0082	04	10201301	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0082	04	10201301	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0083	01	10200601	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0083	01	10200601	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0083	01	10200601	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0083	01	10200601	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0083	01	10200601	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0083	02	10200701	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0083	02	10200701	NOX	108.54		45.98	44.90
17119	Madison	119090AAA	0083	02	10200701	PM2.5	4.07		3.96	3.87
17119	Madison	119090AAA	0083	02	10200701	SO2	1.88		1.83	1.79
17119	Madison	119090AAA	0083	02	10200701	VOM	2.93		2.85	2.79
17119	Madison	119090AAA	0084	01	30600106	NOX	36.66		11.27	11.01
17119	Madison	119090AAA	0084	01	30600106	PM2.5	1.01		0.98	0.96
17119	Madison	119090AAA	0084	01	30600106	SO2	0.48		0.47	0.46
17119	Madison	119090AAA	0084	01	30600106	VOM	0.70		0.68	0.67

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0084	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0084	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0084	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0084	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0085	01	30600106	NOX	20.72		17.15	16.75
17119	Madison	119090AAA	0085	01	30600106	PM2.5	1.58		1.54	1.50
17119	Madison	119090AAA	0085	01	30600106	SO2	0.74		0.72	0.70
17119	Madison	119090AAA	0085	01	30600106	VOM	1.14		1.11	1.08
17119	Madison	119090AAA	0087	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0087	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0087	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0087	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0088	01	30600106	NOX	24.09		19.94	19.47
17119	Madison	119090AAA	0088	01	30600106	PM2.5	1.84		1.79	1.75
17119	Madison	119090AAA	0088	01	30600106	SO2	0.88		0.86	0.84
17119	Madison	119090AAA	0088	01	30600106	VOM	1.31		1.28	1.25
17119	Madison	119090AAA	0088	02	30600103	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0088	02	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0088	02	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0088	02	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0089	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0089	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0089	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0089	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0089	02	30600106	NOX	5.08		4.95	4.83
17119	Madison	119090AAA	0089	02	30600106	PM2.5	0.39		0.38	0.37
17119	Madison	119090AAA	0089	02	30600106	SO2	0.18		0.18	0.17
17119	Madison	119090AAA	0089	02	30600106	VOM	0.26		0.25	0.25
17119	Madison	119090AAA	0090	01	30600106	NOX	3.94		3.84	3.75
17119	Madison	119090AAA	0090	01	30600106	PM2.5	0.31		0.30	0.29
17119	Madison	119090AAA	0090	01	30600106	SO2	0.13		0.13	0.12
17119	Madison	119090AAA	0090	01	30600106	VOM	0.22		0.21	0.21
17119	Madison	119090AAA	0090	02	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0090	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0090	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0090	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0091	01	30600106	NOX	163.33		87.49	85.43
17119	Madison	119090AAA	0091	01	30600106	PM2.5	4.42		4.30	4.20
17119	Madison	119090AAA	0091	01	30600106	SO2	2.06		2.01	1.96
17119	Madison	119090AAA	0091	01	30600106	VOM	3.20		3.12	3.04
17119	Madison	119090AAA	0091	02	30600105	NH3	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0091	02	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0091	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0091	02	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0091	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0091	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0091	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0092	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0092	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0092	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0092	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0092	02	30600106	NOX	136.35		45.15	44.09
17119	Madison	119090AAA	0092	02	30600106	PM2.5	3.68		3.58	3.50
17119	Madison	119090AAA	0092	02	30600106	SO2	1.71		1.67	1.63
17119	Madison	119090AAA	0092	02	30600106	VOM	2.67		2.60	2.54
17119	Madison	119090AAA	0092	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0092	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0092	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0093	02	30600106	NOX	25.23		5.65	5.52
17119	Madison	119090AAA	0093	02	30600106	PM2.5	1.93		1.88	1.84
17119	Madison	119090AAA	0093	02	30600106	SO2	0.88		0.86	0.84
17119	Madison	119090AAA	0093	02	30600106	VOM	1.40		1.36	1.33
17119	Madison	119090AAA	0093	03	30600103	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0093	03	30600103	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0093	03	30600103	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0094	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0094	01	30600106	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0094	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0094	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0095	01	30600106	NOX	12.70		12.37	12.08
17119	Madison	119090AAA	0095	01	30600106	PM2.5	1.58		1.54	1.50
17119	Madison	119090AAA	0095	01	30600106	SO2	0.74		0.72	0.70
17119	Madison	119090AAA	0095	01	30600106	VOM	1.14		1.11	1.08
17119	Madison	119090AAA	0096	01	40600306	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0097	01	40400497	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0098	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0099	01	30602301	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0100	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0101	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0102	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0103	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0104	01	40301099	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0105	01	40301098	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0106	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0107	01	40400497	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0108	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0109	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0110	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0111	01	40301001	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0112	01	40301001	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0113	01	40301001	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0114	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0115	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0116	01	40301101	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0117	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0118	01	30601601	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0119	01	40400153	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0122	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0123	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0124	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0125	01	40301099	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0126	01	30103204	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0127	01	40400498	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0128	01	40600237	VOM	29.39		34.66	39.13
17119	Madison	119090AAA	0129	01	40600237	VOM	7.45		8.79	9.92
17119	Madison	119090AAA	0130	01	40301098	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0131	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0132	01	40301097	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0133	01	40301098	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0134	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0135	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0136	01	40301098	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0137	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0138	01	30199998	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0141	01	30600904	NOX	14.67		14.29	13.95
17119	Madison	119090AAA	0141	01	30600904	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0141	01	30600904	VOM	13.58		13.23	12.91
17119	Madison	119090AAA	0142	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0143	01	30600517	NOX	1.00		1.14	1.26
17119	Madison	119090AAA	0143	01	30600517	SO2	0.39		0.44	0.49
17119	Madison	119090AAA	0143	01	30600517	VOM	147.69		167.95	186.18
17119	Madison	119090AAA	0144	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0145	01	40301099	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0146	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0147	01	40301097	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0148	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0149	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0150	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0151	01	40301099	VOM	13.14		14.94	16.56
17119	Madison	119090AAA	0152	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0153	01	30600106	NOX	21.33		17.66	17.24
17119	Madison	119090AAA	0153	01	30600106	PM2.5	1.62		1.58	1.54
17119	Madison	119090AAA	0153	01	30600106	SO2	0.74		0.72	0.70
17119	Madison	119090AAA	0153	01	30600106	VOM	1.18		1.15	1.12
17119	Madison	119090AAA	0154	01	30600106	NOX	20.94		17.33	16.93
17119	Madison	119090AAA	0154	01	30600106	PM2.5	1.58		1.54	1.50
17119	Madison	119090AAA	0154	01	30600106	SO2	0.74		0.72	0.70
17119	Madison	119090AAA	0154	01	30600106	VOM	1.14		1.11	1.08
17119	Madison	119090AAA	0155	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0155	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0155	01	30600105	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0155	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0155	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0156	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0156	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0156	01	30600105	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0156	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0156	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0157	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0157	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0157	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0158	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0158	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0158	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0159	01	30603301	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0159	01	30603301	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0159	01	30603301	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0159	01	30603301	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0159	01	30603301	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0160	01	30600202	PM2.5	0.30		0.32	0.33
17119	Madison	119090AAA	0160	01	30600202	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0161	01	40600138	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0162	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0163	01	20200102	NOX	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0163	01	20200102	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0163	01	20200102	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0163	01	20200102	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0164	01	30601601	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0165	01	30601601	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0166	01	40600140	VOM	53.99		61.40	68.06
17119	Madison	119090AAA	0167	01	30600105	NH3	0.00		0.00	0.00
17119	Madison	119090AAA	0167	01	30600105	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0167	01	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0167	01	30600105	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0169	01	30600202	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0170	01	40600140	VOM	19.47		22.14	24.54
17119	Madison	119090AAA	0171	01	40600140	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0173	01	40600136	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0174	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0175	01	30603301	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0176	01	40600251	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0177	01	40600248	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0178	01	40600250	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0179	01	40600250	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0180	01	40600250	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0181	01	40600250	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0183	01	40301001	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0184	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0185	01	40301197	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0186	01	40301197	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0187	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0188	01	40301117	VOM	17.52		19.92	22.09
17119	Madison	119090AAA	0189	01	40301117	VOM	17.52		19.92	22.09
17119	Madison	119090AAA	0190	01	40301117	VOM	17.52		19.92	22.09
17119	Madison	119090AAA	0191	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0192	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0193	01	40301117	VOM	17.52		19.92	22.09
17119	Madison	119090AAA	0194	01	40301117	VOM	17.52		19.92	22.09
17119	Madison	119090AAA	0195	01	40301117	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0196	01	40301117	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0197	01	40301117	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0198	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0199	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0200	01	40301117	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0201	01	40301117	VOM	8.76		9.96	11.04

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0202	01	40301117	VOM	8.47		9.63	10.68
17119	Madison	119090AAA	0203	01	40301117	VOM	26.28		29.89	33.13
17119	Madison	119090AAA	0204	01	40301117	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0205	01	40301117	VOM	26.28		29.89	33.13
17119	Madison	119090AAA	0206	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0207	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0208	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0209	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0210	01	40301117	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0211	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0212	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0213	01	40301117	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0214	01	40301117	VOM	26.28		29.89	33.13
17119	Madison	119090AAA	0215	01	40703698	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0216	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0216	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0217	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0217	02	30600105	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0220	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0221	01	40301099	VOM	21.90		24.90	27.61
17119	Madison	119090AAA	0222	01	40301099	VOM	52.56		59.77	66.26
17119	Madison	119090AAA	0223	01	20200102	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0223	01	20200102	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0223	01	20200102	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0223	01	20200102	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0224	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0225	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0227	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0230	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0231	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0232	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0234	01	40301099	VOM	0.89		1.01	1.12
17119	Madison	119090AAA	0235	01	40301099	VOM	6.48		7.37	8.17
17119	Madison	119090AAA	0239	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0243	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0248	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0249	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0254	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0255	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0257	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0259	01	40301099	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0260	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0264	01	40701612	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0265	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0267	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0268	01	40301079	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0269	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0270	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0271	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0272	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0273	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0274	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0275	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0276	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0277	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0278	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0279	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0280	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0281	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0282	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0283	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0284	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0285	01	40301023	VOM	13.14		14.94	16.56
17119	Madison	119090AAA	0286	01	40301023	VOM	13.14		14.94	16.56
17119	Madison	119090AAA	0287	01	40301023	VOM	8.06		9.17	10.16
17119	Madison	119090AAA	0288	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0289	01	40301023	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0290	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0291	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0292	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0293	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0294	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0295	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0297	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0298	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0300	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0301	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0302	01	40301079	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0303	01	40301079	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0304	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0305	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0307	01	40301023	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0308	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0309	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0310	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0311	01	40301079	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0312	01	40301075	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0313	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0315	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0474	01	40301076	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0475	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0476	01	40301075	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0479	01	40301182	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0480	01	40719698	VOM	8.76		9.98	10.95
17119	Madison	119090AAA	0481	01	40301180	VOM	13.14		14.94	16.56
17119	Madison	119090AAA	0482	01	40301075	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0484	01	40301180	VOM	13.14		14.94	16.56
17119	Madison	119090AAA	0485	01	40301180	VOM	5.62		6.39	7.08
17119	Madison	119090AAA	0486	01	40301180	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0487	01	40301180	VOM	12.13		13.79	15.29
17119	Madison	119090AAA	0488	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0489	01	40301023	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0490	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0491	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0492	01	40301075	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0493	01	40301076	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0494	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0495	01	40301023	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0496	01	40301023	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0497	01	40301197	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0498	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0499	01	40301182	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0501	01	40301180	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0502	01	40301180	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0503	01	40301197	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0504	01	40719698	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0505	01	40719698	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0506	01	40719698	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0507	01	40301021	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0508	01	40301021	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0509	01	40301021	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0510	01	40301079	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0511	01	40301021	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0512	01	40301021	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0513	02	40301182	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0514	01	40301197	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0515	02	40301182	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0516	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0517	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0518	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0519	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0520	01	40301182	VOM	2.99		3.40	3.77
17119	Madison	119090AAA	0521	01	40703616	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0522	01	40719616	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0523	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0524	01	40703616	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0525	01	40301075	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0526	01	40301180	VOM	13.14		14.94	16.56
17119	Madison	119090AAA	0527	01	40301179	VOM	13.93		15.84	17.56
17119	Madison	119090AAA	0528	01	40719616	VOM	17.52		19.96	21.90
17119	Madison	119090AAA	0529	01	40301197	VOM	9.31		10.59	11.74
17119	Madison	119090AAA	0530	01	40301180	VOM	13.14		14.94	16.56
17119	Madison	119090AAA	0531	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0532	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0534	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0535	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0536	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0537	01	40301197	VOM	3.23		3.67	4.07
17119	Madison	119090AAA	0538	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0539	01	40301179	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0540	01	40301179	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0541	01	40301197	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0542	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0543	01	40301197	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0544	02	40301197	VOM	6.17		7.02	7.78
17119	Madison	119090AAA	0545	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0546	01	40301075	VOM	11.65		13.25	14.69
17119	Madison	119090AAA	0547	01	40301023	VOM	2.56		2.91	3.23
17119	Madison	119090AAA	0548	01	40301099	VOM	4.38		4.98	5.52
17119	Madison	119090AAA	0549	01	40301023	VOM	13.01		14.80	16.40
17119	Madison	119090AAA	0550	01	40301023	VOM	26.28		29.89	33.13
17119	Madison	119090AAA	0551	01	40301023	VOM	25.21		28.67	31.78
17119	Madison	119090AAA	0552	01	40301023	VOM	13.14		14.94	16.56
17119	Madison	119090AAA	0559	01	40301075	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0566	01	40301008	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0569	01	40301008	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0570	01	40301008	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0572	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0573	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0574	01	40301021	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0575	01	40301075	VOM	7.93		9.02	10.00
17119	Madison	119090AAA	0576	01	40301075	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0577	01	40301075	VOM	8.76		9.96	11.04
17119	Madison	119090AAA	0578	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0579	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0581	01	40301117	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0582	01	40720898	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0583	01	40301197	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0586	01	40301117	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0590	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0596	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0601	01	30199998	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0602	01	30600517	VOM	0.37		0.42	0.47
17119	Madison	119090AAA	0603	01	10200602	NH3	0.15		0.18	0.21
17119	Madison	119090AAA	0603	01	10200602	NOX	3.78		4.57	5.39
17119	Madison	119090AAA	0603	01	10200602	PM2.5	0.36		0.44	0.51
17119	Madison	119090AAA	0603	01	10200602	SO2	0.03		0.04	0.04
17119	Madison	119090AAA	0603	01	10200602	VOM	0.26		0.31	0.37
17119	Madison	119090AAA	0607	01	30600904	NOX	0.31		0.30	0.29
17119	Madison	119090AAA	0607	01	30600904	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0607	01	30600904	VOM	0.26		0.25	0.25
17119	Madison	119090AAA	0609	01	30600904	NOX	1.93		1.88	1.84
17119	Madison	119090AAA	0609	01	30600904	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0609	01	30600904	VOM	1.80		1.75	1.71
17119	Madison	119090AAA	0610	01	30600904	NOX	2.23		2.17	2.12
17119	Madison	119090AAA	0610	01	30600904	VOM	2.06		2.01	1.96
17119	Madison	119090AAA	0611	01	30600904	NOX	1.66		1.62	1.58
17119	Madison	119090AAA	0611	01	30600904	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0611	01	30600904	VOM	1.53		1.49	1.46
17119	Madison	119090AAA	0612	01	30603201	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0612	01	30603201	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0613	01	10200602	NH3	0.55		0.67	0.78
17119	Madison	119090AAA	0613	01	10200602	NOX	21.55		22.15	26.13
17119	Madison	119090AAA	0613	01	10200602	PM2.5	1.62		1.96	2.31
17119	Madison	119090AAA	0613	01	10200602	SO2	0.70		0.85	1.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0613	01	10200602	VOM	1.18		1.43	1.68
17119	Madison	119090AAA	0614	01	10200602	NH3	0.55		0.67	0.78
17119	Madison	119090AAA	0614	01	10200602	NOX	21.55		22.15	26.13
17119	Madison	119090AAA	0614	01	10200602	PM2.5	1.62		1.96	2.31
17119	Madison	119090AAA	0614	01	10200602	SO2	0.70		0.85	1.00
17119	Madison	119090AAA	0614	01	10200602	VOM	1.18		1.43	1.68
17119	Madison	119090AAA	0617	01	30600106	NOX	112.43		34.23	33.42
17119	Madison	119090AAA	0617	01	30600106	PM2.5	3.07		2.99	2.92
17119	Madison	119090AAA	0617	01	30600106	SO2	1.36		1.32	1.29
17119	Madison	119090AAA	0617	01	30600106	VOM	2.19		2.13	2.08
17119	Madison	119090AAA	0618	01	30600106	NOX	2.76		2.69	2.62
17119	Madison	119090AAA	0618	01	30600106	PM2.5	0.22		0.21	0.21
17119	Madison	119090AAA	0618	01	30600106	SO2	0.09		0.09	0.09
17119	Madison	119090AAA	0618	01	30600106	VOM	0.13		0.13	0.12
17119	Madison	119090AAA	0656	01	30688801	PM2.5	15.53		17.64	19.51
17119	Madison	119090AAA	0656	01	30688801	VOM	727.26		826.21	913.81
17119	Madison	119090AAA	0658	01	40600306	VOM	0.08		0.08	0.09
17119	Madison	119090AAA	0659	01	30600903	NOX	1.66		1.87	1.96
17119	Madison	119090AAA	0659	01	30600903	PM2.5	3.00		3.38	3.54
17119	Madison	119090AAA	0659	01	30600903	SO2	280.43		315.51	330.88
17119	Madison	119090AAA	0659	01	30600903	VOM	2.24		2.52	2.64
17119	Madison	119090AAA	0660	01	30600104	NOX	539.79		126.56	132.73
17119	Madison	119090AAA	0660	01	30600104	PM2.5	9.37		10.54	11.06
17119	Madison	119090AAA	0660	01	30600104	SO2	5.65		6.36	6.67
17119	Madison	119090AAA	0660	01	30600104	VOM	6.79		7.64	8.01
17119	Madison	119090AAA	0661	01	30600104	NOX	36.66		13.03	13.66
17119	Madison	119090AAA	0661	01	30600104	PM2.5	1.01		1.14	1.19
17119	Madison	119090AAA	0661	01	30600104	SO2	0.48		0.54	0.57
17119	Madison	119090AAA	0661	01	30600104	VOM	0.70		0.79	0.83
17119	Madison	119090AAA	0662	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0662	01	30600106	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0662	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0662	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0663	01	30600106	NOX	8.76		8.53	8.33
17119	Madison	119090AAA	0663	01	30600106	PM2.5	1.10		1.07	1.05
17119	Madison	119090AAA	0663	01	30600106	SO2	0.48		0.47	0.46
17119	Madison	119090AAA	0663	01	30600106	VOM	0.79		0.77	0.75
17119	Madison	119090AAA	0664	01	30600106	NOX	345.36		105.21	102.73
17119	Madison	119090AAA	0664	01	30600106	PM2.5	9.37		9.13	8.91
17119	Madison	119090AAA	0664	01	30600106	SO2	4.12		4.01	3.92
17119	Madison	119090AAA	0664	01	30600106	VOM	6.79		6.61	6.46

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAA	0665	01	30600106	NOX	8.50		8.28	8.08
17119	Madison	119090AAA	0665	01	30600106	PM2.5	1.05		1.02	1.00
17119	Madison	119090AAA	0665	01	30600106	SO2	0.48		0.47	0.46
17119	Madison	119090AAA	0665	01	30600106	VOM	0.79		0.77	0.75
17119	Madison	119090AAA	0666	01	30600903	NOX	0.04		0.05	0.05
17119	Madison	119090AAA	0666	01	30600903	VOM	0.04		0.05	0.05
17119	Madison	119090AAA	0667	01	30599999	PM2.5	0.39		0.45	0.51
17119	Madison	119090AAA	0668	01	30103204	SO2	863.52		127.24	139.65
17119	Madison	119090AAA	0669	01	30600104	NOX	23.91		2.69	2.82
17119	Madison	119090AAA	0669	01	30600104	PM2.5	5.44		6.12	6.42
17119	Madison	119090AAA	0669	01	30600104	SO2	0.44		0.50	0.52
17119	Madison	119090AAA	0669	01	30600104	VOM	3.93		4.42	4.64
17119	Madison	119090AAA	0669	02	30600106	NOX	26.41		2.57	2.51
17119	Madison	119090AAA	0669	02	30600106	PM2.5	6.04		5.88	5.74
17119	Madison	119090AAA	0669	02	30600106	VOM	4.38		4.27	4.17
17119	Madison	119090AAA	0670	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0670	01	30600106	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0670	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0670	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0671	01	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0671	01	30600106	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAA	0671	01	30600106	SO2	0.00		0.00	0.00
17119	Madison	119090AAA	0671	01	30600106	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0671	02	30600106	NOX	0.00		0.00	0.00
17119	Madison	119090AAA	0672	01	40301007	VOM	0.00		0.00	0.00
17119	Madison	119090AAA	0673	01	30600903	NOX	11.04		12.42	13.03
17119	Madison	119090AAA	0673	01	30600903	SO2	1177.34		1324.62	1389.17
17119	Madison	119090AAA	0673	01	30600903	VOM	10.21		11.49	12.05
17119	Madison	119090AAA	0674	01	30199998	NOX	0.04		0.05	0.06
17119	Madison	119090AAA	0674	01	30199998	PM2.5	0.44		0.50	0.55
17119	Madison	119090AAA	0674	01	30199998	SO2	0.66		0.75	0.83
17119	Madison	119090AAA	0674	01	30199998	VOM	3.81		4.34	4.77
17119	Madison	119090AAF	0001	01	50300601	NOX	1.74		2.19	2.55
17119	Madison	119090AAF	0001	01	50300601	PM2.5	0.39		0.49	0.57
17119	Madison	119090AAF	0001	01	50300601	SO2	0.38		0.48	0.56
17119	Madison	119090AAF	0001	01	50300601	VOM	0.04		0.05	0.06
17119	Madison	119090AAF	0002	01	50100401	PM2.5	2.15		2.53	2.85
17119	Madison	119090AAF	0003	01	50100403	VOM	2.46		2.90	3.26
17119	Madison	119090AAF	0004	01	50100401	PM2.5	0.39		0.46	0.52
17119	Madison	119090AAF	0005	01	50100402	PM2.5	0.03		0.04	0.04
17119	Madison	119090AAG	0001	01	30600106	NOX	0.99		0.97	0.94

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119090AAG	0001	01	30600106	SO2	0.07		0.07	0.06
17119	Madison	119090AAG	0001	01	30600106	VOM	0.07		0.07	0.06
17119	Madison	119090AAI	0001	01	20100802	NOX	17.43		20.70	25.30
17119	Madison	119090AAI	0001	01	20100802	SO2	0.51		0.61	0.74
17119	Madison	119090AAI	0001	01	20100802	VOM	2.60		3.09	3.77
17119	Madison	119090AAI	0002	01	20100802	NOX	17.43		20.70	25.30
17119	Madison	119090AAI	0002	01	20100802	SO2	0.51		0.61	0.74
17119	Madison	119090AAI	0002	01	20100802	VOM	2.60		3.09	3.77
17119	Madison	119090AAI	0003	01	20100802	NOX	17.43		20.70	25.30
17119	Madison	119090AAI	0003	01	20100802	SO2	0.51		0.61	0.74
17119	Madison	119090AAI	0003	01	20100802	VOM	2.60		3.09	3.77
17119	Madison	119090AAI	0004	01	20100802	NOX	17.43		20.70	25.30
17119	Madison	119090AAI	0004	01	20100802	SO2	0.51		0.61	0.74
17119	Madison	119090AAI	0004	01	20100802	VOM	2.60		3.09	3.77
17119	Madison	119090AAL	0001	01	39999994	VOM	1.05		1.38	1.64
17119	Madison	119090AAM	0005	01	10200603	NH3	0.01		0.01	0.01
17119	Madison	119090AAM	0005	01	10200603	NOX	0.16		0.19	0.22
17119	Madison	119090AAM	0005	01	10200603	PM2.5	0.00		0.00	0.00
17119	Madison	119090AAM	0005	01	10200603	SO2	1.13		1.36	1.61
17119	Madison	119090AAM	0005	01	10200603	VOM	0.00		0.00	0.00
17119	Madison	119097AAA	0001	01	30600503	VOM	4.30		4.89	5.42
17119	Madison	119097AAB	0001	01	30500205	NOX	2.92		3.23	3.38
17119	Madison	119097AAB	0001	01	30500205	PM2.5	1.22		1.35	1.41
17119	Madison	119097AAB	0001	01	30500205	SO2	3.08		3.40	3.57
17119	Madison	119097AAB	0001	01	30500205	VOM	1.70		1.88	1.97
17119	Madison	119097AAB	0002	01	30500213	VOM	0.25		0.28	0.30
17119	Madison	119097AAB	0003	01	10200501	NH3	0.01		0.01	0.01
17119	Madison	119097AAB	0003	01	10200501	NOX	0.93		1.02	1.10
17119	Madison	119097AAB	0003	01	10200501	PM2.5	0.09		0.10	0.11
17119	Madison	119097AAB	0003	01	10200501	SO2	1.98		2.17	2.35
17119	Madison	119097AAB	0003	01	10200501	VOM	0.04		0.04	0.05
17119	Madison	119097AAB	0005	01	30500212	VOM	1.80		1.99	2.08
17119	Madison	119097AAB	0007	01	30502006	PM2.5	0.01		0.01	0.01
17119	Madison	119097AAD	0003	01	30502006	PM2.5	0.00		0.00	0.00
17119	Madison	119100AAE	0005	01	10200603	NH3	0.02		0.03	0.03
17119	Madison	119100AAE	0005	01	10200603	NOX	0.70		0.84	1.00
17119	Madison	119100AAE	0005	01	10200603	PM2.5	0.05		0.06	0.07
17119	Madison	119100AAE	0005	01	10200603	SO2	0.00		0.00	0.01
17119	Madison	119100AAE	0005	01	10200603	VOM	0.04		0.05	0.05
17119	Madison	119105AAA	0001	01	20100101	NOX	0.00		0.00	0.00
17119	Madison	119105AAA	0001	01	20100101	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119105AAA	0001	01	20100101	VOM	0.00		0.00	0.00
17119	Madison	119105AAA	0001	02	20100201	NOX	2.54		4.33	5.50
17119	Madison	119105AAA	0001	02	20100201	PM2.5	0.24		0.41	0.52
17119	Madison	119105AAA	0001	02	20100201	SO2	0.01		0.02	0.02
17119	Madison	119105AAA	0001	02	20100201	VOM	0.21		0.36	0.45
17119	Madison	119105AAA	0012	01	10200602	NH3	0.00		0.00	0.00
17119	Madison	119105AAA	0012	01	10200602	NOX	0.00		0.00	0.00
17119	Madison	119105AAA	0012	01	10200602	PM2.5	0.00		0.00	0.00
17119	Madison	119105AAA	0012	01	10200602	SO2	0.00		0.00	0.00
17119	Madison	119105AAA	0012	01	10200602	VOM	0.00		0.00	0.00
17119	Madison	119105AAA	0012	02	10200501	NH3	0.00		0.00	0.00
17119	Madison	119105AAA	0012	02	10200501	NOX	0.00		0.00	0.00
17119	Madison	119105AAA	0012	02	10200501	PM2.5	0.00		0.00	0.00
17119	Madison	119105AAA	0012	02	10200501	SO2	0.00		0.00	0.00
17119	Madison	119105AAA	0012	02	10200501	VOM	0.00		0.00	0.00
17119	Madison	119105AAA	0015	01	20100201	NOX	2.48		4.23	5.37
17119	Madison	119105AAA	0015	01	20100201	PM2.5	0.25		0.43	0.54
17119	Madison	119105AAA	0015	01	20100201	SO2	0.02		0.03	0.04
17119	Madison	119105AAA	0015	01	20100201	VOM	0.23		0.39	0.50
17119	Madison	119105AAA	0015	02	20100101	NOX	0.00		0.00	0.00
17119	Madison	119105AAA	0015	02	20100101	SO2	0.00		0.00	0.00
17119	Madison	119105AAA	0015	02	20100101	VOM	0.00		0.00	0.00
17119	Madison	119105AAA	0017	01	20100201	NOX	15.38		26.20	33.31
17119	Madison	119105AAA	0017	01	20100201	PM2.5	1.40		2.39	3.03
17119	Madison	119105AAA	0017	01	20100201	SO2	0.17		0.29	0.37
17119	Madison	119105AAA	0017	01	20100201	VOM	0.44		0.75	0.95
17119	Madison	119105AAA	0018	01	20100201	NOX	12.70		21.64	27.50
17119	Madison	119105AAA	0018	01	20100201	PM2.5	1.32		2.25	2.86
17119	Madison	119105AAA	0018	01	20100201	SO2	0.16		0.27	0.35
17119	Madison	119105AAA	0018	01	20100201	VOM	0.42		0.72	0.91
17119	Madison	119105AAA	0019	01	20100201	NOX	1.80		3.07	3.90
17119	Madison	119105AAA	0019	01	20100201	PM2.5	0.17		0.29	0.37
17119	Madison	119105AAA	0019	01	20100201	SO2	0.02		0.03	0.04
17119	Madison	119105AAA	0019	01	20100201	VOM	0.05		0.09	0.11
17119	Madison	119105AAH	0039	01	30400103	PM2.5	5.64		7.44	8.81
17119	Madison	119105AAH	0039	01	30400103	VOM	4.40		5.81	6.87
17119	Madison	119105AAH	0048	01	30400699	NOX	0.01		0.01	0.02
17119	Madison	119105AAH	0048	01	30400699	VOM	0.01		0.01	0.02
17119	Madison	119105AAH	0067	01	30490033	NH3	2.77		3.04	3.19
17119	Madison	119105AAH	0067	01	30490033	NOX	8.65		9.48	9.97
17119	Madison	119105AAH	0067	01	30490033	PM2.5	0.66		0.72	0.76

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119105AAH	0067	01	30490033	SO2	0.04		0.04	0.05
17119	Madison	119105AAH	0067	01	30490033	VOM	0.48		0.53	0.55
17119	Madison	119105AAH	0067	02	30490031	NOX	1.99		2.22	2.28
17119	Madison	119105AAH	0067	02	30490031	SO2	2.12		2.36	2.43
17119	Madison	119105AAH	0067	02	30490031	VOM	0.03		0.03	0.03
17119	Madison	119105AAK	0001	01	40201801	VOM	10.50		13.88	16.44
17119	Madison	119105AAK	0002	01	30199998	SO2	0.05		0.06	0.07
17119	Madison	119105AAK	0003	01	30187010	SO2	0.05		0.06	0.07
17119	Madison	119115AAA	0071	01	30600905	NOX	0.00		0.00	0.00
17119	Madison	119115AAA	0071	01	30600905	SO2	0.00		0.00	0.00
17119	Madison	119115AAA	0071	01	30600905	VOM	0.00		0.00	0.00
17119	Madison	119115AAJ	0024	01	40400107	VOM	41.34		42.87	44.34
17119	Madison	119115AAJ	0026	01	40600162	VOM	5.25		5.44	5.63
17119	Madison	119115AAJ	0029	01	40781699	VOM	0.00		0.00	0.00
17119	Madison	119115AAJ	0030	01	30600801	VOM	0.85		1.00	1.14
17119	Madison	119115AAY	0003	01	40400151	VOM	0.00		0.00	0.00
17119	Madison	119115AAY	0004	01	40301019	VOM	0.09		0.10	0.11
17119	Madison	119115AAY	0005	01	40400102	VOM	0.92		0.98	1.04
17119	Madison	119115AAY	0006	01	40400122	VOM	0.00		0.00	0.00
17119	Madison	119115AAY	0007	01	40600240	VOM	0.00		0.00	0.00
17119	Madison	119115AAY	0009	01	40600131	VOM	2.66		2.76	2.85
17119	Madison	119115AAY	0010	01	50482001	VOM	0.13		0.15	0.17
17119	Madison	119115AAY	0013	01	40400142	VOM	1.94		2.07	2.19
17119	Madison	119115AAY	0015	01	50410310	NOX	1.25		1.47	1.66
17119	Madison	119115AAY	0015	01	50410310	SO2	0.01		0.01	0.01
17119	Madison	119115AAY	0015	01	50410310	VOM	0.07		0.08	0.09
17119	Madison	119115AAY	0020	01	40700810	VOM	0.00		0.00	0.00
17119	Madison	119115AAY	0020	02	40400122	VOM	4.22		4.80	5.32
17119	Madison	119115AAY	0022	01	40400122	VOM	0.37		0.42	0.47
17119	Madison	119115AAY	0034	01	40301197	VOM	1.17		1.33	1.47
17119	Madison	119115AAY	0035	01	40301120	VOM	0.06		0.07	0.08
17119	Madison	119115AAY	0036	01	40400178	VOM	0.27		0.28	0.29
17119	Madison	119115AAY	0037	01	40400178	VOM	3.90		4.04	4.18
17119	Madison	119115AAY	0038	01	40400178	VOM	3.66		3.80	3.93
17119	Madison	119115AAY	0039	01	40400148	VOM	1.51		1.57	1.62
17119	Madison	119115AAY	0041	01	40400249	VOM	4.24		4.82	5.35
17119	Madison	119115AAY	0042	01	40400148	VOM	1.40		1.45	1.50
17119	Madison	119115AAY	0044	01	40400248	VOM	1.39		1.44	1.49
17119	Madison	119115AAY	0045	01	40400248	VOM	1.59		1.65	1.71
17119	Madison	119115AAY	0046	01	40400248	VOM	0.00		0.00	0.00
17119	Madison	119115AAY	0047	01	40400248	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119115AAY	0048	01	40400249	VOM	1.09		1.24	1.37
17119	Madison	119115AAY	0049	01	40400148	VOM	2.94		3.05	3.15
17119	Madison	119115AAY	0050	01	40400162	VOM	9.21		9.81	10.38
17119	Madison	119115AAY	0051	01	40703616	VOM	0.95		1.08	1.19
17119	Madison	119115AAY	0052	01	40688801	VOM	12.51		14.23	15.77
17119	Madison	119115AAY	0056	01	40400154	VOM	0.00		0.00	0.00
17119	Madison	119115ABB	0001	01	40301299	VOM	0.01		0.01	0.01
17119	Madison	119115ABC	0002	01	40200101	VOM	0.00		0.00	0.00
17119	Madison	119115ABC	0008	01	40200101	VOM	34.96		44.05	51.13
17119	Madison	119115ABF	0001	01	40600251	VOM	0.00		0.00	0.00
17119	Madison	119115ABF	0002	01	40388801	VOM	0.00		0.00	0.00
17119	Madison	119115ABG	0001	01	41000202	VOM	1.17		1.34	1.47
17119	Madison	119115ABJ	0001	01	40714698	VOM	0.14		0.16	0.17
17119	Madison	119428AAG	0001	01	40301001	VOM	6.92		7.87	8.72
17119	Madison	119428AAG	0002	01	40301019	VOM	0.04		0.05	0.05
17119	Madison	119428ABI	0001	01	50100701	VOM	0.38		0.44	0.50
17119	Madison	119428ABI	0002	01	20300101	NOX	7.30		6.93	6.18
17119	Madison	119428ABI	0002	01	20300101	PM2.5	0.30		0.28	0.25
17119	Madison	119428ABI	0002	01	20300101	SO2	0.30		0.28	0.25
17119	Madison	119428ABI	0002	01	20300101	VOM	0.17		0.16	0.15
17119	Madison	119428ABL	0001	01	31502102	NOX	0.06		0.07	0.08
17119	Madison	119428ABL	0001	01	31502102	SO2	0.03		0.04	0.04
17119	Madison	119428ABM	0005	01	10200603	NH3	0.00		0.00	0.00
17119	Madison	119428ABM	0005	01	10200603	NOX	0.11		0.13	0.16
17119	Madison	119428ABM	0005	01	10200603	PM2.5	0.00		0.00	0.00
17119	Madison	119428ABM	0005	01	10200603	SO2	0.00		0.00	0.00
17119	Madison	119428ABM	0005	01	10200603	VOM	0.00		0.00	0.00
17119	Madison	119465AAE	0001	01	20200202	NOX	0.30		0.36	0.43
17119	Madison	119465AAE	0001	01	20200202	PM2.5	0.20		0.24	0.29
17119	Madison	119465AAE	0001	01	20200202	SO2	0.02		0.02	0.03
17119	Madison	119465AAE	0001	01	20200202	VOM	0.02		0.02	0.03
17119	Madison	119465AAE	0002	01	20200202	NOX	0.56		0.68	0.80
17119	Madison	119465AAE	0002	01	20200202	PM2.5	0.16		0.19	0.23
17119	Madison	119465AAE	0002	01	20200202	SO2	0.01		0.01	0.01
17119	Madison	119465AAE	0002	01	20200202	VOM	0.03		0.04	0.04
17119	Madison	119465AAE	0003	01	20200202	NOX	2.96		3.58	4.22
17119	Madison	119465AAE	0003	01	20200202	PM2.5	0.18		0.22	0.26
17119	Madison	119465AAE	0003	01	20200202	SO2	0.02		0.02	0.03
17119	Madison	119465AAE	0003	01	20200202	VOM	0.09		0.11	0.13
17119	Madison	119465AAE	0004	01	20200202	NOX	0.77		0.93	1.10
17119	Madison	119465AAE	0004	01	20200202	PM2.5	0.18		0.22	0.26

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119465AAE	0004	01	20200202	SO2	0.02		0.02	0.03
17119	Madison	119465AAE	0004	01	20200202	VOM	0.01		0.01	0.01
17119	Madison	119801AAA	0001	01	40301151	VOM	11.16		12.69	14.07
17119	Madison	119801AAA	0002	01	40301151	VOM	24.43		27.78	30.80
17119	Madison	119801AAA	0007	01	40301151	VOM	0.48		0.55	0.61
17119	Madison	119801AAA	0008	01	40301141	VOM	0.78		0.89	0.98
17119	Madison	119801AAA	0019	01	40400162	VOM	6.20		6.60	6.99
17119	Madison	119801AAA	0020	01	40400162	VOM	8.05		8.57	9.08
17119	Madison	119801AAA	0021	01	40400162	VOM	24.07		25.63	27.14
17119	Madison	119801AAA	0024	01	40301151	VOM	14.41		16.39	18.17
17119	Madison	119801AAA	0025	01	40301151	VOM	12.58		14.31	15.86
17119	Madison	119801AAA	0026	01	40301151	VOM	23.41		26.62	29.51
17119	Madison	119801AAA	0027	01	40301151	VOM	6.86		7.80	8.65
17119	Madison	119801AAA	0028	01	40301151	VOM	1.05		1.19	1.32
17119	Madison	119801AAB	0001	01	40301109	VOM	0.60		0.68	0.76
17119	Madison	119801AAE	0001	01	30180001	VOM	4.68		5.33	5.85
17119	Madison	119801AAE	0002	01	10200401	NH3	0.11		0.12	0.12
17119	Madison	119801AAE	0002	01	10200401	NOX	6.55		7.12	7.03
17119	Madison	119801AAE	0002	01	10200401	PM2.5	0.54		0.59	0.58
17119	Madison	119801AAE	0002	01	10200401	SO2	2.93		3.18	3.14
17119	Madison	119801AAE	0002	01	10200401	VOM	0.14		0.15	0.15
17119	Madison	119801AAE	0003	01	30183001	VOM	3.12		3.55	3.90
17119	Madison	119801AAI	0002	01	49000499	VOM	1.92		2.26	2.54
17119	Madison	119801AAK	0003	01	50100403	VOM	0.07		0.08	0.09
17119	Madison	119801AAK	0006	01	50300601	NOX	9.92		12.50	14.51
17119	Madison	119801AAK	0006	01	50300601	PM2.5	4.53		5.71	6.63
17119	Madison	119801AAK	0006	01	50300601	SO2	4.74		5.97	6.93
17119	Madison	119801AAK	0006	01	50300601	VOM	0.47		0.59	0.69
17119	Madison	119801AAL	0001	01	40600240	VOM	0.00		0.00	0.00
17119	Madison	119801AAL	0001	02	40600235	VOM	0.00		0.00	0.00
17119	Madison	119801AAL	0001	03	40600251	VOM	0.00		0.00	0.00
17119	Madison	119801AAL	0002	01	40688801	VOM	0.21		0.24	0.26
17119	Madison	119801AAS	0001	01	40301001	VOM	0.00		0.00	0.00
17119	Madison	119801AAS	0002	01	40600141	VOM	0.00		0.00	0.00
17119	Madison	119801AAS	0003	01	40688801	VOM	0.00		0.00	0.00
17119	Madison	119802AAC	0002	01	10300602	NH3	0.05		0.05	0.05
17119	Madison	119802AAC	0002	01	10300602	NOX	1.71		1.77	1.75
17119	Madison	119802AAC	0002	01	10300602	PM2.5	0.13		0.13	0.13
17119	Madison	119802AAC	0002	01	10300602	SO2	0.01		0.01	0.01
17119	Madison	119802AAC	0002	01	10300602	VOM	0.09		0.09	0.09
17119	Madison	119802AAC	0005	01	31502001	VOM	0.04		0.05	0.05

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119802AAH	0001	01	30500205	NOX	0.00		0.00	0.00
17119	Madison	119802AAH	0001	01	30500205	PM2.5	0.00		0.00	0.00
17119	Madison	119802AAH	0001	01	30500205	SO2	0.00		0.00	0.00
17119	Madison	119802AAH	0001	01	30500205	VOM	0.00		0.00	0.00
17119	Madison	119802AAH	0003	01	30500212	VOM	0.00		0.00	0.00
17119	Madison	119803AAB	0001	01	30500311	NOX	0.59		0.78	0.92
17119	Madison	119803AAB	0002	01	30500311	NOX	0.59		0.78	0.92
17119	Madison	119803AAE	0001	01	30400103	PM2.5	0.00		0.00	0.00
17119	Madison	119804AAF	0001	01	40204330	VOM	0.00		0.00	0.00
17119	Madison	119804AAF	0002	01	40200710	VOM	1.03		1.29	1.50
17119	Madison	119806AAL	0007	01	30502006	PM2.5	0.01		0.01	0.01
17119	Madison	119813AAA	0001	01	30500205	NOX	5.33		5.89	6.17
17119	Madison	119813AAA	0001	01	30500205	PM2.5	0.08		0.09	0.09
17119	Madison	119813AAA	0001	01	30500205	SO2	0.00		0.00	0.00
17119	Madison	119813AAA	0001	01	30500205	VOM	3.10		3.43	3.59
17119	Madison	119813AAA	0001	02	30500205	NOX	0.00		0.00	0.00
17119	Madison	119813AAA	0001	02	30500205	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAA	0001	02	30500205	SO2	0.00		0.00	0.00
17119	Madison	119813AAA	0001	02	30500205	VOM	0.00		0.00	0.00
17119	Madison	119813AAC	0001	01	20100201	NH3	0.00		0.00	0.00
17119	Madison	119813AAC	0001	01	20100201	NOX	0.11		0.19	0.24
17119	Madison	119813AAC	0001	01	20100201	SO2	0.00		0.00	0.00
17119	Madison	119813AAC	0001	01	20100201	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0001	01	40301012	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0002	01	40301012	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0004	01	39000701	NOX	41.47		36.33	31.96
17119	Madison	119813AAI	0004	01	39000701	PM2.5	21.30		18.66	16.41
17119	Madison	119813AAI	0004	01	39000701	SO2	125.67		110.10	96.84
17119	Madison	119813AAI	0004	02	39000702	NOX	193.61		169.63	149.20
17119	Madison	119813AAI	0004	02	39000702	PM2.5	18.59		16.29	14.33
17119	Madison	119813AAI	0004	02	39000702	SO2	583.69		511.38	449.80
17119	Madison	119813AAI	0004	02	39000702	VOM	0.57		0.50	0.44
17119	Madison	119813AAI	0005	01	30300825	NOX	0.34		0.45	0.53
17119	Madison	119813AAI	0005	01	30300825	PM2.5	2.24		2.96	3.52
17119	Madison	119813AAI	0005	01	30300825	SO2	5.01		6.62	7.87
17119	Madison	119813AAI	0005	01	30300825	VOM	2.26		2.99	3.55
17119	Madison	119813AAI	0006	01	30300821	PM2.5	1.37		1.81	2.15
17119	Madison	119813AAI	0007	01	30300825	NOX	6.93		9.16	10.88
17119	Madison	119813AAI	0007	01	30300825	PM2.5	15.25		20.15	23.95
17119	Madison	119813AAI	0007	01	30300825	SO2	96.59		127.64	151.66
17119	Madison	119813AAI	0007	01	30300825	VOM	45.55		60.19	71.52

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119813AAI	0008	01	30390024	NOX	81.56		80.23	78.80
17119	Madison	119813AAI	0008	01	30390024	PM2.5	41.73		41.05	40.32
17119	Madison	119813AAI	0008	01	30390024	SO2	246.23		242.21	237.90
17119	Madison	119813AAI	0009	01	39000701	NOX	48.86		42.81	37.65
17119	Madison	119813AAI	0009	01	39000701	PM2.5	25.09		21.98	19.33
17119	Madison	119813AAI	0009	01	39000701	SO2	148.06		129.72	114.10
17119	Madison	119813AAI	0009	02	39000702	NOX	58.70		51.43	45.23
17119	Madison	119813AAI	0009	02	39000702	PM2.5	5.64		4.94	4.35
17119	Madison	119813AAI	0009	02	39000702	SO2	176.96		155.04	136.37
17119	Madison	119813AAI	0009	02	39000702	VOM	0.17		0.15	0.13
17119	Madison	119813AAI	0010	01	30300825	NOX	0.37		0.49	0.58
17119	Madison	119813AAI	0010	01	30300825	PM2.5	2.48		3.28	3.89
17119	Madison	119813AAI	0010	01	30300825	SO2	5.54		7.32	8.70
17119	Madison	119813AAI	0010	01	30300825	VOM	2.50		3.30	3.93
17119	Madison	119813AAI	0011	01	30300823	PM2.5	1.49		1.97	2.34
17119	Madison	119813AAI	0012	01	30300825	NOX	7.67		10.14	12.04
17119	Madison	119813AAI	0012	01	30300825	PM2.5	16.88		22.31	26.50
17119	Madison	119813AAI	0012	01	30300825	SO2	106.91		141.27	167.87
17119	Madison	119813AAI	0012	01	30300825	VOM	50.42		66.63	79.17
17119	Madison	119813AAI	0014	01	30300931	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0015	01	30390003	NH3	1.49		1.53	1.58
17119	Madison	119813AAI	0015	01	30390003	NOX	183.04		43.54	44.82
17119	Madison	119813AAI	0015	01	30390003	PM2.5	2.33		2.40	2.47
17119	Madison	119813AAI	0015	01	30390003	SO2	0.27		0.28	0.29
17119	Madison	119813AAI	0015	01	30390003	VOM	0.64		0.66	0.68
17119	Madison	119813AAI	0015	02	30390004	NOX	44.48		5.39	5.29
17119	Madison	119813AAI	0015	02	30390004	PM2.5	4.27		4.20	4.13
17119	Madison	119813AAI	0015	02	30390004	SO2	134.09		131.90	129.55
17119	Madison	119813AAI	0015	02	30390004	VOM	0.13		0.13	0.13
17119	Madison	119813AAI	0015	03	30490001	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0015	03	30490001	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0015	03	30490001	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0018	01	30390003	NH3	2.25		2.32	2.38
17119	Madison	119813AAI	0018	01	30390003	NOX	280.08		65.98	67.93
17119	Madison	119813AAI	0018	01	30390003	PM2.5	3.57		3.67	3.78
17119	Madison	119813AAI	0018	01	30390003	SO2	0.42		0.43	0.45
17119	Madison	119813AAI	0018	01	30390003	VOM	0.98		1.01	1.04
17119	Madison	119813AAI	0018	02	30390004	NOX	14.87		14.63	14.37
17119	Madison	119813AAI	0018	02	30390004	PM2.5	1.43		1.41	1.38
17119	Madison	119813AAI	0018	02	30390004	SO2	44.82		44.09	43.30
17119	Madison	119813AAI	0018	02	30390004	VOM	0.04		0.04	0.04

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119813AAI	0018	03	30490001	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0018	03	30490001	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0018	03	30490001	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0019	01	30300910	PM2.5	0.42		0.56	0.66
17119	Madison	119813AAI	0023	01	30390003	NH3	0.00		0.00	0.00
17119	Madison	119813AAI	0023	01	30390003	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0023	01	30390003	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0023	01	30390003	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0023	01	30390003	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0026	01	30300936	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0027	01	30390003	NH3	0.00		0.00	0.00
17119	Madison	119813AAI	0027	01	30390003	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0027	01	30390003	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0027	01	30390003	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0027	01	30390003	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0028	01	30300936	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0029	01	30300936	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0031	01	30390003	NH3	0.00		0.00	0.00
17119	Madison	119813AAI	0031	01	30390003	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0031	01	30390003	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0031	01	30390003	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0031	01	30390003	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0033	01	30300913	NOX	46.26		53.25	69.13
17119	Madison	119813AAI	0033	01	30300913	PM2.5	5.23		6.02	7.82
17119	Madison	119813AAI	0033	01	30300913	VOM	7.13		8.21	10.66
17119	Madison	119813AAI	0034	01	30300999	PM2.5	26.99		35.67	42.38
17119	Madison	119813AAI	0034	01	30300999	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0035	01	30300915	PM2.5	5.59		7.39	8.78
17119	Madison	119813AAI	0035	01	30300915	VOM	0.15		0.20	0.24
17119	Madison	119813AAI	0037	01	30300999	PM2.5	1.90		2.51	2.98
17119	Madison	119813AAI	0038	01	30390003	NH3	2.94		3.03	3.12
17119	Madison	119813AAI	0038	01	30390003	NOX	58.80		60.52	62.30
17119	Madison	119813AAI	0038	01	30390003	PM2.5	0.98		1.01	1.04
17119	Madison	119813AAI	0038	01	30390003	SO2	0.11		0.11	0.12
17119	Madison	119813AAI	0038	01	30390003	VOM	0.27		0.28	0.29
17119	Madison	119813AAI	0038	02	30390004	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0038	02	30390004	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0038	02	30390004	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0040	01	30300920	PM2.5	5.06		6.69	7.95
17119	Madison	119813AAI	0041	01	10200704	NOX	55.93		0.00	0.00
17119	Madison	119813AAI	0041	01	10200704	PM2.5	28.72		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119813AAI	0041	01	10200704	SO2	169.48		0.00	0.00
17119	Madison	119813AAI	0041	02	10200707	NOX	75.62		0.00	0.00
17119	Madison	119813AAI	0041	02	10200707	PM2.5	7.26		0.00	0.00
17119	Madison	119813AAI	0041	02	10200707	SO2	227.97		0.00	0.00
17119	Madison	119813AAI	0041	02	10200707	VOM	0.22		0.00	0.00
17119	Madison	119813AAI	0041	03	10200501	NH3	0.00		0.00	0.00
17119	Madison	119813AAI	0041	03	10200501	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0041	03	10200501	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0041	03	10200501	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0041	03	10200501	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0041	04	10200601	NH3	0.14		0.00	0.00
17119	Madison	119813AAI	0041	04	10200601	NOX	70.00		0.00	0.00
17119	Madison	119813AAI	0041	04	10200601	PM2.5	1.17		0.00	0.00
17119	Madison	119813AAI	0041	04	10200601	SO2	0.14		0.00	0.00
17119	Madison	119813AAI	0041	04	10200601	VOM	0.32		0.00	0.00
17119	Madison	119813AAI	0042	01	10200704	NOX	23.97		0.00	0.00
17119	Madison	119813AAI	0042	01	10200704	PM2.5	12.31		0.00	0.00
17119	Madison	119813AAI	0042	01	10200704	SO2	72.63		0.00	0.00
17119	Madison	119813AAI	0042	02	10200707	NOX	32.41		0.00	0.00
17119	Madison	119813AAI	0042	02	10200707	PM2.5	3.11		0.00	0.00
17119	Madison	119813AAI	0042	02	10200707	SO2	97.70		0.00	0.00
17119	Madison	119813AAI	0042	02	10200707	VOM	0.10		0.00	0.00
17119	Madison	119813AAI	0042	03	10201302	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0042	03	10201302	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0042	03	10201302	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0042	03	10201302	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0042	04	10200602	NH3	0.14		0.00	0.00
17119	Madison	119813AAI	0042	04	10200602	NOX	30.00		0.00	0.00
17119	Madison	119813AAI	0042	04	10200602	PM2.5	0.50		0.00	0.00
17119	Madison	119813AAI	0042	04	10200602	SO2	0.06		0.00	0.00
17119	Madison	119813AAI	0042	04	10200602	VOM	0.14		0.00	0.00
17119	Madison	119813AAI	0044	01	10200704	NOX	36.60		32.07	28.20
17119	Madison	119813AAI	0044	01	10200704	PM2.5	18.79		16.46	14.48
17119	Madison	119813AAI	0044	01	10200704	SO2	110.90		97.16	85.46
17119	Madison	119813AAI	0044	02	10200707	NOX	9.86		8.64	7.60
17119	Madison	119813AAI	0044	02	10200707	PM2.5	0.95		0.83	0.73
17119	Madison	119813AAI	0044	02	10200707	SO2	29.73		26.05	22.91
17119	Madison	119813AAI	0044	02	10200707	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0044	03	10201302	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0044	03	10201302	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0044	03	10201302	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119813AAI	0044	03	10201302	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0044	04	10200601	NH3	0.28		0.34	0.40
17119	Madison	119813AAI	0044	04	10200601	NOX	24.83		7.91	9.33
17119	Madison	119813AAI	0044	04	10200601	PM2.5	0.41		0.50	0.58
17119	Madison	119813AAI	0044	04	10200601	SO2	0.05		0.06	0.07
17119	Madison	119813AAI	0044	04	10200601	VOM	0.11		0.13	0.16
17119	Madison	119813AAI	0045	01	40301097	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0046	01	40301097	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0048	01	10200704	NOX	25.11		22.00	19.35
17119	Madison	119813AAI	0048	01	10200704	PM2.5	12.90		11.30	9.94
17119	Madison	119813AAI	0048	01	10200704	SO2	76.11		66.68	58.65
17119	Madison	119813AAI	0048	02	10200707	NOX	77.87		7.44	6.55
17119	Madison	119813AAI	0048	02	10200707	PM2.5	7.48		6.55	5.76
17119	Madison	119813AAI	0048	02	10200707	SO2	234.75		205.67	180.90
17119	Madison	119813AAI	0048	02	10200707	VOM	0.23		0.20	0.18
17119	Madison	119813AAI	0048	03	10201302	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0048	03	10201302	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0048	03	10201302	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0048	03	10201302	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0048	04	10200601	NH3	0.28		0.34	0.40
17119	Madison	119813AAI	0048	04	10200601	NOX	28.72		9.41	11.10
17119	Madison	119813AAI	0048	04	10200601	PM2.5	0.48		0.58	0.68
17119	Madison	119813AAI	0048	04	10200601	SO2	0.06		0.07	0.09
17119	Madison	119813AAI	0048	04	10200601	VOM	0.13		0.16	0.19
17119	Madison	119813AAI	0050	01	30300310	PM2.5	6.40		8.46	10.05
17119	Madison	119813AAI	0053	01	30300827	PM2.5	0.38		0.50	0.60
17119	Madison	119813AAI	0054	01	30300302	PM2.5	0.03		0.04	0.05
17119	Madison	119813AAI	0054	01	30300302	VOM	0.22		0.29	0.35
17119	Madison	119813AAI	0055	01	30300303	NH3	0.00		0.00	0.00
17119	Madison	119813AAI	0055	01	30300303	NOX	2.52		3.33	3.96
17119	Madison	119813AAI	0055	01	30300303	PM2.5	2.94		3.89	4.62
17119	Madison	119813AAI	0055	01	30300303	SO2	10.48		13.85	16.46
17119	Madison	119813AAI	0055	01	30300303	VOM	28.30		37.40	44.44
17119	Madison	119813AAI	0057	01	39000701	NOX	576.07		504.71	443.93
17119	Madison	119813AAI	0057	01	39000701	PM2.5	32.72		28.67	25.21
17119	Madison	119813AAI	0057	01	39000701	SO2	1027.20		899.95	791.57
17119	Madison	119813AAI	0057	01	39000701	VOM	1.00		0.88	0.77
17119	Madison	119813AAI	0058	01	30300308	VOM	3.84		5.07	6.03
17119	Madison	119813AAI	0059	01	30300314	PM2.5	0.15		0.20	0.24
17119	Madison	119813AAI	0059	01	30300314	VOM	0.36		0.48	0.57
17119	Madison	119813AAI	0063	01	30300304	PM2.5	5.11		6.75	8.02

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119813AAI	0070	01	30300922	NOX	27.86		36.82	43.75
17119	Madison	119813AAI	0070	01	30300922	PM2.5	2.41		3.18	3.78
17119	Madison	119813AAI	0071	01	30300922	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0072	01	30300922	PM2.5	3.96		5.23	6.22
17119	Madison	119813AAI	0073	01	30300922	PM2.5	3.14		4.15	4.93
17119	Madison	119813AAI	0076	01	30300302	PM2.5	0.03		0.04	0.05
17119	Madison	119813AAI	0076	01	30300302	VOM	0.23		0.30	0.36
17119	Madison	119813AAI	0078	01	30300303	NH3	0.00		0.00	0.00
17119	Madison	119813AAI	0078	01	30300303	NOX	2.59		3.42	4.07
17119	Madison	119813AAI	0078	01	30300303	PM2.5	3.04		4.02	4.77
17119	Madison	119813AAI	0078	01	30300303	SO2	10.81		14.28	16.97
17119	Madison	119813AAI	0078	01	30300303	VOM	29.19		38.57	45.83
17119	Madison	119813AAI	0079	01	39000701	NOX	576.07		504.71	443.93
17119	Madison	119813AAI	0079	01	39000701	PM2.5	32.72		28.67	25.21
17119	Madison	119813AAI	0079	01	39000701	SO2	1027.20		899.95	791.57
17119	Madison	119813AAI	0079	01	39000701	VOM	1.00		0.88	0.77
17119	Madison	119813AAI	0080	01	30300308	VOM	3.96		5.23	6.22
17119	Madison	119813AAI	0081	01	30300314	PM2.5	0.16		0.21	0.25
17119	Madison	119813AAI	0081	01	30300314	VOM	0.38		0.50	0.60
17119	Madison	119813AAI	0082	01	30300335	VOM	1.21		1.60	1.90
17119	Madison	119813AAI	0083	01	30300342	VOM	1.11		1.47	1.74
17119	Madison	119813AAI	0084	01	30300343	VOM	0.98		1.30	1.54
17119	Madison	119813AAI	0085	01	30300315	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0086	01	30300336	VOM	0.26		0.34	0.41
17119	Madison	119813AAI	0087	01	30300336	VOM	3.83		5.06	6.01
17119	Madison	119813AAI	0088	01	30300333	VOM	0.02		0.03	0.03
17119	Madison	119813AAI	0089	01	30300315	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0092	01	30300333	VOM	0.16		0.21	0.25
17119	Madison	119813AAI	0093	01	30300331	VOM	0.07		0.09	0.11
17119	Madison	119813AAI	0094	01	30300331	VOM	0.05		0.07	0.08
17119	Madison	119813AAI	0097	01	30300315	NOX	173.12		228.77	271.83
17119	Madison	119813AAI	0097	01	30300315	PM2.5	16.62		21.96	26.10
17119	Madison	119813AAI	0097	01	30300315	SO2	521.89		689.64	819.46
17119	Madison	119813AAI	0097	01	30300315	VOM	0.51		0.67	0.80
17119	Madison	119813AAI	0103	01	30300922	PM2.5	4.16		5.50	6.53
17119	Madison	119813AAI	0105	01	30300922	PM2.5	8.50		11.23	13.35
17119	Madison	119813AAI	0107	01	30300999	PM2.5	3.53		4.66	5.54
17119	Madison	119813AAI	0107	01	30300999	VOM	0.86		1.14	1.35
17119	Madison	119813AAI	0108	01	30390003	NH3	0.00		0.00	0.00
17119	Madison	119813AAI	0108	01	30390003	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0108	01	30390003	PM2.5	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119813AAI	0108	01	30390003	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0108	01	30390003	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0113	01	30300809	PM2.5	4.22		5.58	6.63
17119	Madison	119813AAI	0113	01	30300809	SO2	10.12		13.37	15.89
17119	Madison	119813AAI	0118	01	30300922	PM2.5	4.51		5.96	7.08
17119	Madison	119813AAI	0119	01	30300922	PM2.5	5.41		7.15	8.49
17119	Madison	119813AAI	0120	01	30300922	NOX	31.76		41.97	49.87
17119	Madison	119813AAI	0120	01	30300922	PM2.5	2.75		3.63	4.32
17119	Madison	119813AAI	0122	01	30390003	NH3	1.57		1.62	1.66
17119	Madison	119813AAI	0122	01	30390003	NOX	194.15		45.78	47.13
17119	Madison	119813AAI	0122	01	30390003	PM2.5	2.47		2.54	2.62
17119	Madison	119813AAI	0122	01	30390003	SO2	0.29		0.30	0.31
17119	Madison	119813AAI	0122	01	30390003	VOM	0.68		0.70	0.72
17119	Madison	119813AAI	0122	02	30390004	NOX	53.00		6.42	6.30
17119	Madison	119813AAI	0122	02	30390004	PM2.5	5.09		5.01	4.92
17119	Madison	119813AAI	0122	02	30390004	SO2	159.80		157.19	154.39
17119	Madison	119813AAI	0122	02	30390004	VOM	0.16		0.16	0.15
17119	Madison	119813AAI	0122	03	30490001	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0122	03	30490001	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0122	03	30490001	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0123	01	30490003	NH3	1.41		1.55	1.62
17119	Madison	119813AAI	0123	01	30490003	NOX	179.41		45.00	47.29
17119	Madison	119813AAI	0123	01	30490003	PM2.5	2.28		2.50	2.63
17119	Madison	119813AAI	0123	01	30490003	SO2	0.27		0.30	0.31
17119	Madison	119813AAI	0123	01	30490003	VOM	0.63		0.69	0.73
17119	Madison	119813AAI	0123	02	30390004	NOX	42.84		5.21	5.12
17119	Madison	119813AAI	0123	02	30390004	PM2.5	4.11		4.04	3.97
17119	Madison	119813AAI	0123	02	30390004	SO2	129.15		127.04	124.78
17119	Madison	119813AAI	0123	02	30390004	VOM	0.13		0.13	0.13
17119	Madison	119813AAI	0123	03	30490001	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0123	03	30490001	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0123	03	30490001	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0124	01	30499999	PM2.5	0.58		0.76	0.91
17119	Madison	119813AAI	0125	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0126	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0127	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0129	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0130	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0131	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0132	01	40301021	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0133	01	40301021	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119813AAI	0134	01	40301021	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0135	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0136	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0137	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0138	01	40301099	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0139	01	30300802	PM2.5	12.28		10.56	10.43
17119	Madison	119813AAI	0139	01	30300802	SO2	3.52		3.03	2.99
17119	Madison	119813AAI	0140	01	30300802	PM2.5	13.59		11.69	11.54
17119	Madison	119813AAI	0140	01	30300802	SO2	3.89		3.35	3.30
17119	Madison	119813AAI	0141	01	30183001	PM2.5	0.04		0.05	0.05
17119	Madison	119813AAI	0143	01	30183001	PM2.5	0.50		0.57	0.63
17119	Madison	119813AAI	0144	01	30183001	PM2.5	0.16		0.18	0.20
17119	Madison	119813AAI	0168	01	38500102	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0169	01	30390024	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0170	01	30300336	VOM	3.83		5.06	6.01
17119	Madison	119813AAI	0171	01	30300342	VOM	2.34		3.09	3.67
17119	Madison	119813AAI	0172	01	40600132	VOM	1.28		1.46	1.61
17119	Madison	119813AAI	0174	01	50382001	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0175	01	50382001	VOM	1.51		1.90	2.21
17119	Madison	119813AAI	0176	01	30300936	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0177	01	30300310	PM2.5	0.01		0.01	0.01
17119	Madison	119813AAI	0178	01	30300834	PM2.5	9.71		12.83	15.25
17119	Madison	119813AAI	0180	01	30300308	PM2.5	0.28		0.37	0.44
17119	Madison	119813AAI	0180	01	30300308	VOM	0.92		1.22	1.44
17119	Madison	119813AAI	0181	01	30300308	PM2.5	0.29		0.38	0.46
17119	Madison	119813AAI	0181	01	30300308	VOM	0.95		1.26	1.49
17119	Madison	119813AAI	0182	01	30300936	PM2.5	9.07		11.99	14.24
17119	Madison	119813AAI	0183	01	30300936	PM2.5	0.47		0.62	0.74
17119	Madison	119813AAI	0184	01	30300936	VOM	11.06		14.62	17.37
17119	Madison	119813AAI	0185	01	30490003	NH3	0.32		0.35	0.37
17119	Madison	119813AAI	0185	01	30490003	NOX	2.60		2.85	3.00
17119	Madison	119813AAI	0185	01	30490003	PM2.5	0.43		0.47	0.50
17119	Madison	119813AAI	0185	01	30490003	SO2	0.05		0.05	0.06
17119	Madison	119813AAI	0185	01	30490003	VOM	0.12		0.13	0.14
17119	Madison	119813AAI	0186	01	30490003	NH3	0.00		0.00	0.00
17119	Madison	119813AAI	0186	01	30490003	NOX	0.00		0.00	0.00
17119	Madison	119813AAI	0186	01	30490003	PM2.5	0.00		0.00	0.00
17119	Madison	119813AAI	0186	01	30490003	SO2	0.00		0.00	0.00
17119	Madison	119813AAI	0186	01	30490003	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0187	01	30300315	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0188	01	30300315	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119813AAI	0189	01	30300315	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0190	01	30388801	PM2.5	0.29		0.38	0.45
17119	Madison	119813AAI	0191	01	40301007	VOM	0.04		0.05	0.05
17119	Madison	119813AAI	0192	01	40301007	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0193	01	40301007	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0194	01	40301007	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0195	01	40301007	VOM	0.04		0.05	0.05
17119	Madison	119813AAI	0196	01	40301007	VOM	0.04		0.05	0.05
17119	Madison	119813AAI	0197	01	40301007	VOM	0.08		0.09	0.10
17119	Madison	119813AAI	0198	01	40301007	VOM	0.00		0.00	0.01
17119	Madison	119813AAI	0199	01	40301007	VOM	0.04		0.05	0.05
17119	Madison	119813AAI	0200	01	40301007	VOM	0.00		0.00	0.01
17119	Madison	119813AAI	0201	01	40301007	VOM	0.08		0.09	0.10
17119	Madison	119813AAI	0202	01	40301007	VOM	0.04		0.05	0.05
17119	Madison	119813AAI	0203	01	40301007	VOM	0.04		0.05	0.05
17119	Madison	119813AAI	0204	01	30388801	PM2.5	11.59		15.31	18.17
17119	Madison	119813AAI	0204	01	30388801	VOM	0.00		0.00	0.00
17119	Madison	119813AAI	0205	01	30399999	NOX	0.07		0.09	0.11
17119	Madison	119813AAI	0205	01	30399999	PM2.5	0.34		0.45	0.53
17119	Madison	119813AAI	0205	01	30399999	VOM	8.16		10.78	12.79
17119	Madison	119814AAA	0006	01	30200540	PM2.5	0.06		0.07	0.07
17119	Madison	119818AAA	0001	01	20200201	NH3	0.46		0.56	0.66
17119	Madison	119818AAA	0001	01	20200201	NOX	55.48		67.10	79.15
17119	Madison	119818AAA	0001	01	20200201	VOM	0.41		0.50	0.58
17119	Madison	119818AAA	0002	01	20200201	NH3	0.03		0.03	0.04
17119	Madison	119818AAA	0002	01	20200201	NOX	10.52		12.72	15.01
17119	Madison	119818AAA	0002	01	20200201	PM2.5	0.07		0.08	0.10
17119	Madison	119818AAA	0002	01	20200201	VOM	0.96		1.16	1.37
17119	Madison	119818AAA	0003	01	20200201	NH3	0.01		0.01	0.01
17119	Madison	119818AAA	0003	01	20200201	NOX	1.00		1.21	1.43
17119	Madison	119818AAA	0003	01	20200201	PM2.5	0.03		0.03	0.04
17119	Madison	119818AAA	0003	01	20200201	VOM	0.01		0.01	0.01
17119	Madison	119818AAA	0004	01	40301101	VOM	0.24		0.27	0.30
17119	Madison	119818AAA	0006	01	31000227	VOM	0.00		0.00	0.00
17119	Madison	119818AAA	0007	01	40715801	VOM	0.00		0.00	0.00
17119	Madison	119819AAA	0007	01	40500301	VOM	0.14		0.16	0.18
17119	Madison	119819AAA	0011	01	40500421	VOM	0.03		0.03	0.03
17119	Madison	119819AAA	0015	01	40500511	VOM	0.33		0.37	0.41
17119	Madison	119819AAA	0016	01	40299998	VOM	0.01		0.01	0.01
17119	Madison	119820AAD	0005	01	30200506	PM2.5	0.01		0.02	0.02
17119	Madison	119820AAD	0006	01	30200505	PM2.5	0.01		0.01	0.01

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17119	Madison	119820AAD	0007	01	30200564	PM2.5	0.01		0.01	0.01
17119	Madison	119820AAD	0010	01	30200563	PM2.5	0.01		0.01	0.01
17119	Madison	119820AAD	0011	01	30200563	PM2.5	0.02		0.02	0.03
17119	Madison	119820AAD	0017	01	30200530	PM2.5	0.02		0.02	0.03
17119	Madison	119820AAD	0018	01	30200553	PM2.5	0.01		0.01	0.01
17119	Madison	119820AAD	0019	01	30200560	PM2.5	0.01		0.01	0.01
17119	Madison	119820AAE	0009	01	30200803	PM2.5	0.00		0.01	0.01
17119	Madison	119820AAE	0010	01	30200803	PM2.5	0.00		0.01	0.01
17119	Madison	119820AAE	0014	01	30200553	PM2.5	0.02		0.02	0.03
17119	Madison	119820AAE	0016	01	30200526	PM2.5	0.00		0.00	0.00
17119	Madison	119821AAB	0004	01	30299998	VOM	0.78		0.89	0.98
17119	Madison	119821AAB	0005	01	30204201	VOM	6.83		7.79	8.57
17119	Madison	119821AAB	0006	01	30204201	VOM	2.57		2.93	3.23
17119	Madison	119821AAB	0007	01	30204201	VOM	1.19		1.36	1.49
17119	Madison	119821AAB	0008	01	30204201	VOM	1.24		1.41	1.55
17119	Madison	119821AAE	0005	01	30500201	VOM	1.94		2.14	2.24
17119	Madison	119821AAH	0008	01	40400322	VOM	6.03		7.24	7.64
17119	Madison	119821AAH	0009	01	40400306	VOM	0.35		0.42	0.44
17119	Madison	119821AAI	0001	01	39990023	NOX	0.00		0.00	0.00
17119	Madison	119821AAI	0003	01	39990023	NH3	0.07		0.08	0.08
17119	Madison	119821AAI	0003	01	39990023	NOX	0.04		0.04	0.05
17119	Madison	119821AAI	0003	01	39990023	SO2	0.00		0.00	0.00
17119	Madison	119821AAI	0003	01	39990023	VOM	0.03		0.03	0.03
17119	Madison	119821AAI	0004	01	10200602	NH3	0.01		0.01	0.01
17119	Madison	119821AAI	0004	01	10200602	NOX	0.21		0.25	0.30
17119	Madison	119821AAI	0004	01	10200602	PM2.5	0.02		0.02	0.02
17119	Madison	119821AAI	0004	01	10200602	SO2	0.00		0.00	0.00
17119	Madison	119821AAI	0004	01	10200602	VOM	0.01		0.01	0.01
17119	Madison	119821AAI	0005	01	30199998	NOX	0.00		0.00	0.00
17133	Monroe	133005AAD	0004	01	10200603	NH3	0.00		0.00	0.00
17133	Monroe	133005AAD	0004	01	10200603	NOX	0.10		0.12	0.15
17133	Monroe	133005AAD	0004	01	10200603	PM2.5	0.00		0.00	0.00
17133	Monroe	133005AAD	0004	01	10200603	SO2	0.00		0.00	0.00
17133	Monroe	133005AAD	0004	01	10200603	VOM	0.01		0.01	0.01
17133	Monroe	133005AAO	0001	01	30800702	VOM	0.19		0.22	0.24
17133	Monroe	133005AAO	0002	01	40704401	VOM	0.35		0.40	0.44
17133	Monroe	133005AAO	0003	01	31499999	VOM	0.30		0.39	0.47
17133	Monroe	133005AAO	0004	01	10201003	NOX	1.47		1.62	1.78
17133	Monroe	133005AAO	0004	01	10201003	SO2	0.01		0.01	0.01
17133	Monroe	133005AAO	0004	01	10201003	VOM	0.04		0.04	0.05
17133	Monroe	133005AAO	0005	01	30800702	VOM	0.19		0.22	0.24

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17133	Monroe	133005AAP	0001	01	10200602	NH3	0.05		0.06	0.07
17133	Monroe	133005AAP	0001	01	10200602	NOX	4.32		5.23	6.17
17133	Monroe	133005AAP	0001	01	10200602	PM2.5	0.12		0.14	0.17
17133	Monroe	133005AAP	0001	01	10200602	SO2	0.01		0.01	0.01
17133	Monroe	133005AAP	0001	01	10200602	VOM	0.08		0.10	0.12
17133	Monroe	133005AAQ	0001	01	30800720	VOM	0.28		0.32	0.35
17133	Monroe	133005AAQ	0002	01	30800720	VOM	0.74		0.85	0.93
17133	Monroe	133005AAQ	0003	01	30800799	VOM	0.02		0.02	0.02
17133	Monroe	133005AAR	0001	01	49000207	VOM	0.01		0.02	0.02
17133	Monroe	133025AAK	0001	01	40500401	VOM	6.23		7.09	7.81
17133	Monroe	133030AAO	0005	01	20200401	NH3	0.00		0.00	0.00
17133	Monroe	133030AAO	0005	01	20200401	NOX	0.08		0.09	0.09
17133	Monroe	133030AAO	0005	01	20200401	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0005	01	20200401	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0005	01	20200401	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0006	01	20200401	NH3	0.00		0.00	0.00
17133	Monroe	133030AAO	0006	01	20200401	NOX	0.03		0.03	0.04
17133	Monroe	133030AAO	0006	01	20200401	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0006	01	20200401	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0006	01	20200401	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0007	01	20100102	NH3	0.00		0.00	0.00
17133	Monroe	133030AAO	0007	01	20100102	NOX	0.04		0.04	0.03
17133	Monroe	133030AAO	0007	01	20100102	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0007	01	20100102	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0007	01	20100102	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0009	01	20200401	NH3	0.00		0.00	0.00
17133	Monroe	133030AAO	0009	01	20200401	NOX	0.08		0.09	0.09
17133	Monroe	133030AAO	0009	01	20200401	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0009	01	20200401	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0009	01	20200401	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0010	01	20200401	NH3	0.02		0.02	0.02
17133	Monroe	133030AAO	0010	01	20200401	NOX	1.19		1.30	1.41
17133	Monroe	133030AAO	0010	01	20200401	PM2.5	0.02		0.02	0.02
17133	Monroe	133030AAO	0010	01	20200401	SO2	0.02		0.02	0.02
17133	Monroe	133030AAO	0010	01	20200401	VOM	0.03		0.03	0.04
17133	Monroe	133030AAO	0010	02	20100202	NH3	0.00		0.00	0.00
17133	Monroe	133030AAO	0010	02	20100202	NOX	0.00		0.00	0.00
17133	Monroe	133030AAO	0010	02	20100202	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0010	02	20100202	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0010	02	20100202	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0011	01	20200401	NH3	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17133	Monroe	133030AAO	0011	01	20200401	NOX	0.12		0.13	0.14
17133	Monroe	133030AAO	0011	01	20200401	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0011	01	20200401	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0011	01	20200401	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0011	02	20100202	NH3	0.00		0.00	0.00
17133	Monroe	133030AAO	0011	02	20100202	NOX	0.65		1.11	1.41
17133	Monroe	133030AAO	0011	02	20100202	PM2.5	0.04		0.06	0.08
17133	Monroe	133030AAO	0011	02	20100202	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0011	02	20100202	VOM	0.19		0.32	0.41
17133	Monroe	133030AAO	0012	01	20200401	NH3	0.00		0.01	0.01
17133	Monroe	133030AAO	0012	01	20200401	NOX	0.28		0.31	0.33
17133	Monroe	133030AAO	0012	01	20200401	PM2.5	0.00		0.01	0.01
17133	Monroe	133030AAO	0012	01	20200401	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0012	01	20200401	VOM	0.01		0.01	0.01
17133	Monroe	133030AAO	0012	02	20100202	NH3	0.00		0.00	0.00
17133	Monroe	133030AAO	0012	02	20100202	NOX	0.00		0.00	0.00
17133	Monroe	133030AAO	0012	02	20100202	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0012	02	20100202	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0012	02	20100202	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0013	01	20200401	NH3	0.02		0.02	0.02
17133	Monroe	133030AAO	0013	01	20200401	NOX	1.01		1.11	1.20
17133	Monroe	133030AAO	0013	01	20200401	PM2.5	0.02		0.02	0.02
17133	Monroe	133030AAO	0013	01	20200401	SO2	0.02		0.02	0.02
17133	Monroe	133030AAO	0013	01	20200401	VOM	0.03		0.03	0.04
17133	Monroe	133030AAO	0015	01	20100101	NOX	0.00		0.00	0.00
17133	Monroe	133030AAO	0015	01	20100101	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0015	01	20100101	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0015	01	20100101	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0015	02	20100201	NOX	0.14		0.24	0.30
17133	Monroe	133030AAO	0015	02	20100201	PM2.5	0.01		0.02	0.02
17133	Monroe	133030AAO	0015	02	20100201	SO2	0.00		0.01	0.01
17133	Monroe	133030AAO	0015	02	20100201	VOM	0.05		0.09	0.11
17133	Monroe	133030AAO	0017	01	20100101	NH3	0.01		0.01	0.01
17133	Monroe	133030AAO	0017	01	20100101	NOX	0.43		0.39	0.35
17133	Monroe	133030AAO	0017	01	20100101	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0017	01	20100101	SO2	0.03		0.03	0.02
17133	Monroe	133030AAO	0017	01	20100101	VOM	0.01		0.01	0.01
17133	Monroe	133030AAO	0017	02	20100202	NOX	0.00		0.00	0.00
17133	Monroe	133030AAO	0017	02	20100202	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0017	02	20100202	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0017	02	20100202	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17133	Monroe	133030AAO	0018	01	20100101	NH3	0.01		0.01	0.01
17133	Monroe	133030AAO	0018	01	20100101	NOX	0.38		0.35	0.31
17133	Monroe	133030AAO	0018	01	20100101	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0018	01	20100101	SO2	0.02		0.02	0.02
17133	Monroe	133030AAO	0018	01	20100101	VOM	0.01		0.01	0.01
17133	Monroe	133030AAO	0018	02	20100202	NOX	0.00		0.00	0.00
17133	Monroe	133030AAO	0018	02	20100202	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0018	02	20100202	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0018	02	20100202	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0019	01	20100101	NH3	0.01		0.01	0.00
17133	Monroe	133030AAO	0019	01	20100101	NOX	0.31		0.28	0.25
17133	Monroe	133030AAO	0019	01	20100101	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0019	01	20100101	SO2	0.02		0.02	0.02
17133	Monroe	133030AAO	0019	01	20100101	VOM	0.01		0.01	0.01
17133	Monroe	133030AAO	0019	02	20100202	NOX	0.00		0.00	0.00
17133	Monroe	133030AAO	0019	02	20100202	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0019	02	20100202	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0019	02	20100202	VOM	0.00		0.00	0.00
17133	Monroe	133030AAO	0020	01	20300102	NOX	0.00		0.00	0.00
17133	Monroe	133030AAO	0020	01	20300102	PM2.5	0.00		0.00	0.00
17133	Monroe	133030AAO	0020	01	20300102	SO2	0.00		0.00	0.00
17133	Monroe	133030AAO	0020	01	20300102	VOM	0.00		0.00	0.00
17133	Monroe	133030AAT	0001	01	41000202	VOM	8.88		10.20	11.16
17133	Monroe	133856AAA	0008	01	30502006	PM2.5	0.13		0.15	0.18
17133	Monroe	133858AAA	0001	01	40301001	VOM	0.08		0.09	0.10
17157	Randolph	157851AAA	0001	01	10100203	NH3	44.62		46.39	52.24
17157	Randolph	157851AAA	0001	01	10100203	NOX	1272.59		1323.05	1489.92
17157	Randolph	157851AAA	0001	01	10100203	PM2.5	269.42		280.10	315.43
17157	Randolph	157851AAA	0001	01	10100203	SO2	7250.66		1628.24	1833.61
17157	Randolph	157851AAA	0001	01	10100203	VOM	129.87		135.02	152.05
17157	Randolph	157851AAA	0002	01	10100203	NH3	57.46		59.74	67.27
17157	Randolph	157851AAA	0002	01	10100203	NOX	1557.63		1619.39	1823.64
17157	Randolph	157851AAA	0002	01	10100203	PM2.5	400.26		416.13	468.62
17157	Randolph	157851AAA	0002	01	10100203	SO2	8618.93		1827.97	2058.54
17157	Randolph	157851AAA	0002	01	10100203	VOM	145.40		151.16	170.23
17157	Randolph	157851AAA	0003	01	40301019	VOM	0.01		0.01	0.01
17157	Randolph	157851AAA	0005	01	10100501	NH3	0.00		0.00	0.00
17157	Randolph	157851AAA	0005	01	10100501	NOX	0.02		0.02	0.02
17157	Randolph	157851AAA	0005	01	10100501	PM2.5	0.00		0.00	0.00
17157	Randolph	157851AAA	0005	01	10100501	SO2	0.01		0.01	0.01
17157	Randolph	157851AAA	0005	01	10100501	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17157	Randolph	157851AAA	0013	01	10100202	NH3	0.72		0.75	0.84
17157	Randolph	157851AAA	0013	01	10100202	NOX	2092.10		2175.05	2449.39
17157	Randolph	157851AAA	0013	01	10100202	PM2.5	146.02		151.81	170.96
17157	Randolph	157851AAA	0013	01	10100202	SO2	9727.53		1759.70	1981.65
17157	Randolph	157851AAA	0013	01	10100202	VOM	76.21		79.23	89.23
17157	Randolph	157851AAA	0014	01	40714697	VOM	0.00		0.00	0.00
17157	Randolph	157851AAA	0015	01	40714697	VOM	0.00		0.00	0.00
17157	Randolph	157851AAA	0016	01	40714697	VOM	0.00		0.00	0.00
17157	Randolph	157851AAA	0017	01	40714697	VOM	0.00		0.00	0.00
17157	Randolph	157851AAA	0019	01	40714697	VOM	0.00		0.00	0.00
17157	Randolph	157851AAA	0020	01	40301099	VOM	0.00		0.00	0.00
17157	Randolph	157851AAA	0022	01	40301099	VOM	0.00		0.00	0.00
17157	Randolph	157851AAC	0006	01	30590002	NH3	0.09		0.09	0.10
17157	Randolph	157851AAC	0006	01	30590002	NOX	5.47		5.76	5.89
17157	Randolph	157851AAC	0006	01	30590002	PM2.5	0.45		0.47	0.48
17157	Randolph	157851AAC	0006	01	30590002	SO2	5.29		5.57	5.70
17157	Randolph	157851AAC	0006	01	30590002	VOM	0.12		0.13	0.13
17163	St. Clair	163005AAE	0003	01	40200601	VOM	39.41		49.66	57.64
17163	St. Clair	163005AAE	0004	01	30184001	VOM	0.00		0.00	0.00
17163	St. Clair	163005AAH	0001	01	20100101	NOX	0.00		0.00	0.00
17163	St. Clair	163005AAH	0001	01	20100101	PM2.5	0.00		0.00	0.00
17163	St. Clair	163005AAH	0001	01	20100101	SO2	0.01		0.01	0.01
17163	St. Clair	163005AAH	0001	01	20100101	VOM	0.00		0.00	0.00
17163	St. Clair	163005AAH	0002	01	20100101	NOX	0.01		0.01	0.01
17163	St. Clair	163005AAH	0002	01	20100101	PM2.5	0.00		0.00	0.00
17163	St. Clair	163005AAH	0002	01	20100101	SO2	0.00		0.00	0.00
17163	St. Clair	163005AAH	0002	01	20100101	VOM	0.00		0.00	0.00
17163	St. Clair	163010AAD	0008	01	10200603	NH3	0.00		0.00	0.00
17163	St. Clair	163010AAD	0008	01	10200603	NOX	0.01		0.01	0.01
17163	St. Clair	163010AAD	0008	01	10200603	PM2.5	0.00		0.00	0.00
17163	St. Clair	163010AAD	0008	01	10200603	SO2	0.00		0.00	0.00
17163	St. Clair	163010AAD	0008	01	10200603	VOM	0.00		0.00	0.00
17163	St. Clair	163010AAH	0018	01	30999999	VOM	0.17		0.22	0.26
17163	St. Clair	163010AAH	0019	01	40200101	VOM	1.30		1.63	1.90
17163	St. Clair	163010AAH	0020	01	10200602	NH3	0.08		0.10	0.12
17163	St. Clair	163010AAH	0020	01	10200602	NOX	2.56		3.09	3.65
17163	St. Clair	163010AAH	0020	01	10200602	PM2.5	0.20		0.24	0.28
17163	St. Clair	163010AAH	0020	01	10200602	SO2	0.02		0.02	0.02
17163	St. Clair	163010AAH	0020	01	10200602	VOM	0.14		0.17	0.20
17163	St. Clair	163010AAH	0022	01	39999992	NOX	0.09		0.11	0.13
17163	St. Clair	163010AAH	0022	01	39999992	VOM	0.08		0.11	0.13

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163010AAL	0012	01	40299998	VOM	0.00		0.00	0.00
17163	St. Clair	163010AAN	0002	01	30999999	NOX	1.67		2.21	2.62
17163	St. Clair	163010AAN	0004	01	30599999	VOM	0.03		0.03	0.03
17163	St. Clair	163010AAN	0008	01	30999999	NOX	0.56		0.74	0.87
17163	St. Clair	163010AAN	0008	01	30999999	VOM	0.09		0.12	0.15
17163	St. Clair	163010AAO	0005	01	31502001	VOM	0.06		0.07	0.08
17163	St. Clair	163010AAO	0006	01	10300602	NH3	0.02		0.02	0.02
17163	St. Clair	163010AAO	0006	01	10300602	NOX	3.86		3.99	3.94
17163	St. Clair	163010AAO	0006	01	10300602	PM2.5	0.29		0.30	0.30
17163	St. Clair	163010AAO	0006	01	10300602	SO2	0.02		0.02	0.02
17163	St. Clair	163010AAO	0006	01	10300602	VOM	0.21		0.22	0.21
17163	St. Clair	163010AAO	0006	02	10300401	NH3	0.00		0.00	0.00
17163	St. Clair	163010AAO	0006	02	10300401	NOX	0.02		0.02	0.02
17163	St. Clair	163010AAO	0006	02	10300401	PM2.5	0.00		0.00	0.00
17163	St. Clair	163010AAO	0006	02	10300401	SO2	0.01		0.01	0.01
17163	St. Clair	163010AAO	0006	02	10300401	VOM	0.00		0.00	0.00
17163	St. Clair	163010AAO	0007	01	10300602	NH3	0.01		0.01	0.01
17163	St. Clair	163010AAO	0007	01	10300602	NOX	2.05		2.12	2.09
17163	St. Clair	163010AAO	0007	01	10300602	PM2.5	0.16		0.17	0.16
17163	St. Clair	163010AAO	0007	01	10300602	SO2	0.01		0.01	0.01
17163	St. Clair	163010AAO	0007	01	10300602	VOM	0.11		0.11	0.11
17163	St. Clair	163010AAO	0007	02	10300401	NH3	0.00		0.00	0.00
17163	St. Clair	163010AAO	0007	02	10300401	NOX	0.00		0.00	0.00
17163	St. Clair	163010AAO	0007	02	10300401	PM2.5	0.00		0.00	0.00
17163	St. Clair	163010AAO	0007	02	10300401	SO2	0.00		0.00	0.00
17163	St. Clair	163010AAO	0007	02	10300401	VOM	0.00		0.00	0.00
17163	St. Clair	163010AAO	0008	01	40301025	VOM	0.00		0.00	0.01
17163	St. Clair	163010ADM	0004	01	50200504	NOX	0.00		0.00	0.00
17163	St. Clair	163010ADM	0004	01	50200504	SO2	0.00		0.00	0.00
17163	St. Clair	163010ADM	0004	01	50200504	VOM	0.00		0.00	0.00
17163	St. Clair	163010ADM	0005	01	31502001	VOM	0.00		0.00	0.00
17163	St. Clair	163010ADM	0006	01	10300602	NH3	0.09		0.09	0.09
17163	St. Clair	163010ADM	0006	01	10300602	NOX	2.67		2.76	2.73
17163	St. Clair	163010ADM	0006	01	10300602	PM2.5	0.21		0.22	0.21
17163	St. Clair	163010ADM	0006	01	10300602	SO2	0.01		0.02	0.02
17163	St. Clair	163010ADM	0006	01	10300602	VOM	0.15		0.16	0.15
17163	St. Clair	163010ADM	0006	02	10300501	NH3	0.00		0.00	0.00
17163	St. Clair	163010ADM	0006	02	10300501	NOX	0.00		0.00	0.00
17163	St. Clair	163010ADM	0006	02	10300501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163010ADM	0006	02	10300501	SO2	0.00		0.00	0.00
17163	St. Clair	163010ADM	0006	02	10300501	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163010ADM	0007	01	10300602	NH3	0.07		0.07	0.07
17163	St. Clair	163010ADM	0007	01	10300602	NOX	2.13		2.20	2.18
17163	St. Clair	163010ADM	0007	01	10300602	PM2.5	0.16		0.17	0.16
17163	St. Clair	163010ADM	0007	01	10300602	SO2	0.02		0.02	0.02
17163	St. Clair	163010ADM	0007	01	10300602	VOM	0.11		0.11	0.11
17163	St. Clair	163010ADM	0007	02	10300501	NH3	0.00		0.00	0.00
17163	St. Clair	163010ADM	0007	02	10300501	NOX	0.00		0.00	0.00
17163	St. Clair	163010ADM	0007	02	10300501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163010ADM	0007	02	10300501	SO2	0.00		0.00	0.00
17163	St. Clair	163010ADM	0007	02	10300501	VOM	0.00		0.00	0.00
17163	St. Clair	163010ADQ	0001	01	40301019	VOM	0.02		0.02	0.03
17163	St. Clair	163010ADQ	0002	01	40301019	VOM	0.68		0.78	0.86
17163	St. Clair	163010ADR	0001	01	40301001	VOM	0.04		0.05	0.06
17163	St. Clair	163010ADR	0002	01	40301019	VOM	0.04		0.05	0.06
17163	St. Clair	163010ADR	0003	01	40301019	VOM	0.02		0.02	0.03
17163	St. Clair	163010AEH	0001	01	40301001	VOM	0.00		0.00	0.00
17163	St. Clair	163010AEU	0001	01	31502102	NOX	0.36		0.41	0.46
17163	St. Clair	163010AEY	0002	01	32099999	VOM	14.14		16.06	18.03
17163	St. Clair	163010AEY	0006	01	32099999	VOM	0.58		0.66	0.74
17163	St. Clair	163010AEY	0007	01	32099999	VOM	14.14		16.06	18.03
17163	St. Clair	163010AEZ	0009	01	10200602	NH3	0.09		0.11	0.13
17163	St. Clair	163010AEZ	0009	01	10200602	NOX	2.65		3.20	3.78
17163	St. Clair	163010AEZ	0009	01	10200602	PM2.5	0.19		0.23	0.27
17163	St. Clair	163010AEZ	0009	01	10200602	SO2	0.02		0.02	0.03
17163	St. Clair	163010AEZ	0009	01	10200602	VOM	0.16		0.19	0.23
17163	St. Clair	163010AEZ	0010	01	40201301	NH3	0.16		0.18	0.20
17163	St. Clair	163010AEZ	0010	01	40201301	VOM	1.87		2.13	2.35
17163	St. Clair	163010AEZ	0011	01	40201301	VOM	0.34		0.39	0.43
17163	St. Clair	163010AEZ	0012	01	40201301	VOM	0.25		0.28	0.31
17163	St. Clair	163010AEZ	0014	01	40201399	PM2.5	3.56		4.05	4.48
17163	St. Clair	163010AEZ	0014	01	40201399	VOM	4.71		5.36	5.92
17163	St. Clair	163010AEZ	0015	01	30701399	PM2.5	2.18		2.48	2.74
17163	St. Clair	163010AFA	0002	01	40200710	VOM	3.40		4.28	4.97
17163	St. Clair	163010AFC	0001	01	50410420	VOM	0.01		0.01	0.01
17163	St. Clair	163010AFG	0004	01	40500431	VOM	0.29		0.33	0.37
17163	St. Clair	163010AFG	0004	02	40500401	VOM	2.00		2.28	2.51
17163	St. Clair	163010AFG	0004	03	40500417	VOM	0.01		0.01	0.01
17163	St. Clair	163010AFH	0001	01	40301101	VOM	0.00		0.00	0.00
17163	St. Clair	163010AFH	0002	01	50410310	VOM	0.02		0.03	0.03
17163	St. Clair	163010AFJ	0001	01	30102601	VOM	0.10		0.11	0.13
17163	St. Clair	163010AFM	0001	01	50410420	VOM	0.07		0.08	0.09

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163010AFM	0002	01	50410310	VOM	0.04		0.04	0.05
17163	St. Clair	163010AFO	0001	01	50100410	NOX	2.97		3.50	3.94
17163	St. Clair	163010AFO	0001	01	50100410	PM2.5	0.70		0.83	0.93
17163	St. Clair	163010AFO	0001	01	50100410	SO2	0.65		0.77	0.87
17163	St. Clair	163010AFO	0001	01	50100410	VOM	0.09		0.11	0.12
17163	St. Clair	163020AAB	0001	01	40400178	VOM	3.20		3.32	3.43
17163	St. Clair	163020AAB	0002	01	40400101	VOM	0.18		0.19	0.20
17163	St. Clair	163020AAB	0003	01	40301101	VOM	0.00		0.00	0.01
17163	St. Clair	163020AAB	0005	01	40301002	VOM	0.00		0.00	0.00
17163	St. Clair	163020AAB	0008	01	40700815	VOM	0.00		0.00	0.00
17163	St. Clair	163020AAB	0010	01	40400178	VOM	0.03		0.03	0.03
17163	St. Clair	163020AAB	0011	01	40301020	VOM	0.11		0.13	0.14
17163	St. Clair	163020AAB	0012	01	40301020	VOM	0.00		0.00	0.00
17163	St. Clair	163020AAB	0016	01	30600508	VOM	0.04		0.05	0.05
17163	St. Clair	163020AAB	0019	01	40400178	VOM	0.58		0.60	0.62
17163	St. Clair	163020AAB	0020	01	40400178	VOM	0.17		0.18	0.18
17163	St. Clair	163020AAB	0021	01	40400250	VOM	0.00		0.00	0.00
17163	St. Clair	163020AAB	0025	02	40301099	VOM	5.15		5.86	6.49
17163	St. Clair	163020AAB	0027	02	40400179	VOM	2.97		3.38	3.74
17163	St. Clair	163020AAB	0028	02	40400278	VOM	6.68		6.93	7.17
17163	St. Clair	163020AAB	0029	02	40400278	VOM	4.89		5.07	5.25
17163	St. Clair	163020AAB	0030	02	40400279	VOM	0.31		0.35	0.39
17163	St. Clair	163020AAB	0037	01	40400230	VOM	5.94		6.76	7.49
17163	St. Clair	163020AAB	0038	01	40400232	VOM	1.40		1.49	1.58
17163	St. Clair	163020AAB	0039	01	40400232	VOM	0.55		0.59	0.62
17163	St. Clair	163020AAB	0040	01	40400121	VOM	3.35		3.81	4.22
17163	St. Clair	163020AAB	0041	01	40400232	VOM	12.80		13.63	14.43
17163	St. Clair	163020AAB	0045	01	40400151	VOM	5.44		6.19	6.86
17163	St. Clair	163020AAB	0052	01	40301299	VOM	0.07		0.08	0.09
17163	St. Clair	163020AAB	0053	01	40301299	VOM	0.00		0.00	0.00
17163	St. Clair	163020AAB	0055	01	40301299	VOM	0.01		0.01	0.01
17163	St. Clair	163020AAB	0061	01	40301007	VOM	9.42		10.71	11.88
17163	St. Clair	163020AAB	0065	01	50410310	VOM	0.43		0.51	0.57
17163	St. Clair	163020AAB	0066	01	30600903	NOX	12.38		13.93	14.61
17163	St. Clair	163020AAB	0067	01	40400150	VOM	13.71		15.59	17.28
17163	St. Clair	163020AAB	0068	01	40400150	VOM	13.70		15.58	17.27
17163	St. Clair	163020AAD	0004	01	10200501	NH3	0.00		0.00	0.00
17163	St. Clair	163020AAD	0004	01	10200501	NOX	0.03		0.03	0.04
17163	St. Clair	163020AAD	0004	01	10200501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163020AAD	0004	01	10200501	SO2	0.22		0.24	0.26
17163	St. Clair	163020AAD	0004	01	10200501	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163020AAH	0001	01	30200505	PM2.5	0.19		0.22	0.25
17163	St. Clair	163020AAH	0002	01	30200508	PM2.5	0.17		0.20	0.22
17163	St. Clair	163020AAH	0003	01	30200506	PM2.5	0.01		0.01	0.01
17163	St. Clair	163020AAH	0004	01	30510599	PM2.5	0.42		0.49	0.56
17163	St. Clair	163020AAH	0005	01	30200540	PM2.5	0.02		0.02	0.03
17163	St. Clair	163020AAH	0006	01	30200605	PM2.5	0.05		0.05	0.06
17163	St. Clair	163020AAH	0007	01	30200564	PM2.5	0.05		0.06	0.06
17163	St. Clair	163020AAK	0001	01	40202501	VOM	63.45		83.75	99.45
17163	St. Clair	163025AAD	0004	01	10200603	NH3	0.00		0.00	0.00
17163	St. Clair	163025AAD	0004	01	10200603	NOX	0.06		0.08	0.09
17163	St. Clair	163025AAD	0004	01	10200603	PM2.5	0.00		0.00	0.00
17163	St. Clair	163025AAD	0004	01	10200603	SO2	0.00		0.00	0.00
17163	St. Clair	163025AAD	0004	01	10200603	VOM	0.00		0.00	0.00
17163	St. Clair	163025AAG	0001	01	40388801	VOM	0.04		0.05	0.05
17163	St. Clair	163025AAG	0002	01	49099998	VOM	0.09		0.11	0.12
17163	St. Clair	163025AAG	0003	01	40301099	VOM	0.00		0.00	0.00
17163	St. Clair	163025AAG	0004	01	49099998	VOM	0.00		0.00	0.00
17163	St. Clair	163045AAC	0004	01	10200501	NH3	0.00		0.00	0.00
17163	St. Clair	163045AAC	0004	01	10200501	NOX	0.01		0.01	0.01
17163	St. Clair	163045AAC	0004	01	10200501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163045AAC	0004	01	10200501	SO2	0.08		0.09	0.10
17163	St. Clair	163045AAC	0004	01	10200501	VOM	0.00		0.00	0.00
17163	St. Clair	163045AAK	0001	01	30200505	PM2.5	0.04		0.05	0.05
17163	St. Clair	163045AAK	0003	01	30200504	PM2.5	0.19		0.23	0.25
17163	St. Clair	163045AAK	0007	01	30200506	PM2.5	0.01		0.01	0.01
17163	St. Clair	163045AAK	0009	01	30200608	PM2.5	0.15		0.18	0.19
17163	St. Clair	163045AAK	0010	01	30200540	PM2.5	0.01		0.01	0.01
17163	St. Clair	163045ABA	0004	01	10300602	NH3	0.10		0.10	0.10
17163	St. Clair	163045ABA	0004	01	10300602	NOX	2.01		2.08	2.05
17163	St. Clair	163045ABA	0004	01	10300602	PM2.5	0.15		0.16	0.15
17163	St. Clair	163045ABA	0004	01	10300602	SO2	0.01		0.01	0.01
17163	St. Clair	163045ABA	0004	01	10300602	VOM	0.11		0.11	0.11
17163	St. Clair	163045ABA	0007	01	31502001	VOM	0.00		0.00	0.00
17163	St. Clair	163045ADT	0030	01	30103553	SO2	0.00		0.00	0.00
17163	St. Clair	163045ADT	0031	01	30103599	SO2	0.03		0.03	0.04
17163	St. Clair	163045ADT	0033	01	10200601	NH3	0.00		0.00	0.00
17163	St. Clair	163045ADT	0033	01	10200601	NOX	0.00		0.00	0.00
17163	St. Clair	163045ADT	0033	01	10200601	PM2.5	0.00		0.00	0.00
17163	St. Clair	163045ADT	0033	01	10200601	SO2	0.00		0.00	0.00
17163	St. Clair	163045ADT	0033	01	10200601	VOM	0.00		0.00	0.00
17163	St. Clair	163045ADT	0033	02	10200501	NH3	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163045ADT	0033	02	10200501	NOX	0.00		0.00	0.00
17163	St. Clair	163045ADT	0033	02	10200501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163045ADT	0033	02	10200501	SO2	0.00		0.00	0.00
17163	St. Clair	163045ADT	0033	02	10200501	VOM	0.00		0.00	0.00
17163	St. Clair	163045ADT	0035	01	30103553	NOX	0.00		0.00	0.00
17163	St. Clair	163045ADT	0035	01	30103553	PM2.5	0.00		0.00	0.00
17163	St. Clair	163045ADT	0035	01	30103553	SO2	0.00		0.00	0.00
17163	St. Clair	163045ADT	0035	01	30103553	VOM	0.00		0.00	0.00
17163	St. Clair	163045ADT	0061	01	10200601	NH3	0.00		0.00	0.00
17163	St. Clair	163045ADT	0061	01	10200601	NOX	0.00		0.00	0.00
17163	St. Clair	163045ADT	0061	01	10200601	PM2.5	0.00		0.00	0.00
17163	St. Clair	163045ADT	0061	01	10200601	SO2	0.00		0.00	0.00
17163	St. Clair	163045ADT	0061	01	10200601	VOM	0.00		0.00	0.00
17163	St. Clair	163045ADT	0068	01	10200602	NH3	0.04		0.05	0.06
17163	St. Clair	163045ADT	0068	01	10200602	NOX	1.21		1.46	1.73
17163	St. Clair	163045ADT	0068	01	10200602	PM2.5	0.09		0.11	0.13
17163	St. Clair	163045ADT	0068	01	10200602	SO2	0.01		0.01	0.01
17163	St. Clair	163045ADT	0068	01	10200602	VOM	0.07		0.08	0.10
17163	St. Clair	163045ADT	0069	01	30103553	NOX	0.00		0.00	0.00
17163	St. Clair	163045ADT	0069	01	30103553	SO2	0.00		0.00	0.00
17163	St. Clair	163045ADT	0069	01	30103553	VOM	0.00		0.00	0.00
17163	St. Clair	163045AEA	0001	01	40301019	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFJ	0001	01	10200401	NH3	0.00		0.00	0.00
17163	St. Clair	163045AFJ	0001	01	10200401	NOX	0.02		0.02	0.02
17163	St. Clair	163045AFJ	0001	01	10200401	PM2.5	0.01		0.01	0.01
17163	St. Clair	163045AFJ	0001	01	10200401	SO2	0.06		0.06	0.06
17163	St. Clair	163045AFJ	0001	01	10200401	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFJ	0002	01	40301019	VOM	0.07		0.08	0.09
17163	St. Clair	163045AFM	0012	01	10200603	NH3	0.00		0.00	0.00
17163	St. Clair	163045AFM	0012	01	10200603	NOX	0.00		0.00	0.00
17163	St. Clair	163045AFM	0012	01	10200603	PM2.5	0.00		0.00	0.00
17163	St. Clair	163045AFM	0012	01	10200603	SO2	0.00		0.00	0.00
17163	St. Clair	163045AFM	0012	01	10200603	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0013	01	10200603	NH3	0.06		0.07	0.09
17163	St. Clair	163045AFM	0013	01	10200603	NOX	1.78		2.15	2.54
17163	St. Clair	163045AFM	0013	01	10200603	PM2.5	0.14		0.17	0.20
17163	St. Clair	163045AFM	0013	01	10200603	SO2	0.01		0.01	0.01
17163	St. Clair	163045AFM	0013	01	10200603	VOM	0.10		0.12	0.14
17163	St. Clair	163045AFM	0015	01	30101891	VOM	12.45		14.20	15.64
17163	St. Clair	163045AFM	0016	01	30101891	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0017	01	30101891	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163045AFM	0018	01	30101899	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0019	01	30101899	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0020	01	30101899	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0021	01	30101899	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0022	01	30101899	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0023	01	30101899	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0024	01	30101899	VOM	1.67		1.91	2.10
17163	St. Clair	163045AFM	0047	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0048	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0049	01	40714698	VOM	0.02		0.02	0.03
17163	St. Clair	163045AFM	0050	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0051	01	40714698	VOM	0.03		0.03	0.04
17163	St. Clair	163045AFM	0052	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0053	01	40714698	VOM	0.03		0.03	0.04
17163	St. Clair	163045AFM	0054	01	40714698	VOM	0.03		0.03	0.04
17163	St. Clair	163045AFM	0055	01	40714698	VOM	0.00		0.01	0.01
17163	St. Clair	163045AFM	0056	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0057	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0058	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0059	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0060	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0061	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0062	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0063	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0064	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0065	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0066	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0067	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0068	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0069	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0070	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0071	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0072	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0073	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0074	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0075	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0076	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0077	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0078	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0079	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0080	01	40714698	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163045AFM	0081	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0082	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0083	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0084	01	30101899	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0085	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0087	01	40714698	VOM	0.45		0.51	0.56
17163	St. Clair	163045AFM	0100	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0101	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0102	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0103	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0104	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0105	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0116	01	30188801	VOM	2.81		3.20	3.52
17163	St. Clair	163045AFM	0117	01	40714697	VOM	0.01		0.01	0.01
17163	St. Clair	163045AFM	0118	01	40714697	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0119	01	40714697	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0120	01	40714697	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0121	01	40714697	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFM	0122	01	40714697	VOM	0.00		0.00	0.00
17163	St. Clair	163045AFN	0001	01	40703623	VOM	2.29		2.61	2.86
17163	St. Clair	163045AFN	0002	01	30199998	VOM	0.31		0.35	0.39
17163	St. Clair	163045AFN	0003	01	30199998	VOM	0.18		0.20	0.22
17163	St. Clair	163045AFR	0001	01	50410405	VOM	0.20		0.23	0.26
17163	St. Clair	163045AFW	0002	01	10300603	NH3	0.02		0.02	0.02
17163	St. Clair	163045AFW	0002	01	10300603	NOX	0.70		0.72	0.71
17163	St. Clair	163045AFW	0002	01	10300603	PM2.5	0.09		0.09	0.09
17163	St. Clair	163045AFW	0002	01	10300603	SO2	0.00		0.00	0.00
17163	St. Clair	163045AFW	0002	01	10300603	VOM	0.02		0.02	0.02
17163	St. Clair	163045AFW	0003	01	10300603	NH3	0.01		0.01	0.01
17163	St. Clair	163045AFW	0003	01	10300603	NOX	0.23		0.24	0.24
17163	St. Clair	163045AFW	0003	01	10300603	PM2.5	0.03		0.03	0.03
17163	St. Clair	163045AFW	0003	01	10300603	SO2	0.00		0.00	0.00
17163	St. Clair	163045AFW	0003	01	10300603	VOM	0.01		0.01	0.01
17163	St. Clair	163045AFW	0004	01	40301002	VOM	0.67		0.76	0.85
17163	St. Clair	163045AGB	0001	01	30302411	NOX	0.80		0.91	1.17
17163	St. Clair	163045AGD	0004	01	40600601	VOM	0.47		0.54	0.60
17163	St. Clair	163045AGF	0001	01	41000202	VOM	4.00		4.60	5.03
17163	St. Clair	163045AGG	0001	01	41000202	VOM	7.00		8.05	8.81
17163	St. Clair	163045AGI	0001	01	40202503	VOM	25.51		33.67	39.99
17163	St. Clair	163045AGL	0001	01	41000202	VOM	2.47		2.83	3.10
17163	St. Clair	163050AAA	0019	01	30199998	SO2	0.30		0.34	0.38

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163050AAA	0023	01	30111507	SO2	0.29		0.33	0.36
17163	St. Clair	163050AAD	0001	01	50100410	NOX	19.31		22.76	25.60
17163	St. Clair	163050AAD	0001	01	50100410	PM2.5	0.43		0.51	0.57
17163	St. Clair	163050AAD	0001	01	50100410	SO2	6.09		7.18	8.07
17163	St. Clair	163050AAD	0001	01	50100410	VOM	2.09		2.46	2.77
17163	St. Clair	163050AAD	0009	01	50100403	VOM	5.42		6.39	7.19
17163	St. Clair	163050AAD	0010	01	20200402	NOX	6.16		6.68	7.21
17163	St. Clair	163050AAD	0010	01	20200402	PM2.5	0.44		0.48	0.52
17163	St. Clair	163050AAD	0010	01	20200402	SO2	0.41		0.44	0.48
17163	St. Clair	163050AAD	0010	01	20200402	VOM	0.60		0.65	0.70
17163	St. Clair	163050AAD	0012	01	50100421	NOX	46.02		46.50	44.44
17163	St. Clair	163050AAD	0012	01	50100421	PM2.5	0.57		0.58	0.55
17163	St. Clair	163050AAD	0012	01	50100421	SO2	8.82		8.91	8.52
17163	St. Clair	163050AAD	0012	01	50100421	VOM	3.49		3.53	3.37
17163	St. Clair	163050AAD	0013	01	50100401	PM2.5	2.02		2.38	2.68
17163	St. Clair	163050AAD	0014	01	50100402	PM2.5	2.36		2.78	3.13
17163	St. Clair	163050AAD	0015	01	50100410	NOX	1.97		2.32	2.61
17163	St. Clair	163050AAD	0015	01	50100410	PM2.5	0.04		0.05	0.05
17163	St. Clair	163050AAD	0015	01	50100410	SO2	0.78		0.92	1.03
17163	St. Clair	163050AAD	0015	01	50100410	VOM	0.04		0.05	0.05
17163	St. Clair	163052AAG	0001	01	20300101	NOX	0.01		0.01	0.01
17163	St. Clair	163052AAG	0001	01	20300101	PM2.5	0.00		0.00	0.00
17163	St. Clair	163052AAG	0001	01	20300101	SO2	0.03		0.03	0.03
17163	St. Clair	163052AAG	0001	01	20300101	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAC	0006	01	40202599	NOX	0.09		0.11	0.13
17163	St. Clair	163060AAC	0006	01	40202599	VOM	0.27		0.36	0.43
17163	St. Clair	163060AAC	0007	01	30999999	VOM	0.38		0.50	0.60
17163	St. Clair	163060AAC	0008	01	40200801	VOM	1.80		2.27	2.63
17163	St. Clair	163060AAC	0009	01	40100399	VOM	2.28		3.01	3.57
17163	St. Clair	163060AAF	0001	01	20200402	NOX	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	01	20200402	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	01	20200402	SO2	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	01	20200402	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	02	20200401	NH3	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	02	20200401	NOX	0.24		0.26	0.28
17163	St. Clair	163060AAF	0001	02	20200401	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	02	20200401	SO2	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	02	20200401	VOM	0.01		0.01	0.01
17163	St. Clair	163060AAF	0001	03	20100202	NOX	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	03	20100202	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0001	03	20100202	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163060AAF	0001	03	20100202	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAF	0002	01	20200401	NH3	0.00		0.00	0.00
17163	St. Clair	163060AAF	0002	01	20200401	NOX	0.00		0.00	0.00
17163	St. Clair	163060AAF	0002	01	20200401	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0002	01	20200401	SO2	0.00		0.00	0.00
17163	St. Clair	163060AAF	0002	01	20200401	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	01	20200402	NOX	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	01	20200402	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	01	20200402	SO2	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	01	20200402	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	02	20200401	NH3	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	02	20200401	NOX	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	02	20200401	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	02	20200401	SO2	0.00		0.00	0.00
17163	St. Clair	163060AAF	0003	02	20200401	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	01	20200402	NOX	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	01	20200402	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	01	20200402	SO2	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	01	20200402	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	02	20200401	NH3	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	02	20200401	NOX	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	02	20200401	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	02	20200401	SO2	0.00		0.00	0.00
17163	St. Clair	163060AAF	0004	02	20200401	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAF	0005	01	20200401	NH3	0.00		0.00	0.00
17163	St. Clair	163060AAF	0005	01	20200401	NOX	0.00		0.00	0.00
17163	St. Clair	163060AAF	0005	01	20200401	PM2.5	0.00		0.00	0.00
17163	St. Clair	163060AAF	0005	01	20200401	SO2	0.00		0.00	0.00
17163	St. Clair	163060AAF	0005	01	20200401	VOM	0.00		0.00	0.00
17163	St. Clair	163060AAF	0007	01	20100102	NH3	0.01		0.01	0.01
17163	St. Clair	163060AAF	0007	01	20100102	NOX	0.44		0.40	0.35
17163	St. Clair	163060AAF	0007	01	20100102	PM2.5	0.01		0.01	0.01
17163	St. Clair	163060AAF	0007	01	20100102	SO2	0.01		0.01	0.01
17163	St. Clair	163060AAF	0007	01	20100102	VOM	0.01		0.01	0.01
17163	St. Clair	163065AAI	0001	01	30500205	NOX	3.66		4.05	4.24
17163	St. Clair	163065AAI	0001	01	30500205	PM2.5	0.01		0.01	0.01
17163	St. Clair	163065AAI	0001	01	30500205	SO2	1.53		1.69	1.77
17163	St. Clair	163065AAI	0001	01	30500205	VOM	2.13		2.35	2.47
17163	St. Clair	163065AAI	0009	01	30500214	VOM	0.30		0.33	0.35
17163	St. Clair	163065AAI	0010	01	10200603	NH3	0.00		0.00	0.01
17163	St. Clair	163065AAI	0010	01	10200603	NOX	1.17		1.41	1.67

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163065AAI	0010	01	10200603	PM2.5	0.11		0.13	0.16
17163	St. Clair	163065AAI	0010	01	10200603	SO2	0.04		0.05	0.06
17163	St. Clair	163065AAI	0010	01	10200603	VOM	0.00		0.00	0.00
17163	St. Clair	163065AAI	0011	01	30500212	VOM	6.00		6.63	6.95
17163	St. Clair	163065AAL	0005	01	10200603	NH3	0.00		0.00	0.00
17163	St. Clair	163065AAL	0005	01	10200603	NOX	0.05		0.06	0.07
17163	St. Clair	163065AAL	0005	01	10200603	PM2.5	0.00		0.00	0.00
17163	St. Clair	163065AAL	0005	01	10200603	SO2	0.00		0.00	0.00
17163	St. Clair	163065AAL	0005	01	10200603	VOM	0.00		0.00	0.00
17163	St. Clair	163065AAN	0003	01	30502006	PM2.5	0.00		0.01	0.01
17163	St. Clair	163065AAO	0003	01	30502006	PM2.5	0.00		0.00	0.00
17163	St. Clair	163075AAL	0001	01	20200102	NOX	0.37		0.40	0.44
17163	St. Clair	163075AAL	0001	01	20200102	PM2.5	0.03		0.03	0.04
17163	St. Clair	163075AAL	0001	01	20200102	SO2	0.02		0.02	0.02
17163	St. Clair	163075AAL	0001	01	20200102	VOM	0.03		0.03	0.04
17163	St. Clair	163075AAL	0002	01	50100403	VOM	1.84		2.17	2.44
17163	St. Clair	163075AAL	0003	01	20200102	NOX	0.00		0.00	0.00
17163	St. Clair	163075AAL	0003	01	20200102	PM2.5	0.00		0.00	0.00
17163	St. Clair	163075AAL	0003	01	20200102	SO2	0.00		0.00	0.00
17163	St. Clair	163075AAL	0003	01	20200102	VOM	0.00		0.00	0.00
17163	St. Clair	163075AAL	0006	01	50100402	PM2.5	0.11		0.13	0.15
17163	St. Clair	163075AAL	0006	01	50100402	VOM	0.00		0.00	0.00
17163	St. Clair	163075AAL	0007	01	50300601	NOX	23.24		29.28	33.99
17163	St. Clair	163075AAL	0007	01	50300601	PM2.5	1.01		1.27	1.48
17163	St. Clair	163075AAL	0007	01	50300601	SO2	5.42		6.83	7.93
17163	St. Clair	163075AAL	0007	01	50300601	VOM	1.86		2.34	2.72
17163	St. Clair	163075AAL	0009	01	30599999	VOM	0.00		0.00	0.00
17163	St. Clair	163080AAC	0013	01	20100102	NH3	0.00		0.00	0.00
17163	St. Clair	163080AAC	0013	01	20100102	NOX	0.10		0.09	0.08
17163	St. Clair	163080AAC	0013	01	20100102	PM2.5	0.00		0.00	0.00
17163	St. Clair	163080AAC	0013	01	20100102	SO2	0.00		0.00	0.00
17163	St. Clair	163080AAC	0013	01	20100102	VOM	0.00		0.00	0.00
17163	St. Clair	163080AAC	0014	01	20100102	NH3	0.00		0.00	0.00
17163	St. Clair	163080AAC	0014	01	20100102	NOX	0.07		0.06	0.06
17163	St. Clair	163080AAC	0014	01	20100102	PM2.5	0.00		0.00	0.00
17163	St. Clair	163080AAC	0014	01	20100102	SO2	0.00		0.00	0.00
17163	St. Clair	163080AAC	0014	01	20100102	VOM	0.00		0.00	0.00
17163	St. Clair	163080AAC	0015	01	20100102	NH3	0.00		0.00	0.00
17163	St. Clair	163080AAC	0015	01	20100102	NOX	0.14		0.13	0.11
17163	St. Clair	163080AAC	0015	01	20100102	PM2.5	0.00		0.00	0.00
17163	St. Clair	163080AAC	0015	01	20100102	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163080AAC	0015	01	20100102	VOM	0.00		0.00	0.00
17163	St. Clair	163080AAC	0016	01	20100102	NH3	0.00		0.00	0.00
17163	St. Clair	163080AAC	0016	01	20100102	NOX	0.20		0.18	0.16
17163	St. Clair	163080AAC	0016	01	20100102	PM2.5	0.00		0.00	0.00
17163	St. Clair	163080AAC	0016	01	20100102	SO2	0.00		0.00	0.00
17163	St. Clair	163080AAC	0016	01	20100102	VOM	0.01		0.01	0.00
17163	St. Clair	163080AAC	0017	01	20100102	NH3	0.00		0.00	0.00
17163	St. Clair	163080AAC	0017	01	20100102	NOX	0.03		0.03	0.02
17163	St. Clair	163080AAC	0017	01	20100102	PM2.5	0.00		0.00	0.00
17163	St. Clair	163080AAC	0017	01	20100102	SO2	0.00		0.00	0.00
17163	St. Clair	163080AAC	0017	01	20100102	VOM	0.00		0.00	0.00
17163	St. Clair	163080AAC	0017	02	20100202	NH3	0.01		0.01	0.01
17163	St. Clair	163080AAC	0017	02	20100202	NOX	0.27		0.46	0.58
17163	St. Clair	163080AAC	0017	02	20100202	PM2.5	0.01		0.03	0.03
17163	St. Clair	163080AAC	0017	02	20100202	SO2	0.00		0.00	0.00
17163	St. Clair	163080AAC	0017	02	20100202	VOM	0.08		0.14	0.17
17163	St. Clair	163080AAR	0001	01	40202499	VOM	2.08		2.74	3.26
17163	St. Clair	163085AAA	0001	01	30203299	VOM	21.33		24.34	27.00
17163	St. Clair	163085AAA	0002	01	30290003	NH3	0.04		0.04	0.04
17163	St. Clair	163085AAA	0002	01	30290003	NOX	1.33		1.39	1.44
17163	St. Clair	163085AAA	0002	01	30290003	PM2.5	0.10		0.10	0.11
17163	St. Clair	163085AAA	0002	01	30290003	SO2	0.01		0.01	0.01
17163	St. Clair	163085AAA	0002	01	30290003	VOM	0.07		0.07	0.08
17163	St. Clair	163085AAH	0001	01	30800799	VOM	5.73		6.53	7.20
17163	St. Clair	163085AAH	0003	01	40714697	VOM	0.07		0.08	0.09
17163	St. Clair	163085AAH	0006	01	30800799	VOM	0.04		0.05	0.05
17163	St. Clair	163100AAD	0001	01	30203801	NOX	0.10		0.11	0.13
17163	St. Clair	163100AAD	0001	01	30203801	PM2.5	0.42		0.48	0.53
17163	St. Clair	163100AAD	0001	01	30203801	SO2	0.12		0.14	0.15
17163	St. Clair	163100AAD	0001	01	30203801	VOM	12.55		14.33	15.87
17163	St. Clair	163100AAD	0004	01	10200602	NH3	0.07		0.08	0.10
17163	St. Clair	163100AAD	0004	01	10200602	NOX	2.07		2.50	2.95
17163	St. Clair	163100AAD	0004	01	10200602	PM2.5	0.15		0.18	0.21
17163	St. Clair	163100AAD	0004	01	10200602	SO2	0.01		0.01	0.01
17163	St. Clair	163100AAD	0004	01	10200602	VOM	0.12		0.15	0.17
17163	St. Clair	163100AAD	0004	02	10200501	NH3	0.00		0.00	0.00
17163	St. Clair	163100AAD	0004	02	10200501	NOX	0.00		0.00	0.00
17163	St. Clair	163100AAD	0004	02	10200501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163100AAD	0004	02	10200501	SO2	0.00		0.00	0.00
17163	St. Clair	163100AAD	0004	02	10200501	VOM	0.00		0.00	0.00
17163	St. Clair	163100AAD	0004	03	10201301	NOX	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163100AAD	0004	03	10201301	PM2.5	0.00		0.00	0.00
17163	St. Clair	163100AAD	0004	03	10201301	SO2	0.00		0.00	0.00
17163	St. Clair	163100AAD	0004	03	10201301	VOM	0.00		0.00	0.00
17163	St. Clair	163100AAM	0005	01	20100102	NH3	0.05		0.05	0.04
17163	St. Clair	163100AAM	0005	01	20100102	NOX	27.21		24.92	21.88
17163	St. Clair	163100AAM	0005	01	20100102	PM2.5	0.85		0.78	0.68
17163	St. Clair	163100AAM	0005	01	20100102	SO2	2.57		2.35	2.07
17163	St. Clair	163100AAM	0005	01	20100102	VOM	0.77		0.71	0.62
17163	St. Clair	163100AAM	0007	01	30490035	NOX	0.00		0.00	0.00
17163	St. Clair	163100AAM	0007	01	30490035	VOM	0.00		0.00	0.00
17163	St. Clair	163100AAM	0008	01	30499999	NOX	0.00		0.00	0.00
17163	St. Clair	163100AAM	0008	01	30499999	VOM	0.00		0.00	0.00
17163	St. Clair	163110AAI	0001	01	10200603	NH3	0.02		0.03	0.03
17163	St. Clair	163110AAI	0001	01	10200603	NOX	0.65		0.78	0.92
17163	St. Clair	163110AAI	0001	01	10200603	PM2.5	0.05		0.06	0.07
17163	St. Clair	163110AAI	0001	01	10200603	SO2	0.00		0.00	0.01
17163	St. Clair	163110AAI	0001	01	10200603	VOM	0.04		0.04	0.05
17163	St. Clair	163110AAV	0001	01	30500205	NOX	11.41		12.61	13.21
17163	St. Clair	163110AAV	0001	01	30500205	PM2.5	0.63		0.70	0.73
17163	St. Clair	163110AAV	0001	01	30500205	SO2	11.75		12.99	13.61
17163	St. Clair	163110AAV	0001	01	30500205	VOM	7.59		8.39	8.79
17163	St. Clair	163110AAV	0002	01	10200603	NH3	0.00		0.00	0.00
17163	St. Clair	163110AAV	0002	01	10200603	NOX	0.00		0.00	0.00
17163	St. Clair	163110AAV	0002	01	10200603	PM2.5	0.00		0.00	0.00
17163	St. Clair	163110AAV	0002	01	10200603	SO2	0.00		0.00	0.00
17163	St. Clair	163110AAV	0002	01	10200603	VOM	0.00		0.00	0.00
17163	St. Clair	163110AAV	0003	01	30500212	VOM	0.00		0.00	0.00
17163	St. Clair	163110AAV	0005	01	30500213	VOM	0.00		0.00	0.00
17163	St. Clair	163110AAV	0007	01	30502006	PM2.5	0.00		0.00	0.00
17163	St. Clair	163110AAX	0001	01	30990003	NH3	0.00		0.00	0.00
17163	St. Clair	163110AAX	0001	01	30990003	NOX	0.10		0.11	0.13
17163	St. Clair	163110AAX	0001	01	30990003	PM2.5	0.00		0.00	0.00
17163	St. Clair	163110AAX	0001	01	30990003	SO2	0.00		0.00	0.00
17163	St. Clair	163110AAX	0001	01	30990003	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAB	0010	01	30199998	VOM	0.39		0.44	0.49
17163	St. Clair	163121AAB	0011	01	30199998	VOM	4.69		5.34	5.87
17163	St. Clair	163121AAB	0029	01	40700815	VOM	0.51		0.58	0.64
17163	St. Clair	163121AAB	0035	01	30199998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAB	0041	01	40301099	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAB	0062	01	30199998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAB	0067	02	30199998	VOM	0.00		0.01	0.01

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163121AAB	0080	01	30199998	VOM	0.19		0.22	0.24
17163	St. Clair	163121AAB	0081	01	30199998	VOM	0.56		0.64	0.70
17163	St. Clair	163121AAB	0082	01	30199998	SO2	29.92		34.08	37.46
17163	St. Clair	163121AAB	0082	01	30199998	VOM	0.45		0.51	0.56
17163	St. Clair	163121AAB	0090	01	30199998	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAB	0090	01	30199998	VOM	0.06		0.07	0.08
17163	St. Clair	163121AAB	0091	01	30199998	VOM	0.01		0.01	0.01
17163	St. Clair	163121AAB	0095	01	30199998	SO2	5.57		6.35	6.97
17163	St. Clair	163121AAB	0095	01	30199998	VOM	0.01		0.01	0.01
17163	St. Clair	163121AAB	0099	01	40729697	VOM	0.16		0.18	0.20
17163	St. Clair	163121AAB	0112	02	30199998	VOM	1.12		1.28	1.40
17163	St. Clair	163121AAB	0114	01	30199998	SO2	14.43		16.44	18.06
17163	St. Clair	163121AAB	0114	01	30199998	VOM	5.09		5.80	6.37
17163	St. Clair	163121AAB	0118	01	30199998	SO2	8.58		9.77	10.74
17163	St. Clair	163121AAB	0128	01	30199998	VOM	0.00		0.01	0.01
17163	St. Clair	163121AAB	0129	01	30199998	VOM	1.40		1.59	1.75
17163	St. Clair	163121AAB	0147	01	30121101	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAB	0147	01	30121101	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAB	0147	01	30121101	VOM	0.09		0.10	0.11
17163	St. Clair	163121AAB	0156	01	38500110	VOM	1.48		1.86	2.16
17163	St. Clair	163121AAB	0164	01	40719623	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAB	0175	01	30199998	NH3	6.95		7.92	8.70
17163	St. Clair	163121AAB	0175	01	30199998	VOM	44.16		50.31	55.28
17163	St. Clair	163121AAB	0177	01	40701615	VOM	0.12		0.14	0.15
17163	St. Clair	163121AAB	0180	01	40700815	VOM	1.44		1.64	1.80
17163	St. Clair	163121AAB	0220	01	40702098	VOM	0.45		0.51	0.56
17163	St. Clair	163121AAB	0234	01	40718009	VOM	0.01		0.01	0.01
17163	St. Clair	163121AAB	0235	01	40703298	VOM	0.01		0.01	0.01
17163	St. Clair	163121AAB	0261	01	40700816	VOM	2.63		3.00	3.29
17163	St. Clair	163121AAB	0269	01	40701616	VOM	8.91		10.15	11.14
17163	St. Clair	163121AAB	0270	01	40700816	VOM	2.63		3.00	3.29
17163	St. Clair	163121AAB	0313	01	30199998	VOM	0.44		0.50	0.55
17163	St. Clair	163121AAB	0314	01	30199998	VOM	0.44		0.50	0.55
17163	St. Clair	163121AAB	0315	01	30199998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAB	0317	01	30190023	NH3	0.07		0.07	0.08
17163	St. Clair	163121AAB	0317	01	30190023	NOX	1.53		1.60	1.67
17163	St. Clair	163121AAB	0317	01	30190023	PM2.5	0.17		0.18	0.19
17163	St. Clair	163121AAB	0317	01	30190023	SO2	0.01		0.01	0.01
17163	St. Clair	163121AAB	0317	01	30190023	VOM	3.16		3.30	3.44
17163	St. Clair	163121AAB	0318	01	30190023	NH3	0.01		0.01	0.01
17163	St. Clair	163121AAB	0318	01	30190023	NOX	0.33		0.34	0.36

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163121AAB	0318	01	30190023	PM2.5	0.00		0.01	0.01
17163	St. Clair	163121AAB	0318	01	30190023	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAB	0318	01	30190023	VOM	0.67		0.70	0.73
17163	St. Clair	163121AAB	0320	01	30199998	VOM	0.16		0.18	0.20
17163	St. Clair	163121AAB	0322	01	30199998	SO2	15.27		17.40	19.12
17163	St. Clair	163121AAB	0322	01	30199998	VOM	0.04		0.05	0.05
17163	St. Clair	163121AAB	0323	01	30199998	VOM	0.84		0.96	1.05
17163	St. Clair	163121AAB	0324	01	30199998	VOM	0.10		0.11	0.13
17163	St. Clair	163121AAB	0334	01	40714601	SO2	0.15		0.17	0.19
17163	St. Clair	163121AAB	0334	01	40714601	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAB	0346	01	40701616	VOM	2.38		2.71	2.98
17163	St. Clair	163121AAB	0347	01	40700816	VOM	1.20		1.37	1.50
17163	St. Clair	163121AAB	0349	01	30199998	VOM	0.01		0.01	0.01
17163	St. Clair	163121AAB	0368	01	10200602	NH3	1.23		1.49	1.75
17163	St. Clair	163121AAB	0368	01	10200602	NOX	23.71		28.67	33.83
17163	St. Clair	163121AAB	0368	01	10200602	PM2.5	3.00		3.63	4.28
17163	St. Clair	163121AAB	0368	01	10200602	SO2	0.23		0.28	0.33
17163	St. Clair	163121AAB	0368	01	10200602	VOM	2.17		2.62	3.10
17163	St. Clair	163121AAB	0371	01	30199998	SO2	2.60		2.96	3.25
17163	St. Clair	163121AAB	0371	01	30199998	VOM	0.93		1.06	1.16
17163	St. Clair	163121AAB	0373	01	30199998	NH3	6.96		7.93	8.71
17163	St. Clair	163121AAB	0373	01	30199998	VOM	44.16		50.31	55.28
17163	St. Clair	163121AAB	0374	01	30182001	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAB	0375	01	30187097	VOM	0.00		0.00	0.01
17163	St. Clair	163121AAB	0376	01	30187097	VOM	0.03		0.03	0.04
17163	St. Clair	163121AAC	0051	01	30199998	VOM	0.57		0.65	0.71
17163	St. Clair	163121AAC	0052	01	30199998	VOM	0.26		0.30	0.33
17163	St. Clair	163121AAC	0092	01	30107001	PM2.5	0.16		0.18	0.20
17163	St. Clair	163121AAC	0092	01	30107001	VOM	1.15		1.31	1.44
17163	St. Clair	163121AAC	0172	01	30199998	VOM	0.05		0.06	0.06
17163	St. Clair	163121AAC	0173	01	30199998	VOM	0.09		0.10	0.11
17163	St. Clair	163121AAC	0175	01	30199998	VOM	0.19		0.22	0.24
17163	St. Clair	163121AAC	0176	01	30199998	VOM	1.01		1.15	1.26
17163	St. Clair	163121AAC	0179	01	30199998	VOM	0.10		0.11	0.13
17163	St. Clair	163121AAC	0180	01	30199998	VOM	1.12		1.28	1.40
17163	St. Clair	163121AAC	0181	01	30199998	VOM	0.18		0.21	0.23
17163	St. Clair	163121AAC	0184	01	30199998	VOM	0.02		0.02	0.03
17163	St. Clair	163121AAC	0185	01	40714697	VOM	0.66		0.75	0.83
17163	St. Clair	163121AAC	0186	01	40714697	VOM	0.08		0.09	0.10
17163	St. Clair	163121AAC	0187	01	40714697	VOM	0.69		0.79	0.86
17163	St. Clair	163121AAC	0202	01	30199998	VOM	1.22		1.39	1.53

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163121AAC	0211	01	30190003	NH3	0.01		0.01	0.01
17163	St. Clair	163121AAC	0211	01	30190003	NOX	0.24		0.25	0.26
17163	St. Clair	163121AAC	0211	01	30190003	PM2.5	0.02		0.02	0.02
17163	St. Clair	163121AAC	0211	01	30190003	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAC	0211	01	30190003	VOM	0.13		0.14	0.14
17163	St. Clair	163121AAC	0212	01	40714697	VOM	0.30		0.34	0.38
17163	St. Clair	163121AAC	0222	01	30190003	NH3	0.03		0.03	0.03
17163	St. Clair	163121AAC	0222	01	30190003	NOX	1.03		1.07	1.12
17163	St. Clair	163121AAC	0222	01	30190003	PM2.5	0.08		0.08	0.09
17163	St. Clair	163121AAC	0222	01	30190003	SO2	0.01		0.01	0.01
17163	St. Clair	163121AAC	0222	01	30190003	VOM	0.06		0.06	0.07
17163	St. Clair	163121AAC	0224	01	30188801	NH3	0.43		0.49	0.54
17163	St. Clair	163121AAC	0224	01	30188801	PM2.5	0.21		0.24	0.26
17163	St. Clair	163121AAC	0224	01	30188801	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAC	0353	01	30199998	SO2	3.61		4.11	4.52
17163	St. Clair	163121AAC	0354	01	30199998	VOM	1.19		1.36	1.49
17163	St. Clair	163121AAC	0355	01	30199998	VOM	0.15		0.17	0.19
17163	St. Clair	163121AAC	0356	01	30199998	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAC	0356	01	30199998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAC	0361	01	30190013	NH3	0.01		0.01	0.01
17163	St. Clair	163121AAC	0361	01	30190013	NOX	5.23		5.46	5.69
17163	St. Clair	163121AAC	0361	01	30190013	PM2.5	0.18		0.19	0.20
17163	St. Clair	163121AAC	0361	01	30190013	SO2	0.08		0.08	0.09
17163	St. Clair	163121AAC	0361	01	30190013	VOM	1.49		1.55	1.62
17163	St. Clair	163121AAC	0367	01	30199998	NH3	4.80		5.47	6.01
17163	St. Clair	163121AAC	0367	01	30199998	PM2.5	0.45		0.51	0.56
17163	St. Clair	163121AAE	0034	01	40301151	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAK	0025	01	30400840	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAK	0025	01	30400840	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAK	0025	01	30400840	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAK	0026	01	30102306	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAK	0026	01	30102306	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAK	0027	01	30390003	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAK	0027	01	30390003	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121AAK	0027	01	30390003	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAK	0027	01	30390003	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAK	0034	01	30199998	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAK	0034	01	30199998	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAK	0034	01	30199998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAK	0035	01	30390003	NH3	0.00		0.00	0.00
17163	St. Clair	163121AAK	0035	01	30390003	NOX	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163121AAK	0035	01	30390003	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121AAK	0035	01	30390003	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAK	0035	01	30390003	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAK	0037	01	30390003	NH3	0.00		0.00	0.00
17163	St. Clair	163121AAK	0037	01	30390003	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAK	0037	01	30390003	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121AAK	0037	01	30390003	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAK	0037	01	30390003	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAK	0041	01	30303099	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAK	0041	01	30303099	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAK	0041	01	30303099	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAL	0003	01	40301203	VOM	0.44		0.50	0.55
17163	St. Clair	163121AAM	0001	01	30490003	NH3	0.05		0.05	0.06
17163	St. Clair	163121AAM	0001	01	30490003	NOX	1.62		1.78	1.87
17163	St. Clair	163121AAM	0001	01	30490003	PM2.5	0.12		0.13	0.14
17163	St. Clair	163121AAM	0001	01	30490003	SO2	0.01		0.01	0.01
17163	St. Clair	163121AAM	0001	01	30490003	VOM	0.09		0.10	0.10
17163	St. Clair	163121AAM	0002	02	30390003	NH3	0.01		0.01	0.01
17163	St. Clair	163121AAM	0002	02	30390003	NOX	0.45		0.46	0.48
17163	St. Clair	163121AAM	0002	02	30390003	PM2.5	0.03		0.03	0.03
17163	St. Clair	163121AAM	0002	02	30390003	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAM	0002	02	30390003	VOM	0.02		0.02	0.02
17163	St. Clair	163121AAM	0012	01	30490003	NH3	0.02		0.02	0.02
17163	St. Clair	163121AAM	0012	01	30490003	NOX	0.52		0.57	0.60
17163	St. Clair	163121AAM	0012	01	30490003	PM2.5	0.04		0.04	0.05
17163	St. Clair	163121AAM	0012	01	30490003	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAM	0012	01	30490003	VOM	0.03		0.03	0.03
17163	St. Clair	163121AAM	0013	02	30390003	NH3	0.01		0.01	0.01
17163	St. Clair	163121AAM	0013	02	30390003	NOX	0.35		0.36	0.37
17163	St. Clair	163121AAM	0013	02	30390003	PM2.5	0.03		0.03	0.03
17163	St. Clair	163121AAM	0013	02	30390003	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAM	0013	02	30390003	VOM	0.02		0.02	0.02
17163	St. Clair	163121AAM	0017	01	30490003	NH3	0.02		0.02	0.02
17163	St. Clair	163121AAM	0017	01	30490003	NOX	0.71		0.78	0.82
17163	St. Clair	163121AAM	0017	01	30490003	PM2.5	0.05		0.05	0.06
17163	St. Clair	163121AAM	0017	01	30490003	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAM	0017	01	30490003	VOM	0.04		0.04	0.05
17163	St. Clair	163121AAM	0018	01	30400299	NH3	0.00		0.00	0.00
17163	St. Clair	163121AAM	0018	01	30400299	NOX	0.08		0.11	0.12
17163	St. Clair	163121AAM	0018	01	30400299	PM2.5	0.01		0.01	0.01
17163	St. Clair	163121AAM	0018	01	30400299	SO2	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163121AAM	0018	01	30400299	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAM	0029	01	40301007	VOM	0.13		0.15	0.16
17163	St. Clair	163121AAM	0032	02	40100306	VOM	50.61		66.87	79.36
17163	St. Clair	163121AAM	0033	01	40706024	VOM	0.13		0.15	0.16
17163	St. Clair	163121AAM	0040	01	40100221	VOM	1.60		2.11	2.51
17163	St. Clair	163121AAM	0041	01	30300831	PM2.5	0.35		0.46	0.55
17163	St. Clair	163121AAP	0001	01	50300103	NOX	9.97		12.56	14.58
17163	St. Clair	163121AAP	0001	01	50300103	SO2	0.11		0.14	0.16
17163	St. Clair	163121AAP	0001	01	50300103	VOM	0.04		0.05	0.06
17163	St. Clair	163121AAP	0002	01	40714698	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0003	01	40714698	VOM	0.00		0.00	0.01
17163	St. Clair	163121AAP	0004	01	30199998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0005	01	50300101	NOX	9.74		12.27	14.25
17163	St. Clair	163121AAP	0005	01	50300101	SO2	0.11		0.14	0.16
17163	St. Clair	163121AAP	0005	01	50300101	VOM	0.04		0.05	0.06
17163	St. Clair	163121AAP	0007	01	49099998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0008	01	49099998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0009	01	50300899	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0010	01	50300899	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0011	01	40714697	VOM	0.00		0.01	0.01
17163	St. Clair	163121AAP	0012	01	40714697	VOM	0.01		0.01	0.01
17163	St. Clair	163121AAP	0013	01	49099998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0014	01	40714697	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0015	01	40714697	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0016	01	40714697	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0018	01	49099998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0019	01	30183001	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAP	0020	01	50300830	VOM	0.84		1.06	1.23
17163	St. Clair	163121AAP	0021	01	30180001	VOM	0.02		0.02	0.03
17163	St. Clair	163121AAP	0022	01	50300101	NOX	34.80		43.85	50.90
17163	St. Clair	163121AAP	0022	01	50300101	SO2	0.27		0.34	0.39
17163	St. Clair	163121AAP	0022	01	50300101	VOM	0.11		0.14	0.16
17163	St. Clair	163121AAP	0023	01	10200602	NH3	0.01		0.01	0.01
17163	St. Clair	163121AAP	0023	01	10200602	NOX	0.25		0.30	0.36
17163	St. Clair	163121AAP	0023	01	10200602	PM2.5	0.02		0.02	0.03
17163	St. Clair	163121AAP	0023	01	10200602	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAP	0023	01	10200602	VOM	0.01		0.01	0.01
17163	St. Clair	163121AAP	0024	01	50390010	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAU	0004	01	10500106	NH3	0.01		0.01	0.01
17163	St. Clair	163121AAU	0004	01	10500106	NOX	0.22		0.27	0.31
17163	St. Clair	163121AAU	0004	01	10500106	PM2.5	0.02		0.02	0.03

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163121AAU	0004	01	10500106	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAU	0004	01	10500106	VOM	0.01		0.01	0.01
17163	St. Clair	163121AAU	0005	01	50410720	VOM	64.39		75.89	85.36
17163	St. Clair	163121AAV	0003	01	40688801	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAV	0004	01	30200564	PM2.5	0.02		0.02	0.03
17163	St. Clair	163121AAV	0005	01	40688801	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAY	0001	01	10200601	NH3	0.59		0.71	0.84
17163	St. Clair	163121AAY	0001	01	10200601	NOX	18.89		22.85	26.95
17163	St. Clair	163121AAY	0001	01	10200601	PM2.5	0.92		1.11	1.31
17163	St. Clair	163121AAY	0001	01	10200601	SO2	0.11		0.13	0.16
17163	St. Clair	163121AAY	0001	01	10200601	VOM	1.02		1.23	1.46
17163	St. Clair	163121AAY	0001	02	10200501	NH3	0.00		0.00	0.00
17163	St. Clair	163121AAY	0001	02	10200501	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAY	0001	02	10200501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121AAY	0001	02	10200501	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAY	0004	01	10200601	NH3	0.00		0.00	0.00
17163	St. Clair	163121AAY	0004	01	10200601	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAY	0004	01	10200601	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121AAY	0004	01	10200601	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAY	0004	02	10200501	NH3	0.00		0.00	0.00
17163	St. Clair	163121AAY	0004	02	10200501	NOX	0.00		0.00	0.00
17163	St. Clair	163121AAY	0004	02	10200501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121AAY	0004	02	10200501	SO2	0.00		0.00	0.00
17163	St. Clair	163121AAZ	0013	01	30199998	VOM	0.66		0.75	0.83
17163	St. Clair	163121AAZ	0020	01	10200501	NH3	0.00		0.01	0.01
17163	St. Clair	163121AAZ	0020	01	10200501	NOX	0.14		0.15	0.17
17163	St. Clair	163121AAZ	0020	01	10200501	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121AAZ	0020	01	10200501	SO2	0.23		0.25	0.27
17163	St. Clair	163121AAZ	0020	01	10200501	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAZ	0024	01	49099998	VOM	0.00		0.00	0.00
17163	St. Clair	163121AAZ	0026	02	40301099	VOM	0.09		0.10	0.12
17163	St. Clair	163121AAZ	0032	02	40714698	VOM	6.95		7.91	8.68
17163	St. Clair	163121AAZ	0083	01	30188801	VOM	4.00		4.56	5.01
17163	St. Clair	163121AAZ	0087	01	50410420	VOM	0.44		0.51	0.58
17163	St. Clair	163121ABA	0001	01	33000499	VOM	1.95		2.14	2.24
17163	St. Clair	163121ABD	0002	01	30200606	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121ABD	0006	01	30200540	PM2.5	0.63		0.74	0.81
17163	St. Clair	163121ABD	0007	01	30200560	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121ABE	0001	01	30200742	NOX		16.54	18.56	19.27
17163	St. Clair	163121ABE	0001	01	30200742	SO2		0.20	0.22	0.23
17163	St. Clair	163121ABE	0001	01	30200742	VOM		10.86	12.19	12.65

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163121ABE	0002	01	10200602	NOX		18.62	19.52	19.86
17163	St. Clair	163121ABE	0002	01	10200602	PM2.5		0.40	0.42	0.43
17163	St. Clair	163121ABE	0002	01	10200602	SO2		0.40	0.42	0.43
17163	St. Clair	163121ABE	0002	01	10200602	VOM		1.58	1.66	1.69
17163	St. Clair	163121ABE	0003	01	10200602	NOX		18.62	19.52	19.86
17163	St. Clair	163121ABE	0003	01	10200602	PM2.5		0.40	0.42	0.43
17163	St. Clair	163121ABE	0003	01	10200602	SO2		0.40	0.42	0.43
17163	St. Clair	163121ABE	0003	01	10200602	VOM		1.58	1.66	1.69
17163	St. Clair	163121ABE	0004	01	30125010	VOM		12.65	14.19	14.73
17163	St. Clair	163121ABE	0005	01	30205010	VOM		0.64	0.72	0.75
17163	St. Clair	163121ABE	0008	01	40715810	VOM		4.40	4.94	5.13
17163	St. Clair	163121ABG	0004	01	30290003	NH3	0.00		0.00	0.00
17163	St. Clair	163121ABG	0004	01	30290003	NOX	0.00		0.00	0.00
17163	St. Clair	163121ABG	0004	01	30290003	PM2.5	0.00		0.00	0.00
17163	St. Clair	163121ABG	0004	01	30290003	SO2	0.00		0.00	0.00
17163	St. Clair	163121ABG	0004	01	30290003	VOM	0.00		0.00	0.00
17163	St. Clair	163121ABI	0003	01	30502006	PM2.5	0.01		0.01	0.01
17163	St. Clair	163140AAC	0010	01	10200603	NH3	0.02		0.03	0.03
17163	St. Clair	163140AAC	0010	01	10200603	NOX	0.71		0.86	1.02
17163	St. Clair	163140AAC	0010	01	10200603	PM2.5	0.05		0.06	0.08
17163	St. Clair	163140AAC	0010	01	10200603	SO2	0.00		0.01	0.01
17163	St. Clair	163140AAC	0010	01	10200603	VOM	0.04		0.05	0.06
17163	St. Clair	163140AAI	0013	01	30490003	NH3	0.00		0.00	0.00
17163	St. Clair	163140AAI	0013	01	30490003	NOX	0.01		0.01	0.01
17163	St. Clair	163140AAI	0013	01	30490003	PM2.5	0.00		0.00	0.00
17163	St. Clair	163140AAI	0013	01	30490003	SO2	0.00		0.00	0.00
17163	St. Clair	163140AAI	0013	01	30490003	VOM	0.00		0.00	0.00
17163	St. Clair	163140AAI	0014	01	30400299	SO2	0.01		0.01	0.01
17163	St. Clair	163140AAI	0014	01	30400299	VOM	0.01		0.01	0.02
17163	St. Clair	163140AAI	0015	01	30400299	NH3	0.01		0.01	0.02
17163	St. Clair	163140AAI	0015	01	30400299	NOX	0.00		0.00	0.00
17163	St. Clair	163140AAI	0015	01	30400299	SO2	0.01		0.01	0.02
17163	St. Clair	163140AAI	0015	01	30400299	VOM	0.03		0.04	0.05
17163	St. Clair	163800AAE	0001	01	40301009	VOM	0.27		0.31	0.34
17163	St. Clair	163800AAJ	0004	01	30502006	PM2.5	0.00		0.00	0.00
17163	St. Clair	163801AAE	0003	01	30502006	PM2.5	0.00		0.00	0.00
17163	St. Clair	163802AAA	0006	01	30500205	NOX	1.39		1.54	1.61
17163	St. Clair	163802AAA	0006	01	30500205	PM2.5	0.00		0.00	0.00
17163	St. Clair	163802AAA	0006	01	30500205	SO2	0.06		0.07	0.07
17163	St. Clair	163802AAA	0006	01	30500205	VOM	0.80		0.88	0.93
17163	St. Clair	163802AAA	0007	01	30500213	VOM	0.00		0.00	0.00

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163802AAA	0009	01	30500212	VOM	0.00		0.00	0.00
17163	St. Clair	163802AAA	0017	01	10200603	NH3	0.00		0.00	0.00
17163	St. Clair	163802AAA	0017	01	10200603	NOX	0.00		0.00	0.00
17163	St. Clair	163802AAA	0017	01	10200603	PM2.5	0.00		0.00	0.00
17163	St. Clair	163802AAA	0017	01	10200603	SO2	0.00		0.00	0.00
17163	St. Clair	163802AAA	0017	01	10200603	VOM	0.00		0.00	0.00
17163	St. Clair	163802AAB	0002	01	30502002	PM2.5	0.00		0.00	0.00
17163	St. Clair	163802AAB	0013	01	30502006	PM2.5	0.00		0.00	0.00
17163	St. Clair	163802AAC	0018	01	30502006	PM2.5	0.00		0.00	0.00
17163	St. Clair	163802AAD	0018	01	10200602	NH3	0.03		0.04	0.04
17163	St. Clair	163802AAD	0018	01	10200602	NOX	0.90		1.09	1.28
17163	St. Clair	163802AAD	0018	01	10200602	PM2.5	0.07		0.08	0.10
17163	St. Clair	163802AAD	0018	01	10200602	SO2	0.00		0.01	0.01
17163	St. Clair	163802AAD	0018	01	10200602	VOM	0.05		0.06	0.07
17163	St. Clair	163806AAA	0004	01	10200603	NH3	0.01		0.01	0.01
17163	St. Clair	163806AAA	0004	01	10200603	NOX	0.41		0.50	0.58
17163	St. Clair	163806AAA	0004	01	10200603	PM2.5	0.03		0.04	0.04
17163	St. Clair	163806AAA	0004	01	10200603	SO2	0.00		0.00	0.00
17163	St. Clair	163806AAA	0004	01	10200603	VOM	0.02		0.02	0.03
17163	St. Clair	163806AAA	0010	01	40200701	VOM	3.87		4.88	5.66
17163	St. Clair	163806AAA	0014	01	40201301	NH3	0.00		0.00	0.00
17163	St. Clair	163806AAA	0014	01	40201301	VOM	5.77		6.57	7.26
17163	St. Clair	163809AAH	0001	01	40301018	VOM	0.02		0.02	0.02
17163	St. Clair	163809AAH	0002	01	40301007	VOM	0.06		0.07	0.08
17163	St. Clair	163814ABK	0006	01	30400351	NOX	1.01		1.33	1.56
17163	St. Clair	163814ABK	0006	01	30400351	SO2	0.01		0.01	0.01
17163	St. Clair	163814ABK	0009	01	30400318	PM2.5	1.02		1.34	1.57
17163	St. Clair	163814ABK	0011	01	30400799	VOM	2.00		2.63	3.10
17163	St. Clair	163814ABK	0012	01	30400799	VOM	1.06		1.39	1.64
17163	St. Clair	163814ABS	0001	01	50100410	NOX	2.40		2.83	3.18
17163	St. Clair	163814ABS	0001	01	50100410	PM2.5	1.03		1.21	1.37
17163	St. Clair	163814ABS	0001	01	50100410	SO2	1.11		1.31	1.47
17163	St. Clair	163814ABS	0001	01	50100410	VOM	2.27		2.68	3.01
17163	St. Clair	163814ABU	0010	01	40500601	VOM	6.40		7.29	8.03
17163	St. Clair	163815AAA	0011	01	40301153	VOM	3.80		4.32	4.79
17163	St. Clair	163815AAA	0017	01	40301001	VOM	1.88		2.14	2.37
17163	St. Clair	163815AAA	0063	01	10300603	NH3	0.03		0.03	0.03
17163	St. Clair	163815AAA	0063	01	10300603	NOX	7.47		7.72	7.63
17163	St. Clair	163815AAA	0063	01	10300603	PM2.5	0.57		0.59	0.58
17163	St. Clair	163815AAA	0063	01	10300603	SO2	0.04		0.04	0.04
17163	St. Clair	163815AAA	0063	01	10300603	VOM	0.39		0.40	0.40

FIPS	County	Id Number	Point	Process	SCC	Pollutant	Emissions (tons/year)			
							2008	2009	2017	2025
17163	St. Clair	163815AAA	0066	01	20300102	NOX	0.00		0.00	0.00
17163	St. Clair	163815AAA	0066	01	20300102	PM2.5	0.00		0.00	0.00
17163	St. Clair	163815AAA	0066	01	20300102	SO2	0.00		0.00	0.00
17163	St. Clair	163815AAA	0066	01	20300102	VOM	0.00		0.00	0.00
17163	St. Clair	163815AAA	0070	01	30199998	SO2	0.01		0.01	0.01
17163	St. Clair	163815AAA	0071	01	40705609	VOM	0.00		0.00	0.00
17163	St. Clair	163815AAA	0072	01	50182001	NOX	0.44		0.52	0.58
17163	St. Clair	163815AAA	0072	01	50182001	SO2	0.44		0.52	0.58
17163	St. Clair	163816AAB	0001	01	40301008	VOM	0.64		0.73	0.81
17163	St. Clair	163816AAB	0002	01	40301019	VOM	0.00		0.00	0.00
17163	St. Clair	163818AAB	0002	01	30299998	VOM	0.28		0.32	0.35
17163	St. Clair	163818AAD	0004	01	10200602	NH3	0.02		0.03	0.03
17163	St. Clair	163818AAD	0004	01	10200602	NOX	1.51		1.83	2.15
17163	St. Clair	163818AAD	0004	01	10200602	PM2.5	0.01		0.01	0.01
17163	St. Clair	163818AAD	0004	01	10200602	SO2	0.02		0.02	0.03
17163	St. Clair	163818AAD	0004	01	10200602	VOM	0.06		0.07	0.08
17163	St. Clair	163819AAA	0023	01	30502006	PM2.5	0.02		0.02	0.03
17163	St. Clair	163819AAA	0026	01	30502002	PM2.5	0.12		0.14	0.16
17163	St. Clair	163819AAB	0020	01	30101401	VOM	0.09		0.10	0.11
17163	St. Clair	163819AAB	0021	01	30101404	VOM	0.09		0.10	0.11
17163	St. Clair	163819AAB	0022	01	30101401	VOM	6.74		7.66	8.48
17163	St. Clair	163819AAB	0025	01	30101463	VOM	0.11		0.12	0.13
17163	St. Clair	163819AAC	0002	01	30502002	PM2.5	0.01		0.01	0.02
17163	St. Clair	163819AAC	0020	01	30502006	PM2.5	0.07		0.08	0.09
17163	St. Clair	163819AAG	0003	01	30500205	NOX	3.12		3.45	3.61
17163	St. Clair	163819AAG	0003	01	30500205	PM2.5	0.04		0.04	0.05
17163	St. Clair	163819AAG	0003	01	30500205	SO2	1.18		1.30	1.37
17163	St. Clair	163819AAG	0003	01	30500205	VOM	1.82		2.01	2.11

Appendix F-3 Illinois Area Source Emissions for 2002, 2008, 2017, and 2022

The area source emissions inventory data for the Illinois portion of the nonattainment area that was used in this plan was provided by Illinois EPA to the Air Program. Illinois provided the 2008 area source emissions inventory to the Air Program on September 24, 2013, and the future year area source inventories (2017 and 2025) were provided to the Air Program on September 26, 2013. The 2002 area source emissions data was based on actual emissions levels pulled from the Illinois Base Year Particulate Matter and Haze Inventory for 2002.

Area source emissions data for the Illinois portion of the nonattainment area for each of the following area source categories was summed to get the total area source emissions for each county on the Illinois side: agricultural fertilizer application, agricultural pesticide application, agricultural tilling, aircraft refueling, beef cattle, dairy cattle, chickens, goats, hogs, horses, sheep, turkeys, architectural coating, asphalt paving, automobile refinishing, commercial cooking, nonresidential construction, residential construction, consumer solvent use, dry cleaning, forest fires, commercial/institutional natural gas combustion, commercial/institutional distillate oil combustion, commercial/institutional residual oil combustion, commercial/institutional kerosene combustion, commercial/institutional liquefied petroleum gas combustion, industrial natural gas combustion, industrial distillate oil combustion, industrial residual oil combustion, residential natural gas combustion, residential distillate oil combustion, residential kerosene combustion, residential liquefied petroleum gas combustion, residential coal combustion, residential wood combustion fireplaces, residential wood combustion wood stoves, stage I automobile refueling, stage II automobile refueling, gasoline tank truck leaks, underground storage tank breathing, graphic arts, industrial/commercial/institutional incineration, industrial surface coating, marine vessel volatile organic liquid loading and transport, prescribed burning, residential household waste combustion, yard waste combustion, pavement marking, commercial portable fuel containers, residential portable fuel containers, solvent cleaning, structure fires, publicly owned treatment works, and industrial waste water treatment.

The 2008 area source emissions inventory was provided by Illinois EPA, and was based on actual activity levels. Illinois did not include fugitive dust emissions from paved and unpaved roads in the emissions data sent to the department. These emissions were pulled from the 2008 National Emissions Inventory for Madison, Monroe, St. Clair and Randolph Counties, and the Randolph county emissions were multiplied by 2%, because this is the level of percentage of on-road emissions in Randolph County that Illinois projected would apply to the portion of nonattainment area in the township of Baldwin. The 2017 and 2025 emissions were calculated by Illinois EPA by growing the 2008 emissions to these future years using EGAS 4.0 growth factors. Because EGAS 4.0 only includes annual growth factors through 2020, the annual growth factor projected by EGAS from 2019 to 2020 was used to grow the emissions from 2020 to 2025. For fugitive dust from paved and unpaved roads in the Illinois Counties, Missouri assumed that 2008 levels from these two categories would remain steady when projecting the future year emissions. These types of emissions have very localized impacts, meaning in aggregate they would have a negligible impact on monitored $PM_{2.5}$ concentrations, and also as more roads are paved in the St. Louis area, these emissions would be expected to decrease. By holding emissions from these two categories at 2008 levels, this is expected to be a conservative

yet reasonable method for projecting future year emissions. Table F-8 provides the area source emissions summaries for 2002, 2008, 2017, and 2025 for the Illinois portion of the nonattainment area. Table F-9 provides the detailed area source emissions by category for 2002, and Table F-10 provides the area source emissions by SCC and county for 2008, 2017, and 2025.

Table F-8 Area Source Emissions Summaries for the Illinois Nonattainment Area in 2002, 2008, 2017, and 2025

County Name	Year	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	2002	1,411.64	2,025.70	3,273.43	215.92	12,137.24
Monroe		1,034.67	163.60	1,669.51	22.43	3,340.62
St. Clair		1,298.54	1,412.89	2,873.36	148.97	9,116.25
Randolph		42.30	3.90	102.62	0.53	92.81
2002 Totals		**3,787.15**	**3,606.09**	**7,918.92**	**387.85**	**24,686.92**
Madison	2008	1,233.35	799.86	2,270.43	129.72	3,778.09
Monroe		870	81.22	730.88	13.91	636.95
St. Clair		1,196.67	755.69	2,109.27	102.8	3,346.74
Randolph		54.11	1.59	51.18	0.24	34.56
2008 Totals		**3,354.13**	**1,638.36**	**5,161.76**	**246.67**	**7,796.34**
Madison	2017	1,238.78	829.43	2,106.91	136.11	4,185.57
Monroe		870.32	80.99	653.33	14.24	711.14
St. Clair		1,201.11	782.72	1,900.74	107.76	3,671.51
Randolph		54.11	1.68	45.65	0.25	39.48
2017 Totals		**3,364.32**	**1,694.82**	**4,706.63**	**258.36**	**8,607.70**
Madison	2025	1,244.03	850.27	2,106.51	141.5	4,510.38
Monroe		870.65	81.03	621.25	14.65	771.41
St. Clair		1,205.37	802.13	1,898.63	111.63	3,924.27
Randolph		54.12	1.77	41.76	0.26	43.69
2025 Totals		**3,374.17**	**1,735.20**	**4,668.15**	**268.04**	**9,249.75**

Table F-9 2002 Area Source Emissions by Category for the Illinois Nonattainment Area

County	Source Category	Emissions (Tons/Year)				
		NH_3	NO_X	$PM_{2.5}$	SO_2	VOC
Madison	Agricultural Fertilizer Application	246.77	-	-	-	-
Monroe		147.59	-	-	-	-
Randolph		13.43	-	-	-	-
St. Clair		177.57	-	-	-	-
Madison	Agricultural Pesticide Application	-	-	-	-	408.78
Monroe		-	-	-	-	219.08
Randolph		-	-	-	-	19.36
St. Clair		-	-	-	-	309.74
Madison	Agricultural Tilling	-	-	758.40	-	-
Monroe		-	-	519.80	-	-
Randolph		-	-	45.89	-	-
St. Clair		-	-	547.00	-	-
Madison	Aircraft Refueling	-	-	-	-	-
Monroe		-	-	-	-	-
Randolph		-	-	-	-	-
St. Clair		-	-	-	-	38.46
Madison	Beef Cattle	72.63	-	-	-	-
Monroe		51.11	-	-	-	-
Randolph		3.02	-	-	-	-
St. Clair		41.61	-	-	-	-
Madison	Dairy Cattle	24.46	-	-	-	-
Monroe		20.86	-	-	-	-
Randolph		0.61	-	-	-	-
St. Clair		20.86	-	-	-	-
Madison	Chickens	28.22	-	-	-	-
Monroe		22.50	-	-	-	-
Randolph		1.39	-	-	-	-
St. Clair		33.25	-	-	-	-
Madison	Goats	0.68	-	-	-	-
Monroe		0.29	-	-	-	-
Randolph		0.01	-	-	-	-
St. Clair		0.29	-	-	-	-
Madison	Hogs	194.75	-	-	-	-
Monroe		264.15	-	-	-	-
Randolph		2.29	-	-	-	-
St. Clair		197.94	-	-	-	-
Madison	Horses	30.34	-	-	-	-
Monroe		9.69	-	-	-	-
Randolph		0.35	-	-	-	-
St. Clair		18.93	-	-	-	-

County	Source Category	Emissions (Tons/Year)				
		NH_3	NO_X	$PM_{2.5}$	SO_2	VOC
Madison	Sheep	1.86	-	-	-	-
Monroe		0.78	-	-	-	-
Randolph		0.02	-	-	-	-
St. Clair		0.78	-	-	-	-
Madison	Turkeys	0.04	-	-	-	-
Monroe		-	-	-	-	-
Randolph		-	-	-	-	-
St. Clair		0.03	-	-	-	-
Madison	Architectural Coating	-	-	-	-	337.38
Monroe		-	-	-	-	37.50
Randolph		-	-	-	-	0.61
St. Clair		-	-	-	-	332.86
Madison	Asphalt Paving	-	-	-	-	215.46
Monroe		-	-	-	-	59.49
Randolph		-	-	-	-	7.58
St. Clair		-	-	-	-	190.41
Madison	Automobile Refinishing	-	-	-	-	69.53
Monroe		-	-	-	-	7.73
Randolph		-	-	-	-	0.30
St. Clair		-	-	-	-	68.60
Madison	Commercial Cooking	-	-	64.03	-	10.06
Monroe		-	-	5.32	-	0.82
Randolph		-	-	0.09	-	0.01
St. Clair		-	-	55.43	-	8.58
Madison	Nonresidential Construction	-	-	82.85	-	-
Monroe		-	-	26.80	-	-
Randolph		-	-	0.11	-	-
St. Clair		-	-	61.06	-	-
Madison	Residential Construction	-	-	13.17	-	-
Monroe		-	-	5.12	-	-
Randolph		-	-	0.04	-	-
St. Clair		-	-	22.32	-	-
Madison	Roadway Construction	-	-	248.61	-	-
Monroe		-	-	106.71	-	-
Randolph		-	-	2.23	-	-
St. Clair		-	-	538.27	-	-
Madison	Consumer Solvent Use	-	-	-	-	942.76
Monroe		-	-	-	-	104.80
Randolph		-	-	-	-	1.70
St. Clair		-	-	-	-	930.11

County	Source Category	Emissions (Tons/Year)				
		NH_3	NO_X	$PM_{2.5}$	SO_2	VOC
Madison	Dry Cleaning	-	-	-	-	33.09
Monroe		-	-	-	-	5.00
Randolph		-	-	-	-	0.02
St. Clair		-	-	-	-	42.50
Madison	Forest Fire	0.02	0.09	0.36	0.03	0.20
Monroe		0.01	0.06	0.23	0.02	0.13
Randolph		-	0.01	0.03	-	0.02
St. Clair		0.02	0.08	0.30	0.02	0.17
Madison	Commercial/Institutional Natural Gas Combustion	0.70	153.72	11.17	0.81	8.47
Monroe		0.06	13.15	1.00	0.08	0.72
Randolph		-	0.04	-	-	-
St. Clair		0.62	108.76	6.93	0.65	7.11
Madison	Commercial/Institutional Distillate Oil Combustion	0.44	12.91	1.18	22.07	0.18
Monroe		0.04	1.07	0.10	1.78	0.02
Randolph		-	0.02	-	0.03	-
St. Clair		0.47	14.00	1.25	23.23	0.20
Madison	Commercial/Institutional Residual Oil Combustion	-	0.21	0.01	0.70	0.01
Monroe		-	0.01	-	0.05	-
Randolph		-	-	-	-	-
St. Clair		-	0.22	0.01	0.73	0.01
Madison	Commercial/Institutional Kerosene Combustion	0.01	0.67	0.05	1.88	0.01
Monroe		-	0.05	0.01	0.15	-
Randolph		-	-	-	-	-
St. Clair		0.01	0.71	0.06	1.98	0.01
Madison	Commercial/Institutional LPG Combustion	-	4.49	0.29	-	0.10
Monroe		-	0.36	0.02	-	0.01
Randolph		-	0.01	-	-	-
St. Clair		-	4.74	0.31	-	0.10
Madison	Industrial Natural Gas Combustion	7.98	287.08	14.33	-	13.99
Monroe		0.18	5.55	0.42	0.03	0.30
Randolph		0.02	0.86	0.06	0.01	0.05
St. Clair		1.63	82.67	6.99	0.55	3.27
Madison	Industrial Distillate Oil Combustion	0.57	-	0.18	26.03	-
Monroe		0.01	0.25	-	0.50	-
Randolph		-	0.04	-	0.08	-
St. Clair		0.15	3.73	0.06	0.13	0.03
Madison	Industrial Residual Oil Combustion	-	0.13	0.01	0.38	-
Monroe		-	0.04	-	0.12	-
Randolph		-	-	-	-	-
St. Clair		0.02	1.50	0.13	2.90	0.01

County	Source Category	Emissions (Tons/Year)				
		NH_3	NO_X	$PM_{2.5}$	SO_2	VOC
Madison	Residential Natural Gas Combustion	-	436.84	8.83	2.79	25.56
Monroe		-	27.38	0.55	0.17	1.60
Randolph		-	0.53	0.01	-	0.03
St. Clair		-	409.02	8.27	2.61	23.93
Madison	Residential Distillate Oil Combustion	-	5.25	0.24	12.43	0.20
Monroe		-	0.40	0.02	0.94	0.02
Randolph		-	0.02	-	0.04	-
St. Clair		-	2.91	0.13	6.88	0.11
Madison	Residential Kerosene Combustion	-	2.66	0.13	6.29	0.11
Monroe		-	0.20	0.01	0.48	0.01
Randolph		-	0.01	-	0.02	-
St. Clair		-	1.47	0.07	3.48	0.06
Madison	Residential LPG Combustion	-	39.05	0.51	-	0.11
Monroe		-	19.01	0.25	-	0.73
Randolph		-	0.20	-	-	0.01
St. Clair		-	35.38	0.46	-	1.36
Madison	Residential Coal Combustion	-	0.25	0.10	0.59	0.27
Monroe		-	0.37	0.15	0.88	0.41
Randolph		-	-	-	-	-
St. Clair		-	-	-	-	-
Madison	Residential Wood Combustion Fireplace	-	27.87	174.73	4.27	1,965.90
Monroe		-	5.66	88.36	2.15	992.44
Randolph		-	0.08	0.87	0.02	4.60
St. Clair		-	4.85	102.53	2.51	1,149.76
Madison	Residential Wood Combustion Wood Stove	705.82	1,020.40	1,400.73	109.08	6,209.27
Monroe		517.34	85.61	769.36	11.78	1,741.02
Randolph		21.15	1.97	48.56	0.27	46.90
St. Clair		649.27	710.86	1,086.92	75.14	4,640.10
Madison	Stage I Refueling	-	-	-	-	55.48
Monroe		-	-	-	-	6.75
Randolph		-	-	-	-	0.78
St. Clair		-	-	-	-	52.94
Madison	Stage II Refueling	-	-	-	-	415.82
Monroe		-	-	-	-	50.60
Randolph		-	-	-	-	0.95
St. Clair		-	-	-	-	396.82
Madison	Gasoline Tank Truck Leaks	-	-	-	-	16.53
Monroe		-	-	-	-	2.01
Randolph		-	-	-	-	0.04
St. Clair		-	-	-	-	15.77

County	Source Category	Emissions (Tons/Year)				
		NH_3	NO_X	$PM_{2.5}$	SO_2	VOC
Madison	Underground Storage Tank Breathing	-	-	-	-	2.98
Monroe		-	-	-	-	0.36
Randolph		-	-	-	-	0.14
St. Clair		-	-	-	-	2.84
Madison	Graphic Arts	-	-	-	-	157.26
Monroe		-	-	-	-	13.81
Randolph		-	-	-	-	0.31
St. Clair		-	-	-	-	150.19
Madison	Industrial/Commercial/Institutional Incineration	-	33.34	36.39	28.43	21.74
Monroe		-	3.79	4.04	3.16	2.50
Randolph		-	0.06	0.07	0.05	0.04
St. Clair		-	31.36	35.90	28.05	19.92
Madison	Industrial Surface Coating	-	-	-	-	287.55
Monroe		-	-	-	-	31.96
Randolph		-	-	-	-	0.52
St. Clair		-	-	-	-	283.69
Madison	Marine Vessel VOL	-	-	-	-	149.76
Monroe		-	-	-	-	28.08
Randolph		-	-	-	-	7.59
St. Clair		-	-	-	-	6.24
Madison	Prescribed Burning	0.11	0.51	1.99	0.14	1.12
Monroe		0.06	0.29	1.15	0.08	0.65
Randolph		0.01	0.04	0.15	0.01	0.08
St. Clair		0.09	0.41	1.58	0.11	0.89
Madison	Residential Household Waste Combustion	-	-	-	-	-
Monroe		-	0.33	1.93	0.06	1.67
Randolph		-	0.01	0.30	-	0.03
St. Clair		-	-	-	-	-
Madison	Yard Waste Combustion	-	-	-	-	-
Monroe		-	-	2.43	-	2.08
Randolph		-	-	0.04	-	0.03
St. Clair		-	-	-	-	-
Madison	Pavement Marking	-	-	-	-	19.54
Monroe		-	-	-	-	2.55
Randolph		-	-	-	-	0.31
St. Clair		-	-	-	-	18.23
Madison	Commercial Portable Fuel Containers	-	-	-	-	21.74
Monroe		-	-	-	-	2.19
Randolph		-	-	-	-	0.04
St. Clair		-	-	-	-	20.64

County	Source Category	Emissions (Tons/Year)				
		NH_3	NO_X	$PM_{2.5}$	SO_2	VOC
Madison	Residential Portable Fuel Containers	-	-	-	-	193.20
Monroe		-	-	-	-	19.47
Randolph		-	-	-	-	0.32
St. Clair		-	-	-	-	183.45
Madison	Solvent Cleaning	-	-	-	-	317.74
Monroe		-	-	-	-	3.93
Randolph		-	-	-	-	0.43
St. Clair		-	-	-	-	100.57
Madison	Structure Fires	-	0.23	1.63	-	1.82
Monroe		-	0.02	0.17	-	0.18
Randolph		-	-	0.01	-	0.01
St. Clair		-	0.22	1.56	-	1.75
Madison	POTW	96.24	-	-	-	50.15
Monroe		-	-	-	-	-
Randolph		-	-	-	-	-
St. Clair		155.00	-	-	-	80.77
Madison	Industrial Waste Water Treatment	-	-	-	-	183.37
Monroe		-	-	-	-	-
Randolph		-	-	-	-	-
St. Clair		-	-	-	-	34.05
Madison	Paved Roads	-	-	71.91	-	-
Monroe		-	-	22.66	-	-
Randolph		-	-	0.57	-	-
St. Clair		-	-	76.65	-	-
Madison	Unpaved Roads	-	-	381.60	-	-
Monroe		-	-	112.90	-	-
Randolph		-	-	3.59	-	-
St. Clair		-	-	319.17	-	-

Table F-10 Area Source Emissions by SCC for the Illinois Nonattainment Area in 2008, 2017, and 2025

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17119	Madison	2102002000	Industrial fuel combustion - coal	NOX	0.00	0.00	0.00
17119	Madison	2102002000	Industrial fuel combustion - coal	PM2.5	0.00	0.00	0.00
17119	Madison	2102002000	Industrial fuel combustion - coal	VOM	0.00	0.00	0.00
17119	Madison	2102002000	Industrial fuel combustion - coal	NH3	0.00	0.00	0.00
17119	Madison	2102002000	Industrial fuel combustion - coal	SO2	0.00	0.00	0.00
17119	Madison	2102004000	Industrial fuel combustion - distillate oil	NOX	11.03	12.07	13.08
17119	Madison	2102004000	Industrial fuel combustion - distillate oil	PM2.5	0.88	0.96	1.04
17119	Madison	2102004000	Industrial fuel combustion - distillate oil	VOM	0.02	0.03	0.03
17119	Madison	2102004000	Industrial fuel combustion - distillate oil	NH3	0.48	0.53	0.57
17119	Madison	2102004000	Industrial fuel combustion - distillate oil	SO2	30.21	33.06	35.82
17119	Madison	2102005000	Industrial fuel combustion - residual oil	NOX	0.00	0.00	0.00
17119	Madison	2102005000	Industrial fuel combustion - residual oil	NH3	0.00	0.00	0.00
17119	Madison	2102005000	Industrial fuel combustion - residual oil	SO2	4.02	4.37	4.31
17119	Madison	2102005000	Industrial fuel combustion - residual oil	PM2.5	0.00	0.00	0.00
17119	Madison	2102005000	Industrial fuel combustion - residual oil	VOM	0.00	0.00	0.00
17119	Madison	2102006000	Industrial fuel combustion - natural gas	NOX	25.99	31.44	37.03
17119	Madison	2102006000	Industrial fuel combustion - natural gas	PM2.5	10.91	13.19	15.54
17119	Madison	2102006000	Industrial fuel combustion - natural gas	NH3	5.21	6.30	7.42
17119	Madison	2102006000	Industrial fuel combustion - natural gas	VOM	9.12	11.03	12.99
17119	Madison	2102006000	Industrial fuel combustion - natural gas	SO2	0.00	0.00	0.00
17119	Madison	2103002000	Commercial/institutional fuel combustion - coal	NOX	0.00	0.00	0.00
17119	Madison	2103002000	Commercial/institutional fuel combustion - coal	NH3	0.00	0.00	0.00
17119	Madison	2103002000	Commercial/institutional fuel combustion - coal	PM2.5	0.00	0.00	0.00
17119	Madison	2103002000	Commercial/institutional fuel combustion - coal	SO2	0.00	0.00	0.00
17119	Madison	2103002000	Commercial/institutional fuel combustion - coal	VOM	0.00	0.00	0.00
17119	Madison	2103004000	Commercial/institutional fuel combustion - distillate oil	NOX	8.04	7.63	7.00
17119	Madison	2103004000	Commercial/institutional fuel combustion - distillate oil	NH3	0.26	0.24	0.22
17119	Madison	2103004000	Commercial/institutional fuel combustion - distillate oil	PM2.5	0.95	0.90	0.83
17119	Madison	2103004000	Commercial/institutional fuel combustion - distillate oil	SO2	18.22	17.30	15.87
17119	Madison	2103004000	Commercial/institutional fuel combustion - distillate oil	VOM	0.14	0.13	0.12
17119	Madison	2103005000	Commercial/institutional fuel combustion - residual oil	NH3	0.00	0.00	0.00

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17119	Madison	2103005000	Commercial/institutional fuel combustion - residual oil	NOX	0.04	0.04	0.04
17119	Madison	2103005000	Commercial/institutional fuel combustion - residual oil	PM2.5	0.00	0.00	0.00
17119	Madison	2103005000	Commercial/institutional fuel combustion - residual oil	VOM	0.00	0.00	0.00
17119	Madison	2103005000	Commercial/institutional fuel combustion - residual oil	SO2	0.25	0.26	0.25
17119	Madison	2103006000	Commercial/institutional fuel combustion - natural gas	NOX	166.34	172.00	170.53
17119	Madison	2103006000	Commercial/institutional fuel combustion - natural gas	NH3	0.68	0.70	0.70
17119	Madison	2103006000	Commercial/institutional fuel combustion - natural gas	SO2	1.02	1.06	1.05
17119	Madison	2103006000	Commercial/institutional fuel combustion - natural gas	PM2.5	12.66	13.09	12.98
17119	Madison	2103006000	Commercial/institutional fuel combustion - natural gas	VOM	9.13	9.44	9.36
17119	Madison	2103007000	Commercial/institutional fuel combustion - LPG	PM2.5	0.01	0.01	0.01
17119	Madison	2103007000	Commercial/institutional fuel combustion - LPG	VOM	0.16	0.16	0.16
17119	Madison	2103007000	Commercial/institutional fuel combustion - LPG	NOX	4.25	4.38	4.32
17119	Madison	2103007000	Commercial/institutional fuel combustion - LPG	SO2	0.02	0.02	0.02
17119	Madison	2103011000	Commercial/institutional fuel combustion - kerosene	NH3	0.00	0.00	0.00
17119	Madison	2103011000	Commercial/institutional fuel combustion - kerosene	SO2	0.00	0.00	0.00
17119	Madison	2103011000	Commercial/institutional fuel combustion - kerosene	NOX	0.00	0.00	0.00
17119	Madison	2103011000	Commercial/institutional fuel combustion - kerosene	PM2.5	0.00	0.00	0.00
17119	Madison	2103011000	Commercial/institutional fuel combustion - kerosene	VOM	0.00	0.00	0.00
17119	Madison	2104002000	Residential fuel combustion - coal	NOX	0.15	0.14	0.14
17119	Madison	2104002000	Residential fuel combustion - coal	PM2.5	0.06	0.06	0.06
17119	Madison	2104002000	Residential fuel combustion - coal	VOM	0.17	0.15	0.15
17119	Madison	2104002000	Residential fuel combustion - coal	SO2	1.81	1.65	1.60
17119	Madison	2104002000	Residential fuel combustion - coal	NH3	0.03	0.03	0.03
17119	Madison	2104004000	Residential fuel combustion - distillate oil	NOX	3.94	3.35	3.00
17119	Madison	2104004000	Residential fuel combustion - distillate oil	PM2.5	0.47	0.40	0.36
17119	Madison	2104004000	Residential fuel combustion - distillate oil	VOM	0.15	0.13	0.12
17119	Madison	2104004000	Residential fuel combustion - distillate oil	SO2	9.33	7.94	7.11
17119	Madison	2104004000	Residential fuel combustion - distillate oil	NH3	0.22	0.19	0.17
17119	Madison	2104006000	Residential fuel combustion - natural gas	SO2	2.80	2.90	2.99
17119	Madison	2104006000	Residential fuel combustion - natural gas	NOX	438.35	454.55	467.85
17119	Madison	2104006000	Residential fuel combustion - natural gas	PM2.5	2.01	2.08	2.14
17119	Madison	2104006000	Residential fuel combustion - natural gas	VOM	25.65	26.60	27.37

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17119	Madison	2104006000	Residential fuel combustion - natural gas	NH3	93.27	96.71	99.54
17119	Madison	2104007000	Residential fuel combustion - LPG	NOX	37.59	32.20	29.36
17119	Madison	2104007000	Residential fuel combustion - LPG	SO2	0.16	0.14	0.12
17119	Madison	2104007000	Residential fuel combustion - LPG	PM2.5	0.11	0.10	0.09
17119	Madison	2104007000	Residential fuel combustion - LPG	VOM	1.46	1.25	1.14
17119	Madison	2104007000	Residential fuel combustion - LPG	NH3	0.13	0.11	0.10
17119	Madison	2104008100	Residential fuel combustion - wood - fireplaces	VOM	40.85	41.67	43.04
17119	Madison	2104008100	Residential fuel combustion - wood - fireplaces	SO2	0.86	0.88	0.91
17119	Madison	2104008100	Residential fuel combustion - wood - fireplaces	NH3	3.89	3.97	4.10
17119	Madison	2104008100	Residential fuel combustion - wood - fireplaces	PM2.5	51.00	52.03	53.74
17119	Madison	2104008100	Residential fuel combustion - wood - fireplaces	NOX	5.62	5.73	5.92
17119	Madison	2104008210	Residential fuel combustion - wood - fireplaces	PM2.5	64.10	65.39	67.55
17119	Madison	2104008210	Residential fuel combustion - wood - fireplaces	NH3	3.56	3.63	3.75
17119	Madison	2104008210	Residential fuel combustion - wood - fireplaces	VOM	111.03	113.25	116.99
17119	Madison	2104008210	Residential fuel combustion - wood - fireplaces	SO2	0.84	0.85	0.88
17119	Madison	2104008210	Residential fuel combustion - wood - fireplaces	NOX	5.87	5.98	6.18
17119	Madison	2104008220	Residential fuel combustion - wood - fireplaces	SO2	0.27	0.27	0.28
17119	Madison	2104008220	Residential fuel combustion - wood - fireplaces	VOM	8.06	8.22	8.50
17119	Madison	2104008220	Residential fuel combustion - wood - fireplaces	NOX	1.53	1.56	1.61
17119	Madison	2104008220	Residential fuel combustion - wood - fireplaces	NH3	0.60	0.62	0.64
17119	Madison	2104008220	Residential fuel combustion - wood - fireplaces	PM2.5	13.17	13.43	13.88
17119	Madison	2104008230	Residential fuel combustion - wood - fireplaces	SO2	0.09	0.09	0.09
17119	Madison	2104008230	Residential fuel combustion - wood - fireplaces	VOM	3.36	3.43	3.54
17119	Madison	2104008230	Residential fuel combustion - wood - fireplaces	NH3	0.20	0.21	0.21
17119	Madison	2104008230	Residential fuel combustion - wood - fireplaces	PM2.5	4.57	4.67	4.82
17119	Madison	2104008230	Residential fuel combustion - wood - fireplaces	NOX	0.45	0.46	0.47
17119	Madison	2104008310	Residential fuel combustion - wood - wood stoves	NH3	3.22	3.28	3.39
17119	Madison	2104008310	Residential fuel combustion - wood - wood stoves	VOM	100.39	102.40	105.78
17119	Madison	2104008310	Residential fuel combustion - wood - wood stoves	SO2	0.76	0.77	0.80
17119	Madison	2104008310	Residential fuel combustion - wood - wood stoves	PM2.5	57.96	59.12	61.07
17119	Madison	2104008310	Residential fuel combustion - wood - wood stoves	NOX	5.30	5.41	5.59
17119	Madison	2104008320	Residential fuel combustion - wood - wood stoves	VOM	7.28	7.43	7.68

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17119	Madison	2104008320	Residential fuel combustion - wood - wood stoves	NH3	0.55	0.56	0.58
17119	Madison	2104008320	Residential fuel combustion - wood - wood stoves	NOX	1.38	1.41	1.46
17119	Madison	2104008320	Residential fuel combustion - wood - wood stoves	SO2	0.24	0.25	0.26
17119	Madison	2104008320	Residential fuel combustion - wood - wood stoves	PM2.5	11.90	12.14	12.54
17119	Madison	2104008330	Residential fuel combustion - wood - wood stoves	NH3	0.18	0.19	0.19
17119	Madison	2104008330	Residential fuel combustion - wood - wood stoves	PM2.5	4.13	4.21	4.35
17119	Madison	2104008330	Residential fuel combustion - wood - wood stoves	VOM	3.04	3.10	3.20
17119	Madison	2104008330	Residential fuel combustion - wood - wood stoves	NOX	0.41	0.41	0.43
17119	Madison	2104008330	Residential fuel combustion - wood - wood stoves	SO2	0.08	0.08	0.09
17119	Madison	2104008400	Residential fuel combustion - wood - wood stoves	NH3	0.19	0.19	0.20
17119	Madison	2104008400	Residential fuel combustion - wood - wood stoves	PM2.5	1.95	1.99	2.05
17119	Madison	2104008400	Residential fuel combustion - wood - wood stoves	VOM	0.03	0.03	0.03
17119	Madison	2104008400	Residential fuel combustion - wood - wood stoves	NOX	2.42	2.47	2.55
17119	Madison	2104008400	Residential fuel combustion - wood - wood stoves	SO2	0.20	0.21	0.21
17119	Madison	2104008510	Residential fuel combustion - wood - furnace	NH3	12.99	13.25	13.69
17119	Madison	2104008510	Residential fuel combustion - wood - furnace	NOX	12.99	13.25	13.69
17119	Madison	2104008510	Residential fuel combustion - wood - furnace	VOM	84.44	86.13	88.97
17119	Madison	2104008510	Residential fuel combustion - wood - furnace	PM2.5	199.19	203.18	209.89
17119	Madison	2104008510	Residential fuel combustion - wood - furnace	SO2	14.65	14.94	15.44
17119	Madison	2104008610	Residential fuel combustion - wood - hydronic heater	NH3	8.43	8.60	8.89
17119	Madison	2104008610	Residential fuel combustion - wood - hydronic heater	SO2	9.51	9.70	10.02
17119	Madison	2104008610	Residential fuel combustion - wood - hydronic heater	NOX	8.43	8.60	8.89
17119	Madison	2104008610	Residential fuel combustion - wood - hydronic heater	PM2.5	129.31	131.90	136.26
17119	Madison	2104008610	Residential fuel combustion - wood - hydronic heater	VOM	54.82	55.92	57.76
17119	Madison	2104009000	Residential fuel combustion - firelog	VOM	12.38	12.62	13.04
17119	Madison	2104009000	Residential fuel combustion - firelog	PM2.5	8.89	9.06	9.36
17119	Madison	2104009000	Residential fuel combustion - firelog	NOX	2.40	2.45	2.53
17119	Madison	2104011000	Residential fuel combustion - kerosene	NOX	0.49	0.53	0.57
17119	Madison	2104011000	Residential fuel combustion - kerosene	PM2.5	0.06	0.06	0.07
17119	Madison	2104011000	Residential fuel combustion - kerosene	VOM	0.02	0.02	0.02
17119	Madison	2104011000	Residential fuel combustion - kerosene	SO2	1.16	1.26	1.34
17119	Madison	2104011000	Residential fuel combustion - kerosene	NH3	0.03	0.03	0.03

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17119	Madison	2294000000	Paved roads - fugitive dust	PM2.5	163.57	163.57	163.57
17119	Madison	2296000000	Unpaved roads - fugitive dust	PM2.5	305.59	305.59	305.59
17119	Madison	2302002100	Commercial cooking	PM2.5	6.47	7.39	8.14
17119	Madison	2302002100	Commercial cooking	VOM	1.62	1.85	2.03
17119	Madison	2302002200	Commercial cooking	PM2.5	45.77	52.27	57.62
17119	Madison	2302002200	Commercial cooking	VOM	5.56	6.35	7.00
17119	Madison	2302003000	Commercial cooking	VOM	1.69	1.93	2.13
17119	Madison	2302003100	Commercial cooking	VOM	0.80	0.91	1.00
17119	Madison	2302003100	Commercial cooking	PM2.5	10.50	11.99	13.22
17119	Madison	2302003200	Commercial cooking	PM2.5	0.79	0.90	1.00
17119	Madison	2302003200	Commercial cooking	VOM	0.03	0.04	0.04
17119	Madison	2311010000	Construction - residential	PM2.5	2.38	2.67	2.90
17119	Madison	2311020000	Construction - other	PM2.5	174.75	195.43	212.68
17119	Madison	2311030000	Construction - roads	PM2.5	266.93	298.53	324.88
17119	Madison	2401001000	Architectural coating	VOM	372.76	394.87	415.80
17119	Madison	2401005000	Autobody refinishing	VOM	3.39	4.51	5.68
17119	Madison	2401008000	Pavement markings	VOM	13.57	14.38	15.14
17119	Madison	2401100000	Industrial coating - maintenance	VOM	83.75	105.53	122.49
17119	Madison	2401200000	Industrial coating - other special purpose	VOM	0.94	0.99	1.05
17119	Madison	2415005000	Solvent cleaning - SIC25	VOM	2.18	2.88	3.41
17119	Madison	2415015000	Solvent cleaning - SIC33	VOM	55.33	72.96	86.66
17119	Madison	2415020000	Solvent cleaning - SIC34	VOM	31.79	41.99	49.83
17119	Madison	2415025000	Solvent cleaning - SIC35	VOM	2.12	2.80	3.30
17119	Madison	2415030000	Solvent cleaning - SIC36	VOM	2.57	3.40	4.04
17119	Madison	2415035000	Solvent cleaning - SIC37	VOM	5.11	6.75	8.01
17119	Madison	2415040000	Solvent cleaning - SIC38	VOM	3.09	4.08	4.83
17119	Madison	2415045000	Solvent cleaning - SIC39	VOM	1.39	1.83	2.18
17119	Madison	2420000370	Dry cleaning	VOM	19.84	22.81	24.95
17119	Madison	2425000000	Graphic arts	VOM	367.51	418.59	461.01
17119	Madison	2460100000	Consumer solvent user - personal products	VOM	236.59	248.41	258.34
17119	Madison	2460200000	Consumer solvent user - household products	VOM	224.14	235.34	244.74
17119	Madison	2460400000	Consumer solvent user - automotive	VOM	169.35	177.81	184.91

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17119	Madison	2460500000	Consumer solvent user - coatings	VOM	118.30	134.53	148.82
17119	Madison	2460600000	Consumer solvent user - adhesives	VOM	70.98	81.03	87.01
17119	Madison	2460800000	Consumer solvent user - fifra	VOM	221.65	253.03	277.13
17119	Madison	2460900000	Consumer solvent user - miscellaneous	VOM	8.72	9.95	10.69
17119	Madison	2461021000	Asphalt paving - cutback	VOM	116.69	135.38	150.77
17119	Madison	2461022000	Asphalt paving - emulsified	VOM	12.20	14.15	15.76
17119	Madison	2461850000	Ag pesticides	VOM	233.91	272.88	306.96
17119	Madison	2501011011	Portable gas can emissions - residential	VOM	18.01	18.50	18.95
17119	Madison	2501011012	Portable gas can emissions - residential	VOM	156.49	160.77	164.66
17119	Madison	2501011013	Portable gas can emissions - residential	VOM	8.47	8.70	8.92
17119	Madison	2501011014	Portable gas can emissions - residential	VOM	5.73	5.88	6.03
17119	Madison	2501011015	Portable gas can emissions - residential	VOM	17.18	17.65	18.08
17119	Madison	2501012011	Portable gas can emissions - commercial	VOM	1.06	1.09	1.11
17119	Madison	2501012012	Portable gas can emissions - commercial	VOM	13.77	14.15	14.49
17119	Madison	2501012013	Portable gas can emissions - commercial	VOM	6.88	7.07	7.24
17119	Madison	2501012014	Portable gas can emissions - commercial	VOM	0.36	0.37	0.38
17119	Madison	2501012015	Portable gas can emissions - commercial	VOM	1.09	1.12	1.15
17119	Madison	2501060050	Gasoline marketing - Stage I	VOM	53.58	55.56	57.47
17119	Madison	2501060100	Gasoline marketing - Stage II	VOM	225.64	234.02	242.03
17119	Madison	2501060200	Gasoline marketing - Gasoline trucks	VOM	12.77	13.24	13.70
17119	Madison	2501080050	Aircraft refueling	VOM	3.83	5.93	6.43
17119	Madison	2501080100	Aircraft refueling	VOM	52.36	81.22	87.96
17119	Madison	2505020000	Marine vessels	VOM	167.31	197.33	222.76
17119	Madison	2505030120	Gasoline marketing - Gasoline tanks	VOM	2.88	2.98	3.08
17119	Madison	2601020000	Commercial/Institutional incineration	NOX	34.85	40.43	45.03
17119	Madison	2601020000	Commercial/Institutional incineration	PM2.5	37.53	43.54	48.49
17119	Madison	2601020000	Commercial/Institutional incineration	VOM	22.79	26.44	29.44
17119	Madison	2601020000	Commercial/Institutional incineration	SO2	29.49	34.21	38.10
17119	Madison	2610000100	Yard waste burning - leaves	NOX	0.00	0.00	0.00
17119	Madison	2610000100	Yard waste burning - leaves	PM2.5	0.00	0.00	0.00
17119	Madison	2610000100	Yard waste burning - leaves	VOM	0.00	0.00	0.00
17119	Madison	2610000100	Yard waste burning - leaves	SO2	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17119	Madison	2610000400	Yard waste burning - brush	PM2.5	0.00	0.00	0.00
17119	Madison	2610000400	Yard waste burning - brush	SO2	0.00	0.00	0.00
17119	Madison	2610000400	Yard waste burning - brush	VOM	0.00	0.00	0.00
17119	Madison	2610030000	Open burning - residential waste	NOX	20.12	21.13	21.27
17119	Madison	2610030000	Open burning - residential waste	PM2.5	127.43	133.80	134.72
17119	Madison	2610030000	Open burning - residential waste	VOM	28.71	30.14	30.35
17119	Madison	2610030000	Open burning - residential waste	SO2	3.35	3.52	3.55
17119	Madison	2630010000	Industrial waste water treatment	VOM	107.26	135.16	156.89
17119	Madison	2630020000	Publicly owned treatment works	NH3	1.16	1.37	1.54
17119	Madison	2630020000	Publicly owned treatment works	VOM	5.84	6.88	7.74
17119	Madison	2801000003	Agricultural tilling	PM2.5	851.22	764.14	686.34
17119	Madison	2801700001	Agricultural fertilizer	NH3	338.64	338.64	338.64
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700003	Agricultural fertilizer	NH3	301.65	301.65	301.65
17119	Madison	2801700004	Agricultural fertilizer	NH3	72.88	72.88	72.88
17119	Madison	2801700005	Agricultural fertilizer	NH3	0.40	0.40	0.40
17119	Madison	2801700006	Agricultural fertilizer	NH3	15.53	15.53	15.53
17119	Madison	2801700007	Agricultural fertilizer	NH3	0.08	0.08	0.08
17119	Madison	2801700010	Agricultural fertilizer	NH3	5.62	5.62	5.62
17119	Madison	2801700011	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700012	Agricultural fertilizer	NH3	0.00	0.00	0.00
17119	Madison	2801700013	Agricultural fertilizer	NH3	69.91	69.91	69.91
17119	Madison	2801700014	Agricultural fertilizer	NH3	6.46	6.46	6.46
17119	Madison	2801700015	Agricultural fertilizer	NH3	1.35	1.35	1.35

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17119	Madison	2801700099	Agricultural fertilizer	NH3	1.31	1.31	1.31
17119	Madison	2805002000	Beef cows	NH3	74.25	74.25	74.25
17119	Madison	2805018000	Dairy cows	NH3	20.94	20.94	20.94
17119	Madison	2805025000	Hogs	NH3	127.86	127.86	127.86
17119	Madison	2805030000	Chickens	NH3	36.72	36.72	36.72
17119	Madison	2805030009	Turkeys	NH3	0.11	0.11	0.11
17119	Madison	2805035000	Horses	NH3	21.25	21.25	21.25
17119	Madison	2805040000	Sheep	NH3	2.02	2.02	2.02
17119	Madison	2805045000	Goats	NH3	0.80	0.80	0.80
17119	Madison	2810001000	Forest fires	NH3	0.00	0.00	0.00
17119	Madison	2810001000	Forest fires	NOX	0.02	0.02	0.02
17119	Madison	2810001000	Forest fires	PM2.5	0.07	0.07	0.07
17119	Madison	2810001000	Forest fires	VOM	0.04	0.04	0.04
17119	Madison	2810001000	Forest fires	SO2	0.00	0.00	0.00
17119	Madison	2810015000	Prescribed burning	NOX	1.37	1.37	1.37
17119	Madison	2810015000	Prescribed burning	PM2.5	5.32	5.32	5.32
17119	Madison	2810015000	Prescribed burning	VOM	3.00	3.00	3.00
17119	Madison	2810015000	Prescribed burning	NH3	0.29	0.29	0.29
17119	Madison	2810015000	Prescribed burning	SO2	0.38	0.38	0.38
17119	Madison	2810030000	Structure fires	VOM	3.81	3.23	2.81
17119	Madison	2810030000	Structure fires	NOX	0.48	0.41	0.36
17119	Madison	2810030000	Structure fires	PM2.5	3.39	2.88	2.50
17133	Monroe	2102002000	Industrial fuel combustion - coal	NOX	0.00	0.00	0.00
17133	Monroe	2102002000	Industrial fuel combustion - coal	PM2.5	0.00	0.00	0.00
17133	Monroe	2102002000	Industrial fuel combustion - coal	VOM	0.00	0.00	0.00
17133	Monroe	2102002000	Industrial fuel combustion - coal	NH3	0.00	0.00	0.00
17133	Monroe	2102002000	Industrial fuel combustion - coal	SO2	0.00	0.00	0.00
17133	Monroe	2102004000	Industrial fuel combustion - distillate oil	NOX	0.17	0.19	0.20
17133	Monroe	2102004000	Industrial fuel combustion - distillate oil	PM2.5	0.01	0.01	0.01
17133	Monroe	2102004000	Industrial fuel combustion - distillate oil	VOM	0.00	0.00	0.00
17133	Monroe	2102004000	Industrial fuel combustion - distillate oil	NH3	0.01	0.01	0.01
17133	Monroe	2102004000	Industrial fuel combustion - distillate oil	SO2	0.34	0.37	0.40

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2102005000	Industrial fuel combustion - residual oil	NOX	0.03	0.03	0.03
17133	Monroe	2102005000	Industrial fuel combustion - residual oil	NH3	0.00	0.00	0.00
17133	Monroe	2102005000	Industrial fuel combustion - residual oil	SO2	0.07	0.08	0.08
17133	Monroe	2102005000	Industrial fuel combustion - residual oil	PM2.5	0.00	0.00	0.00
17133	Monroe	2102005000	Industrial fuel combustion - residual oil	VOM	0.00	0.00	0.00
17133	Monroe	2102006000	Industrial fuel combustion - natural gas	NOX	0.00	0.00	0.00
17133	Monroe	2102006000	Industrial fuel combustion - natural gas	PM2.5	0.10	0.12	0.14
17133	Monroe	2102006000	Industrial fuel combustion - natural gas	NH3	0.04	0.05	0.06
17133	Monroe	2102006000	Industrial fuel combustion - natural gas	VOM	0.07	0.08	0.10
17133	Monroe	2102006000	Industrial fuel combustion - natural gas	SO2	0.01	0.01	0.01
17133	Monroe	2103002000	Commercial/institutional fuel combustion - coal	NOX	0.00	0.00	0.00
17133	Monroe	2103002000	Commercial/institutional fuel combustion - coal	NH3	0.00	0.00	0.00
17133	Monroe	2103002000	Commercial/institutional fuel combustion - coal	PM2.5	0.00	0.00	0.00
17133	Monroe	2103002000	Commercial/institutional fuel combustion - coal	SO2	0.00	0.00	0.00
17133	Monroe	2103002000	Commercial/institutional fuel combustion - coal	VOM	0.00	0.00	0.00
17133	Monroe	2103004000	Commercial/institutional fuel combustion - distillate oil	NOX	0.61	0.58	0.53
17133	Monroe	2103004000	Commercial/institutional fuel combustion - distillate oil	NH3	0.02	0.02	0.02
17133	Monroe	2103004000	Commercial/institutional fuel combustion - distillate oil	PM2.5	0.07	0.06	0.06
17133	Monroe	2103004000	Commercial/institutional fuel combustion - distillate oil	SO2	1.22	1.16	1.06
17133	Monroe	2103004000	Commercial/institutional fuel combustion - distillate oil	VOM	0.01	0.01	0.01
17133	Monroe	2103005000	Commercial/institutional fuel combustion - residual oil	NH3	0.00	0.00	0.00
17133	Monroe	2103005000	Commercial/institutional fuel combustion - residual oil	NOX	0.00	0.00	0.00
17133	Monroe	2103005000	Commercial/institutional fuel combustion - residual oil	PM2.5	0.00	0.00	0.00
17133	Monroe	2103005000	Commercial/institutional fuel combustion - residual oil	VOM	0.00	0.00	0.00
17133	Monroe	2103005000	Commercial/institutional fuel combustion - residual oil	SO2	0.02	0.02	0.02
17133	Monroe	2103006000	Commercial/institutional fuel combustion - natural gas	NOX	11.73	12.13	12.02
17133	Monroe	2103006000	Commercial/institutional fuel combustion - natural gas	NH3	0.06	0.06	0.06
17133	Monroe	2103006000	Commercial/institutional fuel combustion - natural gas	SO2	0.07	0.07	0.07
17133	Monroe	2103006000	Commercial/institutional fuel combustion - natural gas	PM2.5	0.89	0.92	0.91
17133	Monroe	2103006000	Commercial/institutional fuel combustion - natural gas	VOM	0.65	0.67	0.66
17133	Monroe	2103007000	Commercial/institutional fuel combustion - LPG	PM2.5	0.00	0.00	0.00
17133	Monroe	2103007000	Commercial/institutional fuel combustion - LPG	VOM	0.01	0.01	0.01

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2103007000	Commercial/institutional fuel combustion - LPG	NOX	0.28	0.29	0.29
17133	Monroe	2103007000	Commercial/institutional fuel combustion - LPG	SO2	0.00	0.00	0.00
17133	Monroe	2103011000	Commercial/institutional fuel combustion - kerosene	NH3	0.00	0.00	0.00
17133	Monroe	2103011000	Commercial/institutional fuel combustion - kerosene	SO2	0.00	0.00	0.00
17133	Monroe	2103011000	Commercial/institutional fuel combustion - kerosene	NOX	0.00	0.00	0.00
17133	Monroe	2103011000	Commercial/institutional fuel combustion - kerosene	PM2.5	0.00	0.00	0.00
17133	Monroe	2103011000	Commercial/institutional fuel combustion - kerosene	VOM	0.00	0.00	0.00
17133	Monroe	2104002000	Residential fuel combustion - coal	NOX	0.23	0.21	0.20
17133	Monroe	2104002000	Residential fuel combustion - coal	PM2.5	0.10	0.09	0.09
17133	Monroe	2104002000	Residential fuel combustion - coal	VOM	0.25	0.23	0.22
17133	Monroe	2104002000	Residential fuel combustion - coal	SO2	2.71	2.47	2.40
17133	Monroe	2104002000	Residential fuel combustion - coal	NH3	0.05	0.05	0.04
17133	Monroe	2104004000	Residential fuel combustion - distillate oil	PM2.5	0.04	0.03	0.03
17133	Monroe	2104004000	Residential fuel combustion - distillate oil	VOM	0.01	0.01	0.01
17133	Monroe	2104004000	Residential fuel combustion - distillate oil	NOX	0.32	0.28	0.25
17133	Monroe	2104004000	Residential fuel combustion - distillate oil	SO2	0.77	0.65	0.58
17133	Monroe	2104004000	Residential fuel combustion - distillate oil	NH3	0.02	0.02	0.01
17133	Monroe	2104006000	Residential fuel combustion - natural gas	SO2	0.19	0.20	0.20
17133	Monroe	2104006000	Residential fuel combustion - natural gas	NOX	29.92	31.02	31.93
17133	Monroe	2104006000	Residential fuel combustion - natural gas	PM2.5	0.14	0.14	0.15
17133	Monroe	2104006000	Residential fuel combustion - natural gas	VOM	1.75	1.82	1.87
17133	Monroe	2104006000	Residential fuel combustion - natural gas	NH3	6.37	6.60	6.79
17133	Monroe	2104007000	Residential fuel combustion - LPG	NOX	19.92	17.07	15.56
17133	Monroe	2104007000	Residential fuel combustion - LPG	SO2	0.08	0.07	0.07
17133	Monroe	2104007000	Residential fuel combustion - LPG	PM2.5	0.06	0.05	0.05
17133	Monroe	2104007000	Residential fuel combustion - LPG	VOM	0.77	0.66	0.60
17133	Monroe	2104007000	Residential fuel combustion - LPG	NH3	0.07	0.06	0.05
17133	Monroe	2104008100	Residential fuel combustion - wood - fireplaces	VOM	4.98	5.08	5.25
17133	Monroe	2104008100	Residential fuel combustion - wood - fireplaces	SO2	0.11	0.11	0.11
17133	Monroe	2104008100	Residential fuel combustion - wood - fireplaces	NH3	0.47	0.48	0.50
17133	Monroe	2104008100	Residential fuel combustion - wood - fireplaces	PM2.5	6.22	6.35	6.56
17133	Monroe	2104008100	Residential fuel combustion - wood - fireplaces	NOX	0.69	0.70	0.72

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2104008210	Residential fuel combustion - wood - fireplaces	PM2.5	7.83	7.98	8.25
17133	Monroe	2104008210	Residential fuel combustion - wood - fireplaces	NH3	0.43	0.44	0.46
17133	Monroe	2104008210	Residential fuel combustion - wood - fireplaces	VOM	13.56	13.83	14.29
17133	Monroe	2104008210	Residential fuel combustion - wood - fireplaces	SO2	0.10	0.10	0.11
17133	Monroe	2104008210	Residential fuel combustion - wood - fireplaces	NOX	0.72	0.73	0.75
17133	Monroe	2104008220	Residential fuel combustion - wood - fireplaces	SO2	0.03	0.03	0.03
17133	Monroe	2104008220	Residential fuel combustion - wood - fireplaces	VOM	0.99	1.01	1.04
17133	Monroe	2104008220	Residential fuel combustion - wood - fireplaces	NOX	0.19	0.19	0.20
17133	Monroe	2104008220	Residential fuel combustion - wood - fireplaces	NH3	0.07	0.08	0.08
17133	Monroe	2104008220	Residential fuel combustion - wood - fireplaces	PM2.5	1.62	1.65	1.70
17133	Monroe	2104008230	Residential fuel combustion - wood - fireplaces	SO2	0.01	0.01	0.01
17133	Monroe	2104008230	Residential fuel combustion - wood - fireplaces	VOM	0.42	0.43	0.45
17133	Monroe	2104008230	Residential fuel combustion - wood - fireplaces	NH3	0.03	0.03	0.03
17133	Monroe	2104008230	Residential fuel combustion - wood - fireplaces	PM2.5	0.57	0.59	0.61
17133	Monroe	2104008230	Residential fuel combustion - wood - fireplaces	NOX	0.06	0.06	0.06
17133	Monroe	2104008310	Residential fuel combustion - wood - wood stoves	NH3	0.39	0.40	0.41
17133	Monroe	2104008310	Residential fuel combustion - wood - wood stoves	VOM	12.25	12.50	12.91
17133	Monroe	2104008310	Residential fuel combustion - wood - wood stoves	SO2	0.09	0.09	0.10
17133	Monroe	2104008310	Residential fuel combustion - wood - wood stoves	PM2.5	7.07	7.21	7.45
17133	Monroe	2104008310	Residential fuel combustion - wood - wood stoves	NOX	0.65	0.66	0.68
17133	Monroe	2104008320	Residential fuel combustion - wood - wood stoves	VOM	0.89	0.91	0.94
17133	Monroe	2104008320	Residential fuel combustion - wood - wood stoves	NH3	0.07	0.07	0.07
17133	Monroe	2104008320	Residential fuel combustion - wood - wood stoves	NOX	0.17	0.17	0.18
17133	Monroe	2104008320	Residential fuel combustion - wood - wood stoves	SO2	0.03	0.03	0.03
17133	Monroe	2104008320	Residential fuel combustion - wood - wood stoves	PM2.5	1.45	1.48	1.53
17133	Monroe	2104008330	Residential fuel combustion - wood - wood stoves	NH3	0.02	0.02	0.02
17133	Monroe	2104008330	Residential fuel combustion - wood - wood stoves	PM2.5	0.50	0.51	0.53
17133	Monroe	2104008330	Residential fuel combustion - wood - wood stoves	VOM	0.37	0.38	0.39
17133	Monroe	2104008330	Residential fuel combustion - wood - wood stoves	NOX	0.05	0.05	0.05
17133	Monroe	2104008330	Residential fuel combustion - wood - wood stoves	SO2	0.01	0.01	0.01
17133	Monroe	2104008400	Residential fuel combustion - wood - wood stoves	NH3	0.02	0.02	0.02
17133	Monroe	2104008400	Residential fuel combustion - wood - wood stoves	PM2.5	0.22	0.22	0.23

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2104008400	Residential fuel combustion - wood - wood stoves	VOM	0.00	0.00	0.00
17133	Monroe	2104008400	Residential fuel combustion - wood - wood stoves	NOX	0.27	0.28	0.29
17133	Monroe	2104008400	Residential fuel combustion - wood - wood stoves	SO2	0.02	0.02	0.02
17133	Monroe	2104008510	Residential fuel combustion - wood - furnace	NH3	1.54	1.57	1.62
17133	Monroe	2104008510	Residential fuel combustion - wood - furnace	NOX	1.54	1.57	1.62
17133	Monroe	2104008510	Residential fuel combustion - wood - furnace	VOM	9.99	10.19	10.52
17133	Monroe	2104008510	Residential fuel combustion - wood - furnace	PM2.5	23.56	24.03	24.82
17133	Monroe	2104008510	Residential fuel combustion - wood - furnace	SO2	1.73	1.77	1.83
17133	Monroe	2104008610	Residential fuel combustion - wood - hydronic heater	NH3	1.03	1.05	1.09
17133	Monroe	2104008610	Residential fuel combustion - wood - hydronic heater	SO2	1.16	1.19	1.22
17133	Monroe	2104008610	Residential fuel combustion - wood - hydronic heater	NOX	1.03	1.05	1.09
17133	Monroe	2104008610	Residential fuel combustion - wood - hydronic heater	PM2.5	15.80	16.12	16.65
17133	Monroe	2104008610	Residential fuel combustion - wood - hydronic heater	VOM	6.70	6.83	7.06
17133	Monroe	2104009000	Residential fuel combustion - firelog	VOM	1.38	1.41	1.45
17133	Monroe	2104009000	Residential fuel combustion - firelog	PM2.5	0.99	1.01	1.04
17133	Monroe	2104009000	Residential fuel combustion - firelog	NOX	0.27	0.27	0.28
17133	Monroe	2104011000	Residential fuel combustion - kerosene	NOX	0.04	0.04	0.05
17133	Monroe	2104011000	Residential fuel combustion - kerosene	PM2.5	0.00	0.01	0.01
17133	Monroe	2104011000	Residential fuel combustion - kerosene	VOM	0.00	0.00	0.00
17133	Monroe	2104011000	Residential fuel combustion - kerosene	SO2	0.10	0.10	0.11
17133	Monroe	2104011000	Residential fuel combustion - kerosene	NH3	0.00	0.00	0.00
17133	Monroe	2294000000	Paved roads - fugitive dust	PM2.5	43.27	43.27	43.27
17133	Monroe	2296000000	Unpaved roads - fugitive dust	PM2.5	91.33	91.33	91.33
17133	Monroe	2302002100	Commercial cooking	PM2.5	0.79	0.90	1.00
17133	Monroe	2302002100	Commercial cooking	VOM	0.20	0.23	0.25
17133	Monroe	2302002200	Commercial cooking	PM2.5	5.60	6.40	7.05
17133	Monroe	2302002200	Commercial cooking	VOM	0.68	0.78	0.86
17133	Monroe	2302003000	Commercial cooking	VOM	0.21	0.24	0.26
17133	Monroe	2302003100	Commercial cooking	VOM	0.10	0.11	0.12
17133	Monroe	2302003100	Commercial cooking	PM2.5	1.28	1.47	1.62
17133	Monroe	2302003200	Commercial cooking	PM2.5	0.10	0.11	0.12
17133	Monroe	2302003200	Commercial cooking	VOM	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2311010000	Construction - residential	PM2.5	0.82	0.91	1.00
17133	Monroe	2311020000	Construction - other	PM2.5	26.96	30.15	32.81
17133	Monroe	2311030000	Construction - roads	PM2.5	49.74	55.63	60.54
17133	Monroe	2401001000	Architectural coating	VOM	45.61	48.32	50.88
17133	Monroe	2401005000	Autobody refinishing	VOM	0.50	0.66	0.84
17133	Monroe	2401008000	Pavement markings	VOM	1.77	1.87	1.97
17133	Monroe	2401100000	Industrial coating - maintenance	VOM	10.25	12.91	14.99
17133	Monroe	2401200000	Industrial coating - other special purpose	VOM	0.11	0.12	0.13
17133	Monroe	2415005000	Solvent cleaning - SIC25	VOM	0.19	0.26	0.30
17133	Monroe	2415015000	Solvent cleaning - SIC33	VOM	0.00	0.00	0.00
17133	Monroe	2415020000	Solvent cleaning - SIC34	VOM	0.47	0.62	0.74
17133	Monroe	2415025000	Solvent cleaning - SIC35	VOM	2.21	2.92	3.45
17133	Monroe	2415030000	Solvent cleaning - SIC36	VOM	0.49	0.65	0.77
17133	Monroe	2415035000	Solvent cleaning - SIC37	VOM	0.00	0.00	0.00
17133	Monroe	2415040000	Solvent cleaning - SIC38	VOM	0.25	0.32	0.38
17133	Monroe	2415045000	Solvent cleaning - SIC39	VOM	0.34	0.45	0.53
17133	Monroe	2420000370	Dry cleaning	VOM	0.00	0.00	0.00
17133	Monroe	2425000000	Graphic arts	VOM	115.29	131.32	144.62
17133	Monroe	2460100000	Consumer solvent user - personal products	VOM	28.95	30.40	31.61
17133	Monroe	2460200000	Consumer solvent user - household products	VOM	27.43	28.80	29.95
17133	Monroe	2460400000	Consumer solvent user - automotive	VOM	20.72	21.76	22.63
17133	Monroe	2460500000	Consumer solvent user - coatings	VOM	14.48	16.46	18.21
17133	Monroe	2460600000	Consumer solvent user - adhesives	VOM	8.69	9.92	10.65
17133	Monroe	2460800000	Consumer solvent user - fifra	VOM	27.12	30.96	33.91
17133	Monroe	2460900000	Consumer solvent user - miscellaneous	VOM	1.07	1.22	1.31
17133	Monroe	2461021000	Asphalt paving - cutback	VOM	32.15	37.30	41.54
17133	Monroe	2461022000	Asphalt paving - emulsified	VOM	3.36	3.90	4.34
17133	Monroe	2461850000	Ag pesticides	VOM	120.06	140.06	157.55
17133	Monroe	2501011011	Portable gas can emissions - residential	VOM	1.98	2.03	2.08
17133	Monroe	2501011012	Portable gas can emissions - residential	VOM	17.17	17.64	18.07
17133	Monroe	2501011013	Portable gas can emissions - residential	VOM	0.93	0.96	0.98
17133	Monroe	2501011014	Portable gas can emissions - residential	VOM	0.63	0.65	0.66

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17133	Monroe	2501011015	Portable gas can emissions - residential	VOM	1.89	1.94	1.98
17133	Monroe	2501012011	Portable gas can emissions - commercial	VOM	0.12	0.12	0.12
17133	Monroe	2501012012	Portable gas can emissions - commercial	VOM	1.51	1.55	1.59
17133	Monroe	2501012013	Portable gas can emissions - commercial	VOM	0.76	0.78	0.79
17133	Monroe	2501012014	Portable gas can emissions - commercial	VOM	0.04	0.04	0.04
17133	Monroe	2501012015	Portable gas can emissions - commercial	VOM	0.12	0.12	0.13
17133	Monroe	2501060050	Gasoline marketing - Stage I	VOM	6.81	7.06	7.30
17133	Monroe	2501060100	Gasoline marketing - Stage II	VOM	28.68	29.74	30.76
17133	Monroe	2501060200	Gasoline marketing - Gasoline trucks	VOM	1.62	1.68	1.74
17133	Monroe	2501080050	Aircraft refueling	VOM	0.57	0.88	0.95
17133	Monroe	2501080100	Aircraft refueling	VOM	7.75	12.02	13.02
17133	Monroe	2505020000	Marine vessels	VOM	31.37	37.00	41.77
17133	Monroe	2505030120	Gasoline marketing - Gasoline tanks	VOM	0.37	0.38	0.39
17133	Monroe	2601020000	Commercial/Institutional incineration	NOX	4.26	4.95	5.51
17133	Monroe	2601020000	Commercial/Institutional incineration	PM2.5	4.59	5.33	5.93
17133	Monroe	2601020000	Commercial/Institutional incineration	VOM	2.79	3.23	3.60
17133	Monroe	2601020000	Commercial/Institutional incineration	SO2	3.61	4.19	4.66
17133	Monroe	2610000100	Yard waste burning - leaves	NOX	0.34	0.36	0.37
17133	Monroe	2610000100	Yard waste burning - leaves	PM2.5	1.21	1.27	1.32
17133	Monroe	2610000100	Yard waste burning - leaves	VOM	1.54	1.61	1.68
17133	Monroe	2610000100	Yard waste burning - leaves	SO2	0.04	0.04	0.05
17133	Monroe	2610000400	Yard waste burning - brush	PM2.5	0.85	0.85	0.85
17133	Monroe	2610000400	Yard waste burning - brush	SO2	0.09	0.09	0.09
17133	Monroe	2610000400	Yard waste burning - brush	VOM	1.04	1.04	1.04
17133	Monroe	2610030000	Open burning - residential waste	NOX	7.59	7.97	8.03
17133	Monroe	2610030000	Open burning - residential waste	PM2.5	48.08	50.48	50.83
17133	Monroe	2610030000	Open burning - residential waste	VOM	10.83	11.37	11.45
17133	Monroe	2610030000	Open burning - residential waste	SO2	1.27	1.33	1.34
17133	Monroe	2630010000	Industrial waste water treatment	VOM	0.00	0.00	0.00
17133	Monroe	2630020000	Publicly owned treatment works	NH3	0.03	0.03	0.04
17133	Monroe	2630020000	Publicly owned treatment works	VOM	0.15	0.18	0.20
17133	Monroe	2801000003	Agricultural tilling	PM2.5	479.63	430.57	386.73

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17133	Monroe	2801700001	Agricultural fertilizer	NH3	198.57	198.57	198.57
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700003	Agricultural fertilizer	NH3	176.88	176.88	176.88
17133	Monroe	2801700004	Agricultural fertilizer	NH3	42.73	42.73	42.73
17133	Monroe	2801700005	Agricultural fertilizer	NH3	0.24	0.24	0.24
17133	Monroe	2801700006	Agricultural fertilizer	NH3	9.10	9.10	9.10
17133	Monroe	2801700007	Agricultural fertilizer	NH3	0.04	0.04	0.04
17133	Monroe	2801700010	Agricultural fertilizer	NH3	3.30	3.30	3.30
17133	Monroe	2801700011	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700012	Agricultural fertilizer	NH3	0.00	0.00	0.00
17133	Monroe	2801700013	Agricultural fertilizer	NH3	40.99	40.99	40.99
17133	Monroe	2801700014	Agricultural fertilizer	NH3	3.79	3.79	3.79
17133	Monroe	2801700015	Agricultural fertilizer	NH3	0.79	0.79	0.79
17133	Monroe	2801700099	Agricultural fertilizer	NH3	0.77	0.77	0.77
17133	Monroe	2805002000	Beef cows	NH3	51.13	51.13	51.13
17133	Monroe	2805018000	Dairy cows	NH3	13.96	13.96	13.96
17133	Monroe	2805025000	Hogs	NH3	274.35	274.35	274.35
17133	Monroe	2805030000	Chickens	NH3	29.28	29.28	29.28
17133	Monroe	2805030009	Turkeys	NH3	0.00	0.00	0.00
17133	Monroe	2805035000	Horses	NH3	11.34	11.34	11.34
17133	Monroe	2805040000	Sheep	NH3	1.66	1.66	1.66
17133	Monroe	2805045000	Goats	NH3	0.31	0.31	0.31
17133	Monroe	2810001000	Forest fires	NH3	0.00	0.00	0.00
17133	Monroe	2810001000	Forest fires	PM2.5	0.04	0.04	0.04

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17133	Monroe	2810001000	Forest fires	VOM	0.02	0.02	0.02
17133	Monroe	2810001000	Forest fires	NOX	0.01	0.01	0.01
17133	Monroe	2810001000	Forest fires	SO2	0.00	0.00	0.00
17133	Monroe	2810015000	Prescribed burning	NOX	0.10	0.10	0.10
17133	Monroe	2810015000	Prescribed burning	PM2.5	0.39	0.39	0.39
17133	Monroe	2810015000	Prescribed burning	VOM	0.22	0.22	0.22
17133	Monroe	2810015000	Prescribed burning	NH3	0.02	0.02	0.02
17133	Monroe	2810015000	Prescribed burning	SO2	0.03	0.03	0.03
17133	Monroe	2810030000	Structure fires	VOM	0.32	0.27	0.23
17133	Monroe	2810030000	Structure fires	NOX	0.04	0.03	0.03
17133	Monroe	2810030000	Structure fires	PM2.5	0.28	0.24	0.21
17157	Randolph	2102002000	Industrial fuel combustion - coal	NOX	0.00	0.00	0.00
17157	Randolph	2102002000	Industrial fuel combustion - coal	PM2.5	0.00	0.00	0.00
17157	Randolph	2102002000	Industrial fuel combustion - coal	VOM	0.00	0.00	0.00
17157	Randolph	2102002000	Industrial fuel combustion - coal	NH3	0.00	0.00	0.00
17157	Randolph	2102002000	Industrial fuel combustion - coal	SO2	0.00	0.00	0.00
17157	Randolph	2102004000	Industrial fuel combustion - distillate oil	NOX	0.02	0.02	0.03
17157	Randolph	2102004000	Industrial fuel combustion - distillate oil	PM2.5	0.00	0.00	0.00
17157	Randolph	2102004000	Industrial fuel combustion - distillate oil	NH3	0.00	0.00	0.00
17157	Randolph	2102004000	Industrial fuel combustion - distillate oil	SO2	0.04	0.05	0.05
17157	Randolph	2102004000	Industrial fuel combustion - distillate oil	VOM	0.00	0.00	0.00
17157	Randolph	2102005000	Industrial fuel combustion - residual oil	NOX	0.00	0.00	0.00
17157	Randolph	2102005000	Industrial fuel combustion - residual oil	NH3	0.00	0.00	0.00
17157	Randolph	2102005000	Industrial fuel combustion - residual oil	SO2	0.01	0.01	0.01
17157	Randolph	2102005000	Industrial fuel combustion - residual oil	PM2.5	0.00	0.00	0.00
17157	Randolph	2102005000	Industrial fuel combustion - residual oil	VOM	0.00	0.00	0.00
17157	Randolph	2102006000	Industrial fuel combustion - natural gas	NOX	0.37	0.45	0.53
17157	Randolph	2102006000	Industrial fuel combustion - natural gas	NH3	0.01	0.01	0.02
17157	Randolph	2102006000	Industrial fuel combustion - natural gas	PM2.5	0.03	0.03	0.04
17157	Randolph	2102006000	Industrial fuel combustion - natural gas	VOM	0.02	0.02	0.03
17157	Randolph	2102006000	Industrial fuel combustion - natural gas	SO2	0.00	0.00	0.00
17157	Randolph	2103002000	Commercial/institutional fuel combustion - coal	NOX	0.00	0.00	0.00

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17157	Randolph	2103002000	Commercial/institutional fuel combustion - coal	PM2.5	0.00	0.00	0.00
17157	Randolph	2103002000	Commercial/institutional fuel combustion - coal	NH3	0.00	0.00	0.00
17157	Randolph	2103002000	Commercial/institutional fuel combustion - coal	VOM	0.00	0.00	0.00
17157	Randolph	2103002000	Commercial/institutional fuel combustion - coal	SO2	0.00	0.00	0.00
17157	Randolph	2103004000	Commercial/institutional fuel combustion - distillate oil	NH3	0.00	0.00	0.00
17157	Randolph	2103004000	Commercial/institutional fuel combustion - distillate oil	NOX	0.01	0.01	0.01
17157	Randolph	2103004000	Commercial/institutional fuel combustion - distillate oil	PM2.5	0.00	0.00	0.00
17157	Randolph	2103004000	Commercial/institutional fuel combustion - distillate oil	SO2	0.02	0.02	0.02
17157	Randolph	2103004000	Commercial/institutional fuel combustion - distillate oil	VOM	0.00	0.00	0.00
17157	Randolph	2103005000	Commercial/institutional fuel combustion - residual oil	NH3	0.00	0.00	0.00
17157	Randolph	2103005000	Commercial/institutional fuel combustion - residual oil	NOX	0.00	0.00	0.00
17157	Randolph	2103005000	Commercial/institutional fuel combustion - residual oil	PM2.5	0.00	0.00	0.00
17157	Randolph	2103005000	Commercial/institutional fuel combustion - residual oil	VOM	0.00	0.00	0.00
17157	Randolph	2103005000	Commercial/institutional fuel combustion - residual oil	SO2	0.00	0.00	0.00
17157	Randolph	2103006000	Commercial/institutional fuel combustion - natural gas	NOX	0.18	0.18	0.18
17157	Randolph	2103006000	Commercial/institutional fuel combustion - natural gas	NH3	0.00	0.00	0.00
17157	Randolph	2103006000	Commercial/institutional fuel combustion - natural gas	SO2	0.00	0.00	0.00
17157	Randolph	2103006000	Commercial/institutional fuel combustion - natural gas	PM2.5	0.01	0.01	0.01
17157	Randolph	2103006000	Commercial/institutional fuel combustion - natural gas	VOM	0.01	0.01	0.01
17157	Randolph	2103007000	Commercial/institutional fuel combustion - LPG	NOX	0.00	0.00	0.00
17157	Randolph	2103007000	Commercial/institutional fuel combustion - LPG	PM2.5	0.00	0.00	0.00
17157	Randolph	2103007000	Commercial/institutional fuel combustion - LPG	SO2	0.00	0.00	0.00
17157	Randolph	2103007000	Commercial/institutional fuel combustion - LPG	VOM	0.00	0.00	0.00
17157	Randolph	2103011000	Commercial/institutional fuel combustion - kerosene	NH3	0.00	0.00	0.00
17157	Randolph	2103011000	Commercial/institutional fuel combustion - kerosene	SO2	0.00	0.00	0.00
17157	Randolph	2103011000	Commercial/institutional fuel combustion - kerosene	NOX	0.00	0.00	0.00
17157	Randolph	2103011000	Commercial/institutional fuel combustion - kerosene	PM2.5	0.00	0.00	0.00
17157	Randolph	2103011000	Commercial/institutional fuel combustion - kerosene	VOM	0.00	0.00	0.00
17157	Randolph	2104002000	Residential fuel combustion - coal	NOX	0.00	0.00	0.00
17157	Randolph	2104002000	Residential fuel combustion - coal	PM2.5	0.00	0.00	0.00
17157	Randolph	2104002000	Residential fuel combustion - coal	VOM	0.00	0.00	0.00
17157	Randolph	2104002000	Residential fuel combustion - coal	SO2	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17157	Randolph	2104002000	Residential fuel combustion - coal	NH3	0.00	0.00	0.00
17157	Randolph	2104004000	Residential fuel combustion - distillate oil	SO2	0.02	0.02	0.02
17157	Randolph	2104004000	Residential fuel combustion - distillate oil	NOX	0.01	0.01	0.01
17157	Randolph	2104004000	Residential fuel combustion - distillate oil	PM2.5	0.00	0.00	0.00
17157	Randolph	2104004000	Residential fuel combustion - distillate oil	VOM	0.00	0.00	0.00
17157	Randolph	2104004000	Residential fuel combustion - distillate oil	NH3	0.00	0.00	0.00
17157	Randolph	2104006000	Residential fuel combustion - natural gas	NOX	0.52	0.54	0.56
17157	Randolph	2104006000	Residential fuel combustion - natural gas	PM2.5	0.00	0.00	0.00
17157	Randolph	2104006000	Residential fuel combustion - natural gas	SO2	0.00	0.00	0.00
17157	Randolph	2104006000	Residential fuel combustion - natural gas	VOM	0.03	0.03	0.03
17157	Randolph	2104006000	Residential fuel combustion - natural gas	NH3	0.11	0.12	0.12
17157	Randolph	2104007000	Residential fuel combustion - LPG	NOX	0.19	0.16	0.15
17157	Randolph	2104007000	Residential fuel combustion - LPG	SO2	0.00	0.00	0.00
17157	Randolph	2104007000	Residential fuel combustion - LPG	PM2.5	0.00	0.00	0.00
17157	Randolph	2104007000	Residential fuel combustion - LPG	VOM	0.01	0.01	0.01
17157	Randolph	2104007000	Residential fuel combustion - LPG	NH3	0.00	0.00	0.00
17157	Randolph	2104008100	Residential fuel combustion - wood - fireplaces	VOM	0.06	0.06	0.07
17157	Randolph	2104008100	Residential fuel combustion - wood - fireplaces	SO2	0.00	0.00	0.00
17157	Randolph	2104008100	Residential fuel combustion - wood - fireplaces	NH3	0.01	0.01	0.01
17157	Randolph	2104008100	Residential fuel combustion - wood - fireplaces	PM2.5	0.08	0.08	0.08
17157	Randolph	2104008100	Residential fuel combustion - wood - fireplaces	NOX	0.01	0.01	0.01
17157	Randolph	2104008210	Residential fuel combustion - wood - fireplaces	PM2.5	0.10	0.10	0.10
17157	Randolph	2104008210	Residential fuel combustion - wood - fireplaces	NH3	0.01	0.01	0.01
17157	Randolph	2104008210	Residential fuel combustion - wood - fireplaces	VOM	0.17	0.17	0.18
17157	Randolph	2104008210	Residential fuel combustion - wood - fireplaces	SO2	0.00	0.00	0.00
17157	Randolph	2104008210	Residential fuel combustion - wood - fireplaces	NOX	0.01	0.01	0.01
17157	Randolph	2104008220	Residential fuel combustion - wood - fireplaces	SO2	0.00	0.00	0.00
17157	Randolph	2104008220	Residential fuel combustion - wood - fireplaces	VOM	0.02	0.02	0.02
17157	Randolph	2104008220	Residential fuel combustion - wood - fireplaces	NOX	0.00	0.00	0.00
17157	Randolph	2104008220	Residential fuel combustion - wood - fireplaces	NH3	0.00	0.00	0.00
17157	Randolph	2104008220	Residential fuel combustion - wood - fireplaces	PM2.5	0.02	0.03	0.03
17157	Randolph	2104008230	Residential fuel combustion - wood - fireplaces	SO2	0.00	0.00	0.00

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17157	Randolph	2104008230	Residential fuel combustion - wood - fireplaces	VOM	0.01	0.01	0.01
17157	Randolph	2104008230	Residential fuel combustion - wood - fireplaces	NH3	0.00	0.00	0.00
17157	Randolph	2104008230	Residential fuel combustion - wood - fireplaces	PM2.5	0.01	0.01	0.01
17157	Randolph	2104008230	Residential fuel combustion - wood - fireplaces	NOX	0.00	0.00	0.00
17157	Randolph	2104008310	Residential fuel combustion - wood - wood stoves	NH3	0.01	0.01	0.01
17157	Randolph	2104008310	Residential fuel combustion - wood - wood stoves	VOM	0.25	0.26	0.27
17157	Randolph	2104008310	Residential fuel combustion - wood - wood stoves	SO2	0.00	0.00	0.00
17157	Randolph	2104008310	Residential fuel combustion - wood - wood stoves	PM2.5	0.15	0.15	0.15
17157	Randolph	2104008310	Residential fuel combustion - wood - wood stoves	NOX	0.01	0.01	0.01
17157	Randolph	2104008320	Residential fuel combustion - wood - wood stoves	VOM	0.01	0.01	0.01
17157	Randolph	2104008320	Residential fuel combustion - wood - wood stoves	NH3	0.00	0.00	0.00
17157	Randolph	2104008320	Residential fuel combustion - wood - wood stoves	NOX	0.00	0.00	0.00
17157	Randolph	2104008320	Residential fuel combustion - wood - wood stoves	SO2	0.00	0.00	0.00
17157	Randolph	2104008320	Residential fuel combustion - wood - wood stoves	PM2.5	0.02	0.02	0.02
17157	Randolph	2104008330	Residential fuel combustion - wood - wood stoves	NH3	0.00	0.00	0.00
17157	Randolph	2104008330	Residential fuel combustion - wood - wood stoves	PM2.5	0.00	0.00	0.00
17157	Randolph	2104008330	Residential fuel combustion - wood - wood stoves	VOM	0.00	0.00	0.00
17157	Randolph	2104008330	Residential fuel combustion - wood - wood stoves	NOX	0.00	0.00	0.00
17157	Randolph	2104008330	Residential fuel combustion - wood - wood stoves	SO2	0.00	0.00	0.00
17157	Randolph	2104008400	Residential fuel combustion - wood - wood stoves	NH3	0.00	0.00	0.00
17157	Randolph	2104008400	Residential fuel combustion - wood - wood stoves	PM2.5	0.00	0.00	0.00
17157	Randolph	2104008400	Residential fuel combustion - wood - wood stoves	VOM	0.00	0.00	0.00
17157	Randolph	2104008400	Residential fuel combustion - wood - wood stoves	NOX	0.00	0.00	0.00
17157	Randolph	2104008400	Residential fuel combustion - wood - wood stoves	SO2	0.00	0.00	0.00
17157	Randolph	2104008510	Residential fuel combustion - wood - furnace	NH3	0.03	0.03	0.03
17157	Randolph	2104008510	Residential fuel combustion - wood - furnace	NOX	0.03	0.03	0.03
17157	Randolph	2104008510	Residential fuel combustion - wood - furnace	VOM	0.17	0.18	0.18
17157	Randolph	2104008510	Residential fuel combustion - wood - furnace	PM2.5	0.41	0.42	0.43
17157	Randolph	2104008510	Residential fuel combustion - wood - furnace	SO2	0.03	0.03	0.03
17157	Randolph	2104008610	Residential fuel combustion - wood - hydronic heater	NH3	0.02	0.02	0.02
17157	Randolph	2104008610	Residential fuel combustion - wood - hydronic heater	SO2	0.02	0.02	0.02
17157	Randolph	2104008610	Residential fuel combustion - wood - hydronic heater	NOX	0.02	0.02	0.02

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17157	Randolph	2104008610	Residential fuel combustion - wood - hydronic heater	PM2.5	0.24	0.25	0.25
17157	Randolph	2104008610	Residential fuel combustion - wood - hydronic heater	VOM	0.10	0.10	0.11
17157	Randolph	2104009000	Residential fuel combustion - firelog	VOM	0.02	0.02	0.02
17157	Randolph	2104009000	Residential fuel combustion - firelog	PM2.5	0.01	0.01	0.01
17157	Randolph	2104009000	Residential fuel combustion - firelog	NOX	0.00	0.00	0.00
17157	Randolph	2104011000	Residential fuel combustion - kerosene	NOX	0.00	0.00	0.00
17157	Randolph	2104011000	Residential fuel combustion - kerosene	PM2.5	0.00	0.00	0.00
17157	Randolph	2104011000	Residential fuel combustion - kerosene	VOM	0.00	0.00	0.00
17157	Randolph	2104011000	Residential fuel combustion - kerosene	SO2	0.00	0.00	0.00
17157	Randolph	2104011000	Residential fuel combustion - kerosene	NH3	0.00	0.00	0.00
17157	Randolph	2294000000	Paved roads - fugitive dust	PM2.5	1.18	1.18	1.18
17157	Randolph	2296000000	Unpaved roads - fugitive dust	PM2.5	2.90	2.90	2.90
17157	Randolph	2302002100	Commercial cooking	PM2.5	0.01	0.01	0.01
17157	Randolph	2302002100	Commercial cooking	VOM	0.00	0.00	0.00
17157	Randolph	2302002200	Commercial cooking	PM2.5	0.08	0.09	0.10
17157	Randolph	2302002200	Commercial cooking	VOM	0.01	0.01	0.01
17157	Randolph	2302003000	Commercial cooking	VOM	0.00	0.00	0.00
17157	Randolph	2302003100	Commercial cooking	VOM	0.00	0.00	0.00
17157	Randolph	2302003100	Commercial cooking	PM2.5	0.02	0.02	0.02
17157	Randolph	2302003200	Commercial cooking	PM2.5	0.00	0.00	0.00
17157	Randolph	2302003200	Commercial cooking	VOM	0.00	0.00	0.00
17157	Randolph	2311010000	Construction - residential	PM2.5	0.01	0.02	0.02
17157	Randolph	2311020000	Construction - other	PM2.5	0.29	0.33	0.35
17157	Randolph	2311030000	Construction - roads	PM2.5	2.04	2.28	2.48
17157	Randolph	2401001000	Architectural coating	VOM	0.64	0.67	0.71
17157	Randolph	2401005000	Autobody refinishing	VOM	0.03	0.04	0.05
17157	Randolph	2401008000	Pavement markings	VOM	0.25	0.27	0.28
17157	Randolph	2401100000	Industrial coating - maintenance	VOM	0.14	0.18	0.21
17157	Randolph	2401200000	Industrial coating - other special purpose	VOM	0.00	0.00	0.00
17157	Randolph	2415005000	Solvent cleaning - SIC25	VOM	0.00	0.00	0.00
17157	Randolph	2415015000	Solvent cleaning - SIC33	VOM	0.09	0.12	0.14
17157	Randolph	2415020000	Solvent cleaning - SIC34	VOM	0.04	0.05	0.06

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17157	Randolph	2415025000	Solvent cleaning - SIC35	VOM	0.03	0.04	0.05
17157	Randolph	2415030000	Solvent cleaning - SIC36	VOM	0.00	0.00	0.00
17157	Randolph	2415035000	Solvent cleaning - SIC37	VOM	0.03	0.04	0.05
17157	Randolph	2415040000	Solvent cleaning - SIC38	VOM	0.00	0.00	0.00
17157	Randolph	2415045000	Solvent cleaning - SIC39	VOM	0.01	0.01	0.02
17157	Randolph	2420000370	Dry cleaning	VOM	0.00	0.00	0.00
17157	Randolph	2425000000	Graphic arts	VOM	1.48	1.69	1.86
17157	Randolph	2460100000	Consumer solvent user - personal products	VOM	0.40	0.42	0.44
17157	Randolph	2460200000	Consumer solvent user - household products	VOM	0.38	0.40	0.42
17157	Randolph	2460400000	Consumer solvent user - automotive	VOM	0.29	0.30	0.32
17157	Randolph	2460500000	Consumer solvent user - coatings	VOM	0.20	0.23	0.25
17157	Randolph	2460600000	Consumer solvent user - adhesives	VOM	0.12	0.14	0.15
17157	Randolph	2460800000	Consumer solvent user - fifra	VOM	0.38	0.43	0.47
17157	Randolph	2460900000	Consumer solvent user - miscellaneous	VOM	0.01	0.02	0.02
17157	Randolph	2461021000	Asphalt paving - cutback	VOM	4.07	4.72	5.26
17157	Randolph	2461022000	Asphalt paving - emulsified	VOM	0.43	0.49	0.55
17157	Randolph	2461850000	Ag pesticides	VOM	11.83	13.80	15.53
17157	Randolph	2501011011	Portable gas can emissions - residential	VOM	0.03	0.03	0.03
17157	Randolph	2501011012	Portable gas can emissions - residential	VOM	0.25	0.26	0.27
17157	Randolph	2501011013	Portable gas can emissions - residential	VOM	0.01	0.01	0.01
17157	Randolph	2501011014	Portable gas can emissions - residential	VOM	0.01	0.01	0.01
17157	Randolph	2501011015	Portable gas can emissions - residential	VOM	0.03	0.03	0.03
17157	Randolph	2501012011	Portable gas can emissions - commercial	VOM	0.00	0.00	0.00
17157	Randolph	2501012012	Portable gas can emissions - commercial	VOM	0.02	0.02	0.02
17157	Randolph	2501012013	Portable gas can emissions - commercial	VOM	0.01	0.01	0.01
17157	Randolph	2501012014	Portable gas can emissions - commercial	VOM	0.00	0.00	0.00
17157	Randolph	2501012015	Portable gas can emissions - commercial	VOM	0.00	0.00	0.00
17157	Randolph	2501060050	Gasoline marketing - Stage I	VOM	1.88	1.95	2.02
17157	Randolph	2501060100	Gasoline marketing - Stage II	VOM	1.35	1.40	1.45
17157	Randolph	2501060200	Gasoline marketing - Gasoline trucks	VOM	0.07	0.08	0.08
17157	Randolph	2501080050	Aircraft refueling	VOM	0.00	0.00	0.00
17157	Randolph	2501080100	Aircraft refueling	VOM	0.00	0.00	0.00

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17157	Randolph	2505020000	Marine vessels	VOM	8.47	9.99	11.28
17157	Randolph	2505030120	Gasoline marketing - Gasoline tanks	VOM	0.33	0.34	0.35
17157	Randolph	2601020000	Commercial/Institutional incineration	SO2	0.05	0.06	0.06
17157	Randolph	2601020000	Commercial/Institutional incineration	NOX	0.06	0.07	0.08
17157	Randolph	2601020000	Commercial/Institutional incineration	PM2.5	0.06	0.07	0.08
17157	Randolph	2601020000	Commercial/Institutional incineration	VOM	0.04	0.05	0.05
17157	Randolph	2610000100	Yard waste burning - leaves	NOX	0.00	0.00	0.00
17157	Randolph	2610000100	Yard waste burning - leaves	PM2.5	0.01	0.01	0.01
17157	Randolph	2610000100	Yard waste burning - leaves	VOM	0.01	0.01	0.01
17157	Randolph	2610000100	Yard waste burning - leaves	SO2	0.00	0.00	0.00
17157	Randolph	2610000400	Yard waste burning - brush	PM2.5	0.00	0.00	0.00
17157	Randolph	2610000400	Yard waste burning - brush	SO2	0.00	0.00	0.00
17157	Randolph	2610000400	Yard waste burning - brush	VOM	0.00	0.00	0.00
17157	Randolph	2610030000	Open burning - residential waste	NOX	0.03	0.04	0.04
17157	Randolph	2610030000	Open burning - residential waste	PM2.5	0.21	0.23	0.23
17157	Randolph	2610030000	Open burning - residential waste	SO2	0.01	0.01	0.01
17157	Randolph	2610030000	Open burning - residential waste	VOM	0.05	0.05	0.05
17157	Randolph	2630010000	Industrial waste water treatment	VOM	0.00	0.00	0.00
17157	Randolph	2630020000	Publicly owned treatment works	NH3	0.00	0.00	0.00
17157	Randolph	2630020000	Publicly owned treatment works	VOM	0.01	0.01	0.01
17157	Randolph	2801000003	Agricultural tilling	PM2.5	45.79	41.11	36.92
17157	Randolph	2801700001	Agricultural fertilizer	NH3	19.00	19.00	19.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700003	Agricultural fertilizer	NH3	16.92	16.92	16.92

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17157	Randolph	2801700004	Agricultural fertilizer	NH3	4.09	4.09	4.09
17157	Randolph	2801700005	Agricultural fertilizer	NH3	0.02	0.02	0.02
17157	Randolph	2801700006	Agricultural fertilizer	NH3	0.87	0.87	0.87
17157	Randolph	2801700007	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700010	Agricultural fertilizer	NH3	0.32	0.32	0.32
17157	Randolph	2801700011	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700012	Agricultural fertilizer	NH3	0.00	0.00	0.00
17157	Randolph	2801700013	Agricultural fertilizer	NH3	3.92	3.92	3.92
17157	Randolph	2801700014	Agricultural fertilizer	NH3	0.36	0.36	0.36
17157	Randolph	2801700015	Agricultural fertilizer	NH3	0.08	0.08	0.08
17157	Randolph	2801700099	Agricultural fertilizer	NH3	0.07	0.07	0.07
17157	Randolph	2805002000	Beef cows	NH3	3.00	3.00	3.00
17157	Randolph	2805018000	Dairy cows	NH3	0.94	0.94	0.94
17157	Randolph	2805025000	Hogs	NH3	2.22	2.22	2.22
17157	Randolph	2805030000	Chickens	NH3	1.80	1.80	1.80
17157	Randolph	2805030009	Turkeys	NH3	0.00	0.00	0.00
17157	Randolph	2805035000	Horses	NH3	0.19	0.19	0.19
17157	Randolph	2805040000	Sheep	NH3	0.05	0.05	0.05
17157	Randolph	2805045000	Goats	NH3	0.03	0.03	0.03
17157	Randolph	2810001000	Forest fires	NH3	0.00	0.00	0.00
17157	Randolph	2810001000	Forest fires	SO2	0.00	0.00	0.00
17157	Randolph	2810001000	Forest fires	NOX	0.00	0.00	0.00
17157	Randolph	2810001000	Forest fires	PM2.5	0.01	0.01	0.01
17157	Randolph	2810001000	Forest fires	VOM	0.00	0.00	0.00
17157	Randolph	2810015000	Prescribed burning	NOX	0.09	0.09	0.09
17157	Randolph	2810015000	Prescribed burning	PM2.5	0.37	0.37	0.37
17157	Randolph	2810015000	Prescribed burning	NH3	0.02	0.02	0.02
17157	Randolph	2810015000	Prescribed burning	SO2	0.03	0.03	0.03
17157	Randolph	2810015000	Prescribed burning	VOM	0.21	0.21	0.21
17157	Randolph	2810030000	Structure fires	VOM	0.01	0.01	0.00
17157	Randolph	2810030000	Structure fires	NOX	0.00	0.00	0.00
17157	Randolph	2810030000	Structure fires	PM2.5	0.01	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2102002000	Industrial fuel combustion - coal	SO2	0.00	0.00	0.00
17163	St. Clair	2102002000	Industrial fuel combustion - coal	NH3	0.00	0.00	0.00
17163	St. Clair	2102002000	Industrial fuel combustion - coal	NOX	0.00	0.00	0.00
17163	St. Clair	2102002000	Industrial fuel combustion - coal	PM2.5	0.00	0.00	0.00
17163	St. Clair	2102002000	Industrial fuel combustion - coal	VOM	0.00	0.00	0.00
17163	St. Clair	2102004000	Industrial fuel combustion - distillate oil	NOX	5.83	6.39	6.92
17163	St. Clair	2102004000	Industrial fuel combustion - distillate oil	PM2.5	0.38	0.41	0.45
17163	St. Clair	2102004000	Industrial fuel combustion - distillate oil	NH3	0.24	0.26	0.29
17163	St. Clair	2102004000	Industrial fuel combustion - distillate oil	SO2	11.42	12.49	13.54
17163	St. Clair	2102004000	Industrial fuel combustion - distillate oil	VOM	0.06	0.07	0.07
17163	St. Clair	2102005000	Industrial fuel combustion - residual oil	NOX	0.90	0.97	0.96
17163	St. Clair	2102005000	Industrial fuel combustion - residual oil	NH3	0.01	0.01	0.01
17163	St. Clair	2102005000	Industrial fuel combustion - residual oil	SO2	2.50	2.72	2.69
17163	St. Clair	2102005000	Industrial fuel combustion - residual oil	PM2.5	0.09	0.10	0.10
17163	St. Clair	2102005000	Industrial fuel combustion - residual oil	VOM	0.00	0.01	0.01
17163	St. Clair	2102006000	Industrial fuel combustion - natural gas	NOX	44.33	53.61	63.15
17163	St. Clair	2102006000	Industrial fuel combustion - natural gas	PM2.5	2.77	3.35	3.95
17163	St. Clair	2102006000	Industrial fuel combustion - natural gas	NH3	1.01	1.23	1.44
17163	St. Clair	2102006000	Industrial fuel combustion - natural gas	VOM	1.67	2.02	2.38
17163	St. Clair	2102006000	Industrial fuel combustion - natural gas	SO2	0.14	0.17	0.20
17163	St. Clair	2103002000	Commercial/institutional fuel combustion - coal	NOX	0.00	0.00	0.00
17163	St. Clair	2103002000	Commercial/institutional fuel combustion - coal	NH3	0.00	0.00	0.00
17163	St. Clair	2103002000	Commercial/institutional fuel combustion - coal	PM2.5	0.00	0.00	0.00
17163	St. Clair	2103002000	Commercial/institutional fuel combustion - coal	SO2	0.00	0.00	0.00
17163	St. Clair	2103002000	Commercial/institutional fuel combustion - coal	VOM	0.00	0.00	0.00
17163	St. Clair	2103004000	Commercial/institutional fuel combustion - distillate oil	NOX	9.74	9.25	8.49
17163	St. Clair	2103004000	Commercial/institutional fuel combustion - distillate oil	NH3	0.39	0.37	0.34
17163	St. Clair	2103004000	Commercial/institutional fuel combustion - distillate oil	PM2.5	1.04	0.99	0.90
17163	St. Clair	2103004000	Commercial/institutional fuel combustion - distillate oil	SO2	19.36	18.38	16.86
17163	St. Clair	2103004000	Commercial/institutional fuel combustion - distillate oil	VOM	0.17	0.16	0.14
17163	St. Clair	2103005000	Commercial/institutional fuel combustion - residual oil	NH3	0.00	0.00	0.00
17163	St. Clair	2103005000	Commercial/institutional fuel combustion - residual oil	NOX	0.02	0.02	0.02

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2103005000	Commercial/institutional fuel combustion - residual oil	PM2.5	0.00	0.00	0.00
17163	St. Clair	2103005000	Commercial/institutional fuel combustion - residual oil	VOM	0.00	0.00	0.00
17163	St. Clair	2103005000	Commercial/institutional fuel combustion - residual oil	SO2	0.25	0.26	0.26
17163	St. Clair	2103006000	Commercial/institutional fuel combustion - natural gas	NOX	165.30	170.92	169.46
17163	St. Clair	2103006000	Commercial/institutional fuel combustion - natural gas	NH3	0.56	0.58	0.58
17163	St. Clair	2103006000	Commercial/institutional fuel combustion - natural gas	SO2	1.00	1.03	1.02
17163	St. Clair	2103006000	Commercial/institutional fuel combustion - natural gas	PM2.5	12.51	12.93	12.82
17163	St. Clair	2103006000	Commercial/institutional fuel combustion - natural gas	VOM	9.14	9.45	9.37
17163	St. Clair	2103007000	Commercial/institutional fuel combustion - LPG	NOX	4.51	4.64	4.58
17163	St. Clair	2103007000	Commercial/institutional fuel combustion - LPG	PM2.5	0.01	0.01	0.01
17163	St. Clair	2103007000	Commercial/institutional fuel combustion - LPG	VOM	0.17	0.17	0.17
17163	St. Clair	2103007000	Commercial/institutional fuel combustion - LPG	SO2	0.02	0.02	0.02
17163	St. Clair	2103011000	Commercial/institutional fuel combustion - kerosene	NH3	0.00	0.00	0.00
17163	St. Clair	2103011000	Commercial/institutional fuel combustion - kerosene	SO2	0.00	0.00	0.00
17163	St. Clair	2103011000	Commercial/institutional fuel combustion - kerosene	NOX	0.00	0.00	0.00
17163	St. Clair	2103011000	Commercial/institutional fuel combustion - kerosene	PM2.5	0.00	0.00	0.00
17163	St. Clair	2103011000	Commercial/institutional fuel combustion - kerosene	VOM	0.00	0.00	0.00
17163	St. Clair	2104002000	Residential fuel combustion - coal	NOX	0.00	0.00	0.00
17163	St. Clair	2104002000	Residential fuel combustion - coal	PM2.5	0.00	0.00	0.00
17163	St. Clair	2104002000	Residential fuel combustion - coal	VOM	0.00	0.00	0.00
17163	St. Clair	2104002000	Residential fuel combustion - coal	SO2	0.00	0.00	0.00
17163	St. Clair	2104002000	Residential fuel combustion - coal	NH3	0.00	0.00	0.00
17163	St. Clair	2104004000	Residential fuel combustion - distillate oil	SO2	5.32	4.53	4.06
17163	St. Clair	2104004000	Residential fuel combustion - distillate oil	NOX	2.25	1.91	1.71
17163	St. Clair	2104004000	Residential fuel combustion - distillate oil	PM2.5	0.27	0.23	0.20
17163	St. Clair	2104004000	Residential fuel combustion - distillate oil	VOM	0.09	0.07	0.07
17163	St. Clair	2104004000	Residential fuel combustion - distillate oil	NH3	0.12	0.11	0.10
17163	St. Clair	2104006000	Residential fuel combustion - natural gas	SO2	2.70	2.80	2.89
17163	St. Clair	2104006000	Residential fuel combustion - natural gas	NOX	423.61	439.26	452.11
17163	St. Clair	2104006000	Residential fuel combustion - natural gas	PM2.5	1.94	2.01	2.07
17163	St. Clair	2104006000	Residential fuel combustion - natural gas	VOM	24.79	25.70	26.45
17163	St. Clair	2104006000	Residential fuel combustion - natural gas	NH3	90.13	93.46	96.19

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2104007000	Residential fuel combustion - LPG	NOX	35.15	30.11	27.45
17163	St. Clair	2104007000	Residential fuel combustion - LPG	SO2	0.15	0.13	0.12
17163	St. Clair	2104007000	Residential fuel combustion - LPG	PM2.5	0.10	0.09	0.08
17163	St. Clair	2104007000	Residential fuel combustion - LPG	VOM	1.36	1.17	1.07
17163	St. Clair	2104007000	Residential fuel combustion - LPG	NH3	0.12	0.10	0.09
17163	St. Clair	2104008100	Residential fuel combustion - wood - fireplaces	VOM	42.57	43.43	44.86
17163	St. Clair	2104008100	Residential fuel combustion - wood - fireplaces	SO2	0.90	0.92	0.95
17163	St. Clair	2104008100	Residential fuel combustion - wood - fireplaces	NH3	4.05	4.14	4.27
17163	St. Clair	2104008100	Residential fuel combustion - wood - fireplaces	PM2.5	53.16	54.23	56.02
17163	St. Clair	2104008100	Residential fuel combustion - wood - fireplaces	NOX	5.86	5.97	6.17
17163	St. Clair	2104008210	Residential fuel combustion - wood - fireplaces	PM2.5	66.80	68.14	70.39
17163	St. Clair	2104008210	Residential fuel combustion - wood - fireplaces	NH3	3.71	3.79	3.91
17163	St. Clair	2104008210	Residential fuel combustion - wood - fireplaces	VOM	115.71	118.02	121.92
17163	St. Clair	2104008210	Residential fuel combustion - wood - fireplaces	SO2	0.87	0.89	0.92
17163	St. Clair	2104008210	Residential fuel combustion - wood - fireplaces	NOX	6.11	6.24	6.44
17163	St. Clair	2104008220	Residential fuel combustion - wood - fireplaces	SO2	0.28	0.29	0.30
17163	St. Clair	2104008220	Residential fuel combustion - wood - fireplaces	VOM	8.41	8.58	8.86
17163	St. Clair	2104008220	Residential fuel combustion - wood - fireplaces	NOX	1.60	1.63	1.68
17163	St. Clair	2104008220	Residential fuel combustion - wood - fireplaces	NH3	0.63	0.64	0.66
17163	St. Clair	2104008220	Residential fuel combustion - wood - fireplaces	PM2.5	13.73	14.01	14.47
17163	St. Clair	2104008230	Residential fuel combustion - wood - fireplaces	SO2	0.09	0.10	0.10
17163	St. Clair	2104008230	Residential fuel combustion - wood - fireplaces	VOM	3.51	3.58	3.70
17163	St. Clair	2104008230	Residential fuel combustion - wood - fireplaces	NH3	0.21	0.21	0.22
17163	St. Clair	2104008230	Residential fuel combustion - wood - fireplaces	PM2.5	4.77	4.87	5.03
17163	St. Clair	2104008230	Residential fuel combustion - wood - fireplaces	NOX	0.47	0.48	0.49
17163	St. Clair	2104008310	Residential fuel combustion - wood - wood stoves	NH3	3.36	3.42	3.54
17163	St. Clair	2104008310	Residential fuel combustion - wood - wood stoves	VOM	104.62	106.72	110.24
17163	St. Clair	2104008310	Residential fuel combustion - wood - wood stoves	SO2	0.79	0.81	0.83
17163	St. Clair	2104008310	Residential fuel combustion - wood - wood stoves	PM2.5	60.41	61.62	63.65
17163	St. Clair	2104008310	Residential fuel combustion - wood - wood stoves	NOX	5.53	5.64	5.82
17163	St. Clair	2104008320	Residential fuel combustion - wood - wood stoves	VOM	7.60	7.75	8.01
17163	St. Clair	2104008320	Residential fuel combustion - wood - wood stoves	NH3	0.57	0.58	0.60

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2104008320	Residential fuel combustion - wood - wood stoves	NOX	1.44	1.47	1.52
17163	St. Clair	2104008320	Residential fuel combustion - wood - wood stoves	SO2	0.25	0.26	0.27
17163	St. Clair	2104008320	Residential fuel combustion - wood - wood stoves	PM2.5	12.41	12.66	13.08
17163	St. Clair	2104008330	Residential fuel combustion - wood - wood stoves	NH3	0.19	0.19	0.20
17163	St. Clair	2104008330	Residential fuel combustion - wood - wood stoves	PM2.5	4.30	4.38	4.53
17163	St. Clair	2104008330	Residential fuel combustion - wood - wood stoves	VOM	3.16	3.22	3.33
17163	St. Clair	2104008330	Residential fuel combustion - wood - wood stoves	NOX	0.42	0.43	0.44
17163	St. Clair	2104008330	Residential fuel combustion - wood - wood stoves	SO2	0.08	0.09	0.09
17163	St. Clair	2104008400	Residential fuel combustion - wood - wood stoves	NH3	0.19	0.19	0.20
17163	St. Clair	2104008400	Residential fuel combustion - wood - wood stoves	PM2.5	1.89	1.93	1.99
17163	St. Clair	2104008400	Residential fuel combustion - wood - wood stoves	VOM	0.03	0.03	0.03
17163	St. Clair	2104008400	Residential fuel combustion - wood - wood stoves	NOX	2.35	2.40	2.48
17163	St. Clair	2104008400	Residential fuel combustion - wood - wood stoves	SO2	0.20	0.20	0.21
17163	St. Clair	2104008510	Residential fuel combustion - wood - furnace	NH3	13.37	13.64	14.09
17163	St. Clair	2104008510	Residential fuel combustion - wood - furnace	NOX	13.37	13.64	14.09
17163	St. Clair	2104008510	Residential fuel combustion - wood - furnace	VOM	86.91	88.65	91.57
17163	St. Clair	2104008510	Residential fuel combustion - wood - furnace	PM2.5	205.01	209.12	216.02
17163	St. Clair	2104008510	Residential fuel combustion - wood - furnace	SO2	15.08	15.38	15.89
17163	St. Clair	2104008610	Residential fuel combustion - wood - hydronic heater	NH3	8.80	8.98	9.28
17163	St. Clair	2104008610	Residential fuel combustion - wood - hydronic heater	SO2	9.93	10.13	10.46
17163	St. Clair	2104008610	Residential fuel combustion - wood - hydronic heater	NOX	8.80	8.98	9.28
17163	St. Clair	2104008610	Residential fuel combustion - wood - hydronic heater	PM2.5	134.99	137.69	142.24
17163	St. Clair	2104008610	Residential fuel combustion - wood - hydronic heater	VOM	57.22	58.37	60.30
17163	St. Clair	2104009000	Residential fuel combustion - firelog	VOM	12.00	12.24	12.65
17163	St. Clair	2104009000	Residential fuel combustion - firelog	PM2.5	8.62	8.79	9.08
17163	St. Clair	2104009000	Residential fuel combustion - firelog	NOX	2.33	2.38	2.46
17163	St. Clair	2104011000	Residential fuel combustion - kerosene	NOX	0.28	0.30	0.32
17163	St. Clair	2104011000	Residential fuel combustion - kerosene	PM2.5	0.03	0.04	0.04
17163	St. Clair	2104011000	Residential fuel combustion - kerosene	VOM	0.01	0.01	0.01
17163	St. Clair	2104011000	Residential fuel combustion - kerosene	SO2	0.66	0.72	0.76
17163	St. Clair	2104011000	Residential fuel combustion - kerosene	NH3	0.02	0.02	0.02
17163	St. Clair	2294000000	Paved roads - fugitive dust	PM2.5	204.34	204.34	204.34

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17163	St. Clair	2296000000	Unpaved roads - fugitive dust	PM2.5	258.21	258.21	258.21
17163	St. Clair	2302002100	Commercial cooking	PM2.5	6.33	7.23	7.97
17163	St. Clair	2302002100	Commercial cooking	VOM	1.58	1.81	1.99
17163	St. Clair	2302002200	Commercial cooking	PM2.5	44.79	51.14	56.38
17163	St. Clair	2302002200	Commercial cooking	VOM	5.44	6.21	6.85
17163	St. Clair	2302003000	Commercial cooking	VOM	1.65	1.89	2.08
17163	St. Clair	2302003100	Commercial cooking	VOM	0.78	0.89	0.98
17163	St. Clair	2302003100	Commercial cooking	PM2.5	10.27	11.73	12.93
17163	St. Clair	2302003200	Commercial cooking	PM2.5	0.78	0.89	0.98
17163	St. Clair	2302003200	Commercial cooking	VOM	0.03	0.03	0.04
17163	St. Clair	2311010000	Construction - residential	PM2.5	4.31	4.82	5.24
17163	St. Clair	2311020000	Construction - other	PM2.5	61.37	68.64	74.69
17163	St. Clair	2311030000	Construction - roads	PM2.5	296.69	331.81	361.10
17163	St. Clair	2401001000	Architectural coating	VOM	364.72	386.35	406.82
17163	St. Clair	2401005000	Autobody refinishing	VOM	3.36	4.48	5.64
17163	St. Clair	2401008000	Pavement markings	VOM	12.65	13.40	14.11
17163	St. Clair	2401100000	Industrial coating - maintenance	VOM	81.94	103.25	119.85
17163	St. Clair	2401200000	Industrial coating - other special purpose	VOM	0.92	0.97	1.02
17163	St. Clair	2415005000	Solvent cleaning - SIC25	VOM	0.69	0.92	1.09
17163	St. Clair	2415015000	Solvent cleaning - SIC33	VOM	0.00	0.00	0.00
17163	St. Clair	2415020000	Solvent cleaning - SIC34	VOM	1.03	1.36	1.62
17163	St. Clair	2415025000	Solvent cleaning - SIC35	VOM	6.41	8.48	10.01
17163	St. Clair	2415030000	Solvent cleaning - SIC36	VOM	6.78	8.96	10.63
17163	St. Clair	2415035000	Solvent cleaning - SIC37	VOM	0.09	0.12	0.14
17163	St. Clair	2415040000	Solvent cleaning - SIC38	VOM	1.70	2.24	2.65
17163	St. Clair	2415045000	Solvent cleaning - SIC39	VOM	3.55	4.68	5.56
17163	St. Clair	2420000370	Dry cleaning	VOM	13.67	15.72	17.19
17163	St. Clair	2425000000	Graphic arts	VOM	342.53	390.14	429.67
17163	St. Clair	2460100000	Consumer solvent user - personal products	VOM	231.48	243.05	252.76
17163	St. Clair	2460200000	Consumer solvent user - household products	VOM	219.30	230.26	239.46
17163	St. Clair	2460400000	Consumer solvent user - automotive	VOM	165.69	173.97	180.92
17163	St. Clair	2460500000	Consumer solvent user - coatings	VOM	115.74	131.62	145.60

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2460600000	Consumer solvent user - adhesives	VOM	69.45	79.28	85.13
17163	St. Clair	2460800000	Consumer solvent user - fifra	VOM	216.86	247.57	271.15
17163	St. Clair	2460900000	Consumer solvent user - miscellaneous	VOM	8.53	9.74	10.45
17163	St. Clair	2461021000	Asphalt paving - cutback	VOM	103.26	119.80	133.42
17163	St. Clair	2461022000	Asphalt paving - emulsified	VOM	10.80	12.52	13.95
17163	St. Clair	2461850000	Ag pesticides	VOM	203.89	237.86	267.57
17163	St. Clair	2501011011	Portable gas can emissions - residential	VOM	17.65	18.13	18.57
17163	St. Clair	2501011012	Portable gas can emissions - residential	VOM	153.37	157.56	161.38
17163	St. Clair	2501011013	Portable gas can emissions - residential	VOM	8.30	8.53	8.74
17163	St. Clair	2501011014	Portable gas can emissions - residential	VOM	5.61	5.77	5.91
17163	St. Clair	2501011015	Portable gas can emissions - residential	VOM	16.84	17.30	17.72
17163	St. Clair	2501012011	Portable gas can emissions - commercial	VOM	1.04	1.07	1.09
17163	St. Clair	2501012012	Portable gas can emissions - commercial	VOM	13.49	13.86	14.20
17163	St. Clair	2501012013	Portable gas can emissions - commercial	VOM	6.75	6.93	7.10
17163	St. Clair	2501012014	Portable gas can emissions - commercial	VOM	0.36	0.37	0.37
17163	St. Clair	2501012015	Portable gas can emissions - commercial	VOM	1.07	1.10	1.12
17163	St. Clair	2501060050	Gasoline marketing - Stage I	VOM	50.31	52.18	53.97
17163	St. Clair	2501060100	Gasoline marketing - Stage II	VOM	211.95	219.81	227.33
17163	St. Clair	2501060200	Gasoline marketing - Gasoline trucks	VOM	11.99	12.44	12.86
17163	St. Clair	2501080050	Aircraft refueling	VOM	4.95	7.67	8.31
17163	St. Clair	2501080100	Aircraft refueling	VOM	67.70	105.02	113.74
17163	St. Clair	2505020000	Marine vessels	VOM	6.97	8.22	9.28
17163	St. Clair	2505030120	Gasoline marketing - Gasoline tanks	VOM	2.70	2.80	2.90
17163	St. Clair	2601020000	Commercial/Institutional incineration	SO2	28.36	32.90	36.64
17163	St. Clair	2601020000	Commercial/Institutional incineration	NOX	0.00	0.00	0.00
17163	St. Clair	2601020000	Commercial/Institutional incineration	PM2.5	36.72	42.60	47.44
17163	St. Clair	2601020000	Commercial/Institutional incineration	VOM	22.10	25.64	28.56
17163	St. Clair	2610000100	Yard waste burning - leaves	NOX	0.00	0.00	0.00
17163	St. Clair	2610000100	Yard waste burning - leaves	PM2.5	0.00	0.00	0.00
17163	St. Clair	2610000100	Yard waste burning - leaves	VOM	0.00	0.00	0.00
17163	St. Clair	2610000100	Yard waste burning - leaves	SO2	0.00	0.00	0.00
17163	St. Clair	2610000400	Yard waste burning - brush	PM2.5	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2610000400	Yard waste burning - brush	SO2	0.00	0.00	0.00
17163	St. Clair	2610000400	Yard waste burning - brush	VOM	0.00	0.00	0.00
17163	St. Clair	2610030000	Open burning - residential waste	NOX	14.49	15.22	15.32
17163	St. Clair	2610030000	Open burning - residential waste	PM2.5	91.78	96.36	97.03
17163	St. Clair	2610030000	Open burning - residential waste	SO2	2.42	2.54	2.55
17163	St. Clair	2610030000	Open burning - residential waste	VOM	20.67	21.71	21.86
17163	St. Clair	2630010000	Industrial waste water treatment	VOM	35.90	45.24	52.51
17163	St. Clair	2630020000	Publicly owned treatment works	NH3	1.14	1.35	1.51
17163	St. Clair	2630020000	Publicly owned treatment works	VOM	5.75	6.77	7.62
17163	St. Clair	2801000003	Agricultural tilling	PM2.5	759.85	682.13	612.67
17163	St. Clair	2801700001	Agricultural fertilizer	NH3	305.48	305.48	305.48
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700002	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700003	Agricultural fertilizer	NH3	272.11	272.11	272.11
17163	St. Clair	2801700004	Agricultural fertilizer	NH3	65.74	65.74	65.74
17163	St. Clair	2801700005	Agricultural fertilizer	NH3	0.36	0.36	0.36
17163	St. Clair	2801700006	Agricultural fertilizer	NH3	14.01	14.01	14.01
17163	St. Clair	2801700007	Agricultural fertilizer	NH3	0.07	0.07	0.07
17163	St. Clair	2801700010	Agricultural fertilizer	NH3	5.07	5.07	5.07
17163	St. Clair	2801700011	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700012	Agricultural fertilizer	NH3	0.00	0.00	0.00
17163	St. Clair	2801700013	Agricultural fertilizer	NH3	63.06	63.06	63.06
17163	St. Clair	2801700014	Agricultural fertilizer	NH3	5.82	5.82	5.82
17163	St. Clair	2801700015	Agricultural fertilizer	NH3	1.22	1.22	1.22
17163	St. Clair	2801700099	Agricultural fertilizer	NH3	1.18	1.18	1.18

FIPS	County	SCC	Category	Pollutant	2008	2017	2025
17163	St. Clair	2805002000	Beef cows	NH3	48.14	48.14	48.14
17163	St. Clair	2805018000	Dairy cows	NH3	13.96	13.96	13.96
17163	St. Clair	2805025000	Hogs	NH3	209.46	209.46	209.46
17163	St. Clair	2805030000	Chickens	NH3	43.26	43.26	43.26
17163	St. Clair	2805030009	Turkeys	NH3	0.09	0.09	0.09
17163	St. Clair	2805035000	Horses	NH3	17.20	17.20	17.20
17163	St. Clair	2805040000	Sheep	NH3	1.10	1.10	1.10
17163	St. Clair	2805045000	Goats	NH3	0.48	0.48	0.48
17163	St. Clair	2810001000	Forest fires	NH3	0.00	0.00	0.00
17163	St. Clair	2810001000	Forest fires	SO2	0.00	0.00	0.00
17163	St. Clair	2810001000	Forest fires	NOX	0.01	0.01	0.01
17163	St. Clair	2810001000	Forest fires	PM2.5	0.06	0.06	0.06
17163	St. Clair	2810001000	Forest fires	VOM	0.03	0.03	0.03
17163	St. Clair	2810015000	Prescribed burning	NOX	0.04	0.04	0.04
17163	St. Clair	2810015000	Prescribed burning	PM2.5	0.16	0.16	0.16
17163	St. Clair	2810015000	Prescribed burning	VOM	0.09	0.09	0.09
17163	St. Clair	2810015000	Prescribed burning	NH3	0.01	0.01	0.01
17163	St. Clair	2810015000	Prescribed burning	SO2	0.01	0.01	0.01
17163	St. Clair	2810030000	Structure fires	VOM	7.41	6.29	5.46
17163	St. Clair	2810030000	Structure fires	NOX	0.94	0.80	0.69
17163	St. Clair	2810030000	Structure fires	PM2.5	6.60	5.60	4.86

Appendix F-4 Illinois On-Road Mobile Source Emissions for 2002, 2008, 2017, and 2022

The Illinois on-road mobile source emissions for 2002 were based on actual activity levels and were developed using Mobile 6. These 2002 emissions were obtained from the Illinois Base Year Particulate Matter and Haze Inventory for 2002.

On September 24, 2013, Illinois EPA provided the Air Program with 2008 on-road mobile emissions inventories, which were developed using Mobile 6 for each county in their portion of the nonattainment area. Table F-9 displays both the 2002 and 2008 on-road mobile source emissions inventory for 2002 and 2008, which were both developed using Mobile 6. In order to provide a useful comparison of 2002 emissions to 2008, two different versions of the on-road mobile source emissions inventory were developed. The version of the 2008 on-road emissions listed in Table F-9 is the version developed using Mobile 6. This provides a useful comparison to the nonattainment base year in the plan (2002), where the mobile source emissions were also developed using Mobile 6.

However, in 2010 EPA released the motor vehicle emissions simulator (MOVES), which is a completely different model than Mobile 6, and reflects EPA's more current understanding of mobile source emissions. Therefore, for the maintenance demonstration in the plan, a second version of the 2008 on-road mobile source emissions inventory was developed using MOVES. This allows for a smooth transition to the newer mobile model that must now be used when developing SIPs and transportation conformity determinations. The on-road mobile source emissions inventories for the future years of 2017 and 2025 were also developed using MOVES. Tables F-10 displays the on-road mobile source emissions summaries for 2008, 2017, and 2025, which were developed by Illinois EPA using MOVES, and provided to the Air Program on November 8, 2013.

Table F-9 On-Road Mobile Source Emissions Summaries for the Illinois Portion of the Nonattainment Area in 2002 and 2008 (Developed using Mobile 6)

County Name	Year	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	2002	280.65	7,877.35	156.48	296.47	3,859.66
Monroe		34.15	976.75	19.04	36.08	521.51
St. Clair		267.83	7,519.49	149.34	282.93	3,683.91
Randolph		0.55	16.31	0.31	0.59	10.19
2002 Totals		**583.18**	**16,389.90**	**325.17**	**616.07**	**8,075.27**
Madison	2008	284.9	5656.45	107.45	28.61	2653.63
Monroe		36.2	745.39	13.65	3.64	358.63
St. Clair		267.55	5312.91	100.92	26.87	2492.26
Randolph		1.41	28.21	0.53	0.14	14.88
2008 Totals		**590.06**	**11,742.96**	**222.55**	**59.26**	**5,519.40**

Table F-10 On-Road Mobile Source Emissions Summaries for the Illinois Portion of the Nonattainment Area in 2008, 2017, and 2025 (Developed Using MOVES)

Area	Year	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Illinois Metro East Nonattainment Area*	2008	250.58	15,012.94	577.99	116.76	5,069.55
	2017	186.79	5,623.42	231.68	49.31	2,364.85
	2025	178.80	3,616.52	181.73	49.15	1,592.92

*Note: MOVES based on-road mobile sources were calculated for the entire Illinois portion of the nonattainment area; therefore, county-level emissions are not provided.

Illinois EPA modeled the Metro-East St. Louis nonattainment area with U.S. EPA's MOVES2010b and the October 30, 2012 default database (movesdb20131030) supplemented with the following input data:

1. The Metro-East St. Louis nonattainment area was treated as a single county: St. Clair. The VMT data for Madison, Monroe, St. Clair counties and Baldwin Township have been included in the input data and treated as St. Clair County for MOVES modeling.

2. Table F-11 provides a brief description of the Illinois test program as used in MOVES. Beginning February 1, 2012 Illinois discontinued testing vehicles with the idle/gas cap test and exempted heavy-duty vehicles not equipped with an OBD-II system.

Table F-11 Illinois Inspection and Maintenance Program

Test Year	Model Year Range	Light-Duty Vehicle	Light-Duty Trucks (8,500 lbs. and less GVWR)	Heavy-Duty Trucks (Between 8,501 and 14,000 lbs. GVWR)	Heavy-Duty Trucks (> 14,000 lbs. GVWR)
2008	1996 - 2004	OBD	OBD	Idle w/Gas Cap	Idle w/Gas Cap
2017	1996 - 2006	OBD	OBD	Exempt	Exempt
	2007 – 2013	OBD	OBD	OBD	Exempt
2025	1996 – 2006	OBD	OBD	Exempt	Exempt
	2007 - 2021	OBD	OBD	OBD	Exempt

3. Table F-12 provides a brief description of the MOVES input data and their sources. MOVES default data was used where Illinois data was not available or was unable to provide better data. For example, the ramp data in the road type table is the MOVES default data since the Illinois Department of Transportation (IDOT) does not provide information regarding traffic on ramps.

Table F-12 Illinois MOVES Input Tables with Descriptions and Data Source Information

MOVES Table	Description	Data Source
Ramp Fraction	Provide the fraction of ramp driving time on selected road types.	Used MOVES default data.
Road Type Distribution	Provides data about vehicle miles traveled by road type for the domain being modeled (East St. Louis nonattainment area: Madison, Monroe, St. Clair Counties with Randolph County's Baldwin Township).	Actual VMT data for 2008 was obtained from Illinois Department of Transportation (IDOT). VMT data for 2017 and 2025 was estimated using IDOT's 2012 actual VMT data with a 1.5% annual growth rate.
Vehicle Type VMT	Provides data about annual vehicle miles traveled and the monthly, type of day, and hourly VMT fractions.	
Source Type Population	Provides data about the number of vehicles in the geographic area to be modeled for each vehicle type.	Source type population is estimated based VMT estimates for a particular source type and ratio of default population to VMT by source type. See MOVES technical guidance Manual for this calculation.
Age Distribution	Provides data about the distribution of vehicle counts by age for each calendar year and vehicle type.	Registration data, obtained from the Illinois Secretary of State (SOS), is used to estimate the age distribution where data about a vehicle type is available. This data is only updated once every five years and was last updated in 2008. MOVES default age distributions are used where information about the vehicle type is not provided in the registration data.

MOVES Table	Description	Data Source
Average Speed Distribution	Allows the user to input average speed data specific to vehicle type, road type and time of day/type of day. Used USEPA's AvgSpeedDistribution worksheet of average speed conversion spreadsheet.	Mobile 6.2 speed data for Illinois was entered into the conversion spreasheet as urban data while existing rural speed data in the conversion spreadsheet was used in the MOVES model.
Fuel Supply	Provides data about the associated market share for existing fuels.	Market share ratios for the East St. Louis nonattainment area were estimated based on the weighted average VMT associated with each county in the nonattainment area.
Fuel Formulation	Provides data about the fuel formulation for each fuel type listed in the fuel supply table.	MOVES default fuel formulations were used.
Meteorilogical Data	Provides temperature and humidity data for months, zones, counties, and hours.	Actaul 2008 and 30 year averageAverage meteorological data was obtained from the National Weather Service (NWS) at Lambert International Airport.
I/M Program	Provides information describing inspection and maintenance programs.	Refer to table 1 which describes the Illinois I/M program by calendar year.

4. Annual emissions for NH_3, NO_X, $PM_{2.5}$ total, $PM_{2.5}$ break wear, $PM_{2.5}$ tire wear, SO_2 and VOC are shown in the Tables F-13, F-14, and F-15 for the calendar years 2008, 2017 and 2025, respectively, and are broken out by MOVES source type.

Table F-13 Illinois Metro-East Nonattainment Area 2008 Annual Emissions by Vehicle Type

Metro East Nonattainment Area for 2008							
Type of Vehicle	Emissions (Ton per Year)						
	NH3	NOx	PM2.5 Brakewear	PM2.5 Tirewear	PM2.5 Total Exh	SO2	VOC
Combination Long-haul Truck	4.24	3,280.99	4.47	0.86	155.60	12.31	260.13
Combination Short-haul Truck	4.86	2,711.30	4.82	0.92	145.45	12.78	127.07
Intercity Bus	0.27	175.01	0.44	0.06	10.48	0.65	8.39
Light Commercial Truck	30.82	1,691.50	5.60	1.30	45.66	14.50	730.57
Motor Home	0.11	21.13	0.06	0.01	0.59	0.13	5.79
Motorcycle	1.28	25.48	0.01	0.03	1.50	0.39	69.12
Passenger Car	106.94	2,415.42	9.96	3.58	45.32	30.09	1,611.14
Passenger Truck	99.40	3,991.62	16.48	3.71	66.62	42.28	2,161.11
Refuse Truck	0.05	21.33	0.04	0.01	1.18	0.10	1.17
School Bus	0.24	92.52	0.29	0.05	5.22	0.35	11.15
Single Unit Long-haul Truck	0.15	35.59	0.10	0.02	1.58	0.19	5.43
Single Unit Short-haul Truck	2.16	509.69	1.49	0.24	22.02	2.85	76.02
Transit Bus	0.07	41.35	0.06	0.01	2.14	0.14	2.47
Total Emissions (Tons per Year)	250.58	15,012.94	43.83	10.79	503.37	116.76	5,069.55

Table F-14 Illinois Metro-East Nonattainment Area 2017 Annual Emissions by Vehicle Type

Metro-East Nonattainment Area for 2017							
Type of Vehicle	Emissions (Tons per Year)						
	NH3	NOx	PM2.5 Brakewear	PM2.5 Tirewear	PM2.5 Total Exh	SO2	VOC
Combination Long-haul Truck	3.58	1,125.01	4.01	0.73	28.49	2.35	97.37
Combination Short-haul Truck	4.09	544.76	4.23	0.77	22.78	2.42	28.58
Intercity Bus	0.60	126.13	0.87	0.14	6.41	0.33	6.36
Light Commercial Truck	21.45	735.49	5.64	1.33	19.01	5.73	301.05
Motor Home	0.13	12.90	0.06	0.01	0.24	0.05	3.26
Motorcycle	2.02	25.53	0.02	0.03	1.89	0.24	71.51
Passenger Car	88.11	1,165.95	14.38	5.19	39.81	19.11	975.76
Passenger Truck	63.34	1,540.40	16.97	3.85	41.11	17.72	829.48
Refuse Truck	0.05	6.23	0.06	0.01	0.26	0.03	0.40
School Bus	0.55	80.97	0.62	0.12	3.76	0.20	9.07
Single Unit Long-haul Truck	0.18	15.60	0.12	0.02	0.39	0.07	2.70
Single Unit Short-haul Truck	2.53	216.84	1.75	0.28	4.89	0.98	37.29
Transit Bus	0.16	27.61	0.12	0.02	1.31	0.08	1.99
Total Emissions (Tons per Year)	186.79	5,623.42	48.84	12.51	170.33	49.31	2,364.85

Table F-15 Illinois Metro-East Nonattainment Area 2025 Annual Emissions by Vehicle Type

Metro-East Nonattainment Area for 2025							
Type of Vehicle	Emissions (Tons per year)						
	NH3	NOx	PM2.5 Brakewear	PM2.5 Tirewear	PM2.5 Total Exh	SO2	VOC
Combination Long-haul Truck	5.07	922.88	4.50	0.82	8.49	2.56	76.50
Combination Short-haul Truck	4.59	310.40	4.74	0.86	6.83	2.64	12.36
Intercity Bus	0.67	61.17	0.98	0.15	2.25	0.35	2.69
Light Commercial Truck	21.45	503.02	6.32	1.49	13.40	5.64	194.12
Motor Home	0.14	10.68	0.07	0.01	0.10	0.06	2.52
Motorcycle	2.31	28.10	0.02	0.04	2.12	0.27	78.52
Passenger Car	78.94	557.54	16.11	5.82	37.55	19.02	662.26
Passenger Truck	61.73	973.09	19.01	4.32	38.65	17.12	527.30
Refuse Truck	0.06	3.76	0.06	0.01	0.08	0.03	0.23
School Bus	0.62	44.95	0.69	0.13	1.30	0.22	4.69
Single Unit Long-haul Truck	0.20	12.06	0.14	0.02	0.13	0.07	2.02
Single Unit Short-haul Truck	2.84	174.69	1.96	0.31	1.67	1.08	28.87
Transit Bus	0.18	14.19	0.13	0.03	0.42	0.08	0.84
Total Emissions (Tons per Year)	178.80	3,616.52	54.72	14.02	112.99	49.15	1,592.92

Appendix F-5 Illinois Off-Road Mobile Source Emissions for 2002, 2008, 2017, and 2022

The off-road emissions inventories for the Illinois portion of the St. Louis nonattainment area included in this plan were provided by Illinois EPA. The Illinois off-road emissions inventories included in this plan include off-road emissions calculated with EPA's NONROAD model, emissions from commercial marine vessels, emissions from locomotives, and emissions from aircraft takeoffs and launches. The 2002 off-road emissions were obtained from the Illinois Base Year Particulate Matter and Haze Inventory for 2002. Illinois provided the 2008 off-road mobile source emissions inventory to the Air Program on September 25, 2013. The 2008 emissions are based on actual levels.

The 2017 and 2025 inventories for off-road categories other than rail, marine, and aircraft were calculated via NONROAD. Illinois provided the emissions calculated via NONROAD for 2017 and 2025 to the Air Program on September 25, 2013. The rail marine and aircraft emissions were grown using EGAS 4.0 growth factors. Because EGAS 4.0 does not include growth factors beyond 2020, the annual growth fact from 2019 to 2020 was used as the annual growth factor between 2020 and 2025. In addition to projecting the aircraft emissions in Illinois via EGAS 4.0, Illinois also included additional growth for the Mid-America airport as it is currently under-utilized and it is possible that additional air traffic could increase at this airport if new business comes to the airport. Daily emissions for this airport in 2017 and 2025 were projected to allow for 1.0 tons/day NO_X, 0.99 tons/day VOC, 0.0566 tons/day $PM_{2.5}$, and 0.0959 tons/day SO_2. Illinois provided the rail, marine, and aircraft emissions for 2017 and 2025 to the Air Program on September 26, 2013.

Table F-16 displays the total off-road emission inventory summaries with NONROAD emissions, rail emissions, marine emissions, and aircraft emissions combined. Table F-17 displays the NONROAD, air, rail, and locomotive emissions inventory for 2002, which were obtained from the Illinois Base Year Particulate Matter and Haze Inventory for 2002. Table F-18 displays the emissions developed with NONROAD for 2008, 2017, and 2025. Table F-19 displays the rail, locomotive, and aircraft emissions by SCC for 2008, 2017, and 2025.

Table F-16 Total Off-Road Emissions Inventory Summaries for the Illinois Portion of the St. Louis Nonattainment Area for 2002, 2008, 2017, and 2025

County Name	Year	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	2002	2.04	3,547.88	177.83	189.38	1,436.56
Monroe		1.02	1,972.23	74.87	133.93	213.41
St. Clair		0.92	1,582.33	124.36	50.23	1,104.78
Randolph		0.15	308.85	15.52	20.74	86.27
2002 Totals		**4.13**	**7,411.29**	**392.58**	**394.28**	**2,841.02**
Madison	2008	1.49	4,258.14	204.59	179.7	1,503.89
Monroe		0.8	1,843.81	73.06	72.99	393.45
St. Clair		0.47	2,112.84	138.98	34.41	990.2
Randolph		0.13	260.45	9.08	13.62	85.23
2008 Totals		**2.89**	**8,475.24**	**425.71**	**300.72**	**2,972.77**
Madison	2017	1.78	4,110.74	166.09	212.27	986.41
Monroe		0.96	2,048.86	67.78	86.63	249.67
St. Clair		0.57	2,211.33	127.54	75.73	1,013.21
Randolph		0.15	302.82	8.87	16.16	54.14
2017 Totals		**3.46**	**8,673.75**	**370.28**	**390.79**	**2,303.43**
Madison	2025	2.03	4,272.16	145.45	239.99	840.06
Monroe		1.12	2,254.51	67.33	98.35	207.63
St. Clair		0.67	2,164.93	109.38	81.37	953.88
Randolph		0.17	336.43	9.04	18.31	35.53
2025 Totals		**3.99**	**9,028.03**	**331.20**	**438.02**	**2,037.10**

Table F-17 2002 Emissions Inventory Summaries for NONROAD, Rail, Marine, and Aircraft for the Illinois Portion of the St. Louis Nonattainment Area

County Name	Category	NH_3	NO_X	$PM_{2.5}$-Pri	SO_2	VOC
Madison	NONROAD	0.90	1,574.24	129.30	24.58	1,368.55
Monroe		0.13	311.05	33.70	5.32	155.37
St. Clair		0.71	1,179.56	108.66	19.97	1,040.98
Randolph		0.01	14.30	2.09	0.26	24.55
NONROAD Totals		**1.75**	**3,079.15**	**273.75**	**50.13**	**2,589.45**
Madison	Rail	0.03	78.20	1.84	5.01	3.00
Monroe		0.47	973.87	25.19	68.25	40.83
St. Clair		0.04	88.52	2.26	5.85	3.97
Randolph		0.06	121.12	3.13	8.43	5.12
Rail Totals		**0.61**	**1,261.72**	**32.42**	**87.54**	**52.92**
Madison	Marine	1.11	1,882.92	40.43	159.51	41.65
Monroe		0.42	687.01	15.29	60.33	15.75
St. Clair		0.17	274.80	6.12	24.13	6.30
Randolph		0.08	133.98	2.98	11.77	3.07
Marine Totals		**1.78**	**2,978.71**	**64.82**	**255.74**	**66.77**
Madison	Aircraft	-	12.52	6.26	0.28	23.36
Monroe		-	0.30	0.69	0.03	1.46
St. Clair		-	39.45	7.32	0.28	53.53
Randolph		-	39.45	7.32	0.28	53.53
Aircraft Totals		**-**	**91.71**	**21.58**	**0.87**	**131.87**
Total 2002 Off-Road Emissions		**4.13**	**7,411.29**	**392.58**	**394.28**	**2,841.02**

Table F-18 Emissions Inventory from NONROAD by Category for the Illinois Portion of the St. Louis Nonattainment Area in 2008, 2017, and 2025

FIPS	County	Category	Pollutant	Emissions (tons/year)		
				2008	2017	2025
17119	Madison	Agricultural Equipment	NOX	387.39	257.80	149.28
17119	Madison	Agricultural Equipment	PM2.5	35.61	19.43	9.33
17119	Madison	Agricultural Equipment	SO2	0.34	0.36	0.37
17119	Madison	Agricultural Equipment	VOM	45.99	28.34	20.67
17119	Madison	Airport Equipment	NOX	0.12	0.03	0.01
17119	Madison	Airport Equipment	PM2.5	0.01	0.00	0.00
17119	Madison	Airport Equipment	SO2	0.00	0.00	0.00
17119	Madison	Airport Equipment	VOM	0.01	0.00	0.00
17119	Madison	Commercial Equipment	NOX	86.49	62.30	51.64
17119	Madison	Commercial Equipment	PM2.5	6.59	5.28	4.22
17119	Madison	Commercial Equipment	SO2	0.14	0.16	0.19
17119	Madison	Commercial Equipment	VOM	106.80	70.06	70.60
17119	Madison	Construction and Mining Equipment	NOX	662.80	363.82	204.20
17119	Madison	Construction and Mining Equipment	PM2.5	55.39	31.81	14.12
17119	Madison	Construction and Mining Equipment	SO2	0.68	0.69	0.71
17119	Madison	Construction and Mining Equipment	VOM	95.84	63.25	52.85
17119	Madison	Industrial Equipment	NOX	302.08	103.57	89.24
17119	Madison	Industrial Equipment	PM2.5	10.68	5.16	3.42
17119	Madison	Industrial Equipment	SO2	0.14	0.13	0.14
17119	Madison	Industrial Equipment	VOM	76.16	14.24	11.03
17119	Madison	Lawn and Garden Equipment (Com)	NOX	39.00	27.02	26.71
17119	Madison	Lawn and Garden Equipment (Com)	PM2.5	8.52	9.39	10.26
17119	Madison	Lawn and Garden Equipment (Com)	SO2	0.11	0.14	0.15
17119	Madison	Lawn and Garden Equipment (Com)	VOM	150.41	122.99	136.18
17119	Madison	Lawn and Garden Equipment (Res)	NOX	29.22	17.42	17.65
17119	Madison	Lawn and Garden Equipment (Res)	PM2.5	4.40	5.02	5.62
17119	Madison	Lawn and Garden Equipment (Res)	SO2	0.12	0.14	0.16
17119	Madison	Lawn and Garden Equipment (Res)	VOM	224.05	139.76	144.23
17119	Madison	Logging Equipment	NOX	0.97	0.26	0.09
17119	Madison	Logging Equipment	PM2.5	0.11	0.07	0.07
17119	Madison	Logging Equipment	SO2	0.00	0.00	0.00
17119	Madison	Logging Equipment	VOM	0.51	0.54	0.61
17119	Madison	Pleasure Craft	NOX	60.38	63.36	58.56
17119	Madison	Pleasure Craft	PM2.5	6.24	2.57	1.30
17119	Madison	Pleasure Craft	SO2	0.55	0.66	0.75
17119	Madison	Pleasure Craft	VOM	387.28	181.75	97.03
17119	Madison	Railroad Equipment	NOX	3.52	2.61	1.67
17119	Madison	Railroad Equipment	PM2.5	0.42	0.29	0.17
17119	Madison	Railroad Equipment	SO2	0.00	0.00	0.00
17119	Madison	Railroad Equipment	VOM	0.79	0.52	0.37
17119	Madison	Recreational Equipment	NOX	14.76	12.60	12.22
17119	Madison	Recreational Equipment	PM2.5	9.22	6.23	4.41
17119	Madison	Recreational Equipment	SO2	0.07	0.09	0.10
17119	Madison	Recreational Equipment	VOM	313.08	242.30	166.87
17133	Monroe	Agricultural Equipment	NOX	210.76	140.26	81.21
17133	Monroe	Agricultural Equipment	PM2.5	19.37	10.57	5.08
17133	Monroe	Agricultural Equipment	SO2	0.19	0.20	0.20
17133	Monroe	Agricultural Equipment	VOM	25.02	15.42	11.25
17133	Monroe	Airport Equipment	NOX	0.00	0.00	0.00
17133	Monroe	Airport Equipment	PM2.5	0.00	0.00	0.00
17133	Monroe	Airport Equipment	SO2	0.00	0.00	0.00
17133	Monroe	Airport Equipment	VOM	0.00	0.00	0.00
17133	Monroe	Commercial Equipment	NOX	8.71	6.28	5.20
17133	Monroe	Commercial Equipment	PM2.5	0.66	0.53	0.43

FIPS	County	Category	Pollutant	Emissions (tons/year)		
				2008	2017	2025
17133	Monroe	Commercial Equipment	SO2	0.01	0.02	0.02
17133	Monroe	Commercial Equipment	VOM	10.76	7.06	7.11
17133	Monroe	Construction and Mining Equipment	NOX	77.35	42.46	23.83
17133	Monroe	Construction and Mining Equipment	PM2.5	6.46	3.71	1.65
17133	Monroe	Construction and Mining Equipment	SO2	0.08	0.08	0.08
17133	Monroe	Construction and Mining Equipment	VOM	11.18	7.38	6.17
17133	Monroe	Industrial Equipment	NOX	12.23	5.94	5.48
17133	Monroe	Industrial Equipment	PM2.5	0.59	0.27	0.14
17133	Monroe	Industrial Equipment	SO2	0.01	0.01	0.01
17133	Monroe	Industrial Equipment	VOM	2.64	0.84	0.75
17133	Monroe	Lawn and Garden Equipment (Com)	NOX	5.78	4.01	3.96
17133	Monroe	Lawn and Garden Equipment (Com)	PM2.5	1.26	1.39	1.52
17133	Monroe	Lawn and Garden Equipment (Com)	SO2	0.02	0.02	0.02
17133	Monroe	Lawn and Garden Equipment (Com)	VOM	22.31	18.25	20.20
17133	Monroe	Lawn and Garden Equipment (Res)	NOX	2.96	1.77	1.79
17133	Monroe	Lawn and Garden Equipment (Res)	PM2.5	0.45	0.51	0.57
17133	Monroe	Lawn and Garden Equipment (Res)	SO2	0.01	0.01	0.02
17133	Monroe	Lawn and Garden Equipment (Res)	VOM	22.73	14.18	14.63
17133	Monroe	Logging Equipment	NOX	1.17	0.32	0.11
17133	Monroe	Logging Equipment	PM2.5	0.13	0.08	0.08
17133	Monroe	Logging Equipment	SO2	0.00	0.00	0.00
17133	Monroe	Logging Equipment	VOM	0.61	0.66	0.74
17133	Monroe	Pleasure Craft	NOX	36.23	38.02	35.14
17133	Monroe	Pleasure Craft	PM2.5	3.74	1.54	0.78
17133	Monroe	Pleasure Craft	SO2	0.33	0.39	0.45
17133	Monroe	Pleasure Craft	VOM	232.37	109.05	58.22
17133	Monroe	Railroad Equipment	NOX	2.00	1.48	0.95
17133	Monroe	Railroad Equipment	PM2.5	0.24	0.17	0.10
17133	Monroe	Railroad Equipment	SO2	0.00	0.00	0.00
17133	Monroe	Railroad Equipment	VOM	0.45	0.29	0.21
17133	Monroe	Recreational Equipment	NOX	1.87	0.97	1.03
17133	Monroe	Recreational Equipment	PM2.5	0.06	0.06	0.07
17133	Monroe	Recreational Equipment	SO2	0.01	0.01	0.01
17133	Monroe	Recreational Equipment	VOM	5.54	3.61	3.53
17157	Randolph	Agricultural Equipment	NOX	19.11	13.68	7.92
17157	Randolph	Agricultural Equipment	PM2.5	1.76	1.03	0.50
17157	Randolph	Agricultural Equipment	SO2	0.02	0.02	0.02
17157	Randolph	Agricultural Equipment	VOM	2.27	1.50	1.10
17157	Randolph	Airport Equipment	NOX	0.00	0.00	0.00
17157	Randolph	Airport Equipment	PM2.5	0.00	0.00	0.00
17157	Randolph	Airport Equipment	SO2	0.00	0.00	0.00
17157	Randolph	Airport Equipment	VOM	0.00	0.00	0.00
17157	Randolph	Commercial Equipment	NOX	0.12	0.09	0.07
17157	Randolph	Commercial Equipment	PM2.5	0.01	0.01	0.01
17157	Randolph	Commercial Equipment	SO2	0.00	0.00	0.00
17157	Randolph	Commercial Equipment	VOM	0.15	0.10	0.10
17157	Randolph	Construction and Mining Equipment	NOX	3.27	2.46	2.06
17157	Randolph	Construction and Mining Equipment	PM2.5	0.35	0.24	0.18
17157	Randolph	Construction and Mining Equipment	SO2	0.00	0.00	0.00
17157	Randolph	Construction and Mining Equipment	VOM	0.59	0.44	0.40
17157	Randolph	Industrial Equipment	NOX	0.57	0.20	0.17
17157	Randolph	Industrial Equipment	PM2.5	0.02	0.01	0.01
17157	Randolph	Industrial Equipment	SO2	0.00	0.00	0.00
17157	Randolph	Industrial Equipment	VOM	0.14	0.03	0.02
17157	Randolph	Lawn and Garden Equipment (Com)	NOX	0.02	0.01	0.01
17157	Randolph	Lawn and Garden Equipment (Com)	PM2.5	0.00	0.00	0.00

FIPS	County	Category	Pollutant	Emissions (tons/year)		
				2008	2017	2025
17157	Randolph	Lawn and Garden Equipment (Com)	SO2	0.00	0.00	0.00
17157	Randolph	Lawn and Garden Equipment (Com)	VOM	0.06	0.05	0.06
17157	Randolph	Lawn and Garden Equipment (Res)	NOX	0.05	0.03	0.03
17157	Randolph	Lawn and Garden Equipment (Res)	PM2.5	0.01	0.01	0.01
17157	Randolph	Lawn and Garden Equipment (Res)	SO2	0.00	0.00	0.00
17157	Randolph	Lawn and Garden Equipment (Res)	VOM	0.38	0.24	0.24
17157	Randolph	Logging Equipment	NOX	0.00	0.00	0.00
17157	Randolph	Logging Equipment	PM2.5	0.00	0.00	0.00
17157	Randolph	Logging Equipment	SO2	0.00	0.00	0.00
17157	Randolph	Logging Equipment	VOM	0.00	0.00	0.00
17157	Randolph	Pleasure Craft	NOX	11.87	14.52	13.41
17157	Randolph	Pleasure Craft	PM2.5	1.16	0.59	0.30
17157	Randolph	Pleasure Craft	SO2	0.10	0.15	0.17
17157	Randolph	Pleasure Craft	VOM	72.92	41.64	22.23
17157	Randolph	Railroad Equipment	NOX	0.28	0.23	0.15
17157	Randolph	Railroad Equipment	PM2.5	0.03	0.03	0.02
17157	Randolph	Railroad Equipment	SO2	0.00	0.00	0.00
17157	Randolph	Railroad Equipment	VOM	0.06	0.05	0.03
17157	Randolph	Recreational Equipment	NOX	0.05	0.04	0.04
17157	Randolph	Recreational Equipment	PM2.5	0.03	0.02	0.02
17157	Randolph	Recreational Equipment	SO2	0.00	0.00	0.00
17157	Randolph	Recreational Equipment	VOM	1.08	0.85	0.58
17163	St. Clair	Agricultural Equipment	NOX	376.57	250.60	145.11
17163	St. Clair	Agricultural Equipment	PM2.5	34.61	18.89	9.07
17163	St. Clair	Agricultural Equipment	SO2	0.33	0.35	0.36
17163	St. Clair	Agricultural Equipment	VOM	44.70	27.54	20.10
17163	St. Clair	Airport Equipment	NOX	1.06	0.33	0.14
17163	St. Clair	Airport Equipment	PM2.5	0.07	0.02	0.01
17163	St. Clair	Airport Equipment	SO2	0.00	0.00	0.00
17163	St. Clair	Airport Equipment	VOM	0.10	0.03	0.03
17163	St. Clair	Commercial Equipment	NOX	55.69	40.12	33.25
17163	St. Clair	Commercial Equipment	PM2.5	4.24	3.40	2.72
17163	St. Clair	Commercial Equipment	SO2	0.09	0.11	0.12
17163	St. Clair	Commercial Equipment	VOM	68.77	45.11	45.46
17163	St. Clair	Construction and Mining Equipment	NOX	488.07	267.91	150.37
17163	St. Clair	Construction and Mining Equipment	PM2.5	40.78	23.42	10.40
17163	St. Clair	Construction and Mining Equipment	SO2	0.50	0.51	0.52
17163	St. Clair	Construction and Mining Equipment	VOM	70.57	46.58	38.92
17163	St. Clair	Industrial Equipment	NOX	151.78	61.28	56.66
17163	St. Clair	Industrial Equipment	PM2.5	6.28	2.92	1.77
17163	St. Clair	Industrial Equipment	SO2	0.08	0.08	0.08
17163	St. Clair	Industrial Equipment	VOM	35.15	7.30	5.86
17163	St. Clair	Lawn and Garden Equipment (Com)	NOX	35.78	24.79	24.51
17163	St. Clair	Lawn and Garden Equipment (Com)	PM2.5	7.82	8.62	9.41
17163	St. Clair	Lawn and Garden Equipment (Com)	SO2	0.10	0.12	0.14
17163	St. Clair	Lawn and Garden Equipment (Com)	VOM	138.01	112.86	124.96
17163	St. Clair	Lawn and Garden Equipment (Res)	NOX	28.06	16.73	16.94
17163	St. Clair	Lawn and Garden Equipment (Res)	PM2.5	4.23	4.82	5.40
17163	St. Clair	Lawn and Garden Equipment (Res)	SO2	0.11	0.13	0.15
17163	St. Clair	Lawn and Garden Equipment (Res)	VOM	215.11	134.18	138.48
17163	St. Clair	Logging Equipment	NOX	0.75	0.20	0.07
17163	St. Clair	Logging Equipment	PM2.5	0.08	0.05	0.05
17163	St. Clair	Logging Equipment	SO2	0.00	0.00	0.00
17163	St. Clair	Logging Equipment	VOM	0.39	0.42	0.47
17163	St. Clair	Pleasure Craft	NOX	39.25	41.19	38.06
17163	St. Clair	Pleasure Craft	PM2.5	4.05	1.67	0.85

FIPS	County	Category	Pollutant	Emissions (tons/year)		
				2008	2017	2025
17163	St. Clair	Pleasure Craft	SO2	0.36	0.43	0.49
17163	St. Clair	Pleasure Craft	VOM	251.73	118.14	63.07
17163	St. Clair	Railroad Equipment	NOX	3.80	2.81	1.80
17163	St. Clair	Railroad Equipment	PM2.5	0.46	0.32	0.19
17163	St. Clair	Railroad Equipment	SO2	0.00	0.00	0.00
17163	St. Clair	Railroad Equipment	VOM	0.86	0.56	0.40
17163	St. Clair	Recreational Equipment	NOX	7.42	5.09	5.11
17163	St. Clair	Recreational Equipment	PM2.5	2.42	1.68	1.24
17163	St. Clair	Recreational Equipment	SO2	0.03	0.04	0.04
17163	St. Clair	Recreational Equipment	VOM	89.36	67.80	48.77

Table F-19 Rail, Marine, and Aircraft Emissions Inventory by SCC for the Illinois Portion of the St. Louis Nonattainment Area in 2008, 2017, and 2025

FIPS	County	Id Number	Point	SCC	Category	Pollutant	Emissions (tons/year)		
							2008	2017	2025
17157	Randolph	LOCO		2285002006	Locomotives - Class I	NOX	81.01	101.61	120.71
17119	Madison	LOCO		2285002006	Locomotives - Class I	NOX	651.62	817.39	970.97
17133	Monroe	LOCO		2285002006	Locomotives - Class I	NOX	750.31	941.19	1,118.04
17163	St. Clair	LOCO		2285002006	Locomotives - Class I	NOX	599.97	752.61	894.02
17157	Randolph	LOCO		2285002006	Locomotives - Class I	VOM	4.28	5.36	6.37
17119	Madison	LOCO		2285002006	Locomotives - Class I	VOM	35.01	43.92	52.17
17133	Monroe	LOCO		2285002006	Locomotives - Class I	VOM	39.61	49.68	59.02
17163	St. Clair	LOCO		2285002006	Locomotives - Class I	VOM	32.12	40.29	47.87
17119	Madison	LOCO		2285002006	Locomotives - Class I	PM2.5	20.52	25.75	30.58
17133	Monroe	LOCO		2285002006	Locomotives - Class I	PM2.5	23.26	29.18	34.66
17163	St. Clair	LOCO		2285002006	Locomotives - Class I	PM2.5	18.83	23.63	28.06
17157	Randolph	LOCO		2285002006	Locomotives - Class I	SO2	0.84	1.06	1.26
17157	Randolph	LOCO		2285002006	Locomotives - Class I	PM2.5	2.51	3.15	3.74
17119	Madison	LOCO		2285002007	Locomotives - Class II/III	PM2.5	0.14	0.17	0.20
17133	Monroe	LOCO		2285002007	Locomotives - Class II/III	PM2.5	0.00	0.00	0.00
17163	St. Clair	LOCO		2285002007	Locomotives - Class II/III	PM2.5	0.59	0.74	0.88
17119	Madison	LOCO		2285002006	Locomotives - Class I	SO2	6.81	8.54	10.14
17133	Monroe	LOCO		2285002006	Locomotives - Class I	SO2	7.82	9.81	11.66
17163	St. Clair	LOCO		2285002006	Locomotives - Class I	SO2	6.26	7.85	9.33
17119	Madison	LOCO		2285002006	Locomotives - Class I	NH3	0.30	0.38	0.45
17133	Monroe	LOCO		2285002006	Locomotives - Class I	NH3	0.35	0.43	0.52
17157	Randolph	LOCO		2285002006	Locomotives - Class I	NH3	0.04	0.05	0.06
17163	St. Clair	LOCO		2285002006	Locomotives - Class I	NH3	0.28	0.35	0.41
17157	Randolph	LOCO		2285002007	Locomotives - Class II/III	NOX	0.00	0.00	0.00
17119	Madison	LOCO		2285002007	Locomotives - Class II/III	NOX	6.01	7.54	8.96
17133	Monroe	LOCO		2285002007	Locomotives - Class II/III	NOX	0.00	0.00	0.00
17163	St. Clair	LOCO		2285002007	Locomotives - Class II/III	NOX	26.14	32.79	38.95
17157	Randolph	LOCO		2285002007	Locomotives - Class II/III	VOM	0.00	0.00	0.00
17119	Madison	LOCO		2285002007	Locomotives - Class II/III	VOM	0.23	0.29	0.35
17133	Monroe	LOCO		2285002007	Locomotives - Class II/III	VOM	0.00	0.00	0.00
17163	St. Clair	LOCO		2285002007	Locomotives - Class II/III	VOM	1.02	1.27	1.51
17157	Randolph	LOCO		2285002007	Locomotives - Class II/III	PM2.5	0.00	0.00	0.00
17157	Randolph	LOCO		2285002007	Locomotives - Class II/III	SO2	0.00	0.00	0.00
17119	Madison	LOCO		2285002007	Locomotives - Class II/III	SO2	0.04	0.05	0.06
17133	Monroe	LOCO		2285002007	Locomotives - Class II/III	SO2	0.00	0.00	0.00
17163	St. Clair	LOCO		2285002007	Locomotives - Class II/III	SO2	0.18	0.23	0.27
17119	Madison	LOCO		2285002007	Locomotives - Class II/III	NH3	0.00	0.00	0.00
17133	Monroe	LOCO		2285002007	Locomotives - Class II/III	NH3	0.00	0.00	0.00
17157	Randolph	LOCO		2285002007	Locomotives - Class II/III	NH3	0.00	0.00	0.00
17163	St. Clair	LOCO		2285002007	Locomotives - Class II/III	NH3	0.01	0.01	0.01
17119	Madison	CMV		2280002100	Commercial marine vessels	NH3	1.19	1.40	1.58
17119	Madison	CMV		2280002100	Commercial marine vessels	NOX	2,012.36	2,373.44	2,679.26
17119	Madison	CMV		2280002100	Commercial marine vessels	PM2.5	43.21	50.97	57.53
17119	Madison	CMV		2280002100	Commercial marine vessels	SO2	170.48	201.06	226.97
17119	Madison	CMV		2280002100	Commercial marine vessels	VOM	44.51	52.50	59.26
17133	Monroe	CMV		2280002100	Commercial marine vessels	NH3	0.45	0.53	0.60
17133	Monroe	CMV		2280002100	Commercial marine vessels	NOX	734.24	865.98	977.57
17133	Monroe	CMV		2280002100	Commercial marine vessels	PM2.5	16.34	19.27	21.76
17133	Monroe	CMV		2280002100	Commercial marine vessels	SO2	64.48	76.05	85.85
17133	Monroe	CMV		2280002100	Commercial marine vessels	VOM	16.84	19.86	22.42
17163	St. Clair	CMV		2280002100	Commercial marine vessels	NH3	0.18	0.21	0.24
17163	St. Clair	CMV		2280002100	Commercial marine vessels	NOX	293.69	346.39	391.02
17163	St. Clair	CMV		2280002100	Commercial marine vessels	PM2.5	6.54	7.71	8.71
17163	St. Clair	CMV		2280002100	Commercial marine vessels	SO2	25.79	30.42	34.34

FIPS	County	Id Number	Point	SCC	Category	Pollutant	Emissions (tons/year)		
							2008	2017	2025
17163	St. Clair	CMV		2280002100	Commercial marine vessels	VOM	6.73	7.94	8.96
17157	Randolph	CMV		2280002100	Commercial marine vessels	NH3	0.09	0.10	0.11
17157	Randolph	CMV		2280002100	Commercial marine vessels	NOX	144.09	169.95	191.85
17157	Randolph	CMV		2280002100	Commercial marine vessels	PM2.5	3.20	3.78	4.27
17157	Randolph	CMV		2280002100	Commercial marine vessels	SO2	12.66	14.93	16.85
17157	Randolph	CMV		2280002100	Commercial marine vessels	VOM	3.30	3.89	4.40
17119	Madison	ALN	AT-Turbine	2275060012	Aircraft - Air Taxi	NOX	0.01	0.01	0.01
17119	Madison	ALN	AT-Turbine	2275060012	Aircraft - Air Taxi	SO2	0.00	0.00	0.00
17119	Madison	3K6	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.01	0.01	0.01
17119	Madison	3K6	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.06	0.06	0.06
17119	Madison	3K6	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.16	0.16	0.16
17119	Madison	3K6	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	3.95	3.95	3.95
17119	Madison	ALN	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.04	0.05	0.05
17119	Madison	ALN	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.28	0.32	0.35
17119	Madison	ALN	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.70	0.81	0.88
17119	Madison	ALN	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	17.23	19.97	21.85
17119	Madison	H07	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17119	Madison	H07	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.03	0.03	0.03
17119	Madison	H07	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.07	0.07	0.07
17119	Madison	H07	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	1.69	1.69	1.69
17133	Monroe	H49	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.01	0.01	0.01
17133	Monroe	H49	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.05	0.05	0.05
17133	Monroe	H49	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.14	0.14	0.14
17133	Monroe	H49	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	3.39	3.39	3.39
17163	St. Clair	BLV	AT-Turbine	2275060012	Aircraft - Air Taxi	NOX	0.00	0.00	0.00
17163	St. Clair	BLV	AT-Turbine	2275060012	Aircraft - Air Taxi	SO2	0.00	0.00	0.00
17163	St. Clair	BLV	AT-Turbine	2275060012	Aircraft - Air Taxi	PM2.5	0.00	0.00	0.00
17163	St. Clair	BLV	AT-Turbine	2275060012	Aircraft - Air Taxi	VOM	0.00	0.00	0.00
17119	Madison	ALN	COM	2275020000	Aircraft - Commercial	SO2	0.00	0.00	0.00
17119	Madison	ALN	COM	2275020000	Aircraft - Commercial	PM2.5	0.00	0.00	0.00
17119	Madison	ALN	COM	2275020000	Aircraft - Commercial	NOX	0.01	0.01	0.01
17119	Madison	ALN	COM	2275020000	Aircraft - Commercial	VOM	0.00	0.00	0.00
17119	Madison	ALN	MIL	2275001000	Aircraft - Military	PM2.5	0.13	0.13	0.13
17119	Madison	ALN	MIL	2275001000	Aircraft - Military	SO2	0.00	0.00	0.00
17119	Madison	ALN	MIL	2275001000	Aircraft - Military	NOX	0.05	0.05	0.05
17119	Madison	ALN	MIL	2275001000	Aircraft - Military	VOM	0.00	0.00	0.00
17163	St. Clair	BLV	COM	2275020000	Aircraft - Commercial	SO2	0.17	35.01	35.01
17163	St. Clair	BLV	COM	2275020000	Aircraft - Commercial	PM2.5	0.10	20.66	20.66
17163	St. Clair	BLV	COM	2275020000	Aircraft - Commercial	NOX	1.75	365.00	365.00
17163	St. Clair	BLV	COM	2275020000	Aircraft - Commercial	VOM	0.55	361.35	361.35
17163	St. Clair	BLV	MIL	2275001000	Aircraft - Military	PM2.5	0.00	0.00	0.00
17163	St. Clair	BLV	MIL	2275001000	Aircraft - Military	SO2	0.00	0.00	0.00
17163	St. Clair	BLV	MIL	2275001000	Aircraft - Military	NOX	0.00	0.00	0.00
17163	St. Clair	BLV	MIL	2275001000	Aircraft - Military	VOM	0.00	0.00	0.00
17163	St. Clair	CPS	COM	2275020000	Aircraft - Commercial	SO2	0.00	0.00	0.00
17163	St. Clair	CPS	COM	2275020000	Aircraft - Commercial	PM2.5	0.00	0.00	0.00
17163	St. Clair	CPS	COM	2275020000	Aircraft - Commercial	NOX	0.00	0.00	0.00
17163	St. Clair	CPS	COM	2275020000	Aircraft - Commercial	VOM	0.00	0.00	0.00
17163	St. Clair	CPS	MIL	2275001000	Aircraft - Military	PM2.5	0.05	0.05	0.05
17163	St. Clair	CPS	MIL	2275001000	Aircraft - Military	SO2	0.00	0.00	0.00
17163	St. Clair	CPS	MIL	2275001000	Aircraft - Military	NOX	0.02	0.02	0.02
17163	St. Clair	CPS	MIL	2275001000	Aircraft - Military	VOM	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	COM	2275020000	Aircraft - Commercial	SO2	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	COM	2275020000	Aircraft - Commercial	PM2.5	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	COM	2275020000	Aircraft - Commercial	NOX	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	COM	2275020000	Aircraft - Commercial	VOM	0.00	0.00	0.00

FIPS	County	Id Number	Point	SCC	Category	Pollutant	Emissions (tons/year)		
							2008	2017	2025
17163	St. Clair	SCOTT AFB	MIL	2275001000	Aircraft - Military	PM2.5	1.76	1.76	1.76
17163	St. Clair	SCOTT AFB	MIL	2275001000	Aircraft - Military	SO2	0.06	0.06	0.06
17163	St. Clair	SCOTT AFB	MIL	2275001000	Aircraft - Military	NOX	0.67	0.67	0.67
17163	St. Clair	SCOTT AFB	MIL	2275001000	Aircraft - Military	VOM	0.00	0.00	0.00
17119	Madison	ALN	AT-Piston	2275060011	Aircraft - Air Taxi	SO2	0.00	0.00	0.00
17119	Madison	ALN	AT-Piston	2275060011	Aircraft - Air Taxi	NOX	0.03	0.03	0.03
17119	Madison	ALN	AT-Piston	2275060011	Aircraft - Air Taxi	VOM	0.00	0.00	0.00
17119	Madison	ALN	AT-Piston	2275060011	Aircraft - Air Taxi	PM2.5	0.08	0.08	0.08
17163	St. Clair	BLV	AT-Piston	2275060011	Aircraft - Air Taxi	SO2	0.00	0.00	0.00
17163	St. Clair	BLV	AT-Piston	2275060011	Aircraft - Air Taxi	NOX	0.00	0.00	0.00
17163	St. Clair	BLV	AT-Piston	2275060011	Aircraft - Air Taxi	VOM	0.00	0.00	0.00
17163	St. Clair	BLV	AT-Piston	2275060011	Aircraft - Air Taxi	PM2.5	0.00	0.00	0.00
17163	St. Clair	CPS	AT-Piston	2275060011	Aircraft - Air Taxi	SO2	0.05	0.05	0.06
17163	St. Clair	CPS	AT-Piston	2275060011	Aircraft - Air Taxi	NOX	0.49	0.55	0.62
17163	St. Clair	CPS	AT-Piston	2275060011	Aircraft - Air Taxi	VOM	0.00	0.00	0.00
17163	St. Clair	CPS	AT-Piston	2275060011	Aircraft - Air Taxi	PM2.5	1.28	1.46	1.63
17163	St. Clair	SCOTT AFB	AT-Piston	2275060011	Aircraft - Air Taxi	SO2	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	AT-Piston	2275060011	Aircraft - Air Taxi	NOX	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	AT-Piston	2275060011	Aircraft - Air Taxi	VOM	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	AT-Piston	2275060011	Aircraft - Air Taxi	PM2.5	0.00	0.00	0.00
17119	Madison	ALN	AT-Turbine	2275060012	Aircraft - Air Taxi	PM2.5	0.03	0.03	0.03
17119	Madison	ALN	AT-Turbine	2275060012	Aircraft - Air Taxi	VOM	0.34	0.34	0.34
17163	St. Clair	CPS	AT-Turbine	2275060012	Aircraft - Air Taxi	NOX	0.19	0.22	0.24
17163	St. Clair	CPS	AT-Turbine	2275060012	Aircraft - Air Taxi	SO2	0.02	0.02	0.02
17163	St. Clair	CPS	AT-Turbine	2275060012	Aircraft - Air Taxi	PM2.5	0.50	0.57	0.64
17163	St. Clair	CPS	AT-Turbine	2275060012	Aircraft - Air Taxi	VOM	5.44	6.19	6.94
17163	St. Clair	SCOTT AFB	AT-Turbine	2275060012	Aircraft - Air Taxi	NOX	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	AT-Turbine	2275060012	Aircraft - Air Taxi	SO2	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	AT-Turbine	2275060012	Aircraft - Air Taxi	PM2.5	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	AT-Turbine	2275060012	Aircraft - Air Taxi	VOM	0.00	0.00	0.00
17119	Madison	3K6	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.16	0.16	0.16
17119	Madison	3K6	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	3K6	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.03	0.03	0.03
17119	Madison	3K6	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.41	0.41	0.41
17119	Madison	ALN	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.71	0.83	0.91
17119	Madison	ALN	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	ALN	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.11	0.13	0.14
17119	Madison	ALN	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	1.80	2.08	2.28
17119	Madison	H07	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.07	0.07	0.07
17119	Madison	H07	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	H07	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.01	0.01	0.01
17119	Madison	H07	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.18	0.18	0.18
17133	Monroe	H49	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.14	0.14	0.14
17133	Monroe	H49	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	H49	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.02	0.02	0.02
17133	Monroe	H49	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.35	0.35	0.35
17163	St. Clair	BLV	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.12	0.12	0.12
17163	St. Clair	BLV	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	BLV	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.02	0.02	0.02
17163	St. Clair	BLV	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.29	0.29	0.29
17163	St. Clair	CPS	GA-Piston	2275050011	Aircraft - General Aviation	NOX	1.11	1.36	1.57
17163	St. Clair	CPS	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	CPS	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.17	0.21	0.24
17163	St. Clair	CPS	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	2.79	3.42	3.95
17163	St. Clair	SCOTT AFB	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00

FIPS	County	Id Number	Point	SCC	Category	Pollutant	Emissions (tons/year)		
							2008	2017	2025
17163	St. Clair	SCOTT AFB	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	BLV	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.01	0.01	0.01
17163	St. Clair	BLV	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.05	0.05	0.05
17163	St. Clair	BLV	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.11	0.11	0.11
17163	St. Clair	BLV	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	2.81	2.81	2.81
17163	St. Clair	CPS	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.07	0.08	0.09
17163	St. Clair	CPS	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.43	0.53	0.61
17163	St. Clair	CPS	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	1.08	1.33	1.54
17163	St. Clair	CPS	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	26.77	32.82	37.92
17163	St. Clair	SCOTT AFB	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	SCOTT AFB	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	1IL4	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	1IL4	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	1IL4	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	1IL4	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	1IS0	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	1IS0	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	1IS0	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	1IS0	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17133	Monroe	27LL	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17133	Monroe	27LL	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	27LL	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17133	Monroe	27LL	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	2IL7	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	2IL7	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	2IL7	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	2IL7	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	3LL1	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	3LL1	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	3LL1	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	3LL1	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17119	Madison	3LL9	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17119	Madison	3LL9	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	3LL9	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17119	Madison	3LL9	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	3LL6	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	3LL6	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	3LL6	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	3LL6	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17119	Madison	48IL	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17119	Madison	48IL	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	48IL	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17119	Madison	48IL	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17133	Monroe	4IS5	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17133	Monroe	4IS5	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	4IS5	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17133	Monroe	4IS5	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17133	Monroe	91LS	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17133	Monroe	91LS	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	91LS	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17133	Monroe	91LS	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	7IS2	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	7IS2	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00

FIPS	County	Id Number	Point	SCC	Category	Pollutant	Emissions (tons/year)		
							2008	2017	2025
17163	St. Clair	7IS2	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	7IS2	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17133	Monroe	7IS9	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17133	Monroe	7IS9	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	7IS9	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17133	Monroe	7IS9	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17119	Madison	7IS7	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17119	Madison	7IS7	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	7IS7	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17119	Madison	7IS7	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	6LL4	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	6LL4	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	6LL4	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	6LL4	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	83LL	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	83LL	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	83LL	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	83LL	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	LL26	GA-Piston	2275050011	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	LL26	GA-Piston	2275050011	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	LL26	GA-Piston	2275050011	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	LL26	GA-Piston	2275050011	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	1IL4	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	1IL4	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	1IL4	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	1IL4	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	1IS0	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	1IS0	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	1IS0	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	1IS0	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	27LL	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17133	Monroe	27LL	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17133	Monroe	27LL	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17133	Monroe	27LL	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	2IL7	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	2IL7	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	2IL7	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	2IL7	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	3LL1	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	3LL1	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	3LL1	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	3LL1	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	3LL9	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17119	Madison	3LL9	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17119	Madison	3LL9	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17119	Madison	3LL9	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	3LL6	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	3LL6	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	3LL6	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	3LL6	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	48IL	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17119	Madison	48IL	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17119	Madison	48IL	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17119	Madison	48IL	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	4IS5	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17133	Monroe	4IS5	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00

FIPS	County	Id Number	Point	SCC	Category	Pollutant	Emissions (tons/year)		
							2008	2017	2025
17133	Monroe	4IS5	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17133	Monroe	4IS5	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	91LS	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17133	Monroe	91LS	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17133	Monroe	91LS	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17133	Monroe	91LS	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	7IS2	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	7IS2	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	7IS2	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	7IS2	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17133	Monroe	7IS9	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17133	Monroe	7IS9	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17133	Monroe	7IS9	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17133	Monroe	7IS9	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17119	Madison	7IS7	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17119	Madison	7IS7	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17119	Madison	7IS7	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17119	Madison	7IS7	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	6LL4	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	6LL4	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	6LL4	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	6LL4	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	83LL	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	83LL	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	83LL	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	83LL	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00
17163	St. Clair	LL26	GA-Turbine	2275050012	Aircraft - General Aviation	SO2	0.00	0.00	0.00
17163	St. Clair	LL26	GA-Turbine	2275050012	Aircraft - General Aviation	NOX	0.00	0.00	0.00
17163	St. Clair	LL26	GA-Turbine	2275050012	Aircraft - General Aviation	PM2.5	0.00	0.00	0.00
17163	St. Clair	LL26	GA-Turbine	2275050012	Aircraft - General Aviation	VOM	0.00	0.00	0.00

Appendix G

Retired Unit Exemption Forms
For
Trigen – St. Louis Energy Corporation
And
Anheuser Busch, Inc.

Appendix G-1

Retired Unit Exemption Form
For
Trigen – St. Louis Energy Corporation
Units 5 and 6

OMB Nos. 2060-0258,
2060-0570, and 2060-0584
Approval Expires 7/31/2009

Retired Unit Exemption

For more information, see instructions and refer to 40 CFR 72.8, 96.105, 96.205, and 96.305, or a comparable state regulation, as applicable.

This submission is: ☒ **New** ☐ **Revised**

STEP 1
Identify the unit by facility (source) name, State, ORIS/plant code and unit ID#.

Facility (Source) Name	State	ORIS/Plant Code	Unit ID#
Trigen-St. Louis Energy Corporation	**MO**	**880094**	**EU0060**

STEP 2
Indicate the program(s) that the unit is subject to:

~ Acid Rain
~ CAIR NO_X Annual
~ CAIR SO_2
X CAIR NO_X Ozone Season

STEP 3
Identify the date on which the unit was (or will be) permanently retired.

October 29, 2008

STEP 4
If the unit is subject to the Acid Rain Program, identify the first full calendar year in which the unit meets (or will meet) the requirements of 40 CFR 72.8(d).

January 1, _____

STEP 5
Read the appropriate special provisions.

Acid Rain Program Special Provisions

(1) A unit exempt under 40 CFR 72.8 shall not emit any sulfur dioxide and nitrogen oxides starting on the date that the exemption takes effect. The owners and operators of the unit will be allocated allowances in accordance with 40 CFR part 73 subpart B.
(2) A unit exempt under 40 CFR 72.8 shall not resume operation unless the designated representative of the source that includes the unit submits a complete Acid Rain permit application under 40 CFR 72.31 for the unit not less than 24 months prior to the date on which the unit is first to resume operation.
(3) The owners and operators and, to the extent applicable, the designated representative of a unit exempt under 40 CFR 72.8 shall comply with the requirements of the Acid Rain Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(4) For any period for which a unit is exempt under 40 CFR 72.8, the unit is not an affected unit under the Acid Rain Program and 40 CFR part 70 and 71 and is not eligible to be an opt-in source under 40 CFR part 74. As an unaffected unit, the unit shall continue to be subject to any other applicable requirements under 40 CFR parts 70 and 71.
(5) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 72.8 shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time prior to the end of the period, in writing by the Administrator or the permitting authority. The owners and operators bear the burden of proof that the unit is permanently retired.
(6) On the earlier of the following dates, a unit exempt under 40 CFR 72.8(b) or (c) shall lose its exemption and become an affected unit under the Acid Rain Program and 40 CFR part 70 and 71: (i) the date on which the designated representative submits an Acid Rain permit application under paragraph (2); or (ii) the date on which the designated representative is required under paragraph (2) to submit an Acid Rain permit application. For the purpose of applying monitoring requirements under 40 CFR part 75, a unit that loses its exemption under 40 CFR 72.8 shall be treated as a new unit that commenced commercial operation on the first date on which the unit resumes operation.

OMB Nos. 2060-0258, 2060-0570, and 2060-0584
Approval Expires 7/31/2009

Retired Unit Exemption

For more information, see instructions and refer to 40 CFR 72.8, 96.105, 96.205, and 96.305, or a comparable state regulation, as applicable.

This submission is: ☒ **New** ☐ **Revised**

STEP 1
Identify the unit by facility (source) name, State, ORIS/plant code and unit ID#.

Facility (Source) Name	State	ORIS/Plant Code	Unit ID#
Trigen-St. Louis Energy Corporation	**MO**	**880094**	**EU0070**

STEP 2
Indicate the program(s) that the unit is subject to:

~ Acid Rain
~ CAIR NO_X Annual
~ CAIR SO_2
X CAIR NO_X Ozone Season

STEP 3
Identify the date on which the unit was (or will be) permanently retired.

October 29, 2008

STEP 4
If the unit is subject to the Acid Rain Program, identify the first full calendar year in which the unit meets (or will meet) the requirements of 40 CFR 72.8(d).

January 1, _____

STEP 5
Read the appropriate special provisions.

Acid Rain Program Special Provisions

(1) A unit exempt under 40 CFR 72.8 shall not emit any sulfur dioxide and nitrogen oxides starting on the date that the exemption takes effect. The owners and operators of the unit will be allocated allowances in accordance with 40 CFR part 73 subpart B.
(2) A unit exempt under 40 CFR 72.8 shall not resume operation unless the designated representative of the source that includes the unit submits a complete Acid Rain permit application under 40 CFR 72.31 for the unit not less than 24 months prior to the date on which the unit is first to resume operation.
(3) The owners and operators and, to the extent applicable, the designated representative of a unit exempt under 40 CFR 72.8 shall comply with the requirements of the Acid Rain Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(4) For any period for which a unit is exempt under 40 CFR 72.8, the unit is not an affected unit under the Acid Rain Program and 40 CFR part 70 and 71 and is not eligible to be an opt-in source under 40 CFR part 74. As an unaffected unit, the unit shall continue to be subject to any other applicable requirements under 40 CFR parts 70 and 71.
(5) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 72.8 shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time prior to the end of the period, in writing by the Administrator or the permitting authority. The owners and operators bear the burden of proof that the unit is permanently retired.
(6) On the earlier of the following dates, a unit exempt under 40 CFR 72.8(b) or (c) shall lose its exemption and become an affected unit under the Acid Rain Program and 40 CFR part 70 and 71: (i) the date on which the designated representative submits an Acid Rain permit application under paragraph (2); or (ii) the date on which the designated representative is required under paragraph (2) to submit an Acid Rain permit application. For the purpose of applying monitoring requirements under 40 CFR part 75, a unit that loses its exemption under 40 CFR 72.8 shall be treated as a new unit that commenced commercial operation on the first date on which the unit resumes operation.

CAIR NO_X Annual Trading Program Special Provisions

(1) A unit exempt under 40 CFR 96.105(a) shall not emit any nitrogen oxides, starting on the date that the exemption takes effect.
(2) The permitting authority will allocate CAIR NO_X allowances under 40 CFR 96 subpart EE to a unit exempt under 40 CFR 96.105(a).
(3) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 96.105(a) shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.
(4) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under 40 CFR 96.105(a) shall comply with the requirements of the CAIR NO_X Annual Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(5) A unit exempt under 40 CFR 96.105(a) and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under 40 CFR 96.122 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2009 or the date on which the unit resumes operation.
(6) On the earlier of the following dates, a unit exempt under 40 CFR 96.105(a) shall lose its exemption:
(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under 40 CFR 96.105(b)(5);
(ii) The date on which the CAIR designated representative is required under 40 CFR 96.105(b)(5) to submit a CAIR permit application for the unit; or
(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.
(7) For the purpose of applying monitoring, reporting, and recordkeeping requirements under 40 CFR 96 subpart HH, a unit that loses its exemption under 40 CFR 96.105(a) shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

CAIR SO_2 Trading Program Special Provisions

(1) A unit exempt under 40 CFR 96.205(a) shall not emit any sulfur dioxide, starting on the date that the exemption takes effect.
(2) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 96.205(a) shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.
(3) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under 40 CFR 96.205(a) shall comply with the requirements of the CAIR SO_2 Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(4) A unit exempt under 40 CFR 96.205(a) and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under 40 CFR 96.222 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2010 or the date on which the unit resumes operation.
(5) On the earlier of the following dates, a unit exempt under 40 CFR 96.205(a) shall lose its exemption:
(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under 40 CFR 96.205(b)(4);
(ii) The date on which the CAIR designated representative is required under 40 CFR 96.205(b)(4) to submit a CAIR permit application for the unit; or
(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.
(6) For the purpose of applying monitoring, reporting, and recordkeeping requirements under 40 CFR 96 subpart HHH, a unit that loses its exemption under 40 CFR 96.205(a) shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

Trigen-St. Louis Energy Corporation

Plant Name (from STEP 1)

CAIR NO_X Ozone Season Trading Program Special Provisions

(1) A unit exempt under 40 CFR 96.305(a) shall not emit any nitrogen oxides, starting on the date that the exemption takes effect.
(2) The permitting authority will allocate CAIR NO_X Ozone Season allowances under 40 CFR 96 subpart EEEE to a unit exempt under 40 CFR 96.305(a).
(3) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 96.305(a) shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.
(4) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under 40 CFR 96.305(a) shall comply with the requirements of the CAIR NO_X Ozone Season Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(5) A unit exempt under 40 CFR 96.305(a) and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under 40 CFR 96.322 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2009 or the date on which the unit resumes operation.
(6) On the earlier of the following dates, a unit exempt under 40 CFR 96.305(a) shall lose its exemption:
(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under 40 CFR 96.305(b)(5);
(ii) The date on which the CAIR designated representative is required under 40 CFR 96.305(b)(5) to submit a CAIR permit application for the unit; or
(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.
(7) For the purpose of applying monitoring, reporting, and recordkeeping requirements under 40 CFR 96 subpart HHHH, a unit that loses its exemption under 40 CFR 96.305(a) shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

Trigen-St. Louis Energy Corporation
Plant Name (from STEP 1)

STEP 6
Read the statement of compliance and the appropriate certification statements and sign and date.

Statement of Compliance
I certify that the unit identified above at STEP 1 was (or will be) permanently retired on the date identified at STEP 3 and will comply with the appropriate Special Provisions listed at STEP 5.

Certification (for Acid Rain or CAIR designated representatives or alternate Acid Rain or CAIR designated representatives only)
I am authorized to make this submission on behalf of the owners and operators of the source and unit for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Wayne Deczynski Name		**Vice President/General Manager** Title
Owner Company Name **Veolia Energy North America**		
Phone **(314) 621-3550**	Email **wdeczynski@trigen.com**	
Signature Wayne Deczynski		Date 10-1-09

Certification (for certifying officials of units subject to the Acid Rain Program only)
I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Name		Title
Owner Company Name		
Phone	Email	
Signature		Date

Appendix G-2

Retired Unit Exemption Form
For
Anheuser Busch, Inc.
Unit 6

United States Environmental Protection Agency
Acid Rain and CAIR Program

OMB Nos. 2060-0258, 2060-0570, and 2060-0584
Approval Expires 7/31/2009

Retired Unit Exemption

For more information, see instructions and refer to 40 CFR 72.8, 96.105, 96.205, and 96.305, or a comparable state regulation, as applicable.

This submission is: [X] New [ ] Revised

STEP 1
Identify the unit by facility (source) name, State, ORIS/plant code and unit ID#.

Facility (Source) Name	State	ORIS/Plant Code	Unit ID#
Anheuser-Busch, Inc.	MO	010430	#6

STEP 2
Indicate the program(s) that the unit is subject to:

~ Acid Rain
~ CAIR NO_X Annual
~ CAIR SO_2
~ CAIR NO_X Ozone Season

STEP 3
Identify the date on which the unit was (or will be) permanently retired.

October 10, 2009

STEP 4
If the unit is subject to the Acid Rain Program, identify the first full calendar year in which the unit meets (or will meet) the requirements of 40 CFR 72.8(d).

January 1, _____

STEP 5
Read the appropriate special provisions.

Acid Rain Program Special Provisions

(1) A unit exempt under 40 CFR 72.8 shall not emit any sulfur dioxide and nitrogen oxides starting on the date that the exemption takes effect. The owners and operators of the unit will be allocated allowances in accordance with 40 CFR part 73 subpart B.
(2) A unit exempt under 40 CFR 72.8 shall not resume operation unless the designated representative of the source that includes the unit submits a complete Acid Rain permit application under 40 CFR 72.31 for the unit not less than 24 months prior to the date on which the unit is first to resume operation.
(3) The owners and operators and, to the extent applicable, the designated representative of a unit exempt under 40 CFR 72.8 shall comply with the requirements of the Acid Rain Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(4) For any period for which a unit is exempt under 40 CFR 72.8, the unit is not an affected unit under the Acid Rain Program and 40 CFR part 70 and 71 and is not eligible to be an opt-in source under 40 CFR part 74. As an unaffected unit, the unit shall continue to be subject to any other applicable requirements under 40 CFR parts 70 and 71.
(5) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 72.8 shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time prior to the end of the period, in writing by the Administrator or the permitting authority. The owners and operators bear the burden of proof that the unit is permanently retired.
(6) On the earlier of the following dates, a unit exempt under 40 CFR 72.8(b) or (c) shall lose its exemption and become an affected unit under the Acid Rain Program and 40 CFR part 70 and 71: (i) the date on which the designated representative submits an Acid Rain permit application under paragraph (2); or (ii) the date on which the designated representative is required under paragraph (2) to submit an Acid Rain permit application. For the purpose of applying monitoring requirements under 40 CFR part 75, a unit that loses its exemption under 40 CFR 72.8 shall be treated as a new unit that commenced commercial operation on the first date on which the unit resumes operation.

Anheuser - Busch, Inc

Plant Name (from STEP 1)

CAIR NO_X Annual Trading Program Special Provisions

(1) A unit exempt under 40 CFR 96.105(a) shall not emit any nitrogen oxides, starting on the date that the exemption takes effect.
(2) The permitting authority will allocate CAIR NO_X allowances under 40 CFR 96 subpart EE to a unit exempt under 40 CFR 96.105(a).
(3) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 96.105(a) shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.
(4) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under 40 CFR 96.105(a) shall comply with the requirements of the CAIR NO_X Annual Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(5) A unit exempt under 40 CFR 96.105(a) and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under 40 CFR 96.122 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2009 or the date on which the unit resumes operation.
(6) On the earlier of the following dates, a unit exempt under 40 CFR 96.105(a) shall lose its exemption:
(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under 40 CFR 96.105(b)(5);
(ii) The date on which the CAIR designated representative is required under 40 CFR 96.105(b)(5) to submit a CAIR permit application for the unit; or
(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.
(7) For the purpose of applying monitoring, reporting, and recordkeeping requirements under 40 CFR 96 subpart HH, a unit that loses its exemption under 40 CFR 96.105(a) shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

CAIR SO_2 Trading Program Special Provisions

(1) A unit exempt under 40 CFR 96.205(a) shall not emit any sulfur dioxide, starting on the date that the exemption takes effect.
(2) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 96.205(a) shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.
(3) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under 40 CFR 96.205(a) shall comply with the requirements of the CAIR SO_2 Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(4) A unit exempt under 40 CFR 96.205(a) and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under 40 CFR 96.222 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2010 or the date on which the unit resumes operation.
(5) On the earlier of the following dates, a unit exempt under 40 CFR 96.205(a) shall lose its exemption:
(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under 40 CFR 96.205(b)(4);
(ii) The date on which the CAIR designated representative is required under 40 CFR 96.205(b)(4) to submit a CAIR permit application for the unit; or
(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.
(6) For the purpose of applying monitoring, reporting, and recordkeeping requirements under 40 CFR 96 subpart HHH, a unit that loses its exemption under 40 CFR 96.205(a) shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

Anheuser-Busch, Inc.

Plant Name (from STEP 1)

CAIR NO_X Ozone Season Trading Program Special Provisions

(1) A unit exempt under 40 CFR 96.305(a) shall not emit any nitrogen oxides, starting on the date that the exemption takes effect.
(2) The permitting authority will allocate CAIR NO_X Ozone Season allowances under 40 CFR 96 subpart EEEE to a unit exempt under 40 CFR 96.305(a).
(3) For a period of 5 years from the date the records are created, the owners and operators of a unit exempt under 40 CFR 96.305(a) shall retain, at the source that includes the unit, records demonstrating that the unit is permanently retired. The 5-year period for keeping records may be extended for cause, at any time before the end of the period, in writing by the permitting authority or the Administrator. The owners and operators bear the burden of proof that the unit is permanently retired.
(4) The owners and operators and, to the extent applicable, the CAIR designated representative of a unit exempt under 40 CFR 96.305(a) shall comply with the requirements of the CAIR NO_X Ozone Season Trading Program concerning all periods for which the exemption is not in effect, even if such requirements arise, or must be complied with, after the exemption takes effect.
(5) A unit exempt under 40 CFR 96.305(a) and located at a source that is required, or but for this exemption would be required, to have a title V operating permit shall not resume operation unless the CAIR designated representative of the source submits a complete CAIR permit application under 40 CFR 96.322 for the unit not less than 18 months (or such lesser time provided by the permitting authority) before the later of January 1, 2009 or the date on which the unit resumes operation.
(6) On the earlier of the following dates, a unit exempt under 40 CFR 96.305(a) shall lose its exemption:
(i) The date on which the CAIR designated representative submits a CAIR permit application for the unit under 40 CFR 96.305(b)(5);
(ii) The date on which the CAIR designated representative is required under 40 CFR 96.305(b)(5) to submit a CAIR permit application for the unit; or
(iii) The date on which the unit resumes operation, if the CAIR designated representative is not required to submit a CAIR permit application for the unit.
(7) For the purpose of applying monitoring, reporting, and recordkeeping requirements under 40 CFR 96 subpart HHHH, a unit that loses its exemption under 40 CFR 96.305(a) shall be treated as a unit that commences commercial operation on the first date on which the unit resumes operation.

Anheuser-Busch, Inc
Plant Name (from STEP 1)

STEP 6
Read the statement of compliance and the appropriate certification statements and sign and date.

Statement of Compliance
I certify that the unit identified above at STEP 1 was (or will be) permanently retired on the date identified at STEP 3 and will comply with the appropriate Special Provisions listed at STEP 5.

Certification (for Acid Rain or CAIR designated representatives or alternate Acid Rain or CAIR designated representatives only)
I am authorized to make this submission on behalf of the owners and operators of the source and unit for which the submission is made. I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Name: Charles H. Fisher	Title: EHS Manager
Owner Company Name: Anheuser-Busch, Inc	
Phone: 314-713-7786	Email: chad.fisher@anheuser-busch.com
Signature: CHFisher	Date: 10-28-09

Certification (for certifying officials of units subject to the Acid Rain Program only)
I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this document and all its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Name	Title
Owner Company Name	
Phone	Email
Signature	Date

Appendix H

MEMC Electronic Materials, Inc.

Termination of 2009 Consent Agreement

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Sara Parker Pauley, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

AUG 1 3 2013

CERTIFIED MAIL: 7004 1350 0003 1414 6160

Mr. Larry E. Weaver, Environmental Engineer
MEMC Electronic Materials, Incorporated
501 Pearl Drive (City of O'Fallon)
P.O. Box 8
St. Peters, MO 63376

RE: Consent Agreement (June 2, 2009) Termination Agreement

Dear Mr. Weaver:

Please be informed, the Missouri Department of Natural Resource's Air Pollution Control Program (APCP) has reviewed MEMC Electronic Materials, Incorporated's letter dated July 11, 2012, regarding the removal of Emission Units 7 and 7L.

In your letter, you report that the nitric acid etching stations and associated control devices named in the above referenced Consent Agreement have been removed, decommissioned or severed from utility connections in advance of building demolition. Thank you for providing this notification. On January 31, 2013, the APCP conducted an air pollution compliance inspection at the facility and confirmed this to be correct.

Based on these findings, the department hereby concludes, the nitric acid etching stations (Emission Unit 7 and 7L) described in "Findings of Fact" Item 12 of the Consent Agreement, are no longer operational and therefore, the Consent Agreement, entered by both parties on June 2, 2009, shall be deemed terminated effective the date the enclosed Agreement is signed by all parties. Please review the enclosed Agreement and, if acceptable, sign and return the Agreement to the address below. A fully executed copy will be provided upon final signature of the department.

Termination Agreement

I. Summary of Request

1. On July 11, 2012, SunEdison, Incorporated, F/K/A MEMC Electronic Materials, Incorporated, (MEMC) located at 501 Pearl Drive (City of O'Fallon), in St. Peters, St. Charles County, Missouri provided a letter to the Missouri Department of Natural Resources' (Department) Air Pollution Control Program (APCP) regarding the removal of Emission Units 7 and 7L described in the Consent Agreement dated June 2, 2009.

2. MEMC reported, that the nitric acid etching stations and associated control devices (Emission Units 7 and 7L) named in the above referenced Consent Agreement had been removed, decommissioned or severed from utility connections in advance of building demolition and requested termination of the Consent Agreement.

II. Findings of Fact

3. On January 31, 2013, the APCP conducted an air pollution compliance inspection at MEMC and confirmed the nitric acid etching stations and associated control devices (Emission Units 7 and 7L) named in the above referenced Consent Agreement removed, decommissioned or severed from utility connections in advance of building demolition.

4. Under "Effective Date, Termination" in the Consent Agreement, Item 21 states "This Agreement will be terminated at such time that it is superseded by a future agreement, regulation, or other enforceable document that contains equivalent or more stringent emission limits."

III. Agreement

5. Based on the findings described under paragraph 3, the Department hereby concludes, the nitric acid etching stations (Emission Unit 7 and 7L) described in "Findings of Fact" Item 12 of the Consent Agreement, are no longer operational and therefore, the Consent Agreement, entered by both parties on June 2, 2009, shall be deemed terminated effective the date the Department signs this Agreement.

6. The Department and MEMC agree that any reinstatement of the equipment described in paragraph 3, would be in violation of the Missouri Air Conservation Law and its implementing regulations, subjecting MEMC to further sanction.

7. The provisions of this Agreement shall apply to and be binding upon the parties executing this Agreement, their agents, subsidiaries, successors, assigns, affiliates, and lessees, including the officers, agents, servants, corporations and any persons acting under, through, or for the parties agreeing hereto. Any changes in ownership

183-0027
Enf File

MEMC

TECHNOLOGY IS BUILT ON US

RECEIVED
2012 JUL 16 PM 1:02
AIR POLLUTION
CONTROL PGM

MEMC Electronic Materials, Inc.

501 Pearl Drive (City of O'Fallon)
Post Office Box 8
St. Peters, Missouri
63376 USA

Phone: 636-474-5000

July 11, 2012

Missouri Department of Natural Resources
Air Pollution Control Program Enforcement
1659 E. Elm Street
Jefferson City, MO 65101

Ref: Notification of Removal of Emission Units 7, 7L
at MEMC Electronic Materials, 183-0027

Certified Mail: 7005 0390 0005 9613 8334

Dear APCP,

As part of the NOx SIP Call, MEMC signed a Consent Agreement effective June 2, 2009.

The nitric acid etching stations and associated control devices named in that agreement are now effectively obsolete. (Findings of Fact, Item 13)

These process tools have either been removed to another MEMC location, or decommissioned and severed from utility connections in advance of building demolition. The control devices are dismantled or demolished. In one case a scrubber exhauster fan has been converted to part of a general building exhaust system.

The agreement stated that if the nitric acid etchers are shut down, scrubbers are not required. But to make this condition official and permanent, I would respectfully request that you release MEMC from the agreement.

If you have questions for me, please call 636-474-5330 or send e-mail to lweaver@memc.com

Sincerely,

Larry Weaver

Larry E. Weaver
Environmental Engineer

File MEMC 183-0027 ENF

PMC 5/3/09

CONSENT AGREEMENT

The parties hereto, the Missouri Department of Natural Resources and MEMC Electronic Materials, Inc., having agreed that entry of this Consent Agreement (hereinafter "Agreement") is in the best interest of the parties and the public health and the environment, hereby represent and state as follows:

JURISDICTION

1. The Missouri Department of Natural Resources (hereinafter "Department") is a duly authorized state agency created under Chapter 640 of the Revised Statutes of Missouri (as amended) to administer the programs assigned to it related to environmental control and the conservation and management of natural resources.

2. Chapter 643 of the Revised Statutes of Missouri (as amended) provides that the Director of the Department, on behalf of the Missouri Air Conservation Commission, administers the provisions of the Missouri Air Conservation Law.

3. MEMC Electronic Materials, Inc. (hereinafter "MEMC") is a Missouri corporation in good standing and registered to do business in Missouri in accordance with Missouri laws and is subject to the Missouri Air Conservation Law and the regulations adopted thereunder. MEMC is the legal and rightful owner of the MEMC Electronic Materials facility listed in paragraphs 12 and 13.

4. Pursuant to RSMo 643.060, the Director has authority and jurisdiction to issue this Agreement and to enforce the same. In any action by the Department to enforce the terms of this Agreement, MEMC agrees not to contest the authority or jurisdiction of the Director to issue this Agreement.

5. The terms of this Agreement shall be construed in accordance with the applicable laws of the state of Missouri and the United States.

STATEMENT OF PURPOSE

6. In entering into this Agreement, it is the mutual objective of the Department and MEMC to reduce contributions of fine particulates (PM2.5) to the St. Louis Nonattainment Area, and to establish requirements by which MEMC will achieve regulatory compliance by the continued and proper use of the air pollution control devices described in paragraph 13. This Agreement establishes enforceable technology controls pursuant to the Department's requirements to comply with the Reasonably Available Control Technology (RACT) regulations identified in this Agreement at applicable emission sources. This Agreement is not the result of any enforcement action or alleged non-compliance with any law, regulation, permit, or order and will enable MEMC to timely comply with the EPA and the Department deadlines for RACT and other unforeseen consequences.

PARTIES BOUND

7. This Agreement shall apply to and be binding upon the parties, their agents, successors, and assigns and upon all persons, contractors, and consultants acting under or for either the Department or MEMC or both.

8. The parties agree to undertake all actions required of them by the terms and conditions of this Agreement.

9. Notwithstanding the terms of any contract, MEMC is responsible for compliance with this Agreement and for insuring that its contractors and agents comply with this Agreement.

10. The activities conducted under this Agreement are subject to approval by the Department. MEMC shall make all reasonable efforts to provide all necessary information consistent with this Agreement requested by the Department.

LIABILITY

11. Nothing in this Agreement shall be considered an admission of any fact or acknowledgement of any liability by any party, nor shall anything in this Agreement be considered an admission of any fact or acknowledgement of any violation of any law, regulation, permit or order but will enable MEMC to timely comply with established EPA and Department deadlines for compliance with the RACT regulations and other unforeseen requirements. Neither the State of Missouri nor any agency thereof shall be held out as a party of any contract entered into by MEMC in carrying out activities pursuant to this Agreement.

FINDINGS OF FACT

12. The Department's Air Pollution Control Program has made the following findings regarding the State's obligation to develop RACT regulations as part of the oxides of nitrogen (NOx) precursor fine particle (PM2.5) planning efforts for the St. Louis Nonattainment Area:

    The Department identified that MEMC plans to continue to operate the nitric acid etching stations with the current scrubbing systems collectively identified as Point 7/Point 7L, (Emission Unit 7 and 7L). In reviewing the information provided by MEMC, the Department has concluded that there are no additional cost effective control technologies for NOx because costs for these additional controls ranged from $8,048 to $13,078 per ton reduction.

AGREEMENT AND COMPLIANCE PLAN

13. The Department has determined that the continued operation of the nitric acid etching stations small scrubbers identified by MEMC as Unit 7, N-120-2 for the first stage and N-120-3 and N-120-4 in parallel as the second stage, (so all three operate); and identified by MEMC as Unit 7L with K-45-1 (or K-45-2) as the first stage and K-45-3 (or K-45-4) as the second stage, (so both operate) meets the definition of RACT for the annual PM2.5 effort at MEMC. If the nitric acid etching stations are shut down, the scrubbers are not required to be operated. This Department's consent agreement with MEMC will make this plan legally enforceable. The Department is going to include this agreement in Missouri's formal submittal to the U.S. Environmental Protection Agency (EPA) as part of Missouri's State Implementation Plan (SIP).

CONCLUSIONS OF LAW

14. MEMC is a person within the meaning of section 643.020 of the Revised Statutes of Missouri (RSMo).

15. Section 643.060.4, RSMo, provides that the Director of the Department is responsible for administering and enforcing the Missouri Air Conservation Law, investigating complaints, issuing orders and taking all actions necessary to implement the Missouri Air Conservation Law. Section 643.060.2, RSMo. RSMo, provides that the Director is authorized to enter into contracts as he deems necessary for carrying out the provisions of the Missouri Air Conservation Law. In addition, the Missouri Air Conservation Commission is granted the legal authority under section 643.050, RSMo, to develop and implement regulations and enter into agreements to control air pollution.

BEST PROFESSIONAL JUDGMENT

16. The requirements of this Agreement represent the best professional judgment of the Department based on information available as of the effective date of this Agreement. If circumstances change significantly so that data related to the commitments of this Agreement indicates an imminent threat of danger to the public health, safety or the environment or if the Department determines there is a significantly different threat other than the issues addressed herein, then the Department reserves the right to modify dates or requirements herein as it deems reasonably necessary to comply with the RACT regulations, provided that the Department gives MEMC at least 90 days notice and an opportunity to submit a compliance schedule after the 90 day notice period or submit written objections to the Department's determination of a significantly different threat. MEMC shall submit either a compliance schedule or written objections to the Department within 30 days of its receipt of the Department's notice. MEMC further reserves the right to appeal any such modifications or additional requirements in accordance with paragraph 30.

FORCE MAJEURE, EXCUSABLE DELAY, MODIFICATION

17. The following shall constitute the governing terms for force majeure, excusable delay, and modification of the Agreement:

    A. MEMC shall perform the requirements under this Agreement within the time limits set forth herein unless the performance is prevented or delayed solely by events which constitute a force majeure. For purposes of this Agreement a force majeure is defined as any event beyond the control of MEMC which could not be overcome by due diligence and which delays or prevents performance by a date required by this Agreement. Such events do not include increased costs of performance. Any delay caused in whole or in part by action or inaction by municipal, state, or federal regulatory authorities or third parties unrelated to MEMC shall be considered a force majeure and shall not be deemed a violation of any obligation required by this Agreement.

    B. MEMC shall have the burden of proving all claims of force majeure. Failure to comply by reason of force majeure shall not be construed as a violation of this Agreement.

    C. MEMC shall notify the Department in writing within ten (10) days after becoming aware of an event which MEMC knew or reasonably should have known constituted force majeure. Such notice shall estimate the anticipated length of delay, its cause, measures to be taken to minimize the delay, and an estimated timetable for implementation of these measures. Failure to comply with the notice provision of this section may constitute a waiver of MEMC's right to assert a force majeure claim and may be grounds for the Department, at its sole discretion, to deny MEMC an extension of time for performance.

    D. Within ten (10) days of the receipt of written notice from MEMC of a force majeure event, the Department shall notify MEMC of the extent to which modifications to this Agreement are necessary. In the event that the Department and MEMC cannot agree that a force majeure event has occurred or if there is no agreement on the length of the extension, the dispute shall be resolved as set forth in paragraph 18.

    E. Any modifications to any provision of this Agreement shall not alter the schedule for performance or completion of other tasks required by this Agreement, unless specifically agreed to by the parties in writing and incorporated into this Agreement.

    F. This Agreement may be amended by mutual agreement of the Department and MEMC. Such amendments shall be in writing, shall have as their effective date the date on which they are signed by both parties and shall be incorporated into this Agreement.

DISPUTE RESOLUTION

18. The parties recognize that a dispute may arise between them regarding implementation of the action to be taken as herein set forth or other terms or provisions of this Agreement.

    A. If such dispute arises, the parties will endeavor to settle it by informal negotiations between themselves. If the parties cannot resolve the issue informally within a reasonable period of time, either of the parties may notify the other in writing stating its position with regard to the dispute and the reasons therefore. A party receiving such a notice of dispute will respond in writing within ten (10) days stating its position. The Department or MEMC shall then have an additional ten (10) day period or such longer time as the parties agree to respond. If the parties are still unable to reach an agreement, the matter shall be referred to the Director of the Division of Environmental Quality, who shall decide the matter and provide a written statement of his decision which shall be incorporated into the Agreement

    B. This dispute resolution procedure shall not preclude any party from having direct recourse to court if otherwise available under Missouri law.

OTHER CLAIMS AND PARTIES

19. Nothing in this Agreement shall constitute or be construed as a release for any claim, cause of action or demand in law or equity against any person, firm, partnership, or corporation not a signatory to this Agreement for any liability it may have arising out of or relating in any way to this Agreement.

EFFECTIVE DATE, TERMINATION

20. This Agreement shall become effective when signed by the Director of the Department or his designee.

21. This Agreement will be terminated at such time that it is superseded by a future agreement, regulation, or other enforceable document that contains equivalent or more stringent emission limits. The Department will provide written notice to MEMC of said termination. Such notice shall not be unreasonably withheld. Nothing in this Agreement shall preclude MEMC from challenging the applicability of a future regulation or other enforceable document to which MEMC is not signatory.

VOID OR VOIDABLE PROVISIONS

22. If a court of competent jurisdiction finds that any part of this Agreement is void, voidable, illegal or unenforceable, then that part shall be severed from this Agreement but shall not affect the continued operation of the rest of this Agreement, provided that the basic purposes of this Agreement and the benefits to the parties are not substantially impaired.

AUTHORIZATION OF SIGNATORIES TO EXECUTE THE AGREEMENT AND BIND THE PARTIES

23. The parties hereto have affixed their signatures on the dates inserted below to acknowledge their agreement to this Agreement. The signatories to this Agreement certify that they are authorized to execute and to legally bind the parties they represent to this Agreement.

Missouri Department of Natural Resources
Air Pollution Control Program
1659 E. Elm Street
Jefferson City, MO 65101

By James L. Kavanaugh
James L. Kavanaugh
Director

Date: 6-2-09

JLK: pmcs

MEMC Electronic Materials, Inc.
501 Pearl Drive (City of O'Fallon)
P.O. Box 8
St. Peters, MO 63376-0008

By F.M. McLaughlin
Frank M. McLaughlin
St. Peters Site Manager

Date: 5-28-09

RECEIVED
2009 JUN -2 PM 12:39
AIR POLLUTION
CONTROL PGM

Appendix I

2013 Federal Consent Decree

United States of America, State of Illinois, and State of Ohio
(Plaintiffs)

v.

Gateway Energy and Coke Company, LLC, Haverhill Coke Company LLC, and Suncoke Energy Inc.
(Defendants)

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF ILLINOIS
EAST ST. LOUIS DIVISION

UNITED STATES OF AMERICA, and The STATE OF ILLINOIS, and The STATE OF OHIO, Plaintiffs, v. GATEWAY ENERGY & COKE COMPANY, LLC, and HAVERHILL COKE COMPANY, LLC, and SUNCOKE ENERGY, INC., Defendants.	Civil Action No. 3:13-cv-00616-DRH-SCW **CONSENT DECREE**

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WHEREAS, Plaintiffs, the United States of America ("United States"), on behalf of the United States Environmental Protection Agency ("EPA"); the State of Illinois ("Illinois"); and the State of Ohio ("Ohio"), on behalf of the Ohio Environmental Protection Agency ("Ohio EPA") and its contractual agent, the Portsmouth Local Air Agency, have filed a complaint ("Complaint") concurrently with this Consent Decree, alleging that Defendants Haverhill Coke Company LLC ("HNCC"), Gateway Energy Coke Company ("GECC"), and SunCoke Energy, Inc. (together, the "Defendants") violated Sections 160-169 of the Clean Air Act ("CAA" or "Act"), 42 U.S.C. §§ 7470-7479, and analogous State laws including Section 9.1 of the Illinois Environmental Protection Act, 415 ILCS 5/9 (2010), and Chapter 3704 of the Ohio Revised Code ("R.C.") and the rules adopted thereunder, and the federally-enforceable State Implementation Plan ("SIPs") for Illinois and Ohio approved by EPA pursuant to Section 110 of the CAA, 42 U.S.C. § 7410, which incorporate and/or implement the above-listed federal requirements, and that Defendants violated the General Provisions of the National Emission Standards for Hazardous Air Pollutants for Source Categories, 40 C.F.R. Part 63, Subpart A, promulgated under Section 112 of the Act, 42 U.S.C. § 7412, which require at all times operation and maintenance in a manner consistent with safety and good air pollution control practices for minimizing emissions;

WHEREAS, the Plaintiffs allege that at all times relevant to the Complaint, HNCC and SunCoke and/or its predecessors in interest owned and operated the Haverhill Coke Company LLC plant in Franklin Furnace, Ohio ("Haverhill Facility"), and GECC and SunCoke owned and operated the Gateway Energy and Coke Company ("Gateway Facility") plant in Granite City, Illinois (the "Facilities");

WHEREAS, the Plaintiffs allege that Defendants and/or their predecessors in interest operated the Facilities in excess of Bypass Venting limits specified in their Prevention of Significant Deterioration ("PSD") Permits, and emitted sulfur dioxide ("SO_2"), particulate matter ("PM"), nitrogen oxides ("NOx") and lead ("Pb") through the Bypass Vents above applicable permit limits, and that Defendants have failed to comply with ongoing requirements for emissions monitoring, recordkeeping, and reporting, in violation of the CAA;

WHEREAS, as more specifically described in Section IV (Compliance Requirements), Defendants have agreed to install redundant Heat Recovery Steam Generators ("HRSGs") at the Facilities to reduce the release of waste heat and associated emissions directly to atmosphere from Bypass Vent Stacks and thereby reduce SO_2, PM, Sulfuric Acid Mist, hydrochloric acid ("HCl"), mercury ("Hg"), and Pb and to implement good air pollution control practices to minimize air pollution at the Facilities;

WHEREAS, Defendants have represented that each of the Facilities requires 14 days of maintenance time over a rolling 24 month period for FGD and HRSG maintenance after installation of the redundant HRSGs;

WHEREAS, Defendants do not admit the violations alleged in the Complaint and have worked cooperatively with the Plaintiffs to settle this matter in an expedited manner;

WHEREAS, the Parties recognize, and this Court by entering this Consent Decree finds, that this Consent Decree has been negotiated by the Parties in good faith, will avoid litigation among the Parties, and that this Consent Decree is fair, reasonable, and in the public interest;

NOW, THEREFORE, before the taking of any testimony, without the adjudication or admission of any issue of fact or law except as provided in Section I (Jurisdiction and Venue),

and with the consent of the Parties, IT IS HEREBY ADJUDGED, ORDERED, AND DECREED as follows:

I. JURISDICTION AND VENUE

1. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, 1345, 1355, 1362, and 1367, and Section 113(b) of the CAA, 42 U.S.C. § 7413(b), and over the Parties. Venue lies in this District pursuant to Section 113(b) of the CAA, 42 U.S.C. § 7413(b), and 28 U.S.C. §§ 1391(b) and (c) and 1395(a), because some of the violations alleged in the Complaint are alleged to have occurred in, and Defendants conduct business in, this judicial district. Defendants consent to this Court's jurisdiction over this Consent Decree and any action to enforce this Consent Decree, and to venue in this judicial district.

2. For purposes of this Consent Decree, Defendants agree that the Complaint states claims upon which relief may be granted pursuant to Sections 111, 165 and 502 of the CAA, 42 U.S.C. §§ 7411, 7475 and 7661a.

3. Notice of the commencement of this action has been given to the States of Ohio and Illinois as required by Section 113 of the CAA, 42 U.S.C. § 7413.

II. APPLICABILITY

4. The obligations of this Consent Decree apply to and are binding upon the United States, the State of Illinois, the State of Ohio, and upon Defendants and their officers, employees, agents, successors, assigns, and other entities or persons otherwise bound by law.

5. Defendants shall condition any transfer, in whole or in part, of ownership of, operation of, or other interest (exclusive of any non-controlling, non-operational shareholder interest) in, the Haverhill, Middletown or Gateway Facilities upon the execution by the

transferee of a modification to the Consent Decree, which makes the terms and conditions of the Consent Decree that apply to the respective Facility applicable to the transferee. In the event of such transfer, Defendants shall notify the United States and, in the case of the Gateway Facility, the State of Illinois, and, in the case of the Haverhill or Middletown Facilities, the State of Ohio. By no earlier than thirty (30) Days after such notice, Defendants may file a motion to modify the Consent Decree with the Court to make the terms and conditions of the Consent Decree applicable to the transferee. Defendants shall be released from the obligations and liabilities of this Consent Decree unless the United States opposes the motion and the Court finds the transferee does not have the financial and technical ability to assume the obligations and liabilities under the Consent Decree. The requirements of this Paragraph 5 shall not apply to transfers to SunCoke affiliates, who will be bound by this Decree upon transfer as an assignee.

6. Defendants shall provide a copy of this Consent Decree to all officers, employees, and agents whose duties include compliance with any provision of this Decree, as well as any contractor retained to perform work required under this Consent Decree. Defendants shall condition any such contract upon performance of the work in conformity with the terms of this Consent Decree.

7. Purpose. It is the express purpose of the Parties in entering this Consent Decree to further the objectives of the Act, as enunciated in Section 101 of the Act, 42 U.S.C. § 7401 *et seq*., and with respect to the Gateway Facility, the objectives of the Illinois Environmental Protection Act, 415 ILCS 5/1 *et seq*., and with respect to the Haverhill Facility, the objectives of Chapter 3704 of the Ohio Revised Code. All plans, reports, construction, maintenance and other obligations in this Consent Decree or resulting from the activities required by this Consent Decree shall have the objective of causing Defendants to come into and remain in full

compliance with the terms of its applicable permits and the Act, and Chapter 3704 of the Ohio Revised Code for the Haverhill Facility and the Illinois Environmental Protection Act with respect to the Gateway Facility.

III. **DEFINITIONS**

8. Terms used in this Consent Decree that are defined in the CAA or in federal and state regulations promulgated pursuant to the CAA shall have the meaning assigned to them in the CAA or such regulations, unless otherwise provided in this Decree. Whenever the terms set forth below are used in this Consent Decree, including attached appendices, the following definitions shall apply:

a. "Affected Coke Oven Battery" shall mean all heat recovery ovens, where coal undergoes destructive distillation to produce coke, at HNCC No. 1, HNCC No. 2, and GECC, respectively.

b. "Baghouse" shall mean the fullstream (fabric filter/membrane) particulate emission control device. The Baghouse is a part of the associated Flue Gas Desulfurization Unit ("FGD").

c. "Bypass Vent Stack" shall mean each vent stack located between the coke oven battery common tunnel and each HRSG at the Facilities. In HNCC's Construction Permit – PSD PTI 07-00511, Bypass Vent Stacks are termed "bypass vents," and are identified as Stacks 1-10. In GECC's Construction Permit -- PSD Approval No. 06070020, issued March 13, 2008, these vent stacks are termed "waste heat stacks," and are identified as Stacks 1-6.

d. "Bypass Venting" shall mean the redirection of a gas stream, including associated waste heat and emissions at an Affected Coke Oven Battery (a) through the Bypass Vent Stacks directly to the atmosphere (thereby bypassing the HRSGs and FGD) for any reason,

or (b) through the Main Stack when such venting is not controlled by the FGD. Bypass Venting through a Bypass Vent Stack commences when a Bypass Vent Stack lid opens and continues until the Bypass Vent Stack lid closes; Bypass Venting through the Main Stack occurs when a gas stream vented through the Main Stack is not controlled by the FGD and continues until venting through the Main Stack is controlled by the FGD.

e. "Bypass Venting Incident" shall mean all Bypass Venting that lasts longer than thirty (30) cumulative minutes for all stacks at an Affected Coke Oven Battery over a twenty-four (24) hour period. This definition shall be used only to determine if a root cause analysis is required pursuant to Paragraph 20 for a period of Bypass Venting. This definition shall not be used to determine compliance with the emissions limitations contained in the Consent Decree or applicable Permits.

f. "Charging" shall mean the process of introducing coal feed into a coke oven.

g. "Coal sulfur content" shall mean the elemental composition of sulfur in coal by weight as determined by methods approved in the Permits.

h. "Complaint" shall mean the complaint filed by the United States, the State of Illinois, and the State of Ohio in this action.

i. "Consent Decree" or "Decree" shall mean this Decree and all appendices attached hereto.

j. "Day" shall mean a calendar day. In computing any period of time under this Consent Decree, where the last day would fall on a Saturday, Sunday, or federal or State holiday, the period shall run until the close of business of the next working day.

k. "Defendants" shall mean HNCC, GECC, and SunCoke Energy.

l. "Effective Date" shall have the meaning given in Section XIV (Effective Date).

m. "EPA" shall mean the United States Environmental Protection Agency and any successor departments or agencies.

n. "Existing HRSG" shall mean a HRSG that is already installed and operational at either the Haverhill Facility or the Gateway Facility on the Effective Date. Existing HNCC HRSGs are HRSGs 1-5 at HNCC No. 1, and HRSGs 6-10 at HNCC No. 2. Existing GECC HRSGs are HRSGs 1-6 at GECC.

o. "Flue Gas Desulfurization unit" or "FGD" shall mean a dry scrubber used to remove sulfur dioxides and acid gases, among other pollutants, from the products of combustion or flue gases from gaseous waste streams before discharge to the atmosphere. HNCC owns and operates two FGDs, distributed as one per one hundred (100) ovens among the two hundred (200) coke ovens at the Haverhill Facility. GECC owns and operates one FGD, which serves the Gateway Facility's one hundred and twenty (120) coke ovens.

p. "FGD Maintenance Bypass Venting" shall mean Bypass Venting at an Affected Coke Oven Battery due to Scheduled FGD Maintenance.

q. "Gateway Facility" shall mean the coke plant located at 2585 Edwardsville Road, Granite City, Illinois, 62040. The Gateway Facility includes one hundred and twenty coke ovens, six Heat Recovery Steam Generators, six Bypass Vent Stacks, one FGD, one Baghouse, one Main Stack, and ancillary equipment.

r. "GECC" shall mean the Gateway Energy & Coke Company, LLC.

s. "GECC Battery" shall mean the coke oven battery located at the Gateway Facility.

t. "Haverhill Facility" shall mean the coke plant located at 2446 Gallia Pike, Franklin Furnace, Ohio, 45629. The Haverhill Facility is divided into two one-hundred (100) coke oven batteries identified as HNCC No. 1 and HNCC No. 2, ten Heat Recovery Steam Generators (1-10), ten Bypass Vent Stacks (1-10), two FGDs, two Baghouses, two Main Stacks, and ancillary equipment.

u. "Heat Recovery Steam Generator" or "HRSG" shall mean an energy recovery heat exchanger that recovers heat from a hot gas stream for the purpose of steam generation.

v. "HNCC" shall mean the Haverhill Coke Company LLC.

w. "HRSG Maintenance Bypass Venting" shall mean Bypass Venting out of a single Bypass Vent Stack at an Affected Coke Oven Battery due to Scheduled HRSG Maintenance.

x. "HRSG Outage" means the period of time when a HRSG is not operating.

y. "Illinois" shall mean the State of Illinois.

z. "Main Stack" shall mean the main stack located at the end of the control train after the FGD and baghouse.

aa. "Malfunction" shall mean any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner that causes, or has the potential to cause, the emissions limitations in an applicable standard or permit to be exceeded. Failures that are caused in part or entirely by poor maintenance or careless operation are not malfunctions. Nothing in this definition shall eliminate the obligation of HNCC No. 1 and No. 2 to comply with the requirements of Ohio Adm. Code 3745-15-06.

bb. "Middletown Facility" shall mean the coke plant located at 3353 Yankee Road, Middletown, Ohio 45044. The Middletown Facility includes one hundred (100) coke ovens, five (5) HRSGs, five (5) Bypass Vent Stacks, one FGD, one Baghouse, one Main Stack, and ancillary equipment.

cc. "Month" shall mean calendar month.

dd. "Ohio" shall mean the State of Ohio, acting on behalf of Ohio EPA and the Portsmouth Local Air Agency.

ee. "Paragraph" shall mean a portion of this Consent Decree identified by an Arabic numeral.

ff. "Particulate matter" or "PM" emissions shall mean all finely divided solid or liquid material, other than uncombined water, emitted to the ambient air as measured by applicable reference methods, or an equivalent or alternative method, specified in 40 C.F.R. Chapter 1, or by a test method specified in an approved State implementation plan.

gg. "Parties" shall mean the United States, the State of Illinois, the State of Ohio, HNCC, GECC, and SunCoke Energy.

hh. "Permits" shall mean GECC's Construction Permit – PSD Approval No. 06070020, issued by the Illinois Environmental Protection Agency March 13, 2008 – and HNCC's Final PSD Permit-to-Install (PTI) 07-00511, issued December 11, 2003, as modified by HNCC's Final Administrative Modification of PSD Permit-to-Install (PTI) 07-00511, issued by the Ohio Environmental Protection Agency on January 15, 2008, all as may be modified from time to time, not inconsistent with Section IV.I (Permit Requirements) of this Decree.

ii. "PSD" shall mean the Prevention of Significant Deterioration requirements at Part C of Subchapter I of the CAA, 42 U.S.C. §§ 7470-7492, and the

implementing regulations at 40 C.F.R. Part 52, and as incorporated in Ohio Adm. Code Section 3745-31. Approval and Promulgation of Implementation Plans; Ohio, 68 Fed. Reg. 2909 (January 22, 2003), revised by Approval and Promulgation of Implementation Plans; Ohio New Source Review Rules, 75 Fed. Reg. 8496 (February 25, 2010).

jj. "Redundant HRSG" shall mean a HRSG that operates simultaneously with an Existing HRSG, including in the event of the loss of one of the Existing HRSGs, that meets the criteria set forth in Section IV.A (Redundant HRSG Project).

kk. "Redundant HRSG Tie-In" shall commence when a hot duct at an Existing HRSG is cooled for purposes of installing a Redundant HRSG, and shall conclude when a Redundant HRSG and the Existing HRSGs can consistently operate simultaneously.

ll. "R.C." shall mean the Ohio Revised Code.

mm. "Rolling 12-Month Limit" shall mean an emission limit for a pollutant that applies for any twelve consecutive months.

nn. "Rolling 24-Month Limit" shall mean an emission limit for a pollutant that applies for any twenty-four consecutive months during the period in which the emissions limits in Paragraph 17 apply.

oo. "Root Cause" shall mean the primary cause or causes of a Bypass Venting Incident as determined by the Root Cause Failure Analysis in Section IV.D (Root Cause Failure Analysis for Bypass Venting Incidents) of this Consent Decree.

pp. "Root Cause Failure Analysis" or "RCFA" shall mean an assessment conducted pursuant to Section IV.D (Root Cause Failure Analysis for Bypass Venting Incidents) of this Consent Decree to determine the primary cause and any contributing cause of a Bypass Venting Incident.

qq. "Scheduled FGD Maintenance" shall mean preventative maintenance, inspection, and repair of FGD components, which is planned for and scheduled no less than twenty-one (21) Days prior to commencement of such activity. FGD work completed with at least forty-eight (48) hours' notice shall constitute Scheduled FGD Maintenance, provided that such work was originally scheduled no less than twenty-one (21) Days prior to the actual commencement of such activity.

rr. "Scheduled HRSG Maintenance" shall mean preventative maintenance, inspection, and repair of HRSG components, which is planned for and scheduled no less than seven (7) Days prior to commencement of such activity. HRSG work completed with at least forty-eight (48) hours' notice shall constitute Scheduled HRSG Maintenance, provided that such work was originally scheduled no less than seven (7) Days prior to the actual commencement of such activity.

ss. "Section" shall mean a portion of this Consent Decree identified by a Roman numeral.

tt. "SO_2" shall mean sulfur dioxide.

uu. "SunCoke Energy" shall mean SunCoke Energy, Inc.

vv. "Title V Permit" shall mean a permit required by, or issued pursuant to, 42 U.S.C. §§ 7661-7661f, and Section 39.5 of the Illinois Environmental Protection Act, 415 ILCS 5/39.5 (2010), and the implementing regulations at 40 C.F.R. Part 70, as may be modified from time to time, not inconsistent with Section IV.I (Permit Requirements) of this Decree, or a permit required by, or issued pursuant to, 42 U.S.C. §§ 7661-7661f, and Ohio R.C. 3704.036, and the implementing regulations at 40 C.F.R. Part 70, as may be modified from time to time, not inconsistent with Section IV.I (Permit Requirements) of this Decree.

ww. "Ton" or "tons" shall mean short ton or short tons. One ton equals 2000 pounds.

xx. "United States" shall mean the United States of America, acting on behalf of EPA.

IV. **COMPLIANCE REQUIREMENTS**

A. **Redundant HRSG Project**

9. No later than twenty-seven months after the Effective Date for HNCC No. 2 and fifty-one months after the Effective Date at HNCC No. 1 and the GECC Battery, Defendants shall have completed construction and commenced operation of the Redundant HRSGs.

10. Defendants shall design, construct, install, and operate redundant heat recovery steam generators ("Redundant HRSG Project") at each Affected Coke Oven Battery to capture, cool, and route to pollution control equipment waste gases and associated emissions from each Affected Coke Oven Battery during HRSG Outages.

11. The Redundant HRSG Project at HNCC No. 2 and HNCC No. 1 shall include installation of one or more Redundant HRSGs per one hundred (100) ovens, sufficient to collectively accommodate 100% of the gases from no less than twenty (20) ovens, at charge weights of forty-eight (48) tons of coal on a wet basis per oven. The Redundant HRSG Project at GECC shall include installation of one or more Redundant HRSGs per one-hundred twenty (120) ovens, sufficient to collectively accommodate 100% of the gases from no less than twenty (20) ovens, at charge weights of fifty (50) tons of coal on a wet basis per oven.

12. Each Redundant HRSG at each Affected Coke Oven Battery shall be operated concurrently with Existing HRSGs and be available to receive coking gases normally routed through Existing HRSGs on-demand, and shall be operated to prevent to the extent practicable,

any Bypass Vent Stack from opening during the transfer, except when the Redundant HRSG is down for maintenance.

13. Each Redundant HRSG shall be installed and operated in accordance with the Redundant HRSG Work Plan attached as Appendix 1 to the Consent Decree.

B. **Emission Limits**

14. Beginning on the Effective Date, ending on the date Paragraph 17 takes effect, and not including the Redundant HRSGs Tie-in periods referenced in Paragraph 15, Defendants shall comply with the following Bypass Venting emission limits at each Affected Coke Oven Battery specified in the table below:

Pollutant	Each Bypass Vent Stack (pounds/hour)			Main Stack Bypass Venting (pounds/hour)			Total Bypass Venting (tons/year[b])		
	HNCC No. 1	HNCC No. 2	GECC	HNCC No. 1	HNCC No. 2	GECC	HNCC No. 1	HNCC No. 2	GECC
SO_2	323[c]	323[c]	323[c]	1615[c]	1615[c]	1938[c]	155.1	155.1	302.3
	420[d]	420[d]	---	2100[d]	2100[d]	---			
PM	34.3[a]	34.3[a]	34.3[a]	171.5[a]	171.5[a]	205.8[a]	16.5	16.5	30.24
Pb	---	---	0.186[a]	---	---	1.116[a]	---	---	0.17

Table Notes:

a. Compliance shall be determined in accordance with Section IV.F (Quantification of Emissions During Bypass Venting). The emissions limits relating to PM include both filterable and condensable emissions.

b. Rolling 12-month total.

c. For any Bypass Venting Incident lasting 48 consecutive hours or longer, compliance shall be determined as a rolling 48-hour average, for each such Bypass Venting Incident. For any Bypass Venting Incident lasting less than 48 consecutive hours, this limit shall not apply.

d. Based on a 3-hour block average.

15. For purposes of Redundant HRSG Tie-In pursuant to this Consent Decree only, Defendants shall have seven hundred twenty (720) hours to complete such work, per Bypass Vent Stack, including all Bypass Venting through the Main Stack. From the time this work is

started until the time specified in Paragraph 17, Defendants shall comply with the limits specified in the table below:

Pollutant	Each Bypass Vent Stack (pounds/hour)			Main Stack Bypass Venting (pounds/hour)		
	HNCC No. 1	HNCC No. 2	GECC	HNCC No. 1	HNCC No. 2	GECC
SO_2	323[b]	323[b]	323[b]	1615[b]	1615[b]	1938[b]
	420[c]	420[c]	---	2100[c]	2100[c]	---
PM	34.3[a]	34.3[a]	34.3[a]	171.5[a]	171.5[a]	205.8[a]
Pb	---	---	0.186[a]	---	---	1.116[a]

Table Notes:

a. Compliance shall be determined in accordance with Section IV.F (Quantification of Emissions During Bypass Venting). The emissions limits relating to PM include both filterable and condensable emissions.

b. For any Bypass Venting Incident lasting 48 consecutive hours or longer, compliance shall be determined as a rolling 48-hour average, for each such Bypass Venting Incident. For any Bypass Venting Incident lasting less than 48 consecutive hours, this limit shall not apply.

c. Based on a 3-hour block average.

16. Compliance with the SO_2 limits in Paragraphs 14 and 15 shall be determined pursuant to Section IV.F using (a) the average of all of the concentration data from the continuous emissions monitoring system ("CEMS") required by Section IV.G.b, for the duration of the Bypass Venting or as otherwise defined in the limits in Paragraphs 14 and 15 above, when the CEMS is producing valid data, (b) average flow rate from the Flue Gas Flow Rate Study required by Paragraph 36 (or, in the case of a bypass through the Main Stack, valid CEMS and flow data from the Main Stack); and (c) the duration of the Bypass Venting. If the CEMS is not operational and producing valid data by the time the HRSG Outage begins, compliance with the SO_2 limits in Paragraphs 14 and 15 shall be determined pursuant to Section IV. F using the most recent stack test required by Section IV.G.a. Compliance with the Pb and PM limits in

Paragraphs 14 and 15 shall be determined by the stack tests required by Section IV.G.a. Compliance with the rolling 12-Month Limits in Paragraph 14 shall be determined by adding the sum of the emissions over a twelve (12) month period, commencing one year after the Effective Date and ending twenty-seven (27) months after the Effective Date for HNCC No. 2 and fifty-one (51) months after the Effective Date for HNCC No. 1 and the GECC Battery. Nothing in this Paragraph shall be interpreted to preclude Defendants from disconnecting the Bypass Vent Stack CEMS in order to complete the Redundant HRSG Tie-ins required by Section IV.A for a period not to exceed 360 total cumulative hours.

17. Beginning on the earlier of (a) the date Defendants notify Plaintiffs that the redundant HRSGs at HNCC No. 2, HNCC No. 1, and the GECC Battery, respectively, are fully operational or (b) twenty-seven (27) months after the Effective Date at HNCC No. 2 and fifty-one (51) months after the Effective Date at HNCC No. 1 and the GECC Battery, Defendants shall comply with the Bypass Venting emission limits[1] specified in the table below at each Affected Coke Oven Battery:

Pollutant	Each Bypass Vent Stack (pounds/hour)			Main Stack Bypass Venting (pounds/hour)			Total Bypass Venting (tons/year[b])		
	HNCC No. 1	HNCC No. 2	GECC	HNCC No. 1	HNCC No. 2	GECC	HNCC No. 1	HNCC No. 2	GECC
SO_2	323[c]	323[c]	323[c]	1615[c]	1615[c]	1938[c]	271.3	271.3	325.6
	420[d]	420[d]	--	2100[d]	2100[d]	--			
PM	34.3[a]	34.3[a]	34.3[a]	171.5[a]	171.5[a]	205.8[a]	28.8	28.8	34.6
Pb	---	---	0.186[a]	---	---	1.116[a]	---	---	0.188

[1] Nothing in Paragraph 17 of this Consent Decree shall eliminate Defendants' obligations to comply with the existing requirements of Defendants' relevant permits.

Table Notes:

a. Compliance shall be determined in accordance with Section IV.F (Quantification of Emissions During Bypass Venting). The emissions limits relating to PM include both filterable and condensable emissions.

b. Rolling 24-month total.

c. For any Bypass Venting Incident lasting 48 consecutive hours or longer, compliance shall be determined as a rolling 48-hour average, for each such Bypass Venting Incident. For any Bypass Venting Incident lasting less than 48 consecutive hours, this limit shall not apply.

d. Based on a 3-hour block average.

18. Compliance with the limits in Paragraph 17 shall be determined pursuant to Section IV.F using the most recent stack test required by Section IV.G.a. Compliance with the Rolling 24-Month Limits in Paragraph 17 shall be determined by adding the emissions over a twenty-four (24) month period, commencing two years after Paragraph 17 takes effect.

C. **Emissions Minimization During All Bypass Venting**

19. During all periods of Bypass Venting at each Facility, Defendants shall minimize Bypass Venting emissions at each Affected Coke Oven Battery. Accordingly, Defendants shall, if practicable, take the following actions (beginning forty-eight (48) hours prior to the period of Bypass Venting if practicable, and if that is not practicable, as soon as the Facility can do so), or if not taken, shall indicate in the Root Cause Failure Analysis required by Paragraph 20 why the steps were not taken:

a. Reduce the coal charge at each Affected Coke Oven Battery to no more than a forty-two and a half (42.5) ton average on a wet weight basis. If the Bypass Venting is caused by a HRSG Outage, Defendants need only reduce the coal charged to the ovens affected by the HRSG Outage;

b. Minimize sulfur content of coal charged to each oven to no more than 1.1% by weight. If the Bypass Venting is caused by a HRSG Outage, Defendants need only

minimize to 1.1% by weight or less the sulfur content of the coal charged to the ovens affected by the HRSG Outage; and

c. Minimize the duration of the Bypass Venting to the extent practicable.

D. **Root Cause Failure Analysis for Bypass Venting Incidents**

20. Contents and Timing of Reports. Beginning after the Effective Date, Defendants shall complete a Root Cause Failure Analysis ("RCFA") within thirty (30) Days of the conclusion of any Bypass Venting Incident at any Affected Coke Oven Battery. Defendants shall include the RCFA(s) in the semi-annual report required by Section IV.J. Such reports shall set forth the following information concerning the Bypass Venting Incident:

a. The date and time that the Bypass Venting Incident started and ended. To the extent that the Bypass Venting Incident involved multiple releases either within a twenty-four (24) hour period or within subsequent, contiguous, non-overlapping twenty-four (24) hour periods, Defendants shall set forth the starting and ending dates and times of each release;

b. An estimate of the quantity of SO_2, PM, and Lead emissions that were emitted and the calculations that were used to determine that quantity;

c. Identification of the steps taken and not taken pursuant to Paragraph 19, along with (1) an explanation of why any steps identified in Paragraph 19 were not taken, (2) an estimate of the sulfur content of the coal charged into each coke oven whose emissions are bypassed, and (3) an estimate of the corresponding charge weights associated with each such coke oven;

d. For a Bypass Venting Incident that is a result of the following, Defendants need only provide the information in subparagraphs (a), (b), and (c) above and note one of the

below as the cause of the Bypass Venting:

(1) Venting that occurs before Paragraph 17 takes effect, and that results from Scheduled HRSG Maintenance that is conducted in compliance with the applicable Permit; or

(2) Venting that results from Scheduled FGD Maintenance that is conducted in compliance with the applicable Permit or for which Defendants receive Director's approval; or

(3) Venting that occurs before twenty-seven (27) months after the Effective Date for HNCC No. 2 and before fifty-one (51) months after the Effective date for HNCC No. 1 and the GECC Battery as a result of completing the Redundant HRSG Tie-In so long as

i. Defendants have submitted notification to EPA and Illinois or Ohio, as applicable, in the manner set forth in Section XIII (Notices), at least thirty (30) Days prior to the initiation of the Bypass Venting;

ii. Defendants follow the Project Schedule set forth in the Redundant HRSG Work Plan (Appendix 1); and

iii. The total duration of Bypass Venting for the purposes of Redundant HRSG Tie-In at each Affected Coke Oven Battery is no longer than seven hundred and twenty (720) hours, per Existing HRSG.

(4) Venting that occurs after Paragraph 17 takes effect, and that results from transferring waste gas from an Existing HRSG to a Redundant HRSG in order to perform Scheduled HRSG Maintenance that is conducted in compliance with the applicable Permit so long as the Bypass Venting Incident does not last more than sixty (60) minutes for each transfer.

e. For all other Bypass Venting Incidents, the RCFA will include the requirements in subparagraphs (a), (b), (c) and (f-i):

f. A detailed analysis that sets forth the root cause(s) and all contributing causes of that Bypass Venting Incident, to the extent determinable, and the steps, if any, that Defendants took to limit the duration and/or quantity of emissions associated with the Bypass Venting Incident;

g. An analysis of the measures, if any, that are reasonably available to prevent or reduce the likelihood of a recurrence of the Bypass Venting Incident resulting at the same Affected Coke Oven Battery from the same root cause(s) and contributing causes in the future. The analysis shall evaluate design, operational, and maintenance changes, if any; the probable effectiveness of each such measure; the likely cost of each measure; and whether or not an outside consultant should be retained to assist in the analysis;

h. Either a description of corrective action(s) implemented under this Section or, if not already implemented, a schedule for its (their) implementation, including proposed commencement and completion dates, or an explanation that corrective action(s) is (are) not required;

i. To the extent that investigations of the causes and/or possible corrective actions still are underway on the due date of the report, a statement of the anticipated date by which a follow-up report fully conforming to the requirements of this Paragraph will be submitted; provided, however, that if Defendants have not submitted a report or a series of reports containing the information required to be submitted under this Paragraph within sixty (60) Days (or such additional time as EPA may allow) after the due date for the initial report for any Event, the stipulated penalty provisions of Section VII (Stipulated Penalties) shall apply for

failure to timely submit the report. Nothing in this Paragraph shall be deemed to excuse Defendants from their investigation, reporting, and corrective action obligations under this Section for any Bypass Venting Incident which occurs after another Bypass Venting Incident for which Defendants have requested an extension of time under this Paragraph; and

j. To the extent that completion of the implementation of corrective action(s), if any, is not finalized at the time of the submission of the report required under this Paragraph, then, by no later than thirty (30) Days after completion of the implementation of corrective action(s), Defendants shall submit a report identifying the corrective action(s) taken and the dates of commencement and completion of the implementation.

21. Corrective Actions Required. In response to any Bypass Venting Incident other than those referenced in Paragraph 20.d., Defendants shall, as expeditiously as possible, implement such interim and/or long-term corrective actions, if any, as are reasonable and consistent with good engineering practices to minimize the likelihood of a recurrence of the root causes and any contributing causes of that Bypass Venting Incident.

22. If EPA, after consultation with Illinois EPA for corrective actions pertaining to GECC and with Ohio EPA for corrective actions pertaining to HNCC, does not notify Defendants in writing within sixty (60) Days of receipt of the report(s) required by Paragraph 20 that it objects to one or more aspects of Defendants' proposed corrective action(s), if any, and schedule(s) of implementation, if any, then that (those) action(s) and schedule(s) shall be deemed acceptable for purposes of compliance with Paragraphs 20 and 21 of this Consent Decree.

23. EPA, Illinois EPA, and Ohio EPA do not, by their agreement to the entry of this Consent Decree or by their failure to object to any corrective action that Defendants may take in the future, warrant or aver in any manner that any of Defendants' corrective actions in the future

will result in compliance with the provisions of the CAA, the Illinois Environmental Protection Act, or R.C. Chapter 3704, or their implementing regulations. Notwithstanding EPA's, Illinois EPA's, and Ohio EPA's review of any plans, reports, corrective actions, or procedures under this Section IV.D, Defendants shall remain solely responsible for compliance with the CAA, the Illinois Environmental Protection Act, and R.C. Chapter 3704, and their implementing regulations. Nothing in this Paragraph shall be construed as a waiver of EPA's, Illinois EPA's, or Ohio EPA's rights under the CAA, the Illinois Environmental Protection Act, or R.C. Chapter 3704, or their regulations for future violations of the CAA or its regulations.

24. If EPA, after consultation with Illinois EPA or Ohio EPA, as appropriate, does object, in whole or in part, to Defendants' proposed corrective action(s) and/or its schedule(s) of implementation, or, where applicable, to the absence of such proposal(s) and/or schedule(s), it shall notify Defendants of that fact within sixty (60) Days following receipt of the RCFA required by Paragraph 20. If EPA and Defendants cannot agree on the appropriate corrective action(s), if any, to be taken in response to a particular Bypass Venting Incident, any Party may invoke the Dispute Resolution provisions of Section IX of the Consent Decree (Dispute Resolution).

E. **Future Emissions Reductions**

25. The Parties recognize that the reduced Bypass Venting expected to result from compliance with this Consent Decree after start-up of the Redundant HRSGs will lower emissions of SO_2 and PM, and Pb (for the GECC Battery) from the current annual permit limits applicable to the period prior to start-up of the Redundant HRSGs. Defendants shall provide the information required by Section IV.F (Quantification of Emission During Bypass Venting) regarding emissions during Bypass Venting pursuant to Section IV.J (Reporting Requirements)

to allow calculations of emissions reductions achieved pursuant to the Consent Decree. The reduced Bypass Venting will also result in reductions of sulfuric acid mist, hydrochloric acid, and mercury emissions from previously emitted levels.

F. **Quantification of Emissions During Bypass Venting**

26. Except as otherwise provided in Paragraph 16, for all regulated pollutants subject to a stack test, the quantity of emissions at both the Main Stack and Bypass Vent Stacks, at each respective Facility, as applicable, from all Bypass Venting shall be calculated using data from the most recent, representative stack test performed during Bypass Venting, using the following formula:

$$C = \sum_{i}^{BPS} D_i P$$

The Variables and Derivation of Multipliers used in the Equations in this Paragraph shall have the following meanings:

C = mass of Contaminant

P = mass flow rate of Contaminant

D_i = duration of Bypass Venting on Bypass Vent Stack *i*, except for Bypass Venting in compliance with Paragraph 15

BPS = Bypass Vent Stacks Open during Bypass Venting, where *i* equals each individual open Bypass Stack; during Bypass Venting through the FGD, *i* is all bypass stacks from which venting is occurring and/or would have occurred but for the Bypass Venting at the Main Stack.

i = Bypass Vent Stack *i*

27. The quantity of pollutants emitted shall be rounded to one decimal point. (For example, subsequent to a calculation that results in a number equal to 10.050 tons, the quantity of the pollutant emitted shall be rounded to 10.1 tons and 10.049 tons would be rounded to 10.0 tons.) For purposes of determining the occurrence of, or the total quantity of emissions resulting from Bypass Venting that is comprised of intermittent Bypass Venting, the quantity of pollutants emitted shall be equal to the sum of the quantities of the pollutant emitted during each such period of intermittent Bypass Venting.

28. Any disputes under the provisions of this Section shall be resolved in accordance with Section IX (Dispute Resolution) of this Consent Decree.

G. **Stack Testing and Continuous Emissions Monitoring**

a. **Stack Testing**

29. During each period of Scheduled FGD Maintenance more than ninety (90) Days after the Effective Date that is scheduled to last more than two (2) Days, Defendants shall conduct the stack performance tests (stack tests) required under this Subsection.

30. Defendants shall conduct stack tests measuring the emission rate of Pb, PM, PM_{10}, HCl, mercury, sulfuric acid mist, NO_x, (pre- and post-redundancy), and SO_2 (post-redundancy), at one Bypass Vent in accordance with the applicable requirements of 40 C.F.R. Part 60, Appendix A; however, Defendants shall implement the requirements of Paragraph 19 when conducting stack tests during periods of Bypass Venting. Defendants shall use best efforts to ensure accurate measurements of coke production during each test run.

31. By no later than sixty (60) Days before any stack test is conducted, Defendants shall submit for approval to EPA and Illinois EPA (in the case of the Gateway Facility) or Ohio

EPA (in the case of the Haverhill Facility), in the manner set forth in Section XIII (Notices), notice of its intent to conduct such test.

32. The notification required by Paragraph 31 must include the scheduled date of the test, an emissions test protocol, a description of the planned operating rate and operating conditions, and the procedures that will be used to measure maximum charge weight and rate. If EPA requires modification of information submitted in the notification within thirty (30) days of the notice required by Paragraph 31, Defendants shall make such adjustments and conduct the stack test in conformity with EPA's requirements in accordance with Paragraphs 55-59.

33. By no later than sixty (60) Days after conducting a stack test, Defendants shall submit to EPA and Illinois EPA (in the case of the Gateway Facility) or Ohio EPA (in the case of the Haverhill Facility), in the manner set forth in Section XIII (Notices), a report documenting the results of the stack test.

b. **CEMS Requirements**

34. Within one hundred eighty (180) Days of the Effective Date, Defendants shall install and calibrate an SO_2 CEMS capable of measuring the SO_2 concentration at one Bypass Vent Stack at each Affected Coke Oven Battery in a manner that complies with 40 C.F.R. Part 60, Appendix B, Performance Specification 2, and the quality assurance/quality control requirements specified in 40 C.F.R. Part 60, Appendix F. Defendants shall use best efforts to attempt to certify the CEMS on the first, and in any event, no later than the second, Scheduled HRSG Maintenance following installation of the CEMS associated with the Bypass Vent Stack on which the CEMS is located. The parties recognize that this is an innovative attempt to employ a CEMS on an uncontrolled and extremely hot vent gas stream, and that the application of a CEMS on a stack that is venting only sporadically may be impracticable. Defendants shall

use best efforts to maintain and operate a CEMS at each Affected Coke Oven Battery in accordance with Paragraph 35 below, until the Redundant HRSG at that Affected Coke Oven Battery has commenced operation.

35. Except during CEMS breakdowns, repairs, calibration checks, zero span adjustments, and when disconnected pursuant to Paragraph 16, the SO_2 CEMS on each of the Facilities shall be in continuous operation for the period required by Paragraph 34 to demonstrate compliance with the applicable SO_2 emission limits established in Paragraphs 14 and 15. Defendants shall use best efforts to avoid CEMS breakdowns and minimize CEMS downtime during Bypass Venting. This shall include, but is not limited to, operating and maintaining the CEMS in accordance with best practices and maintaining an adequate on-site inventory of spare parts or other supplies necessary to make rapid repairs to the equipment.

36. Defendants shall complete the Flue Gas Flow Rate Study that is Appendix 2 to this Consent Decree at one Bypass Vent Stack at each Affected Coke Oven Battery during one of the first five Scheduled HRSG Maintenance events at each Affected Coke Oven Battery following the Effective Date. The average flow rate from the study for each Affected Coke Oven Battery shall be used, in conjunction with the CEMS data, to determine compliance with Paragraphs 14 and 15.

H. **FGD and HRSG PMO Plan and Reliability Studies**

a. **FGD and HRSG PMO Plans**

37. By no later than six (6) months after the Effective Date, Defendants shall submit to EPA (and, for the Gateway Facility, Illinois EPA, and for the Haverhill Facility, Ohio EPA) for approval pursuant to Paragraphs 55-59 of the Consent Decree, a plan to implement enhanced maintenance and operation of the Affected Coke Oven Batteries, the HRSGs, the FGD, and all

other pollution control equipment. These plans shall be termed Preventive Maintenance and Operation Plans ("PMO Plans"). Each PMO Plan shall be a compilation of the Defendants' approaches for exercising good air pollution control practices and for minimizing emissions at the Affected Coke Oven Batteries. The PMO Plan shall provide for continuous operation of the HRSGs and FGD between scheduled maintenance with minimization of emissions. The PMO Plan shall include, but not be limited to, emissions minimization plans, emergency procedures and schedules to coordinate Scheduled FGD Maintenance and Scheduled HRSG Maintenance. The PMO Plan shall have the goal of eliminating Bypass Venting to ensure compliance with Paragraph 17. Defendants shall comply with the PMO Plan at all times, including periods of Startup, Shutdown and Malfunction of the HRSG and FGD. If Defendants make changes to a PMO Plan related to minimizing Bypass Venting and/or emissions, such changes shall be summarized and reported to EPA and the Illinois EPA or Ohio EPA, as appropriate, pursuant to Section IV.J (Reporting Requirements) of the Consent Decree. Such changes may be implemented immediately, but nonetheless shall be subject to approval under Paragraphs 55-59 of this Consent Decree.

b. **Reliability Studies**

38. Each PMO Plan for each Affected Coke Oven Battery will also contain FGD/HRSG Reliability Studies ("Reliability Studies"), which will (1) comprehensively catalog and describe all projects implemented in the past to improve the reliability of the operation of Existing FGDs and Existing HRSGs at the Affected Coke Oven Batteries, and (2) discuss or propose potential future reliability enhancements, including—but not limited to—the following:

a. Addition of instrumentation at atomizer gas inlets to monitor balance;

b. Selective use of atomizers for reduced load conditions;

c. Addition of dew-point analyzers;

d. Testing and implementation of spray dryer absorber thermocouple chain; and

e. Increasing the number of spare atomizers for additional maintenance redundancy.

39. The Reliability Studies will contain a schedule for implementation of each project that Defendants recommend be implemented in Paragraph 38 and that provides for project implementation as soon as practicable.

40. To the extent that a reliability project not yet implemented is identified as a corrective action to address a Root Cause identified in a Root Cause Failure Analysis conducted pursuant to Section IV.D (Root Cause Failure Analysis for Bypass Venting Incidents), the schedule for implementing the reliability project as a corrective action pursuant to Paragraph 20.h will supersede any schedule adopted to implement the reliability project under this Section.

I. **Permit Requirements**

41. Permits Prior to Construction or Installation. Defendants shall obtain all required federal, state, and local permits necessary for performing any compliance obligation under this Consent Decree, including without limitation any permits required by law for construction of the Redundant HRSG and pollution control technology, and the installation of equipment at the Facilities. Defendants may seek relief under the provisions of Section VIII (Force Majeure) for any delay in the performance of any such obligation resulting from a failure to obtain, or a delay in obtaining, any permit or approval required to fulfill such obligation if Defendants have submitted timely and complete applications.

42. Applications for Permits Incorporating the Limits in Section IV.B. By no later than one (1) year after the Effective Date, Defendants shall submit an application to modify their federally-enforceable construction permit(s) and issued Title V operating permits for each Facility to the Ohio EPA (for the Haverhill Facility) and Illinois EPA (for the Gateway Facility), in accordance with applicable state and federal rules, including applicable administrative amendment and/or modification provisions of such rules, to incorporate the emissions limitations and their timing established in Paragraph 17 and the emissions quantification methodology established in Section IV.F (Quantification of Emissions During Bypass Venting).

43. Following submission of the complete permit application, Defendants shall cooperate with Ohio EPA or Illinois EPA, as applicable, by promptly submitting all available information that they seek following its receipt of the permit materials.

44. Permits: Emission Limits and Standards. This Consent Decree shall not terminate before the emissions limitations established in Paragraph 17 and the emissions quantification methodology established in Section IV.F (Quantification of Emissions During Bypass Venting) are incorporated into Defendants' federally-enforceable construction permit(s) and any issued Title V operating permits for the Facilities.

45. For any permit applications required by this Section that are filed after the Effective Date, Defendants shall submit to EPA in the manner set forth in Section XIII (Notices), a copy of each application, as well as a copy of any permit proposed as a result of such application, to allow for timely participation in any public comment opportunity. If, as of the Effective Date, Defendants have already received any permit necessary to implement the requirements of this Consent Decree, and if EPA has not already received such permits, then no

later than thirty (30) Days after the Effective Date, Defendants shall submit copies of such permits to EPA in the manner set forth in Section XIII (Notices).

46. Emission Credit Generation. Defendants shall not use any SO_2 PM, or Pb emission reductions required by this Consent Decree for the purpose of obtaining netting credits or offsets in any PSD, major NSR, and/or minor NSR permit or permit proceeding, and shall not buy, sell, or trade any emission reductions required by this Decree; provided, however, that nothing in this Consent Decree is intended to prohibit Defendants from:

a. Using netting reductions or emission offset credits from units that are covered by this Decree to the extent that the proposed netting reductions or emission offset credits represent the difference between the emission limits set forth in this Consent Decree and the more stringent emission limits that Defendants may elect to accept for these units in a permitting process;

b. Using netting reductions or emissions offset credits from units that are not subject to an emission limitation under this Consent Decree; and/or

c. Using netting reductions or emissions offset credits for any pollutants other than SO_2, PM, and Pb.

47. Baseline Actual Emissions. For the purposes of calculating baseline actual emissions as defined in the PSD or NSR rules, in any PSD, major NSR, and/or minor NSR permit or permit proceeding for either the Gateway or the Haverhill Facility, the emission rate during any 24-month period after the Effective Date selected by Defendants shall be adjusted downward to exclude any emissions that would have exceeded the SO_2 and PM limits established under Section IV.B of this Consent Decree had the Facility in question been required

to comply with the SO_2 and PM limits established under Section IV.B during the consecutive 24-month period.

J. **Reporting Requirements**

48. Defendants shall submit, in the manner set forth in Section XIII (Notices), a semi-annual progress report no later than January 31 and July 31 of each year, with the first semi-annual report due on the first January 31 or July 31 that occurs more than ninety (90) Days after the Effective Date. Each semi-annual report shall contain the following information with respect to, respectively, the half-year between July 1 and December 31, or the half-year between January 1 and June 30, commencing on the Effective Date:

a. Work performed and progress made toward implementing the requirements of Section IV (Compliance Requirements), including completion of any milestones;

b. Any significant modifications to previously-submitted design specifications of any pollution control system, or to monitoring equipment, required to comply with the requirements of Section IV (Compliance Requirements);

c. Any significant problems encountered or anticipated in complying with the requirements of Section IV (Compliance Requirements), including implemented or proposed solutions;

d. A summary of the emissions monitoring and testing data collected to demonstrate compliance with a requirement of this Consent Decree;

e. All exceedances of any emission limits set forth in Section IV.B (Emission Limits) of this Consent Decree;

f. All failures to comply with the emissions minimization required by Section IV.C. of this Consent Decree;

g. All RCFA(s) required by Section IV.D (Root Cause Failure Analysis for Bypass Venting Incidents) of this Consent Decree;

h. Any updated PMO Plan required by Paragraph 37 of this Consent Decree;

i. The emissions reduction information required by Paragraph 25;

j. Status of permit applications and a summary of all permitting activity pertaining to compliance with this Consent Decree;

k. Any reports to the State of Illinois or the State of Ohio pertaining to compliance with this Consent Decree or the CAA; and

l. Information required by Appendix 4 (Potential Middletown Redundant HRSG Project).

49. If Defendants have reason to believe that they have violated or may violate any requirement of this Consent Decree for which notice is not provided in Paragraph 48a.-l. above or for which a RCFA is not required pursuant to Section IV.D (Root Cause Failure Analysis for Bypass Venting Incidents), Defendants shall notify the United States, the State of Illinois, and the State of Ohio of such violation or potential violation of this Consent Decree and its duration or anticipated likely duration, in writing, within forty-five (45) Days of the Day Defendants first become aware of the violation or likely violation, with an explanation of the violation's likely cause and of the remedial steps taken, or to be taken, to prevent or minimize such violation. If the cause of the violation cannot be fully explained at the time the report is due, Defendants shall so state in the report. Defendants shall investigate the cause of the violation and shall then submit an amendment to the report, including a full explanation of the cause of the violation, within thirty (30) Days of the Day Defendants become aware of the cause of the violation. Nothing in this Paragraph or the following Paragraph relieves Defendants of their obligation to

provide the notice required by Section VIII (Force Majeure), although notice provided pursuant to Section VIII (Force Majeure) also satisfies this Paragraph with respect to the event(s) in such notice.

50. Whenever any violation of this Consent Decree or of any applicable permits or any other event affecting Defendants' performance under this Decree, or the performance of either Facility, may pose an immediate threat to the public health or welfare or the environment, Defendants shall notify EPA and, for violations occurring at the Gateway Facility, Illinois EPA, and, for violations relating to the Haverhill Facility, Ohio EPA, orally or by electronic or facsimile transmission as soon as possible, but no later than twenty-four (24) hours after Defendants first knew or should have known that the violation or event may pose an immediate threat to the public health or welfare or the environment. This procedure is in addition to the requirements set forth in Section IV.D (Root Cause Failure Analysis for Bypass Venting Incidents), and is in addition to any other state or federal reporting requirement which may be applicable.

51. All reports shall be submitted to the persons and in the manner designated in Section XIII (Notices).

52. Each report submitted by Defendants under this Section shall be signed by a plant manager, a corporate official responsible for environmental management and compliance, or a corporate official responsible for plant engineering management of Defendants and shall include the following certification:

> I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my directions and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and

> belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

This notification requirement does not apply to emergency or similar notifications where compliance would be impractical.

53. The reporting requirements of this Consent Decree do not relieve Defendants of any reporting obligations required by the CAA or implementing regulations, or by any other federal, state, or local law, regulation, permit, or other requirement. The reporting requirements of this Section are in addition to any other reports, plans, or submissions required by other Sections of this Consent Decree.

54. Any information provided pursuant to this Consent Decree may be used by the United States, the State of Ohio or the State of Illinois in any proceeding to enforce the provisions of this Consent Decree and as otherwise permitted by law. All information and documents submitted by Defendants to the United States, Illinois or Ohio pursuant to this Consent Decree shall be subject to public inspection unless identified and supported as confidential business information (CBI) in accordance with 40 C.F.R. Part 2. Under no circumstances shall emissions data be identified or considered CBI.

55. Approval of Deliverables. After review of any plan, report, or other item that is required to be submitted for approval pursuant to this Consent Decree, EPA, after consultation with the State of Illinois or Ohio, as appropriate, shall in writing: a) approve the submission; b) approve the submission upon specified conditions; c) approve part of the submission and disapprove the remainder; or d) disapprove the submission. If EPA has not approved or disapproved of the submission within sixty (60) Days, then Defendants may proceed to implement the plan, report, or other item.

56. If the submission is approved pursuant to Paragraph 55, Defendants shall take all actions required by the plan, report, or other document, in accordance with the schedules and requirements of the plan, report, or other document, as approved. If the submission is conditionally approved or approved only in part, pursuant to Paragraph 55, Defendants shall, upon written direction from EPA, after consultation with the State of Illinois and/or State of Ohio, as appropriate, take all actions required by the approved plan, report, or other item that EPA, after consultation with the relevant State, determines are technically severable from any disapproved portions, subject to Defendants' right to dispute only the specified conditions or the disapproved portions under Section VIII (Dispute Resolution).

57. If the submission is disapproved in whole or in part pursuant to Paragraph 55, Defendants shall, within forty-five (45) Days of such disapproval, or such other time as the Parties agree to in writing, correct all deficiencies and resubmit the plan, report, or other item, or disapproved portion thereof, for approval, in accordance with the preceding Paragraphs. If the resubmission is approved in whole or in part, Defendants shall proceed in accordance with the preceding Paragraph.

58. Any stipulated penalties applicable to the original submission, as provided in Section VII (Stipulated Penalties), shall accrue during the 45-Day period or other specified period, but shall not be payable unless the resubmission is untimely or is disapproved in whole or in part; provided that, if the original submission was so deficient as to constitute a material breach of Defendants' obligations under this Decree, the stipulated penalties applicable to the original submission shall be due and payable notwithstanding any subsequent resubmission.

59. If a resubmitted plan, report, or other item, or portion thereof, is disapproved in whole or in part, EPA, after consultation with the State of Illinois and/or State of Ohio, as

appropriate, may again require Defendants to correct any deficiencies, in accordance with the preceding Paragraphs, or may itself/themselves correct any deficiencies, subject to Defendants' right to invoke Dispute Resolution and the right of EPA, the State of Illinois, and the State of Ohio to seek stipulated penalties as provided in the preceding Paragraphs.

V. **CIVIL PENALTY**

60. Within thirty (30) Days after the Effective Date, Defendants shall pay the sum of $1,270,000 as a civil penalty to the United States by FedWire Electronic Funds Transfer (EFT) to the U.S. Department of Justice in accordance with written instructions to be provided to Defendants following entry of the Consent Decree, by the Financial Litigation Unit of the U.S. Attorney's Office for the Southern District of Illinois. At the time of payment, Defendants shall send a copy of the EFT authorization form and the EFT transaction record, together with a transmittal letter, which shall state that the payment is for the civil penalty owed pursuant to the Consent Decree in *United States, et al. v. SunCoke Energy, Inc., et al.*, and shall reference the civil action numbers, DOJ #90-5-2-1-09890 and #90-5-2-1-10065 to the United States in the manner set forth in Section XIII (Notices); by email to acctsreceivable.CINWD@epa.gov; and by mail to:

EPA Cincinnati Finance Office
26 Martin Luther King Drive
Cincinnati, Ohio 45268

61. Within thirty (30) Days of the Effective Date, Defendants shall pay a civil penalty of $325,000 to the State of Illinois by certified check payable to the Illinois EPA for deposit into the Environmental Protection Trust Fund ("EPTF"). Payments shall be sent by first class mail and delivered to:

Illinois Environmental Protection Agency
Fiscal Services
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Within thirty (30) Days of the Effective Date, Defendants shall make a payment of $125,000 to the State of Illinois by certified check payable to the Illinois Attorney General's Office for deposit into the State Projects and Court Ordered Distribution Fund for subsequent expenditure as authorized by the Attorney General. Payments shall be sent by first class mail and delivered to:

Josiah E. Small, Accounting Director
Illinois Attorney General's Office
500 South Second Street
Springfield, Illinois 62706

Within thirty (30) Days of the Effective Date, Defendants shall make a payment of $125,000 to the State of Illinois by certified check payable to the Illinois EPA for deposit into the Special State Projects Trust Fund. Payments shall be sent by first class mail and delivered to:

Illinois Environmental Protection Agency
Fiscal Services
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

The name and case number shall appear on the face of the checks. A copy of all certified checks and any transmittal letters shall be sent to:

Christine Zeivel
Environmental Bureau
Illinois Attorney General's Office
500 S. Second Street
Springfield, IL 62706

62. Within thirty (30) Days of the Effective Date, Defendants shall pay a civil penalty of $150,000 to the State of Ohio by delivering a cashier's or certified check to Ohio, c/o Martha Sexton or her successor, Paralegal, Office of the Attorney General of Ohio, Environmental Enforcement Section, 30 East Broad Street, 25th Floor, Columbus, Ohio 43215, payable to the order of "Treasurer, State of Ohio" as follows: to the Ohio EPA Division of Air Pollution Control. The memorandum portion of the check, or some other prominent location on the transmittal letter or documentation, shall include a reference to "A.G. EAGO No. 455132" and a notation that such monies are to be deposited into an account for the Division of Air Pollution Control established by Ohio Environmental Protection Agency.

63. Interest. If any portion of the civil penalty due to the United States is not paid when due, Defendants shall pay interest on the amount past due, accruing from the Effective Date through the date of payment, at the rate specified in 28 U.S.C. § 1961. If any portion of the civil penalty due to the State of Illinois is not paid when due, Defendants shall pay interest on the amount past due, accruing from the Effective Date through the date of payment, at the rate specified in Section 3-2 of the Illinois Uniform Penalty and Interest Act, 35 ILCS 735/3-2 (2010). If any portion of the civil penalty due to the State of Ohio is not paid when due, Defendants shall pay interest on the amount past due, accruing from the Effective Date through the date of payment, at the rate specified in R.C. 5703.47. Interest payment under this Paragraph shall be in addition to any stipulated penalty due.

64. Defendants HNCC and SunCoke shall be jointly and severally liable for payment of the civil penalties relating to the Haverhill Facility and Defendants GECC and SunCoke shall be jointly and severally liable for penalties relating to the Gateway Facility.

65. Defendants shall not deduct any penalties paid under this Decree pursuant to this Section or Section VII (Stipulated Penalties) in calculating their federal or state or local income tax.

VI. **FEDERAL-ONLY SUPPLEMENTAL ENVIRONMENTAL PROJECT**

66. In accordance with the requirements and schedule set forth in this Section VI, Defendants shall spend no less than $255,000 to implement the following federal-only Supplemental Environmental Project ("SEP"), designed to protect families from lead-based paint hazards by addressing such hazards in a number of residential properties in Madison and St. Clair Counties, Illinois as further described herein ("Lead Hazard Reduction SEP"). The Lead Hazard Reduction SEP will entail reducing hazards presented by lead in owner-occupied low-income residences whose occupants are unable to afford such lead hazard reduction work, with priority given to families with young children and/or pregnant women.

67. Defendants shall complete the Lead Hazard Reduction SEP by contracting with an entity that is experienced in conducting lead-based paint hazard reduction work, including, where window replacement is necessary, using energy efficient windows that meet EPA Energy Star criteria. Defendants shall conduct the SEP according to all applicable federal and state work practice and notification requirements including, but not limited to, the United States Department of Housing and Urban Development's ("HUD's") Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing and Illinois requirements. "Eligible costs" shall include all, but only those costs of conducting lead hazard reduction work in compliance with the HUD Guidelines, such as family relocation costs, lead inspections/risk assessments, remediation and clearance, purchase of materials, and associated costs allowed by HUD Guidelines, except that up to ten percent of total costs billed by the contractor retained by Defendants may be overhead

costs yet still be considered "eligible costs." Defendants shall complete the Lead Hazard Reduction SEP within two years after the Effective Date, provided that this date may be extended by mutual agreement of the Defendants and the United States in writing.

68. With regard to the Lead Hazard Reduction SEP, Defendants certify the truth and accuracy of each of the following:

a. that, as of the date of executing this Decree, Defendants are not required to perform or develop the SEP by any federal, state, or local law or regulation and is not required to perform or develop the SEP by agreement, grant, or as injunctive relief awarded in any other action in any forum;

b. that the Lead Hazard Reduction SEP is not a project that Defendants were planning or intending to construct, perform, or implement other than in settlement of the claims resolved in this Decree;

c. that Defendants have not received and will not receive credit for the SEP in any other enforcement action;

d. that Defendants will not receive any reimbursement for any portion of the SEP from any other person; and

e. Defendants SunCoke Energy and GECC will certify as follows in the SEP Completion Report:

> I certify that I am not a party to any open federal financial assistance transaction that is funding or could be used to fund the same activity as the SEP. I further certify that, to the best of my knowledge and belief after reasonable inquiry, there is no such open federal financial assistance transaction that is funding or could be used to fund the same activity as the SEP, nor has the same activity been described in an unsuccessful federal financial assistance transaction proposal to EPA within two years of the date of this settlement (unless the project was barred from funding as statutorily ineligible). For purposes of this certification, the term "open federal financial assistance" refers to a grant, cooperative

agreement, loan, federally-guaranteed loan guarantee, or other mechanism for providing federal financial assistance whose performance period has not yet expired.

69. SEP Completion Report. Within thirty (30) Days after the date set for completion of the Lead Hazard Reduction SEP, Defendants shall submit a SEP Completion Report to the United States in accordance with Section XIII (Notices). The SEP Completion Report shall contain the following information:

a. a detailed description of the Lead Hazard Reduction SEP as implemented;

b. a description of any problems encountered in completing the SEP and the solutions thereto;

c. an itemized list of all eligible SEP costs expended;

d. certification that the Lead Hazard Reduction SEP has been fully implemented pursuant to the provisions of this Decree; and

e. a description of the environmental and public health benefits resulting from implementation of the SEP (with a quantification of the benefits and pollutant reductions, if feasible).

70. EPA may, in its sole discretion, require information in addition to that described in the preceding Paragraph, in order to evaluate the SEP Completion Report.

71. After receiving the SEP Completion Report, the United States shall notify Defendants whether or not Defendants have satisfactorily completed the Lead Hazard Reduction SEP. If Defendant has not completed the SEP in accordance with this Consent Decree, stipulated penalties may be assessed under Section VII (Stipulated Penalties).

72. Disputes concerning the satisfactory performance of the Lead Hazard Reduction SEP and the amount of eligible SEP costs may be resolved under Section IX (Dispute Resolution).

73. Each submission required under this Section shall be signed by an official with knowledge of the Lead Hazard Reduction SEP and shall bear the certification language set forth in Paragraph 52.

74. Any public statement, oral or written, in print, film, or other media, made by Defendant making reference to the SEP under this Decree shall include the following language: "This project was undertaken in connection with the settlement of an enforcement action, *United States v. SunCoke Energy, Inc.*, taken on behalf of the U.S. Environmental Protection Agency under the Clean Air Act."

75. For federal income tax purposes, Defendant agrees that it will neither capitalize into inventory or basis nor deduct any costs or expenditures incurred in performing the SEP.

VII. **STIPULATED PENALTIES**

76. Defendants shall be liable for stipulated penalties to the United States, and to the State of Illinois (for the Gateway Facility) and the State of Ohio (for the Haverhill Facility) for violations of this Consent Decree as specified below, unless excused under Section VIII (Force Majeure). A violation includes failing to perform any obligation required by the terms of this Decree, including any work plan or schedule approved under this Decree, according to all applicable requirements of this Decree and within the specified time schedules established by or approved under this Decree.

77. Late Payment of Civil Penalty. If Defendants fail to pay the civil penalties required to be paid under Section V (Civil Penalty) when due, Defendants shall pay a stipulated penalty of $1,000 per Day for each Day that the payment is late.

78. For each day of failure to install a Redundant HRSG at any Affected Coke Oven Battery in accordance with Section IV.A (Redundant HRSG Project):

Period of Delay	Penalty per Day
1st-30th Day after deadline	$1,250
31st-60th Day after deadline	$3,000
Beyond 60th Day after deadline	$5,000 or an amount equal to 1.2 times the economic benefit of delayed compliance, whichever is greater

79. For each day that any of the emission limits established as a Rolling 12-Month or Rolling 24-Month Limit under Section IV.B is violated, the following stipulated penalties will apply: $1,250 for each Day on which the applicable rolling emission limit is exceeded.

80. For each day that any of the emission limits established as pounds/hour under Section IV.B is violated, the following stipulated penalties will apply: $1,250 for each Day in which the average exceeds any and all of such emission limits.

81. For each failure to perform a stack test required by Paragraph 29 during Scheduled FGD Maintenance of more than two (2) Days: $37,500.

82. For each violation of any approved plan or schedule, or failure to submit plans or schedules, reporting requirements, performance testing requirements, emissions monitoring requirements, or permit applications as required, the following stipulated penalties will apply:

Period of Non-Compliance	Penalty per Day
1st-30th Day after deadline	$500

31st-60th Day after deadline	$1,500
Beyond 60th Day after deadline	$2,000

83. The stipulated penalty provisions of this Section VII shall apply to any Bypass Venting Incident at an Affected Coke Oven Battery for which the Root Cause was one or more of the following acts, omissions, or events:

a. Error resulting from careless operation by the personnel charged with the responsibility for the Coke Oven Battery, HRSG, or pollution control systems;

b. Failure to follow written procedures; or

c. A failure of a part, equipment or system that is due to a failure by Defendants to operate and maintain that part, equipment or system in a manner consistent with good engineering practices.

84. If the Bypass Venting Incident is not a result of one of the root causes identified in Paragraph 83, but is the result of any of the root causes identified in Paragraph 20.d, the stipulated penalty provisions of this Section VII (Stipulated Penalties) shall not apply.

85. If the Bypass Venting Incident is not a result of one of the root causes identified in Paragraphs 83 and 84, then the stipulated penalty provisions of this Section VII shall apply if:

a. Defendants failed to act in a manner consistent with the Preventative Maintenance and Operation (PMO) Plan and/or to take any action during the Bypass Venting Incident to limit the duration and/or quantity of SO_2 emissions associated with such Bypass Venting Incident; or

b. With respect to any of the Defendants' Affected Coke Oven Batteries, the total number of Bypass Venting Incidents in a rolling twelve (12) month period exceeds three (3).

86. With respect to any Bypass Venting Incident not identified in Paragraphs 83, 84, and 85 above, the following provisions shall apply:

a. Agreed Upon Malfunction: If EPA has affirmatively, and not by default, agreed that the Root Cause of the Bypass Venting Incident was sudden, infrequent, and not reasonably preventable through the exercise of good engineering practices, then that cause shall be designated as an agreed-upon Malfunction for purposes of reviewing subsequent Bypass Venting Incidents, and the stipulated penalty provisions of this Section VII shall not apply.

b. First Time: If the Root Cause of the Bypass Venting Incident was sudden and infrequent but reasonably preventable through the exercise of good engineering practices, then Defendants shall implement corrective action(s) pursuant to Paragraph 21 and the stipulated penalty provisions of this Section VII (Stipulated Penalties) shall not apply.

c. Recurrence: If the Root Cause of the Bypass Venting Incident is a recurrence of the same Root Cause that caused a previous Bypass Venting Incident occurring after the Effective Date, then the stipulated penalty provisions of this Section VII (Stipulated Penalties) shall apply unless either the Root Cause of the previous Bypass Venting Incident was designated as an Agreed Upon Malfunction under Paragraph 86.a, or Defendants were in the process of timely developing or implementing a corrective action plan under Paragraph 21 for such previous Bypass Venting Incident.

87. Defenses: Defendants may raise the following affirmative defenses in response to a demand by the United States, Illinois, or Ohio for stipulated penalties:

a. Force majeure as determined pursuant to Section VIII (Force Majeure).

b. As to any Bypass Venting Incident, the Bypass Venting Incident could not have been prevented through the exercise of good engineering practices in a manner consistent with safety and good air pollution control practices for minimizing emissions.

88. If Defendants fail to implement the SEP, or halt or abandon work on the SEP, Defendants shall pay a stipulated penalty to the United States equal to the difference between $255,000 and the amount expended as demonstrated in the certified cost reports in satisfactory performance of the Lead Reduction SEP, plus $25,000. The penalty under this Paragraph shall accrue as of the date specified for completing the SEP or the date performance ceases, whichever is earlier.

89. Defendants shall either pay stipulated penalties within thirty (30) Days after receipt of a written demand by the United States, Illinois, or Ohio or shall initiate dispute resolution pursuant to Section IX (Dispute Resolution).

90. Waiver of Payment. The United States, Illinois, or Ohio may, in its unreviewable discretion, waive payment of any portion or all of the stipulated penalties that may be due to either of them under this Consent Decree. Where only one sovereign demands stipulated penalties for a violation, and the other sovereign or sovereigns do not join in the demand within ten (10) Days of receiving the demand, or timely join(s) in the demand but subsequently elect(s) to waive or reduce stipulated penalties for that violation, Defendants shall pay the full stipulated penalties due for the violation to the sovereign(s) making the demand less any amount paid to the other sovereign(s).

91. Demand for Stipulated Penalties. A written demand for the payment of stipulated penalties will identify the particular violation(s) to which the stipulated penalty relates; the stipulated penalty amount that the United States, Illinois and/or Ohio is demanding for each

violation (as can be best estimated); the calculation method underlying the demand; and the grounds upon which the demand is based. The Party making a demand for payment of a stipulated penalty shall simultaneously send a copy of the demand to the other applicable Party.

92. Stipulated Penalties' Accrual. Stipulated penalties will begin to accrue on the Day after performance is due or the day a violation occurs, whichever is applicable, and will continue to accrue until performance is satisfactorily completed or the violation ceases, whichever is applicable. Except for violations of the Rolling 12-Month or Rolling 24-Month Limit and the pounds/hour limit (where stipulated penalties are based on emission exceedances of all pollutants), stipulated penalties shall accrue simultaneously for separate violations of this Consent Decree.

93. Stipulated Penalties Payment Due Date. Stipulated penalties shall be paid no later than thirty (30) Days after receipt of a written demand by the United States, Illinois, or Ohio unless the demand subject to Section IX (Dispute Resolution). For the Gateway Facility, Defendants shall pay fifty percent of the total stipulated penalty amount due to the United States and fifty percent to the State of Illinois; for the Haverhill Facility, Defendants shall pay fifty percent of the total stipulated penalty amount due to the United States and fifty percent to the State of Ohio. For violations relating to both the Gateway Facility and Haverhill Facility, the stipulated penalty amount shall be split evenly between the United States, Illinois, and Ohio.

94. Manner of Payment of Stipulated Penalties. Stipulated penalties owing to the United States of under $10,000 will be paid by check and made payable to "U.S. Department of Justice," referencing DOJ #90-5-2-1-09890 and #90-5-2-1-10065, and delivered to the Financial Litigation Unit of the U.S. Attorney's Office for the Southern District of Illinois. Stipulated penalties owing to the United States of $10,000 or more and all stipulated penalties owing to the

State of Ohio will be paid in the manner set forth in Section V (Civil Penalty). All stipulated penalties owing to the State of Illinois will be paid by certified check payable to the Illinois EPA for deposit into the Environmental Protection Trust Fund ("EPTF"). Payments shall be sent by first class mail and delivered to:

Illinois Environmental Protection Agency
Fiscal Services
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

All transmittal correspondence shall state that the payment is for stipulated penalties, shall identify the violations to which the payment relates, and shall include the same identifying information required by this Section.

95. Disputes over Stipulated Penalties. Stipulated penalties shall continue to accrue as provided in Paragraph 92, during any Dispute Resolution, but need not be paid until the following:

a. If the dispute is resolved by agreement or by a decision of EPA, Illinois, or Ohio that is not appealed to the Court, Defendants shall pay accrued penalties determined to be owing, together with interest, to the United States, Illinois, and/or Ohio, as applicable, within thirty (30) Days of the effective date of the agreement or the receipt of EPA's, Illinois', or Ohio's decision or order.

b. If the dispute is appealed to the Court and the United States, Illinois, or Ohio prevails in whole or in part, Defendants shall pay all accrued penalties determined by the Court to be owing, together with interest, within sixty (60) Days of receiving the Court's decision or order, except as provided in subparagraph c, below.

c. If any Party appeals the District Court's decision, Defendants shall pay all accrued penalties determined to be owing, together with interest, within fifteen (15) Days of receiving the final appellate court decision.

96. No amount of the stipulated penalties paid by Defendants shall be used to reduce its federal or state tax obligations.

97. If Defendants fail to pay stipulated penalties required by this Consent Decree, Defendants shall be liable for interest on such penalties at the rates specified in Paragraph 63, accruing as of the date payment became due. Nothing in this Paragraph shall be construed to limit the United States, Illinois, or Ohio from seeking any remedy otherwise provided by law for Defendants' failure to pay any stipulated penalties.

98. Subject to the provisions of Section XI (Effect of Settlement/Reservation of Rights), the stipulated penalties provided for in this Decree shall be in addition to any other rights, remedies, or sanctions available to the United States, Illinois, or Ohio for a violation of this Consent Decree or applicable law. If the violations result in excess emissions, then the United States and Illinois or Ohio, as applicable, may elect to seek compensatory emissions reductions equal to or greater than the excess amounts emitted in addition to injunctive relief or stipulated penalties; provided, however, that with respect to penalties and compensatory emissions reductions for Bypass Venting that occurs prior to the installation of the Redundant HRSGs, the United States, Illinois and Ohio agree not to file a new action for such penalties and/or emissions reductions, but may only seek stipulated penalties pursuant to Section VII (Stipulated Penalties). Where only one sovereign demands stipulated penalties for a violation, and the other sovereign or sovereigns do not join in the demand within ten (10) Days of receiving the demand, or timely join in the demand but subsequently elect to waive or reduce stipulated

penalties for that violation, Defendants shall pay the full stipulated penalties due for the violation to the sovereign(s) making the demand less any amount paid to the other sovereign(s).

VIII. **FORCE MAJEURE**

99. "Force Majeure," for purposes of this Consent Decree, is defined as any event arising from causes beyond the control of Defendants, of any entity controlled by Defendants, or of Defendants' contractors, which delays or prevents the performance of any obligation under this Consent Decree despite Defendants' best efforts to fulfill the obligation. The requirement that Defendants exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure event and best efforts to address the effects of any such event (a) as it is occurring and (b) after it has occurred to prevent or minimize any resulting delay to the greatest extent possible. "Force Majeure" does not include Defendants' financial inability to perform any obligation under this Consent Decree.

100. If any event occurs or has occurred that may delay the performance of any obligation under this Consent Decree, whether or not caused by a force majeure event, Defendants shall provide notice orally or by electronic mail or facsimile transmission to the EPA and, for events relating to the Gateway Facility, Illinois, and, for events relating to the Haverhill Facility, Ohio, within seventy-two (72) hours of when Defendants first knew that the event might cause a delay. Within seven (7) Days thereafter, Defendants shall provide in writing to EPA and Illinois or Ohio, as applicable, an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; Defendants' rationale for attributing such delay to a force majeure event if it intends to assert such a claim; and a statement as to whether, in the opinion of

Defendants, such event may cause or contribute to an endangerment to public health, welfare or the environment. Defendants shall include with any notice all available documentation supporting the claim that the delay was attributable to a force majeure. Failure to comply with the above requirements shall preclude Defendants from asserting any claim of force majeure for that event for the period of time of such failure to comply, and for any additional delay caused by such failures. Defendants shall be deemed to know of any circumstance of which Defendants, any entity controlled by Defendants, or Defendants' contractors knew or should have known.

101. If EPA, after a reasonable opportunity for review and comment by Illinois or Ohio, as applicable, agrees that the delay or anticipated delay is attributable to a force majeure event, the time for performance of the obligations under this Consent Decree that are affected by the force majeure event will be extended by EPA, after a reasonable opportunity for review and comment by Illinois or Ohio, as applicable, for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure event shall not, of itself, extend the time for performance of any other obligation. EPA will notify Defendants in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure event.

102. If EPA, after a reasonable opportunity for review and comment by Illinois or Ohio, as applicable, does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify Defendants in writing of its decision.

103. If Defendants elect to invoke the dispute resolution procedures set forth in Section IX (Dispute Resolution), it shall do so no later than fifteen (15) Days after receipt of EPA's notice. In any such proceeding, Defendants shall have the burden of demonstrating by a preponderance of the evidence that the delay or anticipated delay has been or will be caused by a

force majeure event, that the duration of the delay or the extension sought was or will be warranted under the circumstances, that best efforts were exercised to avoid and mitigate the effects of the delay, and that Defendants complied with the requirements of Paragraphs 99 and 100 above. If Defendants carry this burden, the delay at issue shall be deemed not to be a violation by Defendants of the affected obligation of this Consent Decree identified to EPA and the Court.

IX. **DISPUTE RESOLUTION**

104. Unless otherwise expressly provided for in this Consent Decree, the dispute resolution procedures of this Section shall be the exclusive mechanism to resolve disputes arising under or with respect to this Consent Decree. Defendants' failure to seek resolution of a dispute under this Section shall preclude Defendants from raising any such issue as a defense to an action by the United States, Illinois, or Ohio to enforce any obligation of Defendants arising under this Decree.

105. Informal Dispute Resolution. Any dispute subject to Dispute Resolution under this Consent Decree shall first be the subject of informal negotiations. The dispute shall be considered to have arisen when Defendants send the United States, Ohio and Illinois a written Notice of Dispute. Such Notice of Dispute shall state clearly the matter in dispute. The period of informal negotiations shall not exceed ninety (90) Days from the date the dispute arises, unless that period is modified by written agreement. If the Parties cannot resolve a dispute by informal negotiations, then the United States, Illinois or Ohio, as applicable, shall provide Defendants with a written summary of its position regarding the dispute. The position advanced by the United States, Illinois, or Ohio, as applicable, shall be considered binding unless, within forty-

five (45) Days of Defendants' receipt of the written Summary of the United States' or Illinois' or Ohio's position, Defendants file with the Court a petition that describes the nature of the dispute.

106. Formal Dispute Resolution. Defendants shall invoke formal dispute resolution procedures, within the time period provided in the preceding Paragraph, by serving on the United States, Illinois, and Ohio and filing with the Court a petition regarding the matter in dispute. The Petition shall include, but need not be limited to, any factual data, analysis, or opinion supporting Defendants' position and any supporting documentation relied upon by Defendants.

107. The United States, or Illinois or Ohio, as applicable, shall serve its response to Defendants' petition within forty-five (45) Days of receipt of Defendants' petition. The United States' Statement of Position, or Illinois' or Ohio's Statement of Position, as applicable, will include, but need not be limited to, any factual data, analysis, or opinion supporting that position and any supporting documentation relied upon by the United States, or Illinois, or Ohio, as applicable.

108. Standard of Review. In any dispute under this Section IX (Dispute Resolution), Defendants shall bear the burden of proof pursuant to applicable principles of law.

109. The invocation of dispute resolution procedures under this Section IX (Dispute Resolution) shall not, by itself, extend, postpone, or affect in any way any obligation of Defendants under this Consent Decree, unless and until final resolution of the dispute so provides. Stipulated penalties with respect to the disputed matter shall continue to accrue from the first Day of noncompliance, but payment shall be stayed pending resolution of the dispute. If Defendants do not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section VII (Stipulated Penalties).

X. INFORMATION COLLECTION AND RETENTION

110. The United States, Illinois, and Ohio, and their representatives, including attorneys, contractors, and consultants, shall have the right of entry into the Facility, at all reasonable times, upon presentation of credentials, to:

a. monitor the progress of activities required under this Consent Decree;

b. verify any data or information submitted to the United States, Illinois or Ohio in accordance with the terms of this Consent Decree;

c. obtain samples and, upon request, splits of any samples taken by Defendants or their representatives, contractors, or consultants in connection with their performance under this Consent Decree;

d. obtain documentary evidence, including photographs and similar data, relevant to compliance with the terms of this Consent Decree; and

e. assess Defendants' compliance with this Consent Decree.

111. Until at least three (3) years after the termination of this Consent Decree, Defendants shall retain, and shall instruct its contractors and agents to preserve, all non-identical copies of all documents, records, or other information in electronic form in its or its contractors' or agents' possession or control, or that come into their or their contractors' or agents' possession or control, and that relates in any manner to Defendants' performance of its obligations under this Consent Decree. This information-retention requirement shall apply regardless of any contrary corporate or institutional policies or procedures. At any time during this information-retention period, the United States, Illinois, or Ohio may request copies of any documents, records, or other information required to be maintained under this Paragraph. For the purposes of this Paragraph, outside counsel is not a contractor or agent.

112. At the conclusion of the information retention period specified in the preceding Paragraph, Defendants shall notify the United States, Illinois, and Ohio at least ninety (90) Days prior to destroying any document(s), record(s), or other information subject to the requirements of the preceding Paragraph and, upon request by the United States, Illinois or Ohio, Defendants shall deliver any such document(s), record(s), or other information to the Plaintiffs. Defendants may assert that certain documents, records, or other information are privileged under the attorney-client privilege or any other privilege recognized by federal law. If Defendants assert such a privilege, they shall provide the following: (1) the title of the document, record, or information; (2) the date of the document, record, or information; (3) the name and title of each author of the document, record, or information; (4) the name and title of each addressee and recipient; (5) a description of the subject of the document, record, or information; and (6) the privilege asserted by Defendants. However, no documents, records, data, or other information required to be generated by this Consent Decree shall be withheld on grounds of privilege.

113. Defendants may also assert that information required to be provided under this Section is protected as CBI under 40 C.F.R. Part 2. As to any information that Defendants seek to protect as CBI, Defendants shall follow the procedures set forth in 40 C.F.R. Part 2.

114. This Consent Decree in no way limits or affects any right of entry and inspection, or any right to obtain information, held by the United States, Illinois, or Ohio pursuant to applicable federal or state laws, regulations, or permits, nor does it limit or affect any duty or obligation of Defendants to maintain documents, records, or other information imposed by applicable federal or state laws, regulations, or permits.

XI. EFFECT OF SETTLEMENT/RESERVATION OF RIGHTS

115. This Consent Decree resolves the civil claims of the United States, the State of Illinois and the State of Ohio through the Date of Lodging for the violations alleged in the Complaint filed in this action, and the violations alleged in the Notices of Violation relating to the Gateway and Haverhill facilities sent to Defendants by EPA, Illinois EPA, and Ohio EPA prior to the Date of Lodging referenced in Appendix 3. This Consent Decree also resolves the civil claims of the United States, Illinois and Ohio for the regulatory and permit provisions for which violations are alleged in the Complaint resulting from Defendants' performance of the requirements set forth in Section IV.A (Redundant HRSG Project), conditioned upon satisfactory performance of the requirements set forth therein. Provided that Defendants perform the requirements of Section IV.A (Redundant HRSG Project) at the Middletown Facility, the Consent Decree would then resolve the civil claims of the United States and the State of Ohio for emissions violations during the time period of and resulting from Defendants' performance of the requirements set forth in Section IV.A (Redundant HRSG Project) at the Middletown Facility, conditioned upon satisfactory performance of such requirements.

116. The United States and the States of Illinois and Ohio reserve all legal and equitable remedies available to enforce the provisions of this Consent Decree, except as expressly stated in Paragraph 115. This Consent Decree shall not be construed to limit the rights of the United States, Illinois or Ohio to obtain penalties or injunctive relief under the CAA or implementing regulations, or under other federal or state laws, regulations, or permit conditions, except as expressly specified in Paragraph 115. The United States, Illinois and Ohio further reserve all legal and equitable remedies to address any imminent and substantial endangerment to the public health or welfare or the environment arising at, or posed by, the Facilities, whether

related to the violations addressed in this Consent Decree or otherwise. The United States and Ohio further reserve all civil claims relating to the Middletown Facility for any violations of the CAA or Chapter 3704 of the Ohio Revised Code prior to the Date of Lodging and any violations following the Date of Lodging, except as expressly stated in Paragraph 115.

117. In any subsequent administrative or judicial proceeding initiated by the United States, Illinois or Ohio for injunctive relief, civil penalties, other appropriate relief relating to the Facilities or Defendants' violations, Defendants shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States, Illinois or Ohio in the subsequent proceeding were or should have been brought in the instant case, except with respect to claims that have been specifically resolved pursuant to Paragraph 115 of this Decree. Except as set forth in this Paragraph, the United States, Illinois and Ohio may not assert or maintain that this Consent Decree constitutes a waiver or determination of, or otherwise obviates, any claim or defense whatsoever, or that this Consent Decree constitutes acceptance by Defendants of any interpretation of guidance issued by EPA, Illinois EPA, or Ohio EPA related to the matters addressed in this Consent Decree.

118. This Consent Decree is not a permit, or a modification of any permit, under any federal, State, or local laws or regulations. Nothing in this Consent Decree alters, amends, or restricts the ability of any federal, State, or local permitting authority to issue permits, including permits applied for pursuant to Section IV (Compliance Requirements), in a manner consistent with applicable law and guidance. Defendants are responsible for achieving and maintaining complete compliance with all applicable federal, State, and local laws, regulations, and permits;

and Defendants' compliance with this Consent Decree shall be no defense to any action commenced pursuant to any such laws, regulations, or permits, except as set forth herein. The United States, Illinois and Ohio do not, by their consent to the entry of this Consent Decree, warrant or aver in any manner that Defendants' compliance with any aspect of this Consent Decree will result in compliance with provisions of the CAA, or with any other provisions of federal, State, or local laws, regulations, permits, or future permitting requirements.

119. Except as otherwise provided by law, this Consent Decree does not limit or affect the rights of Defendants, the United States, Illinois or Ohio against any third parties not party to this Consent Decree, nor does it limit the rights of third parties, not party to this Consent Decree, against Defendants.

120. This Consent Decree shall not be construed to create rights in, or grant any cause of action to, any third party not a party to this Consent Decree.

XII. **COSTS**

121. The Parties shall bear their own costs of this action, including attorneys' fees, except that the United States, Illinois and Ohio shall be entitled to collect the costs (including attorneys' fees), against Defendants incurred in any action necessary to collect (a) any portion of the civil penalty or (b) any stipulated penalties due that were not paid by Defendants, subject to Defendants' right to invoke dispute resolution pursuant to Section IX (Dispute Resolution).

XIII. **NOTICES**

122. Unless otherwise specified herein, whenever notifications, submissions, or communications are required by this Consent Decree, they shall be made in writing and addressed to the (i) United States Department of Justice; (ii) EPA; (iii) the State of Illinois (for

the Gateway Facility); and (iv) the State of Ohio (for the Haverhill Facility). The contact information for the parties to the Consent Decree is set forth in Attachment A.

123. Any Party may, by written notice to the other Parties, change its designated notice recipient(s) or notice address(es) provided in Attachment A. Notices submitted pursuant to this Section shall be deemed submitted upon mailing, unless otherwise provided in this Consent Decree or by mutual agreement of the Parties in writing.

XIV. **EFFECTIVE DATE**

124. The Effective Date of this Consent Decree shall be the date this Consent Decree is entered by the Court, or a motion to enter is granted, whichever occurs first, as recorded on the Court's docket.

XV. **RETENTION OF JURISDICTION**

125. The Court shall retain jurisdiction over this case until termination of this Consent Decree for the purpose of resolving disputes arising under this Decree pursuant to Section IX (Dispute Resolution), or entering orders modifying this Decree pursuant to Section XVI (Modification), or effectuating or enforcing compliance with the terms of this Decree.

126. Any disputes concerning modification of this Decree, including any attached appendices, shall be resolved pursuant to Section IX (Dispute Resolution), provided, however, that, instead of the burden of proof provided by Paragraph 108, the Party seeking the modification bears the burden of demonstrating that it is entitled to the requested modification in accordance with Federal Rule of Civil Procedure 60(b).

XVI. **MODIFICATION**

127. The terms of this Consent Decree may be modified only by a subsequent written agreement signed by the United States, Illinois, Ohio and Defendants. Where the modification

constitutes a material change to any term of this Consent Decree, it shall be effective only upon approval by the Court.

XVII. **TERMINATION**

128. This Consent Decree shall be subject to termination upon motion by the United States or Defendants under the conditions identified in this Section XVII (Termination). Defendants may seek termination of this Consent Decree for any one of the Facilities upon either (1) completion and satisfaction at the Facility of all of the following requirements of this Paragraph, or (2) any time after the permanent shutdown of, and relinquishment of all operating permits for, such Facility, provided that Defendants have complied with the requirements of subparagraph c below of this Paragraph.

a. Installation of the Redundant HRSGs as specified in this Consent Decree;

b. Compliance with all provisions contained in this Consent Decree, which compliance may be established for specific parts of the Consent Decree in accordance with Paragraph 129, below;

c. Payment of all penalties and other monetary obligations due under the terms of the Consent Decree; no penalties or other monetary obligations due hereunder can be outstanding or owed to the United States, Illinois, or Ohio;

d. Receipt of permits incorporating the emission limits and standards established under Section IV.I (Permit Requirements); and

e. Operation for at least twenty-four (24) months in compliance with the emission limits established in Paragraph 17, and certification of such compliance submitted following the conclusion of the compliance period.

129. Certification of Completion.

a. Prior to moving for termination, Defendants shall certify completion for each Facility, provided that all of the related requirements for that Facility have been satisfied.

b. Defendants shall submit a written report to the United States, and, for the Gateway Facility, Illinois, and for the Haverhill Facility, Ohio describing the activities undertaken and certifying that the Redundant HRSGs are fully operational and satisfy the requirements of this Consent Decree, and that Defendants are in substantial and material compliance with all of the other requirements of the Consent Decree. The report shall contain the following statement, signed by a responsible corporate official of Defendants:

> To the best of my knowledge, after appropriate investigation, I certify that the information contained in or accompanying this submission is true, accurate and complete. I am aware that there are penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

c. Upon receipt of Defendants' certification, EPA, after reasonable opportunity for review and comment by Illinois and Ohio, as applicable, shall notify Defendants whether the requirements set forth in the applicable Paragraphs have been completed in accordance with this Consent Decree. The Parties recognize that ongoing obligations under such Paragraphs remain and necessarily continue (*e.g.*, reporting and record keeping requirements), and that Defendants' certification is that they are in current compliance with all such obligations.

(i). If EPA, after consultation with Illinois and Ohio, as appropriate, concludes that the requirements have not been fully complied with, EPA shall notify Defendants as to the activities that must be undertaken to complete the applicable Paragraphs of the Consent Decree. Defendants shall perform all activities described in the notice, subject to their right to invoke the dispute resolution procedures set forth in Section IX (Dispute Resolution).

(ii). If EPA, after consultation with Illinois and Ohio, as appropriate, concludes that the requirements of the applicable Paragraphs have been completed in accordance with this Consent Decree, EPA will so notify Defendants in writing. This shall constitute the certification of completion of the applicable Paragraphs for purposes of this Consent Decree.

d. Nothing in this Paragraph shall preclude the United States, Illinois or Ohio from seeking stipulated penalties for a violation of any of the requirements of the Consent Decree regardless of whether a Certification of Completion has been issued under this Paragraph. In addition, nothing in this Paragraph shall permit Defendants to fail to implement any ongoing obligations under the Consent Decree regardless of whether a Certification of Completion has been issued under this Paragraph.

130. At such time as Defendants believe that they have satisfied the requirements for termination set forth in this Section, Defendants shall certify such compliance and completion to the United States, Illinois (for the Gateway Facility), and Ohio (for the Haverhill Facility) in writing. Unless, within one hundred and twenty (120) Days of receipt of Defendants' certification under Paragraph 129, either the United States, Illinois, or Ohio objects in writing with specific reasons, the Court may upon motion by Defendants order that this Consent Decree be terminated. If the United States, Illinois or Ohio objects to the certification by Defendants, then the matter shall be submitted to the Court for resolution under Section IX (Dispute Resolution). In such case, Defendants shall bear the burden of proving that this Consent Decree should be terminated.

XVIII. **PUBLIC PARTICIPATION**

131. This Consent Decree shall be lodged with the Court for a period of not less than thirty (30) Days for public notice and comment in accordance with 28 C.F.R. § 50.7. The United

States reserves the right to withdraw or withhold its consent if the comments regarding the Consent Decree disclose facts or considerations indicating that the Consent Decree is inappropriate, improper, or inadequate. Defendants consent to entry of this Consent Decree without further notice. Defendants agree not to oppose entry of this Consent Decree by the Court or to challenge any provision of the Decree, unless the United States has notified Defendants in writing that it no longer supports entry of the Decree.

XIX. **SIGNATORIES/SERVICE**

132. Each undersigned representative of Defendants, the State of Illinois, the State of Ohio and the Assistant Attorney General for the Environment and Natural Resources Division of the Department of Justice (or his or her designee) certifies that he or she is fully authorized to enter into the terms and conditions of this Consent Decree and to execute and legally bind the Party he or she represents to this document.

133. This Consent Decree may be signed in counterparts, and its validity shall not be challenged on that basis.

134. Defendants agree to accept service of process by mail with respect to all matters arising under or relating to this Consent Decree and to waive the formal service requirements set forth in Rules 4 and 5 of the Federal Rules of Civil Procedure and any applicable Local Rules of this Court including, but not limited to, service of a summons.

XX. **INTEGRATION**

135. This Consent Decree and its Appendices constitute the final, complete, and exclusive agreement and understanding among the Parties with respect to the settlement embodied in this Consent Decree and its Appendices and supersede all prior agreements and understandings, whether oral or written, concerning the settlement embodied herein. No other

document, except for any plans or other deliverables that are submitted and approved pursuant to this Decree, nor any representation, inducement, agreement, understanding, or promise, constitutes any part of this Decree or the settlement it represents, and no such extrinsic document or statement of any kind shall be used in construing the terms of this Decree.

XXI. **FINAL JUDGMENT**

136. Upon approval and entry of this Consent Decree by the Court, this Consent Decree shall constitute a final judgment of the Court in this action as to the United States, the State of Illinois, the State of Ohio, and Defendants. The Court finds that there is no just reason for delay and therefore enters this judgment as a final judgment under Fed. R. Civ. P. 54 and 58.

XXII. **APPENDICES**

137. The following appendices are attached to and part of the Consent Decree:

Appendix 1 – HRSG Work Plan

Appendix 2 – Flue Gas Flow Rate Study

Appendix 3 – List of Notices of Violation

Appendix 4 – Potential Middletown Redundant HRSG Project

DATED this_____day of_____, 2013.

_____

UNITED STATES DISTRICT JUDGE
SOUTHERN DISTRICT OF ILLINOIS

Signature Page for *United States, et al. v. Haverhill Coke Company LLC, et al.* Consent Decree

FOR PLAINTIFF UNITED STATES OF AMERICA:

Date: 6/20/13

ROBERT G. DREHER
Acting Assistant Attorney General
Environment & Natural Resources Division
United States Department of Justice

Date: 6/23/13

CATHERINE BANERJEE ROJKO
Senior Attorney
NIGEL B. COONEY
Trial Attorney
Environmental Enforcement Section
Environment & Natural Resources Division
United States Department of Justice
P.O. Box 7611, Ben Franklin Station
Washington, D.C. 20044-7611
Telephone: 202-514-3145

STEPHEN R. WIGGINGTON
United States Attorney

J. CHRISTOPHER MOORE
Assistant United States Attorney
United States Attorney's Office
Nine Executive Drive
Fairview Heights, IL 62208-1344
Telephone: (618) 628-3700

JUN 1 2 2013

Signature Page for *United States, et al. v. Haverhill Coke Company LLC, et al.* Consent Decree

FOR PLAINTIFF UNITED STATES OF AMERICA:
U.S. ENVIRONMENTAL PROTECTION AGENCY REGION 5

Date: June 12, 2013

SUSAN HEDMAN
Regional Administrator
U.S. Environmental Protection Agency
Region 5

Date: June 7, 2013

ROBERT A. KAPLAN
Regional Counsel
U.S. Environmental Protection Agency
Region 5

Date: June 5, 2013

JOSE C. DE LEON
Associate Regional Counsel
U.S. Environmental Protection Agency
Region 5 (C-14J)
77 West Jackson Blvd.
Chicago, IL 60604

Date: June 6, 2013

JAMES MORRIS
Associate Regional Counsel
U.S. Environmental Protection Agency
Region 5 (C-14J)
77 West Jackson Blvd.
Chicago, IL 60604

Signature Page for *United States, et al. v. Haverhill Coke Company LLC, et al.* Consent Decree

FOR PLAINTIFF UNITED STATES OF AMERICA:
U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE

Date: 6/13/13

CYNTHIA J. GILES
Assistant Administrator
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency

Date: 6/13/13

SUSAN SHINKMAN
Director, Office of Civil Enforcement
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency

Date: 6/9/2013

PHILLIP A. BROOKS
Director, Air Enforcement Division
Office of Civil Enforcement
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency

Date: 6/9/2013

TERESA DYKES
Air Enforcement Division
Office of Civil Enforcement
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency

Signature Page for *United States, et al. v. Haverhill Coke Company LLC, et al.* Consent Decree

FOR PLAINTIFF STATE OF ILLINOIS:

PEOPLE OF THE STATE OF ILLINOIS
ex rel. LISA MADIGAN,
Attorney General of the
State of Illinois

MATTHEW J. DUNN, Chief
Environmental Enforcement/
Asbestos Litigation Division

Date: 6/14/13

THOMAS DAVIS
Assistant Attorney General
Environmental Enforcement Bureau, Chief
500 S. Second Street
Springfield, IL 62706

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

Date: 6/14/13

JOHN J. KIM
Chief Legal Counsel
1021 North Grand Avenue East
Springfield, IL 62794

Signature Page for *United States, et al. v. Haverhill Coke Company LLC, et al.* Consent Decree

FOR PLAINTIFF STATE OF OHIO:

MICHAEL DEWINE
Ohio Attorney General

Date: 6/17/13

ELIZABETH EWING
Assistant Attorney General
Environmental Enforcement Section
30 E. Broad St., 25th Floor
Columbus, Ohio 43215

Signature Page for *United States, et al. v. Haverhill Coke Company LLC, et al.* Consent Decree

FOR DEFENDANTS HAVERHILL NORTH COKE COMPANY,
GATEWAY ENERGY & COKE COMPANY, LLC,
and SUNCOKE ENERGY, INC.

Date: May 31, 2013

Michael J. Thomson,
President and Chief Operating Officer
SunCoke Energy. Inc.
1011 Warrenville Rd.
Suite 600
Lisle, IL 60532
mjthomson@suncoke.com

ATTACHMENT A

Contact Information for the Parties to *U.S. v. SunCoke Energy, Inc.*

Notice or submission to the United States:

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
Box 7611 Ben Franklin Station
Washington, DC 20044-7611
Re: DOJ No. 90-5-2-1-06944/1

Notice or submission to EPA:

Air Enforcement Division Director
U.S. Environmental Protection Agency
Office of Civil Enforcement
Air Enforcement Division
U.S. Environmental Protection Agency
1200 Pennsylvania Ave, NW Mail Code: 2242A
Washington, DC 20460

and

Gina Harrison
U.S. Environmental Protection Agency
Region 5
AE-17J
77 West Jackson Blvd. Chicago, IL 60604

Including an electronic copy to:

harrison.gina@epa.gov

and

Jose C. de Leon
U.S. Environmental Protection Agency
Region 5
C-14J
77 West Jackson Blvd. Chicago, IL 60640

Including an electronic copy to:

deleon.jose@epa.gov

and

James Morris
U.S. Environmental Protection Agency
Region 5
C-14J
77 West Jackson Blvd. Chicago, IL 60604

Including an electronic copy to:

morris.james@epa.gov

Notice or submission to the State of Illinois:

Christine Zeivel
Environmental Bureau
Illinois Attorney General's Office
500 S. Second Street
Springfield, IL 62706

and

Chris Pressnall
Division of Legal Counsel
Illinois Environmental Protection Agency
1021 North Grand Avenue East
Springfield, IL 62794-9276

and

Manager, Compliance Section
Bureau of Air
Illinois Environmental Protection Agency
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Notice or submission to the State of Ohio:

Ohio Environmental Protection Agency
Division of Air Pollution Control, Central Office
50 W. Town Street
Suite 700
Columbus, Ohio 43216-1049
Attention: Bruce Weinberg

Ohio Attorney General's Office
Environmental Enforcement Section
30 East Broad Street, 25th Floor
Columbus, Ohio 43215
Attention: Samuel Peterson and Elizabeth Ewing

Portsmouth Local Air Agency
605 Washington Street, Third Floor
Portsmouth, Ohio 45662
Attention: Cindy Charles

Notice or submission to Defendants:

Robert Brager
Beveridge & Diamond, P.C.
201 N. Charles St. Suite 2210
Baltimore Md., 21201
rbrager@bdlaw.com

and

Katherine Gates, Senior HES Counsel
SunCoke Energy, Inc.
1011 Warrenville Rd., Ste. 600
Lisle, IL 60532
ktgates@suncoke.com

Denise R. Cade
Senior Vice President and General Counsel
SunCoke Energy, Inc.
1011 Warrenville Rd., Ste. 600
Lisle, IL 60532
drcade@suncoke.com

Appendix 1
Work Plan for Redundant Heat Recovery Steam Generators Project

Defendants shall implement the work plan for the Redundant HRSG Project ("Work Plan") in accordance with Section IV.A of the Consent Decree and the requirements and schedules set forth in this Appendix 1.

Objectives

The objective of the Redundant HRSG Project is to meet the obligations set forth in Section IV (Compliance Requirements) of the Consent Decree relating to the Redundant HRSG Project for phases 1 and 2 of the Haverhill facility (HNCC No. 1 and HNCC No. 2, respectively) and the Gateway facility (GECC Battery).

The purpose of the Redundant HRSG Project is to enable each battery to have any one of the existing HRSGs be taken out of service without the need to vent. To accomplish this objective, Defendants shall add a new, redundant 20-oven HRSG at HNCC No. 1, HNCC No. 2, and the GECC Battery, respectively, along with the ducting and inter-connections to permit any one HRSG to be shut down for maintenance without significant venting through the bypass stack.

A series of planned shutdowns will be required to install tie-ins to minimize interruptions to operations during the installation of the new components for the Redundant HRSG Project.

Project Description

HNCC No. 2 – On-Line 27 months after the Effective Date
HNCC No. 1 – On-Line 51 months after the Effective Date
GECC Battery – On-Line 51 months after the Effective Date

Each coke oven block sends its combined hot flue gas to HRSGs for heat recovery. The HRSGs vent into a common duct that feeds a flue gas desulfurization unit (FGD).

The Redundant HRSG Project will allow any one HRSG to be taken off-line for maintenance while maintaining coke production. The Redundant HRSG Project will ensure that all flue gases generated during maintenance periods and during some malfunctions go to the FGD for treatment before release to atmosphere. To accomplish this objective, Defendants shall install new ductwork and a new HRSG as part of this project.

Process Description

Redundant HRSGs

A new 20-oven HRSG shall be installed at each of the following: HNCC No. 1, HNCC No. 2, and the GECC Battery, connecting to the common tunnel. Each such HRSG shall be designed to facilitate the transfer of gases from existing HRSGs.

Ductwork

New ductwork shall be added to tie-in each Redundant HRSG to the existing system. The duct work shall be sized to accommodate the variations in flue gas flows without adversely impacting the negative pressures required for effective oven operations.

Process Controls

New draft controls shall be installed to precisely control system draft.

Tunnel Tie-Ins

Tunnel tie-ins shall be installed for each new Redundant HRSG. The tie-in locations will be optimized during process modeling currently in progress.

Operational Considerations

The basis of design focuses on the improvement to the overall reliability of the entire system by providing for at least one HRSG to be out of service at any given time. Defendants shall further improve reliability through the implementation of a preventative maintenance program, which will target all existing HRSGs for cleaning and upgrades.

Scope of Work

The scope of work shall include all necessary engineering, procurement and construction support to implement the Redundant HRSG Project.

At a minimum the scope of work shall include the following requirements:

1. Follow SunCoke Energy's document control process
2. Follow SunCoke Engineering Standards, as applicable
3. Process flow diagrams with heat and material balances
4. Develop a process control scheme to control the system to demonstrate, in diagram form, (1) the flow of all inputs and data feedback to ensure the system will work as intended, and (2) predict any potential failures of the equipments as well as the digital control system.
5. Preliminary piping and instrumentation diagrams (P&ID)
6. Plant layout with General Arrangement drawings
7. Evaluate the existing plot plans to perform a site and soils review and consider this in the design of the foundation(s)
8. Prepare single line electrical diagrams
9. Prepare P&IDs for all new systems and modify any impacted P&IDs
10. Perform detailed engineering review of the process controls
11. Perform a Process Hazard Evaluation
12. Perform detailed engineering design for the hot and cold ductwork and dampers

13. Develop Procurement and Contracting Plan
14. Prepare a Constructability Assessment/Construction
15. Prepare purchase orders for equipment and materials
16. Execute Purchase Orders
17. Prepare General Contractor Construction bid packages
18. Startup and heat-up process including dry out of new refractory
19. Commissioning and Startup Support

Major Equipment List

a. One twenty-oven HRSG each for HNCC No. 1, HNCC No. 2, and the GECC Battery
b. Hot ductwork
c. Cold ductwork
d. Louver dampers
e. Refractory plugs
f. Draft control equipment

Project Schedule:

A. HNCC No. 2 Redundant HRSG Project

92 Days after Effective Date
Finalize process details
Evaluate long lead item quotes and place order by end of 1Q after the Effective Date for longest lead items

183 Days after Effective Date
Finalize process modeling
Order balance of long lead materials
Start detailed engineering

274 Days after Effective Date
Issue Construction Contract Request for Proposal

365 Days or one (1) year after Effective Date
Finalize Site Specific Detailed Engineering

457 Days after Effective Date
Award Construction Contract
Mobilize Construction
Start Site Preparation

548 Days after Effective Date
Start Structural Work

639 Days after Effective Date
Redundant HRSG Installation
Pipework Installation

730 Days or two (2) years after Effective Date
HNCC No. 2 Redundant HRSG in Service, subject to Operational testing

822 Days after Effective Date
HNCC No. 2 Project Operational testing
Complete HNCC No. 2 Tests; HNCC No. 2 Redundant HRSG in service

B. HNCC No. 1 and GECC Battery Redundant HRSG Projects

913 Days after Effective Date
Finalize HNCC No. 1 and GECC Battery Design and Changes based on HNCC No. 2 testing
Place order for long lead items for HNCC No. 1 and GECC Battery
Update Site Specific detailed engineering with lessons learned with HNCC No. 2

1004 Days after Effective Date
Issue Construction Contract Request for Proposals

1095 Days or three (3) years after Effective Date
Finalize Site Specific Detailed Engineering

1187 Days after Effective Date
Award Construction Contract
Mobilize Construction
Start Site Preparation

1278 Days after Effective Date
Start Structural Work

1369 after Effective Date
Redundant HRSG Installation
Pipework Installation

1460 Days or four (4) years after Effective Date
HNCC No. 1 and GECC Battery Redundant HRSGs in Service, subject to Operational testing

1552 Days after Effective Date
HNCC No. 1 and GECC Battery Redundant HRSGs Operational Testing
Complete HNCC No. 1 and GECC Battery Tests; HNCC No. 1 and GECC Battery Redundant HRSGs in Service

Appendix 2

Flue Gas Flow Rate Study for Use in Calculation of Bypass Stack Emissions

Introduction

Defendants shall perform the Flue Gas Flow Rate Study as set forth herein. The purpose of the study is to determine the average gas flow rate to a Bypass Vent Stack during Scheduled HRSG Maintenance Bypass Venting at each of the Affected Coke Oven Batteries.

Study Plan

During Scheduled HRSG Maintenance Bypass Venting for a 20 oven battery, the flow rate in the Bypass Vent Stack shall be measured continuously over a full 48 hour coking cycle, starting at the time the lid opens at a Bypass Vent Stack at HNCC No. 1, HNCC No. 2, and the GECC Battery, respectively. The dry flow rate shall be calculated by a certified testing contractor employing a flow meter to continuously measure the rate at which flue gas exits the Bypass Vents and using EPA Method 1, 2, 3, 4 or an equivalent EPA-approved test method.

A full traverse flow rate shall be measured at least once every hour using EPA test methods, as set forth above. Between the traverse measurements the pitot tube will be left at the center of the stack with a continuous datalogger running. This will produce 51 consecutive full traverses (each traverse will result in 24 data points) from which flow rates can be calculated. The average dry flow rate over the 48 hour cycle shall be calculated from these data. The average coal charge rate shall also be calculated using the procedure in Attachment A to this Appendix 2 to account for ovens charged prior to the test period and ovens pushed after the test period.

Study Plan Detail

The study plan shall be performed during Scheduled HRSG Maintenance Bypass Venting as set forth below:

1) Location for the test

    a. At HNCC No. 1, HNCC No. 2 and the GECC Battery

    b. Bypass Vent Stack using standard testing ports

    c. On a 20 oven battery

    d. Bypass Vent on HRSG is open for the duration of the test

    e. If necessary, scaffolding will be constructed to allow for the safe and efficient completion of the testing

2) Instrumentation

   a. Follow EPA Method 2 Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube) as closely as practicable

   b. Portable analyzer with s-type pitot tube

   c. Pitot tube at least 10 ft in length to allow for full traverse of the duct

   d. Automated data logger attached to DP analyzer with potential for wireless connectivity to laptop with sufficient range for the operator to check from indoors

   e. In addition to the pitot tube measurements, the temperature, pressure and oxygen levels will be checked at all sample points

3) Test timing

   a. Follow EPA Method 1 Sample and Velocity Traverse for Stationary Sources as closely as practicable

   b. Test shall last 50 hours

   c. Test shall start at one hour before the Bypass Vent lid is opened and run 50 hours to completely cover a 48 hour cycle

   d. Perform a traverse measurement of the Bypass Vent Stack at the beginning of the test

   e. Repeat the traverse measurement of the Bypass Vent Stack once per hour

   f. Between the traverse measurements leave the pitot tube at the approximate center of the Bypass Vent Stack with the continuous datalogger

   g. Record all events pertaining to the operation, including but not limited to the following:

      i. Individual oven pushing/charging times starting at least 48 hours prior to test period start and extending to at least 48 hours after test period ends

      ii. Amount of coal charged at each oven charging from 48 hours prior to start of test run to 48 hours after end of test run

      iii. Any out-of-ordinary events

4) Data analysis

   a. Calculate average flow rate from the average of the 49 full traverse flow rates (approximately 1,176 data points) that cover the 48 hour coking cycle (*i.e.*, 51 full traverse flow rates minus the first and last full traverse flow rates)

   b. Examine the pitot tube data log to confirm there were no outlier excursions of flow either up or down in the time periods between the times that the full traverse measurements were taken

   c. Review and analyze the flow data and oven push data for possible correlations and patterns

5) Operations

   a. The average coal charge amount shall be targeted as closely as practicable to 42.5 tons for the duration of the test

   b. In order to ensure that the coal charge rate has reached a steady state before the test period starts, the target coal charge amount will be changed to 42.5 tons starting two cycles before the test run starts and the change will be effected according to standard operating procedures for the Haverhill or Gateway facility, as applicable

   c. The actual average coal charge rate for the test period shall be calculated in accordance with Attachment A

Attachment A
Determination of average coal charge rate for an oven battery over any period of coking

N = number of ovens in battery
t_{start} = starting time of test period
t_{end} = ending time of test period

A load of coal is processed for an amount of time (charged at the beginning and pushed at the end)

For a given oven during the test period there are M coal loads

Load 1 was charged prior to the start of the test period and pushed during the test period
Loads 2 through M-1 were charged and pushed during the test period
Load M was charged during the test period and pushed after the end of the test period

The entirety of loads 2 through M-1 shall be counted in the calculation of the average charge rate

Only a fraction of loads 1 and M shall be counted towards the overall average charge rate

$t_{i,j}$ = time that an oven is charged (with oven out of N and load number j out of M)
$C_{i,j}$ = tons of coal loaded in oven i and charge j
C_i = tons of coal processed by oven i during test period
C_{total} = tons of coal processed by the battery during test period
R = average rate of coal processed by battery (tons/hour)

Amount of time that a load (j) in oven (i) is processed = $(t_{i,j+1}-t_{i,j})$

Total coal processed by oven i is determined as follows

$$C_i = C_{i,1}\frac{(t_{i,2}-t_{start})}{(t_{i,2}-t_{i,1})} + \sum_{j=2}^{M-1} C_{i,j} + C_{i,M}\frac{(t_{end}-t_{i,M})}{(t_{i,M+1}-t_{i,M})}$$

The total coal C_{total} processed by the battery during the test period is

$$C_{total} = \sum_{i=1}^{N} C_i$$

The average rate R is

$$R = \frac{C_{total}}{(t_{end} - t_{start})}$$

$$Average\ Gas\ Rate_{Actual} = \frac{Coal\ Charge\ Rate_{Actual}}{Coal\ Charge\ Rate_{Base\ Test}}\ x\ Average\ Gas\ Rate_{Base\ Test}$$

$$Average\ Gas\ Rate_{Actual} = Average\ Gas\ Rate_{Base\ Test}\ x \frac{Coal\ Charge\ Rate_{Actual}}{Coal\ Charge\ Rate_{Base\ Test}}$$

$$Average\ Gas\ Rate_{Actual}\ Average\ Gas\ Rate_{Base\ Test}\ Coal\ Charge\ Rate_{Actual}$$

$$Coal\ Charge\ Rate_{Base\ Test}\ total\ tons = \frac{Charge1}{T_{c2} - T_{c1}}(T_{c2} - T_{start}) + \frac{Charge2}{T_{c3} - T_{c2}}(T_{end} - T_{c2})$$

$$Coal\ Charge\ Rate_{Base\ Test}$$

Appendix 3
List of Notices of Violation (NOVs)

Federal NOVs Relating to the Haverhill Facility

To Haverhill North Coke Company:

1. 12/8/08
2. 4/15/09
3. 2/17/10
4. 7/22/10

To SunCoke Energy, Inc.:

5. 7/1/10
6. 7/1/10
7. 7/1/10

Federal NOVs Relating to the Gateway Facility to Gateway Energy & Coke Company

8. 7/8/10

NOVs Relating to the Haverhill Facility Issued by Ohio EPA/Portsmouth Local Air Agency

9. 07/19/05
10. 11/7/05
11. 01/26/07
12. 8/19/08
13. 10/1/08
14. 7/17/09 (P902)
15. 7/17/09 (P901)
16. 12/11/09
17. 8/19/10
18. 3/31/11
19. 5/17/12

Note: NOVs 5-7 and 14-15 are attached hereto for purposes of clarity, as these NOVs bear the same date as at least one other NOV.

United States, State of Illinois, and State of Ohio v.
Gateway Energy & Coke Company, LLC, Haverhill Coke Company, LLC,
and SunCoke Energy, Inc.

ATTACHMENT TO APPENDIX 3 OF CONSENT DECREE

Federal Notice of Violation Relating to the Haverhill Facility
Issued To SunCoke Energy, Inc. On July 1, 2010

Federal Notice 1 of 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUL 1 - 2010

REPLY TO THE ATTENTION OF:

AE-17J

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Delauna Pack
SunCoke Energy, Incorporated
Parkside Plaza
11400 Parkside Drive
Knoxville, Tennessee 37934

Re: Notice and Finding of Violation at Haverhill North Coke Company, Franklin Furnace

Dear Ms. Pack:

This is to advise you that the U. S. Environmental Protection Agency has determined that Haverhill North Coke Company's (Haverhill North Coke's) facility at 2446 Gallia Pike, Franklin Furnace, Ohio, is in violation of the Clean Air Act (CAA) and associated state or local pollution control requirements. A list of the requirements violated is provided below. We are today issuing to you a Notice of Violation and Finding of Violation (NOV/FOV) for these violations.

Haverhill North Coke's PSD Permit to Install (PTI) limits emissions of particulate matter (PM), particulate matter 10 (PM10), carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2) and volatile organic matter (VOM). The purpose of these emissions limits is to help protect the public from unhealthy exposures to criteria pollutants, emissions of which contribute to respiratory problems, lung damage and premature deaths.

Based on Excess Emissions Report (EER) data submitted for emissions unit P901, Haverhill North Coke has violated its 3-hour rolling SO_2 emission limit for six fiscal quarters since 2006. Also, for twelve quarters since the CEM was certified in 2005, Haverhill North Coke has violated its PTI requirement to continuously operate its SO_2 continuous emission monitor (CEM). Additionally, Haverhill North Coke failed to immediately report a baghouse malfunction observed by Portsmouth Local Air Agency on July 6, 2008.

Violation of these requirements is also a violation of the Ohio State Implementation Plan (SIP), as well as Title I, Part C of the CAA and its associated regulations which require compliance with the terms and conditions of PSD permits. Accordingly, Haverhill North Coke has violated Title I of the CAA and its implementing regulations.

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Section 113 of the CAA gives us several enforcement options to resolve these violations, including: issuing an administrative compliance order, issuing an administrative penalty order, bringing a judicial civil action, and bringing a judicial criminal action. Section 113 of the CAA provides you with the opportunity to request a conference with us about the violations alleged in the NOV/FOV. A conference should be requested within 10 days following receipt of this notice and any conference should be held within 30 days following receipt of this notice. This conference will provide you a chance to present information on the identified violations, any efforts you have taken to comply, and the steps you will take to prevent future violations. Please plan for your facility's technical and management personnel to take part in these discussions. You may have an attorney represent you at this conference.

The EPA contact in this matter is Gina Harrison. You may call her at (312) 353-6956 if you wish to request a conference. EPA hopes that this NOV/FOV will encourage Haverhill North Coke's compliance with the requirements of the CAA.

Sincerely,

for CLN

Cheryl L. Newton
Director
Air and Radiation Division

Enclosure

cc: John Paulian, Division of Air Pollution Control
Ohio Environmental Protection Agency

Cindy Charles, Director, Air Pollution Unit
Portsmouth City Health Department

United States Environmental Protection Agency
Region 5

IN THE MATTER OF:	(	
	(	
Haverhill North Coke Company	(	**NOTICE OF VIOLATION and**
Franklin Furnace, Ohio	(	**FINDING OF VIOLATION**
	(	
	(	**EPA-05-10-OH-17**
Proceedings Pursuant to	(	
the Clean Air Act,	(	
42 U.S.C. §§ 7401 et seq.	(	
	(	

NOTICE AND FINDING OF VIOLATION

Haverhill North Coke Company (you or Haverhill North Coke) owns and/or operates a metallurgical coke plant, located at 2446 Gallia Pike, Franklin Furnace, Ohio (facility).

The U. S. Environmental Protection Agency is sending this Notice of Violation and Finding of Violation (NOV/FOV or Notice) to notify you that sulfur dioxide (SO_2) emissions recorded by Continuous Emission Monitor (CEM) S239 from emissions unit P901 at your facility have been in excess of the limits specified in your PSD permit, and the Ohio State Implementation Plan (SIP). Additionally, excessive monitor downtime as recorded in Excess Emission Reports (EERs) is a violation of CEM standards required by your PSD permit. These exceedances and deviations constitute violations of the Clean Air Act (the Act or CAA).

Section 113 of the Act provides you with the opportunity to request a conference with us to discuss the violations alleged in the NOV/FOV. This conference will provide you a chance to present information on the identified violations, any efforts you have taken to comply, and the steps you will take to prevent future violations. Please plan for the facility's technical and management personnel to take part in these discussions. You may have an attorney represent and accompany you at this conference.

Explanation of Violations

The permits and permit conditions relevant to this NOV/FOV are as follows:

Applicable Permits and Regulations:

1. Section 110 of the Act, 42 U.S.C. § 7410, requires States to adopt, and submit to EPA for approval, SIP's providing for the implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS) promulgated by EPA pursuant to Section 109 of the Act, 42 U.S.C. § 7409. EPA has promulgated NAAQS for, among other pollutants, particulate matter and sulfur dioxide (SO_2).

2. Pursuant to 40 C.F.R. § 52.23, failure to comply with any approved regulatory provision of a SIP, or with any permit condition issued pursuant to approved or promulgated regulations for the review of new or modified stationary or indirect sources, renders the person so failing to comply in violation of a requirement of an applicable implementation plan and subject to enforcement under Section 113 of the Act, 42 U.S.C. § 7413.

3. On November 1, 1982, the Administrator of EPA approved OAC Rule 3745-15 as part of the federally enforceable SIP for the State of Ohio. 47 Fed. Reg. 43377. OAC Rule 3745-15 regulates general provisions, including but not limited to malfunctions at stationary sources, scheduled maintenance, and reporting.

4. OAC Rule 3745-15-06 requires in the event that any emission source, air pollution control equipment, or related facility breaks down in such a manner as to cause the emission of air contaminants in violation of any applicable law, the source shall immediately notify the Ohio Environmental Protection Agency district office or delegate agency of such failure or breakdown.

5. 40 C.F.R. § 63.8 (f)(1) provides that with the exception of system breakdowns, repairs, calibration checks, and zero and span adjustments required, all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements.

6. Section 113(a)(3) of the CAA, 42 U.S.C. § 7413(a)(3), authorizes the Administrator to initiate an enforcement action whenever, among other things, the Administrator finds that any person has violated or is in violation of a requirement or prohibition of Title V of the CAA, or any rule or permit promulgated, issued or approved under Title V of the CAA.

7. 40 C.F.R. § 63.6(e)(1)(i) requires that at all times, including periods of startup, shutdown, and malfunction, the owner or operator must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.

Factual Background

8. Haverhill North Coke owns and/or operates a metallurgical coke plant at 2446 Gallia Pike, Franklin Furnace, Ohio (facility).

9. Ohio Environmental Protection Agency (OEPA) issued PSD Permit to Install 07-00511 (PSD Permit) to the facility on December 11, 2003.

10. At the facility Haverhill North Coke operates one 60-oven and one 40-oven non-recovery coke batteries A and B, and one 60-oven and one 40-oven non-recovery coke batteries C and D, identified in its PSD permit as units P901 and P902, respectively.

11. SO2 CEM designated S239 for unit P901 was certified by Ohio EPA on June 30, 2005.

12. Part III Section A(I)(1) of the PSD Permit effective December 11, 2003, limits SO_2 emissions from unit P901 to 422.40 lbs/hr, 506.88 lbs/hr as a 3-hour block average, and 770.88 tons/year.

13. Part III Section A(I)(1) of the PSD Permit underwent administrative modification effective June 27, 2006 to revise limits on SO_2 emissions from unit P901 waste gas stack to 192 lbs/hour as a 3-hour block average, and 700.80 tons/year.

14. Haverhill North Coke submitted SO2 CEM Excess Emission Reports for unit P901 to Portsmouth Local Air Agency for the period June 2005 to June 2008. Data is included as Attachment A.

15. On August 18, 2008, January 26, 2007, and October 1, 2008, the Portsmouth Local Air Agency (Portsmouth), sent Haverhill North Coke Notices of Violation alleging violations of malfunction reporting requirements and emissions and monitoring standards for CEM S239 on unit P901.

Violations of Emissions Limits and Operating Standards

Year	Quarter	Total Operation (minutes)	Total Downtime (minutes)	Total Non Exempt Excess Emissions (minutes)	Downtime Percentage of Quarter	Excess Emissions Percentage of Quarter
2005	3	132480	22200	0	16.76	0
2005	4	132480	23820	0	17.98	0
2006	1	129600	12960	0	10.00	0
2006	2	131040	3480	1080	2.656	0.824
2006	3	132480	6660	33840	5.027	25.54
2006	4	132480	1260	0	0.951	0
2007	1	129600	1560	900	1.204	0.694
2007	2	131040	3480	240	2.656	0.183
2007	3	132480	660	1260	0.498	0.951
2007	4	132480	6540	6300	4.937	4.755
2008	1	131040	6360	1440	4.853	1.098
2008	2	131040	9060	0	6.914	0

16. Haverhill North Coke's CEM downtime for unit P901 constitutes failure to continuously comply with CEM standards as required by its PSD permit and is therefore a violation of its PSD permit, the Ohio SIP, and PSD regulations promulgated in 40 C.F.R. § 52.21.

17. Haverhill North Coke's excess SO_2 emissions from unit P901 are violations of its PSD permit and the Ohio SIP.

18. Haverhill North Coke's excess SO_2 emissions during the third quarter of 2006 are violations of 40 C.F.R. 63.6(e)(1)(i).

Violation of Malfunction Reporting Requirements

19. Haverhill North Coke's July 6th 2008 Coke Screening Baghouse malfunction was not immediately reported to Ohio EPA and is therefore a violation of its PSD permit and the Ohio SIP.

20. Haverhill North Coke's February 8th 2008 atomizer malfunctions were not immediately reported to Ohio EPA and are therefore violations of its PSD permit and the Ohio SIP.

Environmental Impact of Violations

21. Excess emissions of SO_2 increase the amount of acid rain and public exposure to unhealthy levels of SO_2. SO_2 reacts with other chemicals in the air to form tiny sulfate particles. Long term exposure to high levels of SO_2 gas and particles can cause respiratory illness, aggravate existing heart disease, and lead to premature death.

7/1/10
Date

Cheryl L. Newton
Director
Air and Radiation Division

CERTIFICATE OF MAILING

I, Loretta Shaffer, certify that I sent a Notice and Finding of Violation, No. EPA-5-09-OH-02, by Certified Mail, Return Receipt Requested, to:

SunCoke Energy, Incorporated
Delauna Pack
Parkside Plaza
11400 Parkside Drive
Knoxville, Tennessee 37934

I also certify that I sent copies of the Notice of Violation and Finding of Violation by first class mail to:

Cindy Charles
Portsmouth Local Air Agency
605 Washington Street, Third Floor
Portsmouth, Ohio, 45662

John Paulian
OH EPA – DAPC
Lazarus Government Center
PO Box 1049
Columbus, Ohio, 43215

on the 7 day of July, 2010.

Loretta Shaffer

Loretta Shaffer, Secretary
AECAS, MN-OH

CERTIFIED MAIL RECEIPT NUMBER: 7001 0320 0006 0192 0454

United States, State of Illinois, and State of Ohio v.
Gateway Energy & Coke Company, LLC, Haverhill Coke Company, LLC,
and SunCoke Energy, Inc.

ATTACHMENT TO APPENDIX 3 OF CONSENT DECREE

Federal Notice of Violation Relating to the Haverhill Facility
Issued To SunCoke Energy, Inc. On July 1, 2010

Federal Notice 2 of 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUL 1 - 2010

REPLY TO THE ATTENTION OF:

AE-17J

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Delauna Pack
SunCoke Energy, Incorporated
Parkside Plaza
11400 Parkside Drive
Knoxville, Tennessee 37934

Re: Notice and Finding of Violation at Haverhill North Coke Company, Franklin Furnace

Dear Ms. Pack:

This is to advise you that the U.S. Environmental Protection Agency has determined that Haverhill North Coke Company's (Haverhill North Coke's) facility at 2446 Gallia Pike, Franklin Furnace, Ohio, is in violation of the Clean Air Act (CAA) and associated state or local pollution control requirements. A list of the requirements violated is provided below. We are today issuing you a Notice of Violation and Finding of Violation (NOV/FOV) for these violations.

Haverhill North Coke's PSD Permit to Install (PTI) limits emissions of particulate matter (PM), particulate matter 10 (PM10), carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2) and volatile organic matter (VOM). The purpose of these emissions limits is to help protect the public from unhealthy exposures to criteria pollutants, emissions of which contribute to respiratory problems, lung damage and premature deaths.

Based on data submitted to EPA on April 28, 2006, December 11, 2009 and December 18, 2009, Haverhill North Coke has violated and continues to violate provisions in its PSD permit that govern bypass venting, emissions limits, and continuous emission monitoring (CEMS) standards for units P901 and P902 coke batteries. Violation of these requirements is also a violation of the Ohio State Implementation Plan (SIP), as well as Title I, Part C of the CAA and its associated regulations which require compliance with the terms and conditions of PSD permits. Accordingly, Haverhill North Coke has violated Title I of the CAA and its implementing regulations.

Section 113 of the CAA gives us several enforcement options to resolve these violations, including: issuing an administrative compliance order, issuing an administrative penalty order, bringing a judicial civil action, and bringing a judicial criminal action. Section 113 of the CAA provides you with the opportunity to request a conference with us about the violations alleged in

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the NOV/FOV. A conference should be requested within 10 days following receipt of this notice and any conference should be held within 30 days following receipt of this notice. This conference will provide you a chance to present information on the identified violations, any efforts you have taken to comply, and the steps you will take to prevent future violations. Please plan for your facility's technical and management personnel to take part in these discussions. You may have an attorney represent you at this conference.

EPA's contact in this matter is Gina Harrison. You may call her at (312) 353-6956 if you wish to request a conference. EPA hopes that this NOV/FOV will encourage Haverhill North Coke's compliance with the requirements of the CAA.

Sincerely,

for CLN

Cheryl L. Newton
Director
Air and Radiation Division

Enclosure

cc: John Paulian, Division of Air Pollution Control
Ohio Environmental Protection Agency

Cindy Charles, Director, Air Pollution Unit
Portsmouth City Health Department

United States Environmental Protection Agency
Region 5

IN THE MATTER OF:	(	
	(	
Haverhill North Coke Company	(	**NOTICE OF VIOLATION and**
Franklin Furnace, Ohio	(	**FINDING OF VIOLATION**
	(	
	(	**EPA-05-10-OH-18**
Proceedings Pursuant to	(	
the Clean Air Act,	(	
42 U.S.C. §§ 7401 et seq.	(	
	(	

NOTICE AND FINDING OF VIOLATION

EPA is issuing this Notice and Finding of Violation (Notice) under Section 113(a)(1) of the Clean Air Act, 42 U.S.C. § 7413(a)(1). The authority to issue this Notice has been delegated to the Regional Administrator of the EPA Region 5, and redelegated to the Director, Air and Radiation Division. EPA finds that Haverhill North Coke Company and Sun Coke Energy (Haverhill North Coke or facility), are violating the Clean Air Act (Act), 42 U.S.C. §§ 7401 *et seq.*, at the Haverhill North Coke Plant in Franklin Furnace, Ohio, as follows:

Applicable Permits and Regulations:

1. Section 110 of the Act, 42 U.S.C. § 7410, requires States to adopt, and submit to EPA for approval, SIPs providing for the implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS) promulgated by EPA pursuant to Section 109 of the Act, 42 U.S.C. § 7409. EPA has promulgated NAAQS for, among other pollutants, nitrogen oxides (NOx), particulate matter (PM) and sulfur dioxide (SO_2).

2. Pursuant to 40 C.F.R. § 52.23, failure to comply with any approved regulatory provision of a SIP, or with any permit condition issued pursuant to approved or promulgated regulations for the review of new or modified stationary or indirect sources, renders the person so failing to comply in violation of a requirement of an applicable implementation plan and subject to enforcement under Section 113 of the Act, 42 U.S.C. § 7413.

3. On November 1, 1982, the Administrator of EPA approved OAC Rule 3745-15 as part of the federally enforceable SIP for the State of Ohio. 47 Fed. Reg. 43377. OAC Rule 3745-15 regulates general provisions, including but not limited to malfunctions at stationary sources, scheduled maintenance, and reporting.

4. Section 113(a)(3) of the CAA, 42 U.S.C. § 7413(a)(3), authorizes the Administrator to initiate an enforcement action whenever, among other things, the Administrator finds that

any person has violated or is in violation of a requirement or prohibition of Title V of the CAA, or any rule or permit promulgated, issued or approved under Title V of the CAA.

5. 40 C.F.R. § 63.6(e)(1)(i) requires that at all times, including periods of startup, shutdown, and malfunction, the owner or operator must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.

6. 40 C.F.R § 63.8(f)(1) requires that with the exception of system breakdowns, repairs, calibration checks, and zero and span adjustments required, all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements.

7. Ohio EPA, delegated authority by EPA, issued PSD Permit to Install 07-00511 (PSD Permit) to Haverhill North Coke on December 11, 2003. The permit was modified to incorporate new bypass PM emission rate limits via administrative modification on June 27, 2006, and January 15, 2008.

8. Part III Section A(II)(9) of the PSD Permit effective December 11, 2003, limits bypass venting from units P901 and P902 to 192 hours per bypass vent stack, per rolling 12 month period.

9. Part III Section A(II)(9) of the PSD Permit effective December 11, 2003, requires that there shall be no more than one bypass vent stack in use at any time.

10. Part III Section A(I)(1) of the PSD Permit effective December 11, 2003, limits annual SO_2 emissions from unit P901 bypass vents and unit P902 bypass vents to 192 tons/year per unit.

11. Part III Section A(II)(9) of the PSD Permit effective December 11, 2003, limits the rate of NOx emissions from the unit P902 waste gas stack to 1 pound per ton of coal charged.

12. Part III Section A(II)(9) of the PSD Permit effective December 11, 2003, limits PM emissions from each HRSG bypass vent stack to 12.86 pounds per hour. Portsmouth Local Air Agency modified the PSD Permit on June 27, 2006 to incorporate a new bypass PM limit of 17.14 pounds per hour.

13. Part III Section A(I)(1) of the PSD Permit effective December 11, 2003, limits annual PM emissions from unit P901 bypass vents and unit P902 bypass vents to 10.8 tons/year per unit.

14. P902 Section A(III)(7-8) and (40-42) of the PSD Permit effective January 15, 2008 requires the facility to operate and maintain equipment to continuously monitor and record SO_2 and mercury (Hg) emissions from the waste gas stack in pounds per hour, and maintain records of all data obtained by the CEMS and sorbent trap monitoring system, including the concentration and emission rate of SO_2 and mercury from the exhausted gas.

Factual Background

15. Haverhill North Coke owns and/or operates a metallurgical coke plant at 2446 Gallia Pike, Franklin Furnace, Ohio (facility).

16. At the facility Haverhill North Coke operates 200 nonrecovery coke ovens designated as Batteries A, B, C, and D. Haverhill's PSD permit identifies emissions unit P901, or Batteries A and B, as the set of 100 ovens constructed in 2004, and P902, or Batteries C and D, as the set of 100 ovens constructed in 2008.

17. Haverhill North Coke's April 28, 2006 Compliance Demonstration Report showed a PM emission rate of 17.5 pounds per hour coming from bypass vent stack #3.

18. EPA issued a Notice and Finding of Violation to Haverhill North Coke Company on December 10, 2008 alleging violations of waste gas stack SO_2 limits and CEMS standards.

19. Haverhill North Coke submitted EERs to Portsmouth Local Air Agency for the period October 1, 2008 to March 31, 2009, which showed that the downtime for the SO_2 CEMS for P901& P902 for the first quarter of 2009 was 34.4% (65.6 % data capture) and 15.38% (84.62 % data capture), respectively. The monitor downtime for the Hg CEMS for P902 for the fourth quarter 2008 and first quarter 2009 was 18.35% (81.65% data capture) and 11.20% (88.8% data capture), respectively.

20. EPA issued a Notice and Finding of Violation to Haverhill North Coke Company on April 15, 2009 alleging violations of bypass venting standards and emission limits.

21. Haverhill North Coke's April 19, 2009 Compliance Demonstration Report showed a NOx emission rate of 1.3 pounds per ton coming from the P902 waste gas stack.

22. Haverhill North Coke retested the P902 waste gas stack on July 9, 2009 and recorded a NOx emission rate of 0.792 pounds per ton.

23. Portsmouth Local Air Agency issued Notices of Violation to Haverhill North Coke Company on July 17, 2009 and December 11, 2009, alleging violations of the 1 pound per ton waste gas stack NOx emission limit, CEMS operational standards and requirements for SO2 and mercury monitors, and bypass venting standards.

24. In its December 18, 2009 response to EPA, Haverhill North Coke reported 2955 hours of bypass venting, 642 tons of SO_2, and 86 tons of PM emitted from the bypass vent stacks since January 1, 2009.

2009 Violations of Bypass Venting Operating Standards and Emissions Limits

Unit P901

Month/ Year	Total Bypass Events (hours) BV1	Total Bypass Events (hours) BV2	Total Bypass Events (hours) BV3	Total Bypass Events (hours) BV4	Total Bypass Events (hours) BV5	Rolling 12-M Total (hours) BV1	Rolling 12-M Total (hours) BV2	Rolling 12-M Total (hours) BV3	Rolling 12-M Total (hours) BV4	Rolling 12-M Total (hours) BV5
01/2009		9.22		1.13	57.3	166.6	139.6	100.2	103	211.3
02/2009	254.4	252.4	263.2*	262.9	294.9	421	392	363.4	365.9	506.2
03/2009	0.12	0.17	0.2	0.28	0.32	421.1	392.1	363.6	366.2	506.5
04/2009	0.73			0.65	0.52	421.9	392.1	263.6	366.8	507
05/2009		0.15	0.17	0.12	0.13	421.9	392.3	263.8	367	353.3
06/2009	141.5*	0.02	0.05	0.29	0.09	396.7	392.1	263.7	367.1	353.2
07/2009		111.3*				396.7	373.3	263.7	367.1	353.2
08/2009	0.49	0.38	0.37	0.27	0.18	397.2	373.7	264	367.3	353.4
09/2009				135.7	0.02	397.2	373.7	264	401.3	353.4
10/2009					0.08	397.2	373.6	263.9	401.3	353.5
11/2009					0.2	397.2	373.6	263.9	401.3	353.7
12/2009						397.2	373.6	263.9	401.3	353.7

Unit P902

Month/ Year	Total Bypass Events (hours) BV6	Total Bypass Events (hours) BV7	Total Bypass Events (hours) BV8	Total Bypass Events (hours) BV9	Total Bypass Events (hours) BV10	Rolling 12-M Total (hours) BV6	Rolling 12-M Total (hours) BV7	Rolling 12-M Total (hours) BV8	Rolling 12-M Total (hours) BV9	Rolling 12-M Total (hours) BV10
01/2009	1.8	0.97	1.9	2.2	1.8	269	777.2	502.5	310.8	308.01
02/2009						269	777.2	502.5	310.8	308.01
03/2009	153*					421.96	777.22	502.5	310.75	308.01
04/2009		142*	110*			421.96	919.2	612.5	310.75	308.01
05/2009			42.2*	113*	12*	421.96	919.2	654.7	423.73	320.01
06/2009	0.4	1.28	2.51	0.32	140.5*	422.33	920.48	657.21	424.05	460.51
07/2009	0.7	0.73	0.73	0.55	0.55	423.06	921.21	657.94	424.6	461.06
08/2009	0.2		0.23	0.52	0.35	423.26	921.21	658.17	425.12	461.41
09/2009	98.2			0.02		339.37	733.24	437.36	174.82	240.66
10/2009	351.5	344.3	344.4	352	343.4	684.7	821.5	776.03	521.09	578.22
11/2009						679.9	649.79	546.01	518.14	568.74
12/2009	0.2	0.45			4	606	489.71	502.01	468.59	502.6

* designates annual HRSG maintenance as part of the 12-month rolling total.

2009 Excess SO_2 and PM Emissions from Bypass Vents

Unit	Total Annual SO_2 (tons)	Annual Permit Limit, SO_2 (tons/ year)	Percent Exceeding Permit Limit for SO_2	Total Annual PM (tons)	Annual Permit Limit, PM (tons/ year)	Percent Exceeding Permit Limit for PM
P901	196.7	192	102%	16.2	10.8	150%
P902	445.4	192	232%	69.6	10.8	644%

25. Haverhill North Coke's excess bypass venting from units P901 and P902 since January 1, 2009 collectively constitutes 116 rolling months of failure to comply with operational standards as required by Part III Section (A)(II)(9) of its PSD permit and therefore violates its PSD permit, Title V of the CAA, the Ohio SIP, and PSD regulations promulgated in 40 C.F.R. § 52.21.

26. Haverhill North Coke's excess SO_2 emissions from unit P901 bypass vent stacks constitute violations of Part III Section A(I)(1) of its PSD permit, Title V of the CAA, the Ohio SIP, and 40 C.F.R. 63.6(e)(1)(i).

27. Haverhill North Coke's excess PM emissions from unit P901 bypass vent stacks are violations of Part III Section A(I)(1) of its PSD permit, Title V of the CAA, the Ohio SIP, and 40 C.F.R. 63.6(e)(1)(i).

28. Haverhill North Coke's practice of opening more than one bypass vent stack at one time is a violation of Part III Section A(II)(9) of its PSD permit Title V of the CAA, the Ohio SIP, and 40 C.F.R. § 63.6(e).

29. Haverhill North Coke's failure to limit PM emissions from bypass vents during the period April 28, 2006 to June 27, 2006 is a violation of Part III Section A(I)(1) of its PSD Permit, Title V of the CAA, the Ohio SIP, and 40 C.F.R. § 63.6(e).

30. Haverhill North Coke's failure to limit NOx emission rates from waste gas stacks during the period May 19, 2009 to July 9, 2009 is a violation of Part III Section A(II)(9) of its PSD Permit, Title V of the CAA, the Ohio SIP, and 40 C.F.R. § 63.6(e).

31. Haverhill North Coke's failure to continuously operate and maintain its SO_2 CEMS and Hg sorbent trap monitoring system to monitor SO_2 and Hg emissions from the waste gas stack is a violation of P901 and P902 Section A(III)(7-8) and (40-42) of its PSD permit, Ohio SIP PSD regulations, and NESHAP regulations at 40 C.F.R. § 63.6(e) and 40 C.F.R. § 63.8 (f)(1).

Environmental Impact of Violations

32. Excess emissions of SO_2 increase the amount of acid rain and public exposure to unhealthy levels of SO_2. SO_2 reacts with other chemicals in the air to form tiny sulfate particles. Long term exposure to high levels of SO_2 gas and particles can cause respiratory illness, aggravate existing heart disease, and lead to premature death.

33. Violations of particulate emissions standards increases public exposure to unhealthy particulate matter. Particulate matter, especially fine particulate, contributes to respiratory problems, lung damage and premature deaths.

34. Excess emissions of NOx increase ground level concentrations of ozone and nitrogen dioxide, both of which can cause respiratory inflammation, increased difficulty breathing, and lung damage. NOx emissions also contribute to acid rain, global warming, the formation of fine particles in the atmosphere, water quality deterioration, and visibility impairment.

7/1/10
Date

for ecw
Cheryl L. Newton
Director
Air and Radiation Division

CERTIFICATE OF MAILING

I, Loretta Shaffer, certify that I sent a Notice and Finding of Violation, No. EPA-5-10-OH-09, by Certified Mail, Return Receipt Requested, to:

SunCoke Energy, Incorporated
Delauna Park
Parkside Plaza
11400 Parkside Drive
Knoxville, Tennessee 37934

I also certify that I sent copies of the Notice of Violation and Finding of Violation by first class mail to:

Cindy Charles
Portsmouth Local Air Agency
605 Washington Street, Third Floor
Portsmouth, Ohio 45662

John Paulian
Ohio EPA – DAPC
Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43215

Cathy Rojko
U.S. Department of Justice/ENRD
Environmental Enforcement Section
P.O. Box 7611, Ben Franklin Station
Washington, DC 20044

on the 7 day of July, 2010.

Loretta Shaffer

Loretta Shaffer, Secretary
AECAS, MN-OH

CERTIFIED MAIL RECEIPT NUMBER: 7001 0320 0006 0192 0430

United States, State of Illinois, and State of Ohio v.
Gateway Energy & Coke Company, LLC, Haverhill Coke Company, LLC,
and SunCoke Energy, Inc.

ATTACHMENT TO APPENDIX 3 OF CONSENT DECREE

Federal Notice of Violation Relating to the Haverhill Facility
Issued To SunCoke Energy, Inc. On July 1, 2010

Federal Notice 3 of 3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

JUL 1 - 2010

REPLY TO THE ATTENTION OF:
AE-17J

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Delauna Pack
SunCoke Energy, Incorporated
Parkside Plaza
11400 Parkside Drive
Knoxville, Tennessee 37934

Re: Notice and Finding of Violation at Haverhill North Coke Company, Franklin Furnace

Dear Ms. Pack:

This is to advise you that the U.S. Environmental Protection Agency has determined that Haverhill North Coke Company's (Haverhill North Coke's) facility at 2446 Gallia Pike, Franklin Furnace, Ohio, is in violation of the Clean Air Act (CAA) and associated state or local pollution control requirements. A list of the requirements violated is provided below. We are today issuing you a Notice of Violation and Finding of Violation (NOV/FOV) for these violations.

Haverhill North Coke's PSD Permit to Install (PTI) limits emissions of particulate matter (PM), particulate matter 10 (PM10), carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO_2) and volatile organic matter (VOM). The purpose of these emissions limits is to help protect the public from unhealthy exposures to criteria pollutants, emissions of which contribute to respiratory problems, lung damage and premature deaths.

Based on data submitted to EPA on March 3, 2009, Haverhill North Coke has violated and continues to violate provisions in its PSD permit that govern bypass venting from units P901 and P902 coke batteries. Violation of these requirements is also a violation of the Ohio State Implementation Plan (SIP), as well as Title I, Part C of the CAA and its associated regulations which require compliance with the terms and conditions of PSD permits. Accordingly, Haverhill North Coke has violated Title I of the CAA and its implementing regulations.

Section 113 of the CAA gives us several enforcement options to resolve these violations, including: issuing an administrative compliance order, issuing an administrative penalty order, bringing a judicial civil action, and bringing a judicial criminal action. Section 113 of the CAA

provides you with the opportunity to request a conference with us about the violations alleged in the NOV/FOV. A conference should be requested within 10 days following receipt of this notice and any conference should be held within 30 days following receipt of this notice. This conference will provide you a chance to present information on the identified violations, any efforts you have taken to comply, and the steps you will take to prevent future violations. Please plan for your facility's technical and management personnel to take part in these discussions. You may have an attorney represent you at this conference.

EPA's contact in this matter is Gina Harrison. You may call her at (312) 353-6956 if you wish to request a conference. EPA hopes that this NOV/FOV will encourage Haverhill North Coke's compliance with the requirements of the CAA.

Sincerely,

for CLN

Cheryl L. Newton
Director
Air and Radiation Division

Enclosure

cc: John Paulian, Division of Air Pollution Control
Ohio Environmental Protection Agency

Cindy Charles, Director, Air Pollution Unit
Portsmouth City Health Department

United States Environmental Protection Agency
Region 5

IN THE MATTER OF:	(	
	(	
Haverhill North Coke Company	(	**NOTICE OF VIOLATION and**
Franklin Furnace, Ohio	(	**FINDING OF VIOLATION**
	(	
	(	**EPA-05-10-OH-19**
Proceedings Pursuant to	(	
the Clean Air Act,	(	
42 U.S.C. §§ 7401 et seq.	(	
	(	

NOTICE AND FINDING OF VIOLATION

EPA is issuing this Notice and Finding of Violation (Notice) under Section 113(a)(1) of the Clean Air Act, 42 U.S.C. § 7413(a)(1). The authority to issue this Notice has been delegated to the Regional Administrator of the EPA Region 5, and redelegated to the Director, Air and Radiation Division. EPA finds that Haverhill North Coke Company and Sun Coke Energy (Haverhill North Coke), are violating the Clean Air Act (Act), 42 U.S.C. §§ 7401 *et seq.*, at the Haverhill North Coke Plant in Franklin Furnace, Ohio, as follows:

Applicable Permits and Regulations:

1. Section 110 of the Act, 42 U.S.C. § 7410, requires States to adopt, and submit to EPA for approval, SIP's providing for the implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS) promulgated by EPA pursuant to Section 109 of the Act, 42 U.S.C. § 7409. EPA has promulgated NAAQS for, among other pollutants, particulate matter (PM) and sulfur dioxide (SO_2).

2. Pursuant to 40 C.F.R. § 52.23, failure to comply with any approved regulatory provision of a SIP, or with any permit condition issued pursuant to approved or promulgated regulations for the review of new or modified stationary or indirect sources, renders the person so failing to comply in violation of a requirement of an applicable implementation plan and subject to enforcement under Section 113 of the Act, 42 U.S.C. § 7413.

3. On November 1, 1982, the Administrator of EPA approved OAC Rule 3745-15 as part of the federally enforceable SIP for the State of Ohio. 47 Fed. Reg. 43377. OAC Rule 3745-15 regulates general provisions, including but not limited to malfunctions at stationary sources, scheduled maintenance, and reporting.

4. OAC Rule 3745-15-06(A)(3) requires any source scheduling maintenance activities requiring the shutdown or bypassing of air pollution control equipment to request authorization to continue operating the source during the scheduled maintenance. This

request should be submitted in a written report at least two weeks prior to the planned shutdown of the air pollution control equipment.

5. Section 113(a)(3) of the CAA, 42 U.S.C. § 7413(a)(3), authorizes the Administrator to initiate an enforcement action whenever, among other things, the Administrator finds that any person has violated or is in violation of a requirement or prohibition of Title V of the CAA, or any rule or permit promulgated, issued or approved under Title V of the CAA.

6. 40 C.F.R. § 63.6(e)(1)(i) requires that at all times, including periods of startup, shutdown, and malfunction, the owner or operator must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions.

7. Ohio EPA, delegated authority by EPA, issued PSD Permit to Install 07-00511 (PSD Permit) to Haverhill North Coke on December 11, 2003. The permit was modified to incorporate new bypass PM emission rate limits via administrative modification on June 27, 2006, and January 15, 2008.

8. Part III Section A(I)(1) of the PSD Permit effective December 11, 2003, limits annual SO_2 emissions from unit P901 bypass vents and unit P902 bypass vents to 192 tons/year per unit.

9. Part III Section A(I)(1) of the PSD Permit effective December 11, 2003, limits annual PM emissions from unit P901 bypass vents and unit P902 bypass vents to 10.8 tons/year per unit.

10. Part III Section A(II)(9) of the PSD Permit effective December 11, 2003, limits bypass venting from units P901 and P902 to 192 hours per bypass vent stack, per rolling 12 month period.

11. Part III Section A(II)(9) of the PSD Permit effective December 11, 2003, requires that there shall be no more than one bypass vent stack in use at any time.

Factual Background

12. Haverhill North Coke owns and/or operates a metallurgical coke plant at 2446 Gallia Pike, Franklin Furnace, Ohio (facility).

13. At the facility Haverhill North Coke operates 200 non-recovery coke ovens designated as Batteries A, B, C, and D. Haverhill's PSD permit identifies emissions unit P901, or Batteries A and B, as the set of 100 ovens constructed in 2004, and P902, or Batteries C and D, as the set of 100 ovens constructed in 2008.

14. EPA issued a Notice and Finding of Violation to Haverhill North Coke Company alleging violations of waste gas stack SO_2 limits on December 10, 2008.

15. EPA sent an information request to Haverhill North Coke Company on February 17, 2009, requesting more information on bypass venting.

16. Haverhill North Coke responded to the information request on March 3, 2009, and reported 7409 hours of bypass venting, 723 excess tons of SO2, and 47.6 excess tons of PM emitted from the bypass vent stacks since July 2005.

17. In its March 3, 2009 response to EPA, Haverhill North Coke indicated it had not informed Portsmouth Local Air Agency of three HRSG maintenance events, which occurred in 2006, 2007, and 2008.

18. Haverhill North Coke unit P901 suffered a catastrophic stack collapse on February 11, 2009. Haverhill North Coke reported the event and sent subsequent emails[1] to Portsmouth Local Air Agency describing the duration of the event, projected cause and necessary repairs, and estimated emissions. In these correspondences, Haverhill North Coke reported a total of 1323 hours of bypass venting resulting from this event.

Violations of Emissions Limits and Operating Standards

Unit P901

Month/ Year	Total Bypass Events (hours) BV1	Total Bypass Events (hours) BV2	Total Bypass Events (hours) BV3	Total Bypass Events (hours) BV4	Total Bypass Events (hours) BV5	Rolling 12-M Total (hours) BV1	Rolling 12-M Total (hours) BV2	Rolling 12-M Total (hours) BV3	Rolling 12-M Total (hours) BV4	Rolling 12-M Total (hours) BV5
07/2005	10	10	10	10	10	10	10	10	10	10
11/2005	315.5	287	246	230	230	325.5	297	256	240	240
12/2005	1.4					326.9	297	256	240	240
03/2006	0.83	0.38	1.07	0.43	0.47	327.7	297.4	257.1	240.4	240.5
04/2006			148.4*			327.7	297.4	405.5	240.4	240.5
05/2006					156.3*	327.7	297.4	405.5	240.4	396.7
06/2006		0.17		164.8*		327.7	297.6	405.5	405.2	396.7
07/2006		149.4*				317.7	436.9	395.5	395.2	386.7
08/2006	151.6*					469.3	436.9	395.5	395.2	386.7
10/2006					0.04	469.3	436.9	395.5	395.2	386.8
12/2006			0.47			152.4	149.9	150	165.2	156.8
02/2007	148.3	1.28	0.78	146.4	170.1	300.7	151.2	150.8	311.6	326.9
04/2007			121.6*			299.9	150.8	149.7	311.2	326.4
05/2007	0.25	0.62	0.92	0.4	110.5*	300.1	151.4	123.8	311.6	280.6
06/2007	252.8*					552.9	151.3	123.8	146.8	280.6

[1] February 24, 2009, email from Kris Kinder (HNCC) to Cindy Charles (PLAA) reported a total of 1323 hours of bypass venting as a result of the stack collapse.

* designates annual HRSG maintenance as part of the 12-month rolling total.

07/2007	66.87	116.6*	0.02		0.08	619.8	118.5	123.8	146.8	280.7
08/2007	179.1				28.88	798.9	267.9	272.2	311.6	465.9
09/2007	17	19	93.83	130.2*	11	664.3	137.5	217.6	277	320.6
10/2007	190.3	170.1	167.1	93.53	160.3	854.6	307.7	384.7	370.5	480.8
12/2007		1				854.6	308.7	384.2	370.5	480.8
04/2008			99.95*			706.3	307.4	361.8	224.2	310.7
05/2008					153.9*	706	306.8	360.9	223.8	354.1
06/2008	166.6*	0.17	0.17	0.17	0.17	619.8	306.9	361.1	223.9	354.3
07/2008		130.1*				553	320.4	361	223.9	354.2
09/2008				101.7*		356.9	301.4	267.2	195.4	314.3
10/2008		0.08	0.08			166.6	131.4	100.2	101.9	154.1
01/2009		9.22		1.13	45.28	166.6	139.6	100.2	101.9	154.1
02/2009	227	228	287	263	295	393.6	367.6	387.2	366	494.3

Unit P902

Month/ Year	Total Bypass Events (hours) BV6	Total Bypass Events (hours) BV7	Total Bypass Events (hours) BV8	Total Bypass Events (hours) BV9	Total Bypass Events (hours) BV10	Rolling 12-M Total (hours) BV6	Rolling 12-M Total (hours) BV7	Rolling 12-M Total (hours) BV8	Rolling 12-M Total (hours) BV9	Rolling 12-M Total (hours) BV10
09/2008	182.1	188	220.8	250.3	220.8	182.1	188	220.8	250.3	220.8
10/2008	6.15	256	5.73	5.7	5.86	188.3	444	226.5	256	226.6
11/2008	4.8	171.7	230	2.95	9.48	193.1	615.7	456.6	259	236.1
12/2008	74.1	160.5	44	49.55	70.14	267.2	776.3	500.6	308.5	306.2
01/2009	1.8	0.97	1.94	2.23	1.78	269	777.2	502.5	310.8	308

Excess SO_2 and PM Emissions from Bypass Vents

Year	Total Annual SO_2 (tons)	Annual Permit Limit, SO_2 (tons/ year)	Percent Exceeding Permit Limit for SO_2	Total Annual PM (tons)	Annual Permit Limit, PM (tons/ year)	Percent Exceeding Permit Limit for PM
2005	176	192	-	13.1	10.8	121%
2006	107	192	-	6.78	10.8	-
2007	354	192	184%	22.0	10.8	203%

19. Haverhill North Coke's excess bypass venting from units P901 and P902 since 2005 collectively constitutes 165 rolling months of failure to comply with operation standards as required by its PSD permit and therefore violates its PSD permit, the Ohio SIP, and PSD regulations promulgated in 40 C.F.R. § 52.21.

20. Haverhill North Coke's excess SO_2 emissions from unit P901 bypass vent stacks constitute violations of its PSD permit, the Ohio SIP, and 40 C.F.R. 63.6(e)(1)(i).

21. Haverhill North Coke's excess PM emissions from unit P901 bypass vent stacks are violations of its PSD permit, the Ohio SIP, and 40 C.F.R. 63.6(e)(1)(i).

22. Haverhill North Coke's practice of opening more than one bypass vent stack at one time is a violation of its PSD permit.

23. Failure of Haverhill North Coke to notify Portsmouth Local Air Agency of HRSG maintenance activities is a violation of OAC 3745-15-06(A)(3).

Environmental Impact of Violations

24. Excess emissions of SO_2 increase the amount of acid rain and public exposure to unhealthy levels of SO_2. SO_2 reacts with other chemicals in the air to form tiny sulfate particles. Long term exposure to high levels of SO_2 gas and particles can cause respiratory illness, aggravate existing heart disease, and lead to premature death.

25. Violations of particulate emissions standards increases public exposure to unhealthy particulate matter. Particulate matter, especially fine particulate, contributes to respiratory problems, lung damage and premature deaths.

7/1/10
Date

for CLN
Cheryl L. Newton
Director
Air and Radiation Division

CERTIFICATE OF MAILING

I, Loretta Shaffer, certify that I sent a Notice and Finding of Violation, No. EPA-5-09-OH-14, by Certified Mail, Return Receipt Requested, to:

SunCoke Energy, Incorporated
Delauna Pack
Parkside Plaza
11400 Parkside Drive
Knoxville, Tennessee 37934

I also certify that I sent copies of the Notice of Violation and Finding of Violation by first class mail to:

Cindy Charles
Portsmouth Local Air Agency
605 Washington Street, Third Floor
Portsmouth, Ohio 45662

John Paulian
OH EPA – DAPC
Lazarus Government Center
P.O. Box 1049
Columbus, Ohio 43215

on the 7 day of July, 2010.

Loretta Shaffer

Loretta Shaffer, Secretary
AECAS, MN-OH

CERTIFIED MAIL RECEIPT NUMBER: 7001 0320 0006 0192 0447

United States, State of Illinois, and State of Ohio v.
Gateway Energy & Coke Company, LLC, Haverhill Coke Company, LLC,
and SunCoke Energy, Inc.

ATTACHMENT TO APPENDIX 3 OF CONSENT DECREE

Ohio EPA / Portsmouth Local Air Agency Notice of Violation Relating to the Haverhill Facility, Issued To Haverhill North Coke Company On July 17, 2009

State Notice 1 of 2

PORTSMOUTH LOCAL AIR AGENCY
USEPA AND OEPA REPRESENTATIVE FOR ADAMS, BROWN, SCIOTO AND LAWRENCE COUNTIES
605 Washington Street, Third Floor, Portsmouth, Ohio 45662 (740) 353-5156 Fax (740) 353-3638

July 17, 2009

CERTIFIED MAIL

Mr. John Essman
General Manager
Haverhill North Coke Company
2446 Gallia Pike
Franklin Furnace, OH 45629

Re: Notice of Violation

Dear Mr. Essman:

Our office is in receipt of the emission compliance test report for Haverhill North Coke Company's nonrecovery coke oven battery (C&D) (OEPA ID P902), located at 2446 Gallia Pike, Franklin Furnace, Ohio, conducted April 7th thru 17th , 2009. The purpose of the stack test was to determine compliance with the battery's allowable mass emissions rates for particulate matter (PM), Carbon Monoxide (CO), Sulfur Dioxide (SO2), Nitrogen Oxides (NOx), Volatile Organic Compounds (VOCs), Lead (Pb), Hydrochloric Acid (HCl), Mercury (Hg), and opacity at the waste gas, as well as compliance testing on the charging baghouse, and pushing multiclone exhaust stacks , as required in PTI 07-00511 issued on June 26, 2006.

PTI 07-00511 lists allowable NOx mass emission rates for this battery of 120.0 pounds per hour and 1 pound per ton of coal charged pursuant to 40 CFR Part 52.21 and Ohio Administrative Code (OAC) 3745-31-10 thru 20. The test results submitted show the average NOx emissions to be 1.30 pound per ton during the April 9, 2009 compliance test of the waste gas stack exhaust.

This office has found this failure to comply with the allowable mass emission rate for NOx pounds per tons of coal charged to be a violation of PTI 07-00511 and OAC rules 3745-31-05(A)(3).

This agency is requesting within fourteen days of receipt of this letter, that The Haverhill North Coke Company submit a compliance schedule which outlines the steps to be taken to bring the abovementioned source into compliance, and the dates by which each step will be completed. Also requested is a description of any interim measures The Haverhill North Coke Company has taken to return to compliance.

Acceptance by the Ohio EPA of this information does not constitute a waiver of the Ohio EPA's authority to seek civil penalties as provided in section 3704.06 of the Ohio Revised Code. The determination to pursue or decline such penalties in this case will be made by the Ohio EPA at a later date.

If you are unable to respond to any part of this request, within the time frame discussed above, please inform us and explain so that we may be of assistance.

If you have any questions or need additional information, please me at (740) 353-5156.

Sincerely,

Cindy Charles

Cindy Charles
Director
Portsmouth Local Air Agency

cc: John Paulian, OEPA, DAPC
Lisa Holscher, USEPA
Gina Harrison, USEPA

United States, State of Illinois, and State of Ohio v.
Gateway Energy & Coke Company, LLC, Haverhill Coke Company, LLC,
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ATTACHMENT TO APPENDIX 3 OF CONSENT DECREE

Ohio EPA / Portsmouth Local Air Agency Notice of Violation Relating to the Haverhill Facility, Issued To Haverhill North Coke Company On July 17, 2009

State Notice 2 of 2

PORTSMOUTH LOCAL AIR AGENCY
USEPA AND OEPA REPRESENTATIVE FOR ADAMS, BROWN, SCIOTO AND LAWRENCE COUNTIES
605 Washington Street, Third Floor, Portsmouth, Ohio 45662 (740) 353-5156 Fax (740) 353-3638

July 17, 2009

CERTIFIED MAIL

Mr. John Essman
General Manager
Haverhill North Coke Company
2446 Gallia Pike
Franklin Furnace, OH 45629

Re: Notice of Violation

Dear Mr. Essman:

The Fourth Quarter 2008 and First Quarter 2009 Excess Emissions Reports (EERs) for emissions units P901 & P902 have been reviewed by the Portsmouth Local Air Agency. EER summary results show that the data capture rate for the Sulfur Dioxide (SO_2) and Mercury (Hg) continuous emissions monitoring systems (CEMS) associated with these emissions units was not continuous during this time frame.

Permit to Install (PTI) 07-00511 for emissions unit P901 & P902 requires Haverhill North to operate and maintain equipment to continuously monitor and record SO_2 emissions from P901 and SO_2 and Hg emissions from P902 in accordance with the requirements of 40 CFR Part 60.13. Specifically, the monitor downtime for the SO_2 CEMS for P901& P902 for the first quarter 2009 was 34.4% (65.6 % data capture) and 15.38% (84.62 % data capture), respectively. The monitor downtime for the Hg CEMS for P902 for the fourth quarter 2008 and first quarter 2009 was 18.35% (81.65% data capture) and 11.20% (88.8% data capture), respectively.

The Portsmouth Local Air Agency considers any CEMS downtime a violation of the permit terms and conditions and Ohio Revised Code 3704.05, and the amounts of downtime reported in this time period to be excessive.

Within 14 days of receipt of this letter, please provide a written response to this letter that provides an explanation for the cause of this excessive monitor downtime; a description of the standard operating procedure that are used when a problem with the CEMS is detected, including a listing of all steps taken from the time a problem is detected until the time it is repaired; and a description of what actions will be taken to prevent a recurrence of downtime violations should also be included.

Acceptance by the Ohio EPA of this information does not constitute a waiver of the Ohio EPA's authority to seek civil penalties as provided in section 3704.06 of the Ohio Revised Code. The determination to pursue or decline such penalties in this case will be made by the Ohio EPA at a later date.

If you are unable to respond to any part of this request, within the time frame discussed above, please inform us and explain so that we may be of assistance.

If you have any questions or need additional information, please contact me at (740) 353-5156.

Sincerely,

Cindy Charles

Cindy Charles
Director
Portsmouth Local Air Agency

cc: John Paulian, OEPA, DAPC
Lisa Holscher, USEPA
Gina Harrison, USEPA

Appendix 4

Potential Middletown Redundant HRSG Project

A. Pursuant to Paragraph 48 of this Consent Decree, Defendant SunCoke shall submit a written evaluation for the Relevant Period (the half-year between July 1 and December 31, or the half-year between January 1 and June 30, commencing on the Effective Date) of compliance at the Middletown Facility with all Bypass Venting limits contained in the Middletown Facility's permit-to-install No. P0104768 (effective February 9, 2010) ("Middletown Permit") to determine whether installation of redundancy for the HRSGs at the Middletown Facility is necessary to ensure compliance with the Middletown Permit ("Redundancy Evaluation"). This Redundancy Evaluation shall consist of the following: (1) an analysis of the causes of all Bypass Venting that has occurred at the Middletown Facility during the Relevant Period; (2) the number of hours of Bypass Venting during each Bypass Venting event and the total number of hours of Bypass Venting during the Relevant Period; (3) estimated Bypass Venting emissions during each Bypass Venting event and total Bypass Venting emissions during the Relevant Period; and (4) a discussion of whether installation of HRSG redundancy would have prevented each Bypass Venting event identified in (2) and (3). If the United States disagrees with SunCoke as to the causes of any Bypass Venting, it will notify SunCoke in writing after receipt of the Redundancy Evaluation. Any disagreement between the parties relating to the cause or causes of any Bypass Venting event shall be subject to dispute resolution under Section IX (Dispute Resolution) of this Consent Decree.

B. HRSG Redundancy shall be required at the Middletown Facility pursuant to this Consent Decree if, for any rolling twelve-month period during the pendency of this Consent Decree, the Redundancy Evaluation indicates that the total Bypass Venting hours that could have been avoided by HRSG redundancy (as identified in subparagraph A of this paragraph) exceed 1638 stack hours (105% of the 1560 stack hours per twelve-month period of Bypass Venting emissions allowed in the Middletown Permits). In the event that redundancy is required pursuant to this Paragraph, SunCoke shall install either a Redundant HRSG or HRSGs of substantially similar design to the Redundant HRSG Project required by Section IV of the Consent Decree (Compliance Requirements), or an alternative redundancy project ("Middletown Redundancy Project") that provides at least the same level of redundancy as that provided by the Redundant HRSG Project required by Section IV of the Consent Decree (Compliance Requirements). For purposes of this Appendix 4, "redundancy" shall mean a HRSG(s) or other gas

cooling equipment that operates simultaneously with an Existing HRSG, including in the event of the loss of one of the Existing HRSGs that meets the criteria set forth in Section IV.A of this Consent Decree. Where the criteria set forth in Section IV.A of this Consent Decree differ by geographic location, the Middletown Redundancy Project will meet the criteria applicable to HNCC No. 2.

C. Should installation of the Middletown Redundancy Project be required pursuant to this Appendix, then Defendants shall complete installation and begin operation of the Redundant HRSG(s) or other substantially similar redundancy project at the Middletown Facility on or before the later of (a) December 30, 2018, or (b) twenty-seven (27) months from the date that redundancy is required by this Consent Decree.

Appendix J

2007 Consent Order and
2009 Revision to the Consent Order

State of Illinois
(Plaintiff)

v.

United States Steel Corporation, Inc.
(Defendant)

IN THE CIRCUIT COURT FOR THE THIRD JUDICIAL CIRCUIT
MADISON COUNTY, ILLINOIS

FILED
DEC 18 2007
CLERK OF CIRCUIT COURT FOR THIRD JUDICIAL CIRCUIT MADISON COUNTY, ILLINOIS

PEOPLE OF THE STATE OF ILLINOIS, *ex rel.*, LISA MADIGAN, Attorney General of the State of Illinois,	)	
Plaintiff,	)	
v.	)	No. 05-CH-750
UNITED STATES STEEL CORPORATION, INC., a Delaware Corporation,	)	
Defendant.	)	

CONSENT ORDER

Plaintiff, PEOPLE OF THE STATE OF ILLINOIS, *ex. rel.* LISA MADIGAN, Attorney General of the State of Illinois, the Illinois Environmental Protection Agency ("Illinois EPA"), and Defendant, UNITED STATES STEEL CORPORATION (incorrectly identified as UNITED STATES STEEL CORPORATION, INC.), have agreed to the making of this Consent Order and submit it to this Court for approval.

I. INTRODUCTION

This stipulation of facts is made and agreed upon for purposes of settlement only and as a factual basis for the Court's entry of the Consent Order. None of the facts stipulated herein shall be introduced into evidence in any other proceeding regarding the violations of the Illinois Environmental Protection Act ("Act"), 415 ILCS 5/1, *et seq.* (2006), and the Illinois Pollution Control Board ("Board") Regulations, alleged in the Complaint, except as otherwise provided herein. It is the intent of the Plaintiff and Defendant to this Consent Order that it be a final judgment on the merits of this matter.

A. Parties

1. On September 14, 2005, a Complaint was filed on behalf of the People of the State of Illinois by Lisa Madigan, Attorney General of the State of Illinois, on her own motion and upon the request of the Illinois EPA pursuant to Section 42(d) and (e) of the Act, 415 ILCS 5/42(d) and (e) (2006), against the Defendant. On November 27, 2006, the People moved to supplement the complaint with an additional count, Count VII, to the complaint. That motion was granted on December 7, 2006, and the First Supplemental Complaint was entered. On October 16, 2007, the Plaintiff and Defendant entered a stipulation in which the People requested permission to file a Second Supplemental Complaint to add Counts VIII and IX and Defendant did not object. On October 17, 2007, the request was granted and the Second Supplemental Complaint was entered.

2. The Illinois EPA is an administrative agency of the State of Illinois, created pursuant to Section 4 of the Act, 415 ILCS 5/4 (2006).

3. At all times relevant to the Complaint, Defendant United States Steel Corporation was and is a Delaware corporation that is authorized to transact business in the State of Illinois, and owned and operated integrated iron and steel mill located at 20th Street and State Street, Granite City, Madison County, Illinois ("steel mill").

B. Allegations of Non-Compliance

As set forth in Plaintiff's Complaint, Plaintiff's First Supplemental Complaint, and Plaintiff's Second Supplemental Complaint, Plaintiff contends that the Defendant has violated the following provisions of the Act and Board Regulations:

Count I: Sections 9(a) and (b) of the Act, 415 ILCS 5/9(a), (b) (2006), Sections 212.324(f), 212.207, and 212.309(a) of the Board's Air

Pollution Regulations, 35 Ill. Adm. Code 212.324(f), 212.207, 212.309(a) and operating permit 83050042.

Count II:	Sections 9(a) and (b) of the Act, 415 ILCS 5/9(a), (b) (2006), Section 212.443(c)(1)(A) of the Board's Air Pollution Regulations, 35 Ill. Adm. Code 212.443(c)(1)(A), Standard Condition 7 and Special Conditions 1(a) & (b) of operating permit 88070071 and Special Condition 2(b) of operating permit 82060043.
Count III:	Sections 9(a) and (b) of the Act, 415 ILCS 5/9(a), (b), (2006), Sections 212.307 and 212.309(a) of the Board's Air Pollution Regulations, 35 Ill. Adm. Code 212.307 and 212.309(a), and Standard Condition 7 of operating permit 72080034 and 72080036.
Count IV:	Sections 9(a), (b) and 9.1(d) of the Act, 415 ILCS 5/9(a), (b), 9.1(d) (2006), 40 CFR 63.304(b)(2)(iv), Sections 212.443(b)(1)(A) and 201.141 of the Board's Air Pollution Regulations, 35 Ill Adm. Code 212.443(b)(1)(A) and 201.141, Special Condition 5 of operating permit 80050010, and Special Condition 6 of operating permit 82060043.
Count V:	Sections 9(a) and (b) of the Act, 415 ILCS 5/9(a), (b), (2006), Section 201.141 of the Board's Air Pollution Regulations, 35 Ill. Adm. Code 201.141, Special Condition 18 of revised operating permit 95010001.
Count VI:	Sections 9(a) and 9.1(d) of the Act, 415 ILCS 5/9(a), 9.1(d) (2006), Section 40 CFR 63.309(b)(2)(i)(B), and Sections 212.443(d)(2) and 201.141 of the Board's Air Pollution Regulations, 35 Ill. Adm. Code 212.443(d)(2) and 201.141.
Count VII:	Section 9(a) of the Act, 415 ILCS 5/9(a) (2006).
Count VIII:	Sections 9(a) and 9(b) of the Act, 415 ILCS 5/9(a), (b) (2006), Section 212.446(c) of the Board's Air Pollution Regulations, 35 Ill. Adm. Code 212.446(c), and Condition 8 of Defendant's Operating Permit #95010001.
Count IX:	Sections 9.1(d)(1), (d)(2) and 9(b) of the Act, 415 ILCS 5/9.1(d)(1), (d)(2), 9(b) (2006), Sections 165(a)(1) and 165(a)(4) of the Clean Air Act, 42 U.S.C.A. § 7475(a)(1), (a)(4) (2006), 40 CFR 52.21(j)(l) and (j)(3), and 40 CFR 52.21(r)(l), and Condition 22 of Defendant's Operating Permit #95010001.

C. Non-Admission of Violation

The Defendant represents that it has entered into this Consent Order for the purpose of settling and compromising disputed claims without having to incur the expense of contested litigation. By entering into this Consent Order and complying with its terms, the Defendant does not affirmatively admit the allegations of violation within the Complaint and referenced above, and this Consent Order shall not be interpreted as including such admission.

D. Compliance Activities to Date

1. The Ladle Metallurgy Facility ("LMF")

a. Defendant developed and implemented mechanical and electrical inspection procedures to assure proper operation of the No. 1 baghouse. Defendant also modified the discharge chute of the No. 1 baghouse to maintain a positive connection between the chute and the plastic tote bag used to contain the captured baghouse dust. Also, Defendant modified the synthetic slag addition emission collection hood to improve capture efficiency.

2. The Coke Oven Pushing Operation

a. Defendant revised and implemented its enhanced operating and maintenance plan for its coke oven pushing operations.

b. Defendant completed the installation of the constant heat system for Coke Batteries A and B to provide more consistent heating of the batteries.

c. Defendant completed the installation of the coke guide pyrometers for Coke Batteries A and B to evaluate the carbonization of the coke mass during the push.

d. Defendant completed the installation of the direct spray primary cooler for the Coke Plant By-Products Facility to improve the coke oven gas quality to minimize fouling of the battery underfire systems.

e. Defendant completed the implementation of the data analysis system to predict the heat input for complete carbonization of the coke mass.

3. Blast Furnaces A and B

a. Defendant modified the iron spout baghouse fume collection hoods to minimize hood openings. Defendant has also completed repairs to iron spout baghouse dust handling screw conveyor system and fume collection ductwork.

4. The Coke Oven By-Products Plant

a. Defendant made appropriate repairs to all exhausters. Operating and maintenance procedures have been implemented to prevent recurrence.

5. The Slag Skimming Station Baghouse

a. Defendant installed a new multi-compartment baghouse to collect and control hot metal slag skimming emissions.

6. Coke Oven Doors

a. Defendant implemented NESHAP work practices in accordance with 40 CFR 63, Subpart L.

b. Defendant took steps to ensure an adequate supply of coke oven doors, including by entry into a relationship with a new local contractor to rebuild coke oven doors as necessary.

7. Air Pollution Violation

a. At the time of the coke oven gas release on February 28, 2006, Defendant maximized the consumption of coke oven gas and reduced coke oven operations to minimize the amount of coke oven gas released. The failed linkage to the flare stack butterfly valve was repaired, re-establishing flow of excess coke oven gas to the flare stack.

8. The Basic Oxygen Furnace

a. Defendant completed extensive repairs to the Basic Oxygen Furnace air pollution capture and control equipment and implemented an enhanced inspection and maintenance program for the Basic Oxygen Furnace.

b. Defendant has retained an engineering consultant to evaluate the significant sources of Basic Oxygen Furnace roof emissions and to identify options for additional emissions reductions.

9. The Blast Furnace Gas SO2 Emissions

a. Defendant completed SO2 modeling required for the application to revise the PSD Construction Permit.

II. APPLICABILITY

This Consent Order shall apply to and be binding upon the Plaintiff and the Defendant, and any officer, director, agent, or employee of the Defendant, as well as any successors or assigns of the Defendant. The Defendant waives as a defense to any enforcement action taken pursuant to this Consent Order the failure of any of its officers, directors, agents, employees or successors or assigns to take such actions as shall be required to comply with the provisions of this Consent Order. This Consent Order may be used against the Defendant in any subsequent enforcement action or permit proceeding as proof of a past adjudication of violation of the Act and the Board Regulations for all violations alleged in the Complaint in this matter, for purposes of Sections 39, 39.5, and 42 of the Act, 42 ILCS 5/39, 5/39.5, and 5/42 (2006).

The Defendant shall notify each contractor to be retained to perform work required in this Consent Order of each of the requirements of this Consent Order relevant to the activities to be performed by that contractor, including all relevant work schedules and reporting deadlines, and

shall provide a copy of this Consent Order to each contractor already retained no later than thirty (30) calendar days after the date of entry of this Consent Order. In addition, the Defendant shall provide copies of all schedules for implementation of the provisions of this Consent Order to the prime vendor(s) supplying the control technology systems and other equipment required by this Consent Order.

No change in ownership, corporate status or operator of the facility shall in any way alter the responsibilities of the Defendant under this Consent Order. In the event that the Defendant proposes to sell or transfer any real property or operations subject to this Consent Order, the Defendant shall notify the Plaintiff thirty (30) calendar days prior to the conveyance of title, ownership or other interest, including a leasehold interest in the facility or a portion thereof. Defendant shall make as a condition of any such sale or transfer, that the purchaser or successor provide to Defendant site access and all cooperation necessary for Defendant to perform to completion any compliance obligation(s) required by this Consent Order. The Defendant shall provide a copy of this Consent Order to any such successor in interest and the Defendant shall continue to be bound by and remain liable for performance of all obligations under this Consent Order. In appropriate circumstances, however, the Defendant and a proposed purchaser or operator of the facility may jointly request, and the Plaintiff, in its discretion, may consider modification of this Consent Order to obligate the proposed purchaser or operator to carry out future requirements of this Consent Order in place of, or in addition to, the Defendant. This provision does not relieve the Defendant from compliance with any regulatory requirement regarding notice and transfer of applicable facility permits or permit applications.

III. JUDGMENT ORDER

This Court has jurisdiction of the subject matter herein and of the Plaintiff and Defendant consenting hereto and, having considered the stipulated facts and being advised in the premises, finds the following relief appropriate:

IT IS HEREBY ORDER, ADJUDGED AND DECREED:

A. Penalty

The Defendant shall pay a civil penalty of Three-Hundred Thousand Dollars ($300,000.00) within thirty (30) days of the date of entry of this Consent Order in a manner prescribed below.

B. Stipulated Penalties, Interest and Default

1. If the Defendant fails to complete any activity or fails to comply with any response or reporting requirement by the date specified in this Consent Order, the Defendant shall provide notice to the Plaintiff of each failure to comply with this Consent Order and shall pay stipulated penalties in the amount of $500.00 per day per violation until such time that compliance is achieved. The Plaintiff shall make a demand for stipulated penalties upon the Defendant for its noncompliance with this Consent Order. However, failure by the Plaintiff to make this demand shall not relieve the Defendant of the obligation to pay stipulated penalties. All stipulated penalties shall be payable within thirty (30) calendar days of the date of Plaintiff's demand for stipulated penalties upon the Defendant for its noncompliance with any provision of this Consent Order.

2. If the Defendant fails to make any payment required by this Consent Order on or before the date upon which the payment is due, the Defendant shall be in default and the remaining unpaid balance of the penalty plus any accrued interest, shall be due and owing

immediately. In the event of default, the Plaintiff shall be entitled to reasonable costs of collection, including reasonable attorney's fees.

3. Pursuant to Section 42(g) of the Act, interest shall accrue on any penalty amount owed by the Defendant not paid within the time prescribed herein. Interest on unpaid penalties shall begin to accrue from the date such are due and continue to accrue to the date full payment is received. Where partial payment is made on any penalty amount that is due, such partial payment shall be first applied to any interest on unpaid penalties then owing.

C. Payment Procedures

All payments required by this Consent Order shall be made by certified check or money order payable to the Illinois EPA for deposit into the Environmental Protection Trust Fund ("EPTF"). Payments shall be sent by first class mail and delivered to:

Illinois Environmental Protection Agency
Fiscal Services
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

The name, case number and the Defendant's federal tax identification number shall appear on the face of the certified check or money order. A copy of the certified check or money order and any transmittal letter shall be sent to:

Environmental Bureau
Illinois Attorney General's Office
500 South Second Street
Springfield, IL 62706

D. Future Compliance

1. General Compliance

a. The Attorney General, her employees and representatives, shall have the right of entry into and upon the Defendant's facility that is the subject of this Consent Order, at all reasonable times for the purposes of conducting inspections and evaluating compliance status. In conducting such inspections, the Attorney General, her employees and representatives, may take photographs, samples, and collect information, as they deem necessary, and shall comply with all of the Defendant's safety requirements for all personnel entering the Defendant's facility.

b. This Consent Order in no way affects the responsibilities of the Defendant to comply with any other federal, state or local laws or regulations, including but not limited to the Act and the Board Regulations.

c. The Defendant shall cease and desist from future violations of the Act and state and federal regulations that were the subject matter of the complaint, except that, for those violations covered by compliance schedules set forth in III.D.2, 3, and 4, implementation of the cease and desist requirement shall be consistent with the compliance schedule.

2. Compliance Schedule for the Uncaptured Emissions from the Coke Oven Pushing Operation

a. Coke Oven Pushing Opacity Reading Methodology and Limitations

i. Opacity reading methodology and limitations for uncaptured emissions from the coke oven pushing operation

The following methods shall be utilized to conduct opacity readings of uncaptured particulate matter emissions from pushing operations at Coke Oven Battery A and B during the initial and additional compliance demonstrations.

Opacity readings shall be taken by a qualified observer located in a position where the oven being pushed, the coke receiving car, and the path to the quench tower are visible. The opacity shall be read as the emissions rise and clear the top of the coke battery gas mains. The opacity readings shall be taken in accordance with the procedures set forth in 40 CFR 60, Appendix A, Method 9. Opacity readings shall be taken at 15-second intervals, beginning from the time the coke falls into the receiving car or is first visible as it emerges from the coke guide, whichever is first.

The qualified observer shall record opacity readings of pushing emissions originating at the receiving car and associated equipment and the coke oven, including the standpipe on the coke side of the oven being pushed. The qualified observer referenced shall be certified pursuant to 40 CFR 60, Appendix A, Method 9. The data reduction of Section 2.5 of 40 CFR 60, Appendix A, Method 9 shall not be used.

ii. Battery specific methodology and limitations

For Coke Oven Battery A, the readings shall begin as referenced above and continue until the receiving car enters the quench tower or quenching device. The emissions of uncaptured particulate matter from pushing operations shall not exceed an average of 20 percent opacity for four (4) consecutive pushes considering the highest average of six (6) consecutive readings in each push. For a push with a duration of less than 90-seconds, the actual number of 15-second readings will be averaged.

For Coke Oven Battery B, the readings shall begin as referenced above and end with the sixth reading. The emissions of uncaptured particulate matter shall not exceed 20 percent opacity based on the average of the six (6) consecutive readings.

b. Compliance Demonstration

i. Within forty-five (45) days of entry of this Consent Order, Defendant shall demonstrate that the uncaptured emissions from the coke oven pushing operation comply with the 20% opacity limitations consistent with the procedures in Section III.D.2.a. The Defendant's visible emissions readings shall occur over a period of three (3) consecutive days, if possible given the meteorological conditions, but regardless of the conditions, the three (3) days of readings must occur over a period no longer than five (5) days. During this period, Defendant shall read a minimum of twenty (20) pushes per day, with readings from at least eight (8) pushes per each battery per day.

ii. Within 15 days of entry of this order, or January 3, 2008, whichever is later, Defendant shall submit a protocol(s) to the Illinois EPA for review and comment, which protocol shall address the opacity testing required under Section III.D.2.b.i and Section III.D.2.c.i. The test protocol shall describe the specific procedures for testing and include at a minimum:

(a) The test date.

(b) A requirement for final confirmation to the Illinois EPA Field Operations Section and the Compliance Assurance and Source Monitoring Section of the test date and time of the test at least five (5) days prior to the test date.

(c) The identification of individual(s)/entity conducting the test.

(d) The specific conditions under which testing will be performed.

(e) The test methodology, consistent with Section III.D.2.a.

(f) The format and content of the final test report.

iii. Within 30 days of the conclusion of the compliance demonstration required by Section III.D.2.b.i, Defendant shall prepare a final report of its compliance demonstration and submit the report to the Illinois EPA. That report shall include, but not be limited to:

(a) A descriptive and table summary of results.

(b) General information including but not limited to the name, location and identification of the emission source(s) tested, date(s) of testing, names of personnel and entities performing the tests, and Illinois EPA observers, if any.

(c) A detailed description of test conditions.

(d) Data and calculations, including copies of all raw data sheets with all recorded observations regardless of whether used to determine compliance.

(e) The test methods, consistent with Section III.D.2.a.

c. Additional Compliance Demonstration

i. By March 31, 2008, for both Batteries, using the protocol(s) approved per paragraph D.2.b.ii., above, Defendant shall demonstrate that the uncaptured emissions from coke oven pushing operation comply with the 20% opacity limitations consistent with the procedures in Section III.D.2.a. To this end, Defendant shall perform opacity testing on each oven and further shall observe at least four (4) pushes on each battery per day.

ii. Within 30 days of the conclusion of this additional compliance demonstration, Defendant shall prepare a report of its additional compliance demonstration and submit the report to the Agency. That report shall include, but not be limited to:

(a) A descriptive and table summary of results.

(b) General information including but not limited to the name, location and identification of the emission source(s) tested,

date(s) of testing, names of personnel and entities performing the tests, and Illinois EPA observers, if any.

(c) Detailed description of test conditions.

(d) Data and calculations, including copies of all raw data sheets with all recorded observations regardless of whether used to determine compliance.

(e) The test methods, consistent with Section III.D.2.a.

iii. In the event that during the additional compliance demonstration, Defendant observes an exceedance of the opacity limitations applicable to uncaptured emissions from the Coke Oven Pushing operation, Defendant shall: (A) provide notification of such exceedance by electronic mail or facsimile to the Illinois EPA Bureau of Air Field Inspector assigned to the U. S. Steel Granite City Works, and to the Illinois EPA Bureau of Air Field Operations Section Manager at the Collinsville Regional Office, within five days of such observation; and (B) submit a certified written report regarding such exceedance to Illinois EPA within fifteen days of such observation. Such written report shall address, to the extent known, the cause of the exceedance, any steps taken to mitigate the exceedance and any steps taken or to be taken by Defendant to prevent such exceedance from reoccurring.

d. Within 30 days of entry of this order, Defendant shall submit a copy of the MACT Operations and Maintenance Plan for the coke ovens, as required by 40 CFR Part 63, Subpart CCCCC, and as enhanced in accordance with Defendant's written responses to comments that have been tendered to Defendant by the Illinois EPA, including but not limited to comments regarding the quench box, pushing control system spare diesel engines, timeframe for implementing repairs, and procedures for identifying green ends, to the Illinois EPA contacts referenced in Section III.H. of this order.

e. Continuing Compliance for Uncaptured Emissions from Coke Oven Pushing Operation.

i. In the event uncaptured pushing emissions at an oven in Battery A or Battery B exceed the 20% opacity limit pursuant to the procedures in Section III.D.2.a, Defendant shall determine the cause of the exceedance and shall implement necessary measures, including any corrective actions and/or preventative measures. Defendant shall prepare and maintain a record of any such event.

ii. Defendant shall adhere to the most current enhanced MACT Operations and Maintenance Plan for the coke ovens, as required by 40 CFR Part 63, Subpart CCCCC, and as revised in accordance with paragraph III.D.2.d. above, which plan prescribes operations and maintenance procedures as well as monitoring. Such plan shall be reviewed at least quarterly and amended by the Defendant, as necessary, within 30 days after the end of each quarter, so that the plan is current and sufficient to assure compliance with 40 CFR Part 63, Subpart CCCCC, 35 Ill. Adm. Code 212.443(c)(1)(A) and (B), and the consent decree with appendix entered in *United States of America* v. *National Steel Corporation*, civil action no. 81-3009.

iii. Defendant shall read at least four (4) consecutive pushes per day at Battery A and one (1) push per day at Battery B in accordance with the procedures in Section III.D.2.a.

3. <u>Compliance Schedule for the Basic Oxygen Furnace</u>

a. Within 30 days of entry of this order, Defendant shall submit a copy of the enhanced inspection and maintenance program for the Basic Oxygen Furnace to the Illinois EPA.

b. By January 31, 2008, Defendant shall complete an engineering study regarding an evaluation of the significant sources of Basic Oxygen Furnace shop roof emissions, including an evaluation of the sufficiency of: current operating practices and parameters and current air pollution capture and control equipment. The engineering study also shall identify options for additional reductions in emissions from the roof of the Basic Oxygen Furnace shop.

c. By February 29, 2008, Defendant shall submit the results of the engineering study to Plaintiff for its review.

d. By March 31, 2008, Defendant shall submit a compliance schedule detailing the recommendations that will be implemented and the schedule for such implementation. Any recommendations from the engineering study that the Defendant proposes to not implement must be accompanied by a detailed justification as to why. Defendant shall be required to implement such recommendations or other measures necessary to assure compliance. The compliance schedule shall also include the other measures necessary to assure compliance with the Act and state and federal regulations including but not limited to operating practices, maintenance practices and monitoring that will be implemented, and the schedule for such implementation.

e. By June 30, 2008, Defendant shall have implemented the compliance schedule as described above.

f. By July 31, 2008, Defendant shall demonstrate compliance with the requirements of Section 212.446(c) of the Board's Air Pollution Regulations, 35 Ill. Adm. Code 212.446(c), with compliance based upon the compliance determination methodology specified herein at III.D.3.g. In the interim, Defendant shall continue its implementation of the enhanced inspection and maintenance program for the Basic Oxygen Furnace shop.

g. The compliance demonstration shall consist of Method 9 opacity readings from openings in the building housing the Basic Oxygen Furnace shop. Such readings must be conducted for three (3) one-hour periods per day, two (2) days per week for four (4) weeks beginning July 1, 2008, and ending July 31, 2008. Compliance shall be determined in accordance with 40 CFR Appendix A, Method 9 except that compliance shall be determined by averaging any 12 consecutive observations taken at 15 second intervals.

h. By June 1, 2008, Defendant shall submit a protocol(s) to the Illinois EPA for review and comment that shall address the opacity testing required under Section III.D.3.f above. The test protocol shall describe the specific procedures for testing and include at a minimum:

(i) The identification of individual(s)/entity conducting the test.

(ii) The specific conditions under which testing will be performed including but not limited to the manner of operation of the Basic Oxygen Furnace.

(iii) The test methodology, consistent with Section III.D.3.g.

(iv) The format and content of the final test report.

i. By March 31, 2008, Defendant shall submit to Plaintiff a request for modification, pursuant to Section III.F.2 of this Consent Order, to modify the compliance deadline of July 31, 2008, consistent with Section III.D.3.d and for the purposes of Section III.D.3.f.

j. Defendant shall submit a quarterly progress report to the Plaintiff for the first quarter of 2008, by May 1, 2008. Each quarter thereafter, Defendant shall submit a

quarterly report, until such time as the compliance plan as been fully implemented and the source has returned to compliance, within 30 days of the end of the quarter.

4. Compliance Schedule for the Blast Furnace Gas SO2 Emissions

a. On or before January 31, 2008, Defendant shall prepare and submit to the Illinois EPA a complete and accurate application, including required SO2 modeling, to revise the PSD Construction Permit for the Production Increase, issued by the Illinois EPA on July 23, 1996 (Application No. 95010001), as necessary to reflect the corrected emission factor for the Blast Furnace Gas SO2 emissions.

b. In the interim, Defendant shall use the correct emission factor for the Blast Furnace Gas SO2 emissions in calculating, recording, and reporting SO2 emissions and for any other purposes under the Act.

c. Defendant shall work with the Illinois EPA, including providing additional information to the Illinois EPA, when requested, and shall obtain a revised PSD Construction Permit to resolve the Blast Furnace Gas SO2 Emissions issue.

d. Defendant shall submit a quarterly progress report to the Plaintiff for the first quarter of 2008, by May 1, 2008. Each quarter thereafter, Defendant shall submit a quarterly report, until such time as the compliance plan as been fully implemented and the source has returned to compliance, within 30 days of the end of the quarter.

5. Defendant shall continue to implement on an ongoing basis the steps it has already taken to achieve compliance, as set forth in Section I.D., Compliance Activities to Date, above, as well as to comply with any and all operations and maintenance plans or procedures that apply to the facilities and operations discussed in Section I.D., Compliance Activities to Date, above.

E. *Force Majeure*

1. *Force majeure* is an event arising solely beyond the control of the Defendant, which prevents the timely performance of any of the requirements of this Consent Order and shall include, but is not limited to, events such as floods, fires, tornadoes, other natural disasters, and labor disputes and unavailability of necessary equipment beyond the reasonable control of the Defendant. An increase in costs associated with implementing any requirement of this Consent Order shall not, by itself, excuse the Defendant for a failure to comply with such a requirement.

2. When a *force majeure* event occurs which causes or may cause a delay in the performance of any of the requirements of this Consent Order, the Defendant shall orally notify the Plaintiff within forty-eight (48) hours of the occurrence. Written notice shall be given to the Plaintiff as soon as practicable, but no later than ten (10) calendar days after the claimed occurrence. This section shall be of no effect as to the particular event involved if the Defendant fails to comply with these notice requirements.

3. Within ten (10) calendar days of receipt of any written *force majeure* notice, the Plaintiff shall respond in writing regarding the Defendant's claim of a delay or impediment to performance. If the Plaintiff agrees that the delay or impediment to performance has been or will be caused by circumstances beyond the control of the Defendant and that the Defendant could not have prevented the delay by the exercise of due diligence, the Plaintiff and Defendant shall stipulate to an extension of the required deadline(s) for all requirement(s) affected by the delay, by a period equivalent to the delay actually caused by such circumstances. Such stipulation may be filed as a modification to this Consent Order. The Defendant shall not be liable for stipulated penalties for the period of any such stipulated extension.

4. If the Plaintiff does not accept the Defendant's claim of a *force majeure* event, the Defendant must file a petition with the Court within twenty (20) calendar days of receipt of the Plaintiff's determination in order to contest the imposition of stipulated penalties. The Plaintiff shall have twenty (20) calendar days to file its response to said petition. The burden of proof of establishing that a *force majeure* event prevented the timely performance shall be upon the Defendant. If this Court determines that the delay or impediment to performance has been or will be caused by circumstances solely beyond the control of the Defendant and that the Defendant could not have prevented the delay by the exercise of due diligence, the Defendant shall be excused as to that event (including any imposition of stipulated penalties), for all requirements affected by the delay, for a period of time equivalent to the delay or such other period as may be determined by this Court.

F. Enforcement and Modification of Consent Order

1. This Consent Order is a binding and enforceable order of this Court. Except as set forth in Section III.J below, this Court shall retain jurisdiction of this matter and shall consider any motion by Plaintiff or Defendant, for the purposes of interpreting and enforcing the terms and conditions of this Consent Order.

2. The Plaintiff and the Defendant may, by mutual written consent, extend any compliance dates or modify the terms of this Consent Order without leave of this Court. A request for any modification shall be made in writing and submitted to the designated representatives. Any such request shall be made by separate document, and shall not be submitted within any other report or submittal required by this Consent Order. Any such agreed modification shall be in writing and signed by authorized representatives of the Plaintiff and the Defendant, for filing and incorporation by reference into this Consent Order.

G. Dispute Resolution

1. Except as provided herein, the Plaintiff and Defendant may seek to informally resolve disputes arising under this Consent Order, including but not limited to the Illinois EPA's decision regarding appropriate or necessary response activity, approval or denial of any report, plan or remediation objective, or the Plaintiff's rejection of a request for modification or termination of the Consent Order. The Plaintiff reserves the right to seek enforcement by the Court where the Defendant has failed to satisfy any compliance deadline within this Consent Order. The following are also not subject to the dispute resolution procedures provided by this section: a claim of *force majeure*, a failure to make any required payment and any circumstances posing a substantial danger to the environment or to the public health or welfare of persons.

2. The dispute resolution procedure must be invoked by a party through a written notice describing the nature of the dispute and the party's position with regard to such dispute. The other party shall acknowledge receipt of the notice and schedule a meeting to discuss the dispute informally not later than fourteen (14) calendar days from the receipt of such notice. These informal negotiations shall be concluded within thirty (30) calendar days from the date of the first meeting between the Plaintiff and Defendant, unless the Plaintiff and Defendant agree, in writing, to shorten or extend this period. The invocation of dispute resolution, in and of itself, shall not excuse compliance with any requirement, obligation or deadline contained herein, and stipulated penalties may be assessed for failure or noncompliance during the period of dispute resolution. As part of the resolution of any dispute, the Plaintiff and Defendant, by agreement or by order of this Court, may extend or modify the schedule for completion of work under this Consent Order to account for the delay in the work that occurred as a result of dispute resolution.

3. In the event that the Plaintiff and Defendant are unable to reach agreement during the informal negotiation period, the Plaintiff shall provide the Defendant with a written summary of its position regarding the dispute. The position advanced by the Plaintiff shall be considered binding unless, within twenty (20) calendar days of the Defendant's receipt of the written summary of the Plaintiff's position, the Defendant files a petition with this Court seeking judicial resolution of the dispute. The Plaintiff shall respond to the petition by filing the administrative record of the dispute and any argument responsive to the petition within twenty (20) calendar days of service of the Defendant's petition. The administrative record of the dispute shall include the written notice of the dispute, any responsive submittals, the Plaintiff's written summary of its position, the Defendant's petition before the court and the Plaintiff's response to the petition. The Plaintiff's position shall be affirmed unless, based upon the administrative record, it is against the manifest weight of the evidence.

H. Notice and Submittals

Except for payments, the submittal of any notice, reports or other documents required under this Consent Order, shall be delivered to the following designated representatives:

As to the Plaintiff

Kristen Laughridge Gale
Assistant Attorney General
Environmental Bureau
500 South Second Street
Springfield, IL 62706

Chris Pressnall
Division of Legal Counsel
Illinois EPA
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Ray Pilapil
Bureau of Air
Section Manager, Compliance Assurance and Source Monitoring
Illinois EPA
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Jeff Benbenek
Bureau of Air
Illinois EPA
2009 Mall Street
Collinsville, IL 62234

As to the Defendant

David Smiga
United States Steel Corporation
600 Grant Street, Room 1500
Pittsburgh, PA 15219

David W. Hacker
United States Steel Corporation
600 Grant Street, Room 1500
Pittsburgh, PA 15219

Larry Siebenberger
United States Steel Corporation, Granite City Works
1951 State Street
Granite City, Illinois 62040

I. Release from Liability

In consideration of the Defendant's payment of a $300,000.00 penalty and upon completion of all activities required under Section III.D.2.a-d, 3, and 4. of this Consent Order,

the Plaintiff releases, waives and discharges the Defendant from any further liability or penalties for violations of the Act and state and federal regulations that were the subject matter of the Complaints herein. The release set forth above does not extend to any matters other than those expressly specified in the Plaintiff's Complaint filed on September 15, 2005, Plaintiff's First Supplemental Complaint filed on December 7, 2006, and Plaintiff's Second Supplemental Complaint filed on October 17, 2007. The Plaintiff reserves, and this Consent Order is without prejudice to, all rights of the State of Illinois against the Defendant with respect to all other matters, including but not limited to, the following:

a. criminal liability;

b. liability for future violations;

c. liability for natural resources damage arising out of the alleged violations; and

d. the Defendant's failure to satisfy the requirements of this Consent Order.

Nothing in this Consent Order is intended as a waiver, discharge, release, or covenant not to sue for any claim or cause of action, administrative or judicial, civil or criminal, past or future, in law or in equity, which the State of Illinois or the Illinois EPA may have against any person, as defined by Section 3.315 of the Act, 415 ILCS 5/3.315 (2006), other than the Defendant.

J. Termination

1. The Defendant may request that this Consent Order terminate no sooner than twelve (12) months after the Defendant has completed all actions required of the Defendant under Sections III.D.2.a-d, 3, and 4 of this Consent Order, provided that the Defendant has been in continuous compliance with the terms of the Consent Order for the twelve (12) months preceding the request; or after a Title V CAAPP permit is issued by the Illinois EPA to the Defendant, whichever date is later. Any such request must be made by notice to the Plaintiff and

include a statement that the Defendant has completed all actions required by Sections III.D.2.a-d, 3, and 4 of this Consent Order and has been in continuous compliance with the terms of the Consent Order for the twelve (12) months preceding the request and the following certification by a responsible corporate official of the Defendant:

> I certify under penalty of law that this statement was prepared under my direction or supervision, and that the information submitted in or accompanying this statement of final compliance is to the best of my knowledge true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and or imprisonment for knowing violations.

2. The Plaintiff shall notify the Defendant of its decision on the request within forty-five (45) calendar days of the Plaintiff's receipt of the request. If the Plaintiff agrees to terminate this Consent Order, the Plaintiff and the Defendant shall jointly file a notice with the Court that the Consent Order is terminated. If the Plaintiff does not agree to terminate this Consent Order, the Plaintiff shall provide the Defendant written notification stating the reasons why this Consent Order should not be terminated and the Defendant may then invoke the Dispute Resolution provisions. The Consent Order shall remain in effect pending resolution of any dispute between the Plaintiff and Defendant or the Court concerning whether the Defendant has completed its obligations under this Consent Order and is in compliance with the terms of the Consent Order. The provisions of Section III.I. shall survive and shall not be subject to and are not affected by the termination of any other provision of this Consent Order.

K. Execution and Entry of Consent Order

This Order shall become effective only when executed by the Plaintiff, the Defendant, and the Court. This Order may be executed by the Plaintiff, the Defendant, and the Court in one or more counterparts, all of which taken together, shall constitute one and the same instrument.

The undersigned representatives for the Plaintiff and the Defendant certify that they are fully authorized by the party whom they represent to enter into the terms and conditions of this Consent Order and to legally bind them to it.

WHEREFORE, the Plaintiff and the Defendant, by their representatives, enter into this Consent Order and submit it to this Court that it may be approved and entered.

PEOPLE OF THE STATE OF ILLINOIS, *ex rel.*, LISA MADIGAN, Attorney General of the State of Illinois, v. UNITED STATES STEEL CORPORATION, INC., No. 05-CH-750
(CIRCUIT COURT, MADISON COUNTY, ILLINOIS)

CONSENT ORDER

FOR THE PLAINTIFF:

PEOPLE OF THE STATE OF ILLINOIS
ex rel. LISA MADIGAN,
Attorney General of the
State of Illinois

MATTHEW J. DUNN, Chief
Environmental Enforcement/
Asbestos Litigation Division

BY: _____
THOMAS E. DAVIS, Chief
Environmental Bureau
Assistant Attorney General

DATE: 12/17/07

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

BY: _____
ROBERT A. MESSINA
Chief Legal Counsel

DATE: 12/17/07

PEOPLE OF THE STATE OF ILLINOIS, *ex rel.*, LISA MADIGAN, Attorney General of the State of Illinois, v. UNITED STATES STEEL CORPORATION, INC., No. 05-CH-750
(CIRCUIT COURT, MADISON COUNTY, ILLINOIS)

CONSENT ORDER

FOR THE DEFENDANT:

UNITED STATES STEEL CORPORATION

BY: _____
JAMES D. GARRAUX
General Counsel and Senior Vice President – Labor Relations & Environmental Affairs

DATE: 12-18-2007

BY: _____
DAVID W. HACKER
Attorney - Environmental

DATE: 12-18-2007

PEOPLE OF THE STATE OF ILLINOIS, *ex rel.*, LISA MADIGAN, Attorney General of the State of Illinois, v. UNITED STATES STEEL CORPORATION, INC., No. 05-CH-750
(CIRCUIT COURT, MADISON COUNTY, ILLINOIS)

CONSENT ORDER

ENTERED:

JUDGE

DATE: 18 Dec 2009

05-CH-750

IN THE CIRCUIT COURT FOR THE THIRD JUDICIAL CIRCUIT
MADISON COUNTY, ILLINOIS

FILED
DEC 23 2009
CLERK OF CIRCUIT COURT #18
THIRD JUDICIAL CIRCUIT
MADISON COUNTY, ILLINOIS

PEOPLE OF THE STATE OF ILLINOIS *ex rel.* **LISA MADIGAN, Attorney General of the State of Illinois,**	)	
Plaintiff,	)	
v.	)	**No. 05-CH-750**
UNITED STATES STEEL CORPORATION,	)	
Defendant.	)	

AGREED MODIFICATION OF CONSENT ORDER

Plaintiff, PEOPLE OF THE STATE OF ILLINOIS, *ex rel.* LISA MADIGAN, Attorney General of the State of Illinois, the Illinois Environmental Protection Agency ("Illinois EPA"), and Defendant, UNITED STATES STEEL CORPORATION, ("Parties to the Consent Order") have agreed to the Modification of this Consent Order and submit it to this Court for approval.

1. The Consent Order entered in this action on December 18, 2007 expressly provides that the Parties to the Consent Order may, by mutual written consent, extend any compliance dates or modify the terms of this Consent Order without leave of this Court.

2. Pursuant to a request by the Defendant to modify the compliance schedule for the Blast Oxygen Furnace and to extend the compliance demonstration deadline in the Consent Order, the Parties to the Consent Order have fully discussed the issues and the Plaintiff

has approved the terms and conditions of the compliance schedule dated September 10, 2009 and attached hereto.

3. This agreed motion seeks to incorporate the compliance schedule dated September 10, 2009 as a modification of the Consent Order.

4. Nothing in the Modification shall alter the rights or obligations of the Parties to the Consent Order, except as specifically provided above.

WHEREFORE, the Parties to the Consent Order by mutual written consent pray that this Court modify the Consent Order by incorporating the compliance schedule dated September 10, 2009.

FOR THE PLAINTIFF:

PEOPLE OF THE STATE OF ILLINOIS
ex rel. LISA MADIGAN,
Attorney General of the
State of Illinois

MATTHEW J. DUNN, Chief
Environmental Enforcement/
Asbestos Litigation Division

BY: _____
THOMAS DAVIS, Chief
Environmental Bureau

DATE: 12/18/09

ILLINOIS ENVIRONMENTAL
PROTECTION AGENCY

DOUGLAS P. SCOTT, Director
Illinois Environmental Protection Agency

BY: _____
JOHN J. KIM
Chief Legal Counsel

DATE: 12/16/09

FOR THE DEFENDANT:

UNITED STATES STEEL CORPORATION

BY: _____
JAMES D. GARRAUX
General Counsel and Senior Vice President
Labor Relations & Environmental Affairs

DATE: 11/19/09

ENTERED: _____
JUDGE

DATE: 23 Dec 2009

United States Steel Corporation
Granite City Works
BOP Compliance Schedule
September 10, 2009

To maintain continuous compliance at the Granite City Works BOP, U.S. Steel has implemented a compliance plan.

Description	Milestone Date	Status
1. Retain engineering consultant(s) to evaluate the significant sources of BOP roof emissions and identify options for emission reductions.	Complete	Complete
2. Complete the engineering study.	Complete	Complete
3. Submit summary of results of the engineering study to Plaintiff for review.	February 29, 2008	Complete
4. Revise Compliance Plan based upon the results and analysis of the engineering study. Upon completion, GCW will continue following the implemented BOF Capture System Inspection and Maintenance Program to identify predictive preventive repairs.	March 31, 2008	Complete
5. Complete repair and replacement of Hood/ESP duct work. Replace #1 Elbow Replace #2 Elbow Upon completion, GCW will continue following the implemented BOF Capture System Inspection and Maintenance Program to identify predictive/preventive repairs.	September 30, 2009 October 17, 2008 August 30, 2009	On-going Complete Complete
6. Repair in-kind ESP Scope of Work to be completed on ESP		

#1-3 (total of 6 sections) - Take section off line, and clean and prepare for rebuild - Remove all wires and collector plates. - Inspect/Repair/Replace 4 sided box and entry/exit plenums. - Replace internals in-kind, including wires and collector plates. - Inspect/Repair/Replace top equipment including rappers and supports. - Contract expert erector to provide technical support for repairs. (a) Complete repairs in-kind #1 ESP Section A. (b) Complete repairs in-kind to 3 additional ESP sections (total of 4) (c) Complete repairs in-kind to 2 remaining ESP sections (total of 6)	December 31, 2008 September 30, 2010 January 15, 2011	Complete
7. Re-submit compliance demonstration protocol per Consent Order	November 30, 2010	
8. Perform Compliance Testing per Order	February 1-28, 2011	
9. Certify Compliance	March 31, 2011	

Appendix K

2010 Memorandum of Understanding

Illinois Environmental Protection Agency

and

United States Steel Corporation – Granite City Works

United States Steel Corporation
Granite City Works and
IEPA Memorandum of Understanding

The Memorandum of Understanding (MOU or Agreement) is entered into by and between United States Steel Corporation (U. S. Steel) and the Illinois Environmental Protection Agency (IEPA), and is dated and effective as of the last date of signature in the signature block.

U. S. Steel and IEPA have reached an Agreement that will achieve reductions in emissions of particulate matter from U. S. Steel's Granite City Works, with the specific intent of reducing the emissions of particulate matter$_{2.5}$ (PM2.5). This MOU sets forth the terms of the Agreement between U. S. Steel and IEPA and sets forth the intended regulatory uses for those emission reductions. This agreement does not relieve U.S. Steel from the continuing obligation to comply with requirements of applicable Federal and State regulations, construction or operating permits, and other applicable requirements to control emissions.

1. Enhancements to Compliance Procedures
    a. Within 2 months of the effective date of this agreement, U. S. Steel shall begin installation of an enhanced operational monitoring system for the capture systems for particulate matter emissions from the Basic Oxygen Furnaces (BOF), including installation, operation and maintenance of monitoring devices to verify the performance of each capture system during the various steps in the steelmaking process. This will include establishment of values of operating parameters that reliably indicate and ensure adequate capture of emissions by each existing hood.
    b. Within 3 months of beginning operation of any additional new pollution control equipment at the BOF, as prescribed in this MOU, U. S. Steel shall implement enhanced operational monitoring for such new capture system for particulate matter. Such implementation will include installation, operation and maintenance of appropriate monitoring devices. These devices will verify the performance of the new capture system. Such monitoring devices will be used to establish values of operating parameters that reliably indicate and ensure adequate capture of emissions by each new hood.
    c. Within 2 months of the effective date of this agreement, U. S. Steel shall conduct opacity readings of emissions escaping from any openings in the Basic Oxygen Process Furnace (BOPF) building in accordance with USEPA Method 9 in 40 CFR Part 60, Appendix A. These readings shall be performed for at least five (5) days out of every seven (7). A day is defined as any day when a BOF is in operation for a minimum of four hours during conditions that are acceptable for Method 9 readings. A minimum of 60 consecutive minutes of opacity readings must be obtained and must encompass at least one steel production cycle. A production

cycle is defined as the beginning of scrap charging to the completion of deslagging of the steelmaking vessel. Results of these readings shall be reduced to three (3) minute rolling averages. U.S. Steel shall maintain appropriate records for all opacity measurements and these records shall be made available upon request from the IEPA.

d. U.S. Steel may, at some later date, submit a formal request to IEPA to streamline the monitoring requirements. This request shall be submitted as an application for a significant modification to the CAAPP permit.

2. Emission Limits
   a. All particulate matter emission limits in this MOU are expressed in terms of particulate as would be measured by USEPA Methods 5, 5D or 17.
   b. As of January 1, 2012, U. S. Steel shall comply with the following requirements for particulate matter emissions:
      i. Particulate matter emissions from the basic oxygen process (BOP) that exit from the electrostatic precipitator stack must not exceed 0.01 gr/dscf.
      ii. Particulate matter emissions from hot metal desulfurization and reladling (BOF Hot Metal Transfer and Desulfurization Baghouse(s)) that exit from the baghouse must not exceed 0.005 gr/dscf.
      iii. Particulate matter emissions from slag skimming (BOF Slag Skimming Baghouse(s)) that exit from the baghouse stack must not exceed 0.005 gr/dscf.
      iv. Particulate matter emissions from ladle metallurgy operations (LMF Baghouse) that exit from the baghouse stack must not exceed 0.005 gr/dscf.
   c. As of March 31, 2013, or such later date established pursuant to paragraph 4(c)(v) below, U. S. Steel will comply with the following requirements for particulate matter emissions from tapping:
      i. Emissions shall be controlled by a new baghouse.
      ii. Emissions that exit from this baghouse stack must not exceed 0.005 gr/dscf.

3. Within 2 months of the effective date of this Agreement U. S. Steel shall submit an application for a federally enforceable permit or permits to incorporate the requirements of Sections 1 and 2 above. The federally enforceable permit or permits shall include the requirements imposed by Sections 1 and 2 and appropriate requirements for emission testing, monitoring, recordkeeping and reporting associated with these requirements.

4. Emission Reduction Projects
   a. Steam Rings for the Oxygen Lances
      i. Within 6 months of the effective date of the Agreement, U. S. Steel will complete basic engineering of steam rings for the oxygen lances in the BOP shop.

ii. U. S. Steel will submit a construction permit application and an installation schedule to IEPA within 30 days of completion of the basic engineering. In consideration of the need to begin operation of the steam rings by October 31, 2011, U. S. Steel shall commence construction of the steam rings within 40-days of issuance of a final construction permit, assuming that no appeal(s) or challenge(s) of the Permit or the requirements therein have been filed with the Pollution Control Board or Federal Court within that 40-day period.

b. U. S. Steel will complete the installation and begin operation of the steam rings no later than October 31, 2011 provided that the required construction permit is obtained in a reasonable time and not appealed.

c. Secondary Emission Control for Tapping

i. Within 9 months of the effective date of the Agreement, U. S. Steel will complete the basic engineering for the installation and operation of a dedicated tapping emission control system that includes a fabric filter control device (baghouse).

ii. The tapping emission control system will be designed for optimal capture to minimize emissions from tapping, which have the potential of escaping to the atmosphere from the BOPF building. The air pollution control device for the captured emissions will be designed to comply with a particulate matter emission rate of 0.005 grains per dry standard cubic feet exhaust, at the stack.

iii. Within 30 days of the completion of the basic engineering for the new control system, U. S. Steel will submit a construction permit application for the new system to the IEPA that contains a schedule for the design engineering, construction and initial start up of the new tapping emission control system.

iv. In consideration of the need to begin operation of the secondary emission controls for tapping by March 31, 2013, IEPA shall act on all required permit(s) within three months of receipt of permit application(s) from U. S. Steel. U. S. Steel shall commence construction of the secondary emission controls for tapping within 40-days of issuance of a final construction permit, assuming that no appeal(s) or challenge(s) of the Permit or the requirements therein have been filed with the Pollution Control Board or Federal Court within that 40-day period.

v. U. S. Steel will begin operation of the new tapping emission control system no later than March 31, 2013 provided that required permits are obtained in a reasonable time and not appealed.

d. Secondary Emission Control for Charging

i. As part of the engineering for the new tapping emission control system, U. S. Steel will also evaluate the current emission control system for charging and potential projects to reduce particulate matter emissions from charging. As part of this evaluation, U. S. Steel will evaluate improvements to the capture efficiency achieved for charging emissions and ducting some or all of the captured charging emissions, which currently are controlled by the electrostatic precipitator, to the new control device for tapping or another new baghouse.

ii. If the evaluation completed in paragraph 4(d)(i) does not support implementing additional projects to reduce particulate emission from charging, U. S. Steel will submit within 9 months of the effective date of the Agreement, an evaluation report that includes a summary of the evaluation, statement on decision criteria for potential projects, and incremental cost per ton of pollutant reduction analysis.

iii. If the evaluation completed in paragraph 4(d)(i) does support implementing additional projects to reduce particulate emissions from charging, U. S. Steel will complete within 9 months of the effective date of the agreement the basic engineering for installation and operation of an upgrade to the existing charging control system. Future submittals will coincide with the tapping hood schedule identified in paragraph 4(c)(iii) – 4(c)(v).

5. Regulatory Uses of Emission Reductions

a. For the Granite City BOP, the particulate emission reductions set forth in the MOU will be incorporated into the Illinois 1997 $PM_{2.5}$ National Ambient Air Quality Standard State Implementation Plan (NAAQS SIP) submitted to U. S. EPA in accordance with 40 CFR §51.1001, et seq., and §§ 110 and 172 of the Clean Air Act

b. IEPA shall use its best efforts to support and represent that the requirements of this MOU satisfy U. S. Steel's obligations towards Illinois EPA's requirement to demonstrate compliance with the 1997 $PM_{2.5}$ NAAQS.

c. IEPA will provide U. S. Steel with an opportunity to review and provide comments on the 1997 $PM_{2.5}$ modeled attainment demonstration.
d. U. S. Steel and IEPA shall mutually support and use best efforts to obtain the appropriate permits and approvals incorporating the terms of this agreement to make the reductions federally enforceable so that they can be incorporated into the Illinois 1997 $PM_{2.5}$ SIP.
e. U. S. Steel's commitments and obligations under this MOU are subject to and conditioned upon: 1) the issuance and sustained validity of a federally enforceable permit or permits containing the particulate matter emission reductions requirements set forth in the MOU; 2) IEPA's approval that the particulate matter emission reductions satisfy U. S. Steel's requirement for the 1997 $PM_{2.5}$ NAAQS SIP; and 3) IEPA not pursuing a regulation pursuant to the 1997 PM2.5 NAAQS containing additional restrictions for the Granite City Works BOP. U. S. Steel and IEPA shall mutually support and use best efforts to obtain the appropriate permits and SIP approvals based on this agreement.
f. In developing rules, regulations, or state implementation plan revisions designed to comply with the $PM_{2.5}$ NAAQS, IEPA, taking into account all emission reduction efforts and other appropriate factors, will use best efforts to seek $PM_{2.5}$ reductions in regards to future NAAQS from other sources before seeking additional emission reductions from the U. S. Steel BOP.

6. Force Majeure

U. S. Steel shall not be liable for any failure or delay in performance under this MOU (other than for delay for submitting a permit application) to the extent said failures or delays are caused by extraordinary circumstances beyond U. S. Steel's reasonable control and occurring without its fault or negligence, provided that, U. S. Steel gives prompt written notice, with full details following the occurrence of the cause relied upon. Dates by which performance obligations are scheduled to be met will be extended for a period of time equal to the time lost due to any delay so caused.

For United States Steel Corporation	For Illinois EPA
MS Williams Michael S. Williams Senior Vice President – North American Flat Roll Operations	Douglas P. Scott Douglas P. Scott Director, Illinois EPA
Date: 6 / 30 / 2010	Date: 7 / 1 / 2010

Appendix L

2013 Clean Air Act Permit Program
Construction Permit

For

U.S. Steel Corporation – Granite City Works

217/785-1705

TITLE V - CLEAN AIR ACT PERMIT PROGRAM (CAAPP) PERMIT
REVISED

PERMITTEE:

U. S. Steel Corporation
Granite City Works
Attn: Bryan Kresak
20th and State Streets
Granite City, Illinois 62040

I.D. No.: 119813AAI
Application No.: 96030056

Date Originally Received: March 6, 1996
Date Originally Issued: September 3, 2009
Date Revised Permit Issued: March 4, 2013
Expiration Date[1]: September 3, 2014

Operation of: Integrated Steel Mill
Source Location: 20th and State Streets, Granite City
Responsible Official: Richard E. Veitch, General Manager

This permit is hereby granted to the above-designated Permittee to OPERATE an Integrated Steel Mill Plant, pursuant to the above referenced permit application. This permit is subject to the conditions contained herein.

This permit was revised on March 4, 2013, in accordance with Sections 39.5(9)(e) through (g) of the Environmental Protection Act, pursuant to an order from Lisa P. Jackson, Administrator of the USEPA, *In the Matter of United States Steel Corporation – Granite City Works,* Petition Number V-2011-2 (December 3, 2012), which order was received by the Illinois EPA on December 4, 2012.

If you have any questions concerning this permit, please contact Anatoly Belogorsky or Michael Reed at 217/785-1705.

Edwin C. Bakowski, P.E.
Manager, Permit Section
Division of Air Pollution Control

ECB:MR:psj

cc: Illinois EPA, FOS, Region 3
CES
Lotus Notes

[1] Except as provided in Conditions 1.5 and 8.7 of this permit.

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1.0 SOURCE IDENTIFICATION

1.1 Source

U. S. Steel Corporation
Granite City Works
20th and State Streets
Granite City, Illinois 62040
618/451-3456

I.D. No.: 119813AAI
County: Madison
Standard Industrial Classification: 3312, Integrated Steel Mill

Responsible Official: Richard E. Veitch, General Manager

Delegated Authorities:
Michelle Fields, Division Manager - Coke and Iron Making;
Michael Terry, Division Manager - Steelmaking

1.2 Owner/Parent Company

United States Steel Corporation
600 Grant Street
Pittsburgh, Pennsylvania 15219

1.3 Operator

U. S. Steel Corporation
Granite City Works
20th and State Streets
Granite City, Illinois 62040

Contact Person:
Bryan Kresak, Manager Environmental Control
618/451-3456

1.4 Source Description

Integrated steel manufacturing employing raw material processing/preparation, coke production, iron production, steel production, and steel finishing.

1.5 Title I Conditions

As generally identified below, this CAAPP permit contains certain conditions for emission units at this source that address the applicability of permitting programs for the construction and modification of sources, which programs were established pursuant to Title I of the Clean Air Act (CAA) and regulations thereunder. These programs include 40 CFR 52.21, Prevention of Significant Deterioration (PSD) and 35 IAC Part 203, Major Stationary Sources Construction and Modification (MSSCAM), and are implemented by the Illinois EPA pursuant to Sections 9, 9.1, 39(a) and 39.5(7)(a) of the Illinois Environmental Protection Act (Act). These conditions continue in effect,

notwithstanding the expiration date specified on the first page of this permit, as their authority derives from Titles I and V of the CAA, as well as Titles II and X of the Act. (See also Condition 8.7.)

a. This permit contains “Title I Conditions” that reflect Title I requirements established in permits previously issued for this source, which conditions are specifically designated as “T1”.

b. This permit contains Title I conditions that are newly established in this CAAPP permit, which conditions are specifically designated as “T1N”.

2.0 LIST OF ABBREVIATIONS AND ACRONYMS COMMONLY USED

ACMA	Alternative Compliance Market Account
Act	Illinois Environmental Protection Act [415 ILCS 5/1 et seq.]
AP-42	Compilation of Air Pollutant Emission Factors, Volume 1, Stationary Point and Other Sources (and Supplements A through F), USEPA, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711
ATU	Allotment Trading Unit
BACT	Best Available Control Technology
BAT	Best Available Technology
BFG	Blast Furnace Gas
BOF	Basic Oxygen Furnace
BOPF	Basic Oxygen Process Furnace
BTX	Benzene, toluene and xylene
CAA	Clean Air Act [42 U.S.C. Section 7401 et seq.]
CAAPP	Clean Air Act Permit Program
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
COG	Coke Oven Gas
COG-DS	Coke Oven Gas Desulfurization System
COMS	Continuous Opacity Monitoring System
CPMS	Continuous Parameters Monitoring System
dscf	Dry standard cubic feet
ERMS	Emissions Reduction Market System
ESP	Electro Static Precipitator
°F	Fahrenheit
FESOP	Federally Enforceable State Operating Permit
GHG	Greenhouse Gases
gr	grains
HAP	Hazardous Air Pollutant
HCL	Hydrogen Chloride
H_2S	Hydrogen Sulfate
IAC	Illinois Administrative Code
I.D. No.	Identification Number of Source, assigned by Illinois EPA
ILCS	Illinois Compiled Statutes
Illinois EPA	Illinois Environmental Protection Agency
LAER	Lowest Achievable Emission Rate
LMF	Ladle Metallurgy Furnace
MACT	Maximum Achievable Control Technology
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_x	Nitrogen Oxides
NSPS	New Source Performance Standards
PM	Particulate Matter
PM_{10}	Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 microns as measured by applicable test or monitoring methods

$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 microns as measured by applicable test or monitoring methods
ppm	Parts per million
PSD	Prevention of Significant Deterioration
RMP	Risk Management Plan
scf	Standard cubic feet
SO_2	Sulfur Dioxide
SSM	Startup, Shutdown and Malfunction
T1	Title I – identifies Title I conditions that have been carried over from an existing permit
T1N	Title I New – identifies Title I conditions that are being established in this permit
T1R	Title I Revised – identifies Title I conditions that have been carried over from an existing permit and subsequently revised in this permit
USEPA	United States Environmental Protection Agency
VHAP	Volatile Hazardous Air Pollutant
VOM	Volatile Organic Material

3.0 CONDITIONS FOR INSIGNIFICANT ACTIVITIES

3.1 Identification of Insignificant Activities

The following activities at the source constitute insignificant activities as specified in 35 IAC 201.210:

3.1.1 Activities determined by the Illinois EPA to be insignificant activities, pursuant to 35 IAC 201.210(a)(1) and 201.211, as follows:

a. Material Handling and Processing Operations

N/A

b. Coke Production

N/A

c. Coke Oven Gas By-Products Recovery Plant

Ammonium Sulfate Handling

d. Blast Furnaces

N/A

e. Basic Oxygen Furnaces

N/A

f. Continuous Casting

Tanks #543, #544, #545, #555

g. Finishing Operations

Scale Pits
#6 Zinc Pot (Backup)
#7 and #8 Zinc Pots
Storage Tanks ##306-310, #403, #427, #800, #815

h. Wastewater Treatment

N/A

i. Boiler Houses

N/A

3.1.2 Activities that are insignificant activities based upon maximum emissions, pursuant to 35 IAC 201.210(a)(2) or (a)(3), as follows:

a. Material Handling Operations

N/A

b. Coke Production

N/A

c. Coke Oven Gas By-Products Recovery Plant

Storage Tanks #116, #117, #118, #120

d. Blast Furnaces

Torpedo Car Dekishing

e. Basic Oxygen Furnaces

Lime/Magnesium Handling and Storage Unit

f. Continuous Casting

N/A

g. Finishing Operations

72″ Line and Cold Mill

h. Wastewater Treatment

N/A

i. Boiler Houses

N/A

3.1.3 Activities that are insignificant activities based upon their type or character, pursuant to 35 IAC 201.210(a)(4) through (18), as follows:

a. Material Handling Operations

Direct combustion units designed and used for comfort heating purposes and fuel combustion emission units as follows: (A) Units with a rated heat input capacity of less than 2.5 mmBtu/hr that fire only natural gas, propane, or liquefied petroleum gas; (B) Units with a rated heat input capacity of less than 1.0 mmBtu/hr that fire only oil or oil in combination with only natural gas, propane, or liquefied petroleum gas; and (C) Units with a rated heat input capacity of less than 200,000 Btu/hr which never burn refuse, or treated or chemically contaminated wood [35 IAC 201.210(a)(4)].

b. Coke Production

Direct combustion units designed and used for comfort heating purposes and fuel combustion emission units as follows: (A) Units with a rated heat input capacity of less than 2.5 mmBtu/hr that fire only natural gas, propane, or liquefied petroleum gas; (B) Units with a rated heat input capacity of less than 1.0 mmBtu/hr that fire only oil or oil in combination with only natural gas, propane, or liquefied petroleum gas; and (C) Units with a rated heat input capacity of less than 200,000 Btu/hr which never burn refuse, or treated or chemically contaminated wood [35 IAC 201.210(a)(4)].

Storage tanks of virgin or re-refined distillate oil, hydrocarbon condensate from natural gas pipeline or storage systems, lubricating oil, or residual fuel oils [35 IAC 201.210(a)(11)].

Storage tanks of any size containing exclusively soaps, detergents, surfactants, glycerin, waxes, vegetable oils, greases, animal fats, sweeteners, corn syrup, aqueous salt solutions, or aqueous caustic solutions, provided an organic solvent has not been mixed with such materials [35 IAC 201.210(a)(17)].

c. Coke Oven Gas By-Products Recovery Plant

Storage tanks of organic liquids with a capacity of less than 10,000 gallons and an annual throughput of less than 100,000 gallons, provided the storage tank is not used for the storage of gasoline or any material listed as a HAP pursuant to Section 112(b) of the CAA [35 IAC 201.210(a)(10)].

Storage tanks of virgin or re-refined distillate oil, hydrocarbon condensate from natural gas pipeline or storage systems, lubricating oil, or residual fuel oils [35 IAC 201.210(a)(11)].

Storage tanks of any size containing exclusively soaps, detergents, surfactants, glycerin, waxes, vegetable oils, greases, animal fats, sweeteners, corn syrup, aqueous salt solutions, or aqueous caustic solutions, provided an organic solvent has not been mixed with such materials [35 IAC 201.210(a)(17)].

d. Blast Furnaces

Direct combustion units designed and used for comfort heating purposes and fuel combustion emission units as follows: (A) Units with a rated heat input capacity of less than 2.5 mmBtu/hr that fire only natural gas, propane, or liquefied petroleum gas; (B) Units with a rated heat input capacity of less than 1.0 mmBtu/hr that fire only oil or oil in combination with only natural gas, propane, or liquefied petroleum gas; and (C) Units with a rated heat

input capacity of less than 200,000 Btu/hr which never burn refuse, or treated or chemically contaminated wood [35 IAC 201.210(a)(4)].

Storage tanks of virgin or re-refined distillate oil, hydrocarbon condensate from natural gas pipeline or storage systems, lubricating oil, or residual fuel oils [35 IAC 201.210(a)(11)].

e. Basic Oxygen Furnaces

Direct combustion units designed and used for comfort heating purposes and fuel combustion emission units as follows: (A) Units with a rated heat input capacity of less than 2.5 mmBtu/hr that fire only natural gas, propane, or liquefied petroleum gas; (B) Units with a rated heat input capacity of less than 1.0 mmBtu/hr that fire only oil or oil in combination with only natural gas, propane, or liquefied petroleum gas; and (C) Units with a rated heat input capacity of less than 200,000 Btu/hr which never burn refuse, or treated or chemically contaminated wood [35 IAC 201.210(a)(4)].

Storage tanks of organic liquids with a capacity of less than 10,000 gallons and an annual throughput of less than 100,000 gallons, provided the storage tank is not used for the storage of gasoline or any material listed as a HAP pursuant to Section 112(b) of the CAA [35 IAC 201.210(a)(10)].

f. Continuous Casting

Direct combustion units designed and used for comfort heating purposes and fuel combustion emission units as follows: (A) Units with a rated heat input capacity of less than 2.5 mmBtu/hr that fire only natural gas, propane, or liquefied petroleum gas; (B) Units with a rated heat input capacity of less than 1.0 mmBtu/hr that fire only oil or oil in combination with only natural gas, propane, or liquefied petroleum gas; and (C) Units with a rated heat input capacity of less than 200,000 Btu/hr which never burn refuse, or treated or chemically contaminated wood [35 IAC 201.210(a)(4)].

Storage tanks of organic liquids with a capacity of less than 10,000 gallons and an annual throughput of less than 100,000 gallons, provided the storage tank is not used for the storage of gasoline or any material listed as a HAP pursuant to Section 112(b) of the CAA [35 IAC 201.210(a)(10)].

Storage tanks of virgin or re-refined distillate oil, hydrocarbon condensate from natural gas pipeline or storage systems, lubricating oil, or residual fuel oils [35 IAC 201.210(a)(11)].

Storage tanks of any size containing exclusively soaps, detergents, surfactants, glycerin, waxes, vegetable oils, greases, animal fats, sweeteners, corn syrup, aqueous salt solutions, or aqueous caustic solutions, provided an organic solvent has not been mixed with such materials [35 IAC 201.210(a)(17)].

g. Finishing Operations

Direct combustion units designed and used for comfort heating purposes and fuel combustion emission units as follows: (A) Units with a rated heat input capacity of less than 2.5 mmBtu/hr that fire only natural gas, propane, or liquefied petroleum gas; (B) Units with a rated heat input capacity of less than 1.0 mmBtu/hr that fire only oil or oil in combination with only natural gas, propane, or liquefied petroleum gas; and (C) Units with a rated heat input capacity of less than 200,000 Btu/hr which never burn refuse, or treated or chemically contaminated wood [35 IAC 201.210(a)(4)].

Storage tanks of organic liquids with a capacity of less than 10,000 gallons and an annual throughput of less than 100,000 gallons, provided the storage tank is not used for the storage of gasoline or any material listed as a HAP pursuant to Section 112(b) of the CAA [35 IAC 201.210(a)(10)].

Storage tanks of virgin or re-refined distillate oil, hydrocarbon condensate from natural gas pipeline or storage systems, lubricating oil, or residual fuel oils [35 IAC 201.210(a)(11)].

Storage tanks of any size containing exclusively soaps, detergents, surfactants, glycerin, waxes, vegetable oils, greases, animal fats, sweeteners, corn syrup, aqueous salt solutions, or aqueous caustic solutions, provided an organic solvent has not been mixed with such materials [35 IAC 201.210(a)(17)].

h. Wastewater Treatment

Storage tanks of organic liquids with a capacity of less than 10,000 gallons and an annual throughput of less than 100,000 gallons, provided the storage tank is not used for the storage of gasoline or any material listed as a HAP pursuant to Section 112(b) of the CAA [35 IAC 201.210(a)(10)].

Storage tanks of virgin or re-refined distillate oil, hydrocarbon condensate from natural gas pipeline or storage systems, lubricating oil, or residual fuel oils [35 IAC 201.210(a)(11)].

Storage tanks of any size containing exclusively soaps, detergents, surfactants, glycerin, waxes, vegetable oils, greases, animal fats, sweeteners, corn syrup, aqueous salt solutions, or aqueous caustic solutions, provided an organic solvent has not been mixed with such materials [35 IAC 201.210(a)(17)].

i. Boiler Houses

Direct combustion units designed and used for comfort heating purposes and fuel combustion emission units as follows: (A) Units with a rated heat input capacity of less than 2.5 mmBtu/hr that fire only natural gas, propane, or liquefied petroleum gas; (B) Units with a rated heat input capacity of less than 1.0 mmBtu/hr that fire only oil or oil in combination with only natural gas, propane, or liquefied petroleum gas; and (C) Units with a rated heat input capacity of less than 200,000 Btu/hr which never burn refuse, or treated or chemically contaminated wood [35 IAC 201.210(a)(4)].

Storage tanks of organic liquids with a capacity of less than 10,000 gallons and an annual throughput of less than 100,000 gallons, provided the storage tank is not used for the storage of gasoline or any material listed as a HAP pursuant to Section 112(b) of the CAA [35 IAC 201.210(a)(10)].

Storage tanks of virgin or re-refined distillate oil, hydrocarbon condensate from natural gas pipeline or storage systems, lubricating oil, or residual fuel oils [35 IAC 201.210(a)(11)].

Gas turbines and stationary reciprocating internal combustion engines of less than 112 kW (150 horsepower) power output [35 IAC 201.210(a)(15)].

Storage tanks of any size containing exclusively soaps, detergents, surfactants, glycerin, waxes, vegetable oils, greases, animal fats, sweeteners, corn syrup, aqueous salt solutions, or aqueous caustic solutions, provided an organic solvent has not been mixed with such materials [35 IAC 201.210(a)(17)].

3.1.4 Activities that are considered insignificant activities pursuant to 35 IAC 201.210(b). Note: These activities are not required to be individually listed.

3.2 Compliance with Applicable Requirements

Insignificant activities are subject to applicable requirements notwithstanding status as insignificant activities. In particular, in addition to regulations of general applicability, such as 35 IAC 212.301 and 212.123 (Condition 5.3.2), the Permittee shall comply with the following requirements, as applicable:

3.2.1 For each particulate matter process emission unit, the Permittee shall comply with the applicable particulate matter emission limit of 35 IAC 212.321 or 212.322 (see Attachment 2) and 35 IAC Part 266. For example, the particulate matter emissions from a process emission unit shall not exceed 0.55 pounds per hour if the emission unit's process weight rate is 100 pounds per hour or less, pursuant to 35 IAC 266.110.

3.2.2 For each organic material emission unit that uses organic material, e.g., a mixer or printing line, the Permittee shall comply with the applicable VOM emission limit of 35 IAC 219.301, which requires that organic material emissions not exceed 8.0 pounds per hour or, if no odor nuisance exists, do not qualify as photochemically reactive material as defined in 35 IAC 211.4690.

3.2.3 For each cold cleaning degreaser, the Permittee shall comply with the applicable equipment and operating requirements of 35 IAC 219.182.

3.2.4 For each open burning activity, the Permittee shall comply with 35 IAC Part 237, including the requirement to obtain a permit for open burning in accordance with 35 IAC 237.201, if necessary.

3.2.5 For each storage tank that has a storage capacity greater than 946 liters (250 gallons) and, if no odor nuisance exists, that stores an organic material with a vapor pressure exceeding 2.5 psia, the Permittee shall comply with the applicable requirements of 35 IAC 219.122, which requires use of a permanent submerged loading pipe, submerged fill, a vapor recovery system, or an equivalent device approved by the Illinois EPA. [Note: storage tanks used for storing gasoline and any hazardous air pollutants are not eligible for insignificant activities].

3.2.6 For sulfuric acid operations and storage, the Permittee shall comply with the following emission limits of sulfuric acid and/or sulfur trioxide from all emission sources (with the exception of fuel combustion emission sources and acid manufacturing) at a plant or premises, pursuant to 35 IAC 214.303:

a. 45.4 grams in any one hour period for sulfuric acid usage less than 1180 Mg/yr (100 percent acid basis) (0.10 lbs/hr up to 1300 T/yr); and

b. 250 grams per metric ton of acid used for sulfuric acid usage greater than or equal to 1180 Mg/yr (100 percent acid basis) (0.50 lbs/T over 1300 T/yr).

3.3 <u>Addition of Insignificant Activities</u>

3.3.1 The Permittee is not required to notify the Illinois EPA of additional insignificant activities present at the source of a

type that is identified in Condition 3.1, until the renewal application for this permit is submitted, pursuant to 35 IAC 201.212(a).

3.3.2 The Permittee must notify the Illinois EPA of any proposed addition of a new insignificant activity of a type addressed by 35 IAC 201.210(a) and 201.211 other than those identified in Condition 3.1, pursuant to Section 39.5(12)(b) of the Act.

3.3.3 The Permittee is not required to notify the Illinois EPA of additional insignificant activities present at the source of a type identified in 35 IAC 201.210(b).

4.0 SUMMARY OF SIGNIFICANT EMISSION UNITS AT THIS SOURCE

Department	Description	Emission Control Equipment	Section
Material Handling and Processing Operations	Coal Crusher, Coal Pulverizer, Conveyors, Screens, Storage Bins, Feed Hoppers	Baghouse, Various Dust Collectors and Enclosures	7.1
Coke Production	Coke Oven Batteries “A” and “B” Coke Quenching	Water Scrubber; Flares Tower, Baffles	7.2
Coke By-Product Recovery Plant	Various Storage Tanks and Process Vessels	Vapor Recovery System and Various Blanketing and Negative Pressure Systems	7.3
COG Desulfurization System	Amine Unit and SRU Unit	Thermal Oxidizer	
COG System	Holding Tank and COG Flare	None	
Blast Furnaces	Blast Furnaces “A” and “B” BFG Flares #1 and #2	Casthouse Baghouse; Iron Spout Baghouse	7.4
Basic Oxygen Processes	BOF #1/#2 and Auxiliary Equipment	Electrostatic Precipitator; Baghouses	7.5
Continuous Casting	Continuous Casting and Slab Formation	None	7.6
Hot Strip Mill	Slab Reheat Furnaces	None	7.7
Finishing Operations	Pickling Line, Galvanizing Lines, Coating Operations	Fume Scrubbers; Catalytic Converter	7.8
Wastewater Treatment Plant	Various tanks, filtration and Lagoons	None	7.9
Boilers	Power Boiler #1 Boilers #11 and #12 Cooling Water Tower Portable Boilers #1 - #4	Flue Gas Recirculation (planned for Boilers #11 and #12)	7.10
Internal Combustion Engine	Emergency Engine-Generator	None	7.11
Gasoline Storage and Dispensing	Four Gasoline Storage Tanks and associated Dispensing Operations	None	7.12

Department	Description	Emission Control Equipment	Section
Fugitive Dust	Landfill Vehicular Traffic on Roadways, Parking Lots and Other Open Areas Storage Piles including truck unloading, wind erosion and material transfer from storage piles, beaching areas	None	7.13

5.0 OVERALL SOURCE CONDITIONS

5.1 Applicability of Clean Air Act Permit Program (CAAPP)

5.1.1 This permit is issued based on the source requiring a CAAPP permit as a major source of NO_x, PM_{10}, SO_2, VOM, CO, GHG and HAP emissions.

5.1.2 For purposes of the CAAPP, U.S. Steel is considered a single source with Stein Steel Mill Services (I.D. 119813AAD) located at 20th Street and Edwardsville in Granite City. Stein Steel Mill Services has a separate CAAPP permit for it operations.

5.1.3 For purposes of the CAAPP, U.S. Steel is considered a single source with Granite City Slag, LLC (I.D. 119040ATF) located at 20th Street and Edwardsville in Granite City. Granite City Slag has a separate CAAPP permit for it operations.

5.1.4 For purposes of the CAAPP, U.S. Steel is considered a single source with AKJ Industries, Inc (I.D. 119040AEB) located at 20th Street and Edwardsville in Granite City. AKJ Industries has a separate CAAPP permit for it operations.

5.1.5 For purposes of the CAAPP, U.S. Steel is considered a single source with Oil Technology, Inc (I.D. 119040ATG) located onsite of Granite City Steel (Route 203) in Granite City. Oil Technology has a separate CAAPP permit for it operations.

5.1.6 For purposes of the CAAPP, U.S. Steel is considered a single source with Tube City IMS (I.D.119040ATL) located at 2500 East 23rd Street in Granite City. Tube City has a separate CAAPP permit for it operations.

5.1.7 For purposes of the CAAPP, U.S. Steel is considered a single source with Gateway Energy & Coke Co LLC (I.D. 119040ATN) located at Edwardsville Road in Granite City. Gateway Energy & Coke has elected to obtain a separate CAAPP permit for its operations.

5.2 Area Designation

5.2.1 This permit is issued based on the source being located in an area that, as of the date of permit issuance, is designated nonattainment for the National Ambient Air Quality Standards for ozone (moderate nonattainment), $PM_{2.5}$ and lead, and attainment or unclassifiable for all other criteria pollutants (PM_{10}, CO, NO_x, SO_2).

5.3 Source-Wide Applicable Provisions and Regulations

5.3.1 Specific emission units at this source are subject to particular regulations as set forth in Section 7 (Unit-Specific Conditions for Specific Emission Units) of this permit.

5.3.2 Fugitive Dust

a. This source shall be operated under the provisions of Fugitive Particulate Matter Operating Program prepared by the Permittee and submitted to the Illinois EPA for its review. Such operating program shall be designed to significantly reduce fugitive particulate matter emissions [35 IAC 212.309(a)]. The Permittee shall comply with the fugitive particulate matter operating program and any amendments to the program submitted pursuant to Condition 5.3.2(b), as required by 35 IAC 212.309. As a minimum, the operating program shall include provisions identified in 35 IAC 212.310(a) through (g) and the following:

   i. A detailed description of the best management practices utilized to achieve compliance with 35 IAC 212.304 through 212.308.

   ii. Estimated frequency of application of dust suppressants by location; and

   iii. Such other information as may be necessary to facilitate the Illinois EPA's review of the operating program.

b. Pursuant to 35 IAC 212.312, the operating program shall be amended from time to time by the Permittee so that the operating program is current. Such amendments shall be consistent with the requirements set forth by this Condition 5.3.2 and shall be submitted to the Illinois EPA within 30 days of such amendment.

c. In addition to the items described above in Condition 5.3.2(a), the Permittee shall include the following additional plans and programs as part of the Fugitive Particulate Matter Operating Program:

   i. Housekeeping program for non-roadway areas as required by Condition 7.13.5(a)(i)(B);

   ii. Road Cleaning Program as required by Condition 7.13.5(d); and

   iii. On-site fugitive dust control program as referenced in Condition 7.13.9(b).

d. The revised Fugitive Particulate Matter Operating Program, submitted by the Permittee on August 12, 2009, (identified as Revision 8 and necessitated by changes to responsible officials and description of areas treated] and containing an attached Table and Map for the iron-making and steel-making roads respectively), is incorporated herein by reference. The document constitutes the formal operating program required under 35 IAC 212.310, addressing the control of fugitive particulate matter emissions from all plant roadways, including the iron-making and steel-making

roads, storage piles, access areas near storage piles, and other subject operations located at the facility that are subject to 35 IAC 212.309.

Any future revision to the aforementioned operating program made by the Permittee during the permit term is automatically incorporated by reference provided that said revision is not expressly disapproved, in writing, by the Illinois EPA within 30 days of receipt of said revision. In the event that the Illinois EPA notifies the Permittee of a deficiency with any revision to the operating program, the Permittee shall be required to revise and resubmit the operating program within 30 days of receipt of notification to address the deficiency [415 ILCS 39.5(7)(a)].

e. Pursuant to 35 IAC 212.301, the affected emission units at the source shall not cause or allow the emission of fugitive particulate matter from any process, including any material handling or storage activity, that is visible by an observer looking generally toward the zenith at a point beyond the property line of the source.

f. Pursuant to 35 IAC 212.307, all unloading and transporting operations of materials collected by pollution control equipment shall be enclosed or shall utilize spraying, pelletizing, screw conveying or other equivalent methods.

5.3.3 PM_{10} Contingency Measure Plan

a. This stationary source meets the criteria in 35 IAC 212.700 and is required to prepare and submit a contingency measure plan reflecting the PM_{10} emission reductions as set forth in 35 IAC 212.701 and 212.703.

b. PM_{10} Contingency Measure Plan shall be implemented by the Permittee in accordance with 35 IAC 212.704 upon notification from the Illinois EPA.

c. Pursuant to 35 IAC 212.701(c), for operational changes subject to Sections 212.304, 212.305, 212.306, 212.308, 212.316(a) through (e), 212.424 or 212.464 which require either a new permit or a revision to an existing permit the Permittee shall, within 30 days after such changes, submit a request to modify this CAAPP permit in order to include a new, appropriate contingency measure plan.

d. The plan, as submitted by the Permittee on November 15, 1994 (which includes tabulations of PM_{10} fugitive emissions, maps for the steel-works and iron making respectively, and a comparative analysis of contingency requirements and existing road programs), is incorporated herein by reference. The document constitutes the formal PM_{10} Contingency Measure Plan required by 35 IAC 212.701, addressing the Levels 1 and 2 control measures for reducing annual source-wide fugitive emissions of PM_{10} from plant

roads (paved and unpaved) and materials handling operations in the event of an exceedance of the 24-hour ambient air quality standard for PM10 under 35 IAC 212.704 or 212.705.

5.3.4 Ozone Depleting Substances

The Permittee shall comply with the standards for recycling and emissions reduction of ozone depleting substances pursuant to 40 CFR Part 82, Subpart F, except as provided for motor vehicle air conditioners in Subpart B of 40 CFR Part 82:

a. Persons opening appliances for maintenance, service, repair, or disposal must comply with the required practices pursuant to 40 CFR 82.156.

b. Equipment used during the maintenance, service, repair, or disposal of appliances must comply with the standards for recycling and recovery equipment pursuant to 40 CFR 82.158.

c. Persons performing maintenance, service, repair, or disposal of appliances must be certified by an approved technician certification program pursuant to 40 CFR 82.161.

5.3.5 Standards for Asbestos Demolition and Renovation (40 CFR 61.145)

a. Prior to demolition or renovation of the affected facility or part of the affected facility, the Permittee shall fulfill notification requirements established by 40 CFR 61.145(b).

b. During demolition or renovation, the Permittee shall comply with the procedures for asbestos emission control established by 40 CFR 61.145(c).

5.3.6 Future Emission Standards

Should this stationary source become subject to a regulation under 40 CFR Parts 60, 61, 62, or 63, or 35 IAC Subtitle B after the date this permit is issued, then the owner or operator shall, in accordance with the applicable regulation(s), comply with the applicable requirements by the date(s) specified and shall certify compliance with the applicable requirements of such regulation(s) as part of the annual compliance certification, as required by Condition 9.8. This permit may also have to be revised or reopened to address such new regulations (see Condition 9.12.2).

5.3.7 Episode Action Plan

a. Pursuant to 35 IAC 244.141, the Permittee shall maintain at the source and have on file with the Illinois EPA a written Episode Action Plan (plan) for reducing the levels of emissions during yellow alerts, red alerts, and emergencies, consistent with safe operating procedures.

b. The Permittee shall immediately implement the appropriate steps described in this plan should an air pollution alert or emergency be declared, as required by 35 IAC 244.169, or as may otherwise be required under 35 IAC 244, Appendix D.

c. If an operational change occurs at the source which invalidates the plan, a revised plan shall be submitted to the Illinois EPA for review within 30 days of the change, pursuant to 35 IAC 244.143(d). Such plans shall be further revised if disapproved by the Illinois EPA.

d. The revised plan, submitted by the Permittee on October 19, 2009, (which contains a completed APC Form 100 and attached Tables I-V identifying additional actions to be implemented), is incorporated herein by reference. The document constitutes the formal Episode Action Plan required by 35 IAC 244.142, addressing the actions that will be implemented to reduce SO_2, PM_{10}, NO_2, CO and VOM emissions from various emissions units in the event of a yellow alert, red alert or emergency issued under 35 IAC 244.161-244.165.

   Any future revision to the aforementioned plan made by the Permittee during the permit term is automatically incorporated by reference provided that said revision is not expressly disapproved, in writing, by the Illinois EPA within 30 days of receipt of said revision. In the event that the Illinois EPA notifies the Permittee of a deficiency with any revision to the plan, the Permittee shall be required to revise and resubmit the plan within 30 days of receipt of notification to address the deficiency [415 ILCS 39.5(7)(a)].

5.3.8 Risk Management Plan (RMP)

Should this stationary source, as defined in 40 CFR 68.3, become subject to the federal regulations for Chemical Accident Prevention in 40 CFR Part 68, then the owner or operator shall submit the items below. This condition is imposed in this permit pursuant to 40 CFR 68.215(a)(2)(i) and (ii).

a. A compliance schedule for meeting the requirements of 40 CFR Part 68 by the date provided in 40 CFR 68.10(a); or

b. A certification statement that the source is in compliance with all requirements of 40 CFR Part 68, including the registration and submission of the RMP, as part of the annual compliance certification required by Condition 9.8.

5.3.9 Energy Assessment (40 CFR 63, Subpart DDDDD)

Pursuant to 40 CFR 63.7500(a)(1) and Item 3 of Table 3 of 40 CFR 63 Subpart DDDDD, the Permittee must have a one-time energy assessment performed on the major source facility (i.e., the facility) by a qualified energy assessor. This energy

assessment shall be completed no later than the applicable compliance date of this NESHAP for existing sources and meet requirements in Table 3, including preparation of a comprehensive report detailing the ways to improve efficiency, the cost of specific improvements, benefits, and the time frame for recouping those investments. This energy assessment shall be conducted consistent with the definitions for “energy assessment”, “energy management practices” and “energy use system” in 40 CFR 63.7575

5.4 Source-Wide Non-Applicability of Regulations of Concern

a. Except where noted, 35 IAC 212.321 and 212.322 shall not apply to the steel manufacturing processes subject to 35 IAC 212.442 through 212.452 [35 IAC 212.441].

b. Except where noted, emission limitations of 35 IAC 212.324 are not applicable to any emission unit subject to a specific emissions standard or limitation contained in 35 IAC Subpart R, Primary and Fabricated Metal Products and Machinery Manufacture pursuant to 35 IAC 212.324(a)(3)(C).

c. This source (as a source of coke manufacturing, by-products recovery plant, iron and steel production) is excluded from the control requirements of 35 IAC Part 219 Subpart TT pursuant to 35 IAC 219.980(e).

d. This source does not receive any off-site waste as defined in 40 CFR 63.680(b) and, therefore is not subject to 40 CFR Part 63 Subpart DD “Off-site Waste and Recovery Operations”.

e. The source is not required to address 40 CFR Part 64, Compliance Assurance Monitoring (CAM) for Major Stationary Sources at the time of issuance of this permit, because the initial CAAPP application was submitted prior to April 1998 [40 CFR 64.5(a)(1)].

5.5 Source-Wide Control Requirements and Work Practices

The Permittee (U.S. Steel), in conjunction with Gateway Energy and Coke Company shall maintain 267.77 tons of PM_{10} emission offsets generated by the following activities/projects (see also Sections 7.3 and 7.13):

Activity/Project	(Tons/Year)
Coke Oven Gas (COG) Desulfurization Project	31.74
Road Cleaning Program	236.03
Total:	267.77

a. These emission reductions have been relied upon by the Illinois EPA to issue Construction Permits 06070088 and 06070020 for projects by the Permittee and Gateway, respectively and cannot be used as emission reduction credits for other purposes.

b. If the Permittee proposes to rely upon emission offsets from other sources or other activities/projects, the Permittee shall

apply for and obtain a revision to Permit 06070088 prior to relying on such emission offsets, which application shall be accompanied by detailed documentation for the nature and amount of those alternative emission offsets.

5.6 Source-Wide Production and Emission Limitations

5.6.1 Emissions of Hazardous Air Pollutants

Source-wide emission limitations for HAPs as listed in Section 112(b) of the CAA are not set. This source is considered to be a major source of HAPs.

5.6.2 Other Source-Wide Production and Emission Limitations from existing permits:

a. Provisions from Construction Permit #95010001

i. Total production of iron and steel by U.S. Steel/Granite City plant shall not exceed the following limits. Compliance with these annual production limits shall be determined on a month by month basis by showing that the actual production of iron and steel from the plant did not exceed the scheduled rate of production for a month given in the most recent production schedule provided to the Illinois EPA Compliance Section and Collinsville Regional Office as provided below [T1]:

Product	Net tons/yr
Iron	3,165,000
Steel	3,580,000

A. If no production schedule is submitted to the Illinois EPA by the Permittee for a particular year, the scheduled monthly production of iron and steel shall be set at one twelfth of the annual production limits in Condition 5.6.2(a)(i) above.

B. 1. The Permittee may submit a schedule for iron and steel production for each month of the calendar year. Such schedule shall provide the scheduled monthly iron and steel production for each month and the total of such scheduled production shall not exceed the annual production limits in Condition 5.6.2(a)(i) above. This schedule shall be submitted each year no later than December 15th of the preceding year.

2. During the course of the year, the Permittee may submit a revised production

schedule which accounts for actual production levels which were below that scheduled for the previous months, provided that in no case shall the scheduled production for prior months in such a revised schedule be lowered to less than actual production levels or raised. Such revised schedule shall be submitted no later than 15 days after the first day of the month for which scheduled production has been raised. Such schedule shall be accompanied by data on actual production in preceding months.

ii. Total fuel usage for blast furnaces stoves (A and B), boilers 11 and 12, ladle drying preheaters and blast furnace gas flare #1 and shall not exceed the following limits. Compliance with the monthly limits shall be determined by direct comparison of monthly data to the applicable limit. Compliance with the annual limits shall be determined based on a calendar year [T1]:

A. Natural Gas usage:

225 million ft^3 per month and 1,346 million ft^3 per year;

B. Blast Furnace Gas (BFG) usage:

30,800 million ft^3 per month and 185,030 million ft^3 per year; and

C. Fuel Oil usage:

60,000 gallons per month and 365,000 gallons per year.

iii. A. Annual emissions from the fuel combustion units identified in Condition 5.6.2(a)(ii) above shall not exceed the following limits in tons/year:

PM/PM_{10}	SO_2*	NO_x	VOM	CO	Lead
274	641	706	2	1,295	0.06

* These limits have been addressed by an enforcement action, with a compliance schedule established for compliance with these limits. (See Condition 7.4.13)

B. Annual emissions from each individual fuel used in the fuel combustion units identified in

Condition 5.6.2(a)(ii) above shall not exceed the following limits:

1. Natural Gas

Pollutant	Emission Factor (Lbs/mmcf)	Maximum Emissions (Tons/Yr)
PM	5.1	3.43
PM_{10}	5.1	3.43
SO_2	0.6	0.40
NO_x	306.0	205.94
VOM	2.8	1.88
CO	40.0	26.92

2. BFG

Pollutant	Emission Factor (Lbs/mmcf)	Maximum Emissions (Tons/Yr)
PM	2.90	268.29
PM_{10}	2.90	268.29
SO_2	6.65*	615.22*
NO_x	5.28	488.48
CO	13.70	1,267.46

* These limits have been addressed by an enforcement action, with a compliance schedule established for compliance with these factors and limits. (See Condition 7.4.13)

3. Fuel Oil

Pollutant	Emission Factor (Lbs/Mgal)	Maximum Emissions (Tons/Yr)
PM	9.72	1.77
PM_{10}	9.75	1.77
SO_2	141.30	25.79
NO_x	55.00	10.04
VOM	0.28	0.05
CO	5.00	0.91
Lead	0.336	0.06 (Waste Oil)

C. Compliance with the annual limits in Condition 5.6.2(a)(iii) shall be determined based on a calendar year.

b. Provisions from Construction Permit #06070022:

Annual emissions of the source from combustion of COG shall not exceed the following limits [T1)]

	Limits (Tons/Year)	
	PM_{10}	SO_2
“Outage” of Affected System	47.55	530.59
Total (includes normal and outage):	224.80	807.90

c. Provisions from FESOP #94120017:

Emissions of SO_2 from the so called “sulfur dioxide emission units” operated at the source shall not exceed the following limits. Compliance with the limits shall be determined in accordance with the procedure in Condition 5.12.

Unit Operating Group	Sulfur Dioxide Emissions		
	(Lbs/3-Hours)	(Lbs/Day)	(Tons/Yr)
Slab Reheat Furnaces 1-3	2,299	9,754	987
Slab Reheat Furnace 4	---	11,873	1,204
Blast Furnace Stoves A and B	---	19,774	3,609
Boilers 11 and 12	---	20,584	3,756
Ladle Drying Preheaters	555	2,786	509
Blast Furnace Casthouse Baghouse	---	3,430	626
Iron Spout Baghouse	---	170	31

5.7 Source-Wide Testing Requirements

Pursuant to 35 IAC 201.282 and Section 4(b) of the Act, every emission source or air pollution control equipment shall be subject to the following testing requirements for the purpose of determining the nature and quantities of specified air contaminant emissions and for the purpose of determining ground level and ambient air concentrations of such air contaminants:

a. Testing by Owner or Operator: The Illinois EPA may require the owner or operator of the emission source or air pollution control equipment to conduct such tests in accordance with procedures adopted by the Illinois EPA, at such reasonable times as may be specified by the Illinois EPA and at the expense of the owner or operator of the emission source or air pollution control equipment. All such tests shall be made by or under the direction of a person qualified by training and/or experience in the field of air pollution testing. The Illinois EPA shall have the right to observe all aspects of such tests [35 IAC 201.282(a)].

b. Testing by the Illinois EPA: The Illinois EPA shall have the right to conduct such tests at any time at its own expense. Upon request of the Illinois EPA, the owner or operator of the emission source or air pollution control equipment shall provide, without charge to the Illinois EPA, necessary holes in stacks or ducts and other safe and proper testing facilities, including scaffolding, but excluding instruments and sensing devices, as may be necessary [35 IAC 201.282(b)].

c. Any such tests are also subject to the Testing Procedures of Condition 8.5 set forth in the General Permit Conditions of Section 8.

5.8 Source-Wide Monitoring Requirements

a. Requirements for coke oven gas (COG) flow meters from FESOP #94120017: for purposes of these conditions, a Unit Operating Group is a group of emission units as defined in Condition 5.6.2(c).

Note: Requirements for monitoring the sulfur content of COG as present in FESOP #94120017 are included in Section 7.3 of this CAAPP permit.

i. The Permittee shall test, operate, and maintain a system for measuring the COG usage for each unit operating group.

ii. A flow meter shall be maintained on the main Blast Furnace and Steelworks COG feed lines and each individual emission unit or unit operating group and shall be used to measure the COG usage rate. The total COG usage for each unit operating group as a whole shall be the sum of the individual usage for the emission units of that group as measured by the individual meters or that measured by a single flow meter measuring the COG usage for the unit operating group as a whole.

iii. The COG flow meter system shall be capable of recording the COG usage in standard cubic feet on an hourly and daily basis. COG usage shall be obtained from the COG flow meter system to allow the determination of hourly and/or daily COG usage for each unit operating group, as needed for the emission rate calculations of this permit.

iv. The COG flow meter system shall be operated, and data collected, reduced and maintained, in accordance with the applicable requirements of 40 CFR 60.13 and 35 Ill. Adm. Code Part 201 Subpart L.

A. Each COG flow meter shall be tested at least every 12 months, in accordance with the procedures of 40 CFR 60, Appendix B, Performance Specification 6.

B. The results of these flow meter performance tests shall be sent to the Illinois EPA's Division of Air Pollution Control, Permit Section and Regional Office within 14 days after completion of the tests. In addition, the results shall be maintained in accordance with the recordkeeping requirements specified in this permit.

C. If a single flow meter on an unit operating group fails, then the COG usage for that group may be calculated using the difference between overall total COG usage and the total COG usage at the remaining properly operating COG flow meters, or the difference in COG usage from the main COG feed line of the affected unit operating group and the COG usage at the remaining properly operating flow meters associated with that main feed line.

D. In the event that several flow meters are down such that the above COG usage calculation is not possible, the COG usage for the affected unit operating group(s) shall be determined by a method approved by the Illinois EPA (e.g., use of temporary backup measurement system). In no case shall COG usage not be determined by a method described in this permit, or an approved alternative method, so as to result in insufficient data being obtained to determine the COG usage for any unit operating group as needed to evaluate compliance using the emission rate calculations of this permit.

v. In the event of malfunction or breakdown of a COG flow meter system, the Permittee shall repair and recalibrate the meter or monitoring system as soon as practicable but no later than 10 days after the malfunction or breakdown is detected, unless prior Illinois EPA approval is obtained by submitting a notification of extended outage and adequate justification to the Illinois EPA detailing the reasons for delay. Records of repair and recalibration must be maintained in accordance with the recordkeeping requirements of this CAAPP permit. This condition does not relieve the Permittee of the minimum data obtaining requirements of this CAAPP permit.

b. The Permittee shall conduct observations at the property line of the source for visible emissions of fugitive particular matter form the source to address compliance with 35 IAC 212.301, upon request by the Illinois EPA, as follows:

For this purpose, daily observations shall be conducted for a week for particular area(s) of concern at the source, as specified in the request. Observations shall begin either within one day or three days of receipt of a written request

from the Illinois EPA, depending, respectively, upon whether observations will be conducted by employees of the Permittee or a third-party observer hired by the Permittee to conduct observations on its behalf. The Permittee shall keep records for these observations, including identity of the observer, the date and time of observations, the location(s) from which observations were made, and duration of any fugitive emissions event(s).

c. Pursuant to FESOP 94120017, the Permittee shall analyze the fuel oil used at the source in accordance with the following.

i. The sulfur content and density as determined by the ASTM methods specified in the testing requirements of FESOP 94120017 shall be used in emission calculations.

ii. The sulfur content and density of the fuel oil shall be determined upon each instance of fuel oil usage.

5.9 Source-Wide Recordkeeping Requirements

5.9.1 Records for Opacity and Emission Limits

The Permittee shall maintain the following records pursuant to Section 39.5(7)(b) of the Act:

a. The Permittee shall maintain records of the total annual net production of iron and steel on a monthly basis and a total calendar year basis, to verify compliance with Condition 5.6.2(a)(i).

b. The Permittee shall maintain records of monthly and annual use of fuels to verify compliance with Condition 5.6.2(a)(ii).

c. The Permittee shall maintain records of annual emissions from the emission units listed in Condition 5.6.2(a)(ii) for comparison to the annual emission limits in Condition 5.6.2(a)(iii)(A) for PM/PM_{10}, SO_2, NO_x, VOM, CO and lead.

d. The Permittee shall maintain the following records for the emission units identified in Condition 5.6.2(a)(ii) to verify the emission factors for different fuels listed in Condition 5.6.2(a)(iii)(B):

i. For emissions of NO_x, PM, PM_{10}, VOM, and CO, records for the emission factors used by the Permittee to determine emissions of the pollutant from the subject emission units for firing of natural gas, blast furnace gas and oil, with supporting documentation and analysis, and the “maximum” annual emission factors for the different fuels and pollutants calculated as a weighted average of the individual

factors for different emission units, weighted for the greatest relative annual use of fuel in different units, beginning with the unit that has the highest emission factor. For example, if the boilers have the highest emission factors for NO_x, the factors shall be weighted for the greatest percentage of fuels expected to be used in the boilers, and then for the units that have the next highest emission factor(s), and so forth until all of the fuel has been accounted for. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of the subject unit do not understate emissions, including review when emission testing is conducted for the subject emission units, review when emission testing of similar emission units is conducted at other facilities (as would be needed if the Permittee is relying upon data from emission testing at other US Steel facilities), and review when USEPA revises its *Compilation of Air Pollutant Emission Factors*, AP-42 (as would be needed if the Permittee has relied upon emission factors from AP-42). These records shall be prepared and copies submitted to the Illinois EPA in accordance with Condition 5.9.6(c).

ii. Records for the sulfur content of COG and BFG, as measured pursuant to Conditions 5.9.1(e) and 7.3.9(f) and Condition 7.10.8-1(c), respectively, which data shall either be used when determined SO_2 emissions from combustion of the fuels or used to confirm that the determinations of SO_2 emissions from combustion of these fuels do not understate actual SO_2 emissions.

iii. Records for the actual average annual emission rates for different fuels and pollutants, including SO_2 and lead, calculated by dividing the actual emissions of the subject units for different fuels and pollutants by the annual usage of fuels. These records shall be compiled on an annual basis by the Permittee when the records for annual emissions of the subject units are compiled.

e. The Permittee shall maintain the following records for the emissions of PM_{10}* and SO2 associated with use of COG to verify compliance with the emission limits in Condition 5.6.2(b). (See also recordkeeping requirements in Section 7.3 of the permit.)

* For the purpose of this condition, the Permittee shall address total PM_{10}, including both filterable and condensable particulate, rather than only filterable particulate.

i. Records for the volumes of COG that are and are not processed by the COG Desulfurization System (scf), with data for undesulfurized COG on a 3-hour, daily and monthly basis and data for desulfurized COG on a daily and monthly basis.

ii. Records for the sulfur contents of COG (gr/scf or gr/100 scf), with data for undesulfurized COG on a 3-hour, daily and monthly basis and data for desulfurized COG on a daily and monthly basis.

iii. Records for the emission factors used by the Permittee to determine the PM_{10} emissions from firing desulfurized and undesulfurized COG for the emission units at the facility that fire COG, with supporting documentation and analysis, and the “maximum” annual PM_{10} emission factor calculated as a weighted average of the individual factors for different emission units, weighted for the greatest relative annual use of COG in different units, beginning with the unit that has the highest emission factor. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of units firing COG do not understate emissions, including review when PM_{10} emission testing is conducted for units at the facility and review when PM_{10} emission testing of similar emission units is conducted at other facility.

iv. Records for the annual PM_{10} and SO_2 emissions from the facility from combustion of COG that has not been desulfurized, determined from the summation of the volume of such COG multiplied by either its sulfur content or the established PM10 emission factor for undesulfurized COG.

v. Records for the annual PM_{10} and SO_2 emissions from the facility from combustion of COG that has been desulfurized, determined from the summation of the volume of such COG multiplied by either its sulfur content or the established PM10 emission factor for desulfurized COG.

vi. Records for the total annual PM_{10} and SO_2 emissions from the facility from combustion of COG, determined as the sum of the annual emission from combustion of COG that has and has not been desulfurized.

5.9.2 Records for HAP Emissions

The Permittee shall maintain source-wide records of HAP emissions on a calendar year basis and individually for the emission units or group of emission units covered by Section 7 (Unit Specific Conditions for Specific Emission Units) of this

permit and emitting HAPs, pursuant to Section 39.5(7)(b) of the Act.

5.9.3 Records for Source-Wide Control Requirements and Work Practices

a. The Permittee shall keep a copy of the fugitive particulate matter operating plan, and any amendments or revisions to the plan, as required by Condition 5.3.2. The Permittee shall also keep a record of activities completed according to the plan.

b. The Permittee shall keep copy of the PM_{10} contingency plan, and any amendments or revisions as described by Condition 5.3.3. The Permittee shall also keep a record of activities completed according to the plan.

c. The Permittee shall keep a copy of the Episode Action Plan, and any amendments or revisions to the plan, as described in Condition 5.3.7. The Permittee shall also keep a record of activities completed according to the plan.

d. The Permittee shall keep a record of property line observations required by Condition 5.8(b).

5.9.4 Records to address SO_2 emission limits in Condition 5.6.2(c) from FESOP #94120017:

a. SO_2 emissions of each unit operating group in terms of the associated emission limits of this permit (i.e., lbs/3-hrs and lbs/day) accompanied by the data from which they were determined.

b. SO_2 emissions of each unit operating group in tons/month.

c. SO_2 emissions of each unit operating group in tons/year determined by using a rolling total of the previous 12 consecutive months of data.

d. Records for repairs of any COG flow meter, as required by Condition 5.8(a)(v), including copies of any notifications to the Illinois EPA for extended outage of a flow meter.

e. Records for any fuel oil usage instances with the results of the sampling and analysis of oil sulfur content.

5.9.5 The Permittee shall retain copies of all emission test reports and other test reports and other submittals to the Illinois EPA related to testing that are required by Conditions 5.7 and 5.10 and other conditions of this permit.

5.9.6 Retention, Availability and Submittal of Records

Pursuant to Section 39.5(7)(e)(ii) of the Act, the Permittee shall keep the records required by this permit as follows:

a. All records and logs required by this permit shall be retained for at least five years from the date of entry (unless a longer retention period is specified by the particular recordkeeping provision herein). The Permittee shall keep the last 3 years of data on-site and remaining 2 years data may be kept at an offsite location. The Permittee shall make all these readily accessible records available to the Illinois EPA or USEPA for inspection and/or copying upon request.

b. The Permittee shall retrieve and print, on paper during normal source office hours, any records retained in an electronic format (e.g., computer) in response to an Illinois EPA or USEPA request for records during the course of a source inspection.

c. For certain records related to emission factors or emission rates required to be kept by this permit for various emission units at this source, as specifically identified in other conditions of this permit, the Permittee shall submit a copy of the records to the Illinois EPA as provided below:

   i. Copies of initial records shall be submitted to the Illinois EPA within 15 days of the date that the Permittee prepares these records for subject unit(s), which shall in no case be later than January 20, 2012.

   ii. Thereafter, copies of revised records shall be submitted to the Illinois EPA with the emission test reports for subject emission unit(s) if the records were revised as a consequence of emission testing or otherwise within 15 days of the date that the Permittee completes the preparation of revised records for subject unit(s).

5.9.7 Inspection, Sampling and Observations Documentation

Inspection, sampling and observation performed as required by this permit shall have documentation in addition to the records elsewhere in this permit that identifies at least the following:

a. Name of person(s) or representative performing such activity;

b. Date and time of such activity;

c. Any applicable industry standards or other specific procedures for such activities; and

d. Any quality assurance or quality control results.

5.10 Source-Wide Reporting Requirements

5.10.1 General Source-Wide Reporting Requirements

a. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations from applicable requirements as follows:

   i. Requirements in Condition 5.3.2(d) and (e)

   ii. Requirements in Condition 5.5.

   iii. Requirements in Condition 5.6.2.

b. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

c. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by in Condition 8.6.1.

d. All required deviation reports described in Condition 5.10.1 above shall contain the following information:

   i. Date and time of the deviation;

   ii. Emission units(s)/operation involved;

   iii. The duration of the event;

   iv. Probable cause of the deviation;

   v. Any corrective actions or preventative measures taken;

   vi. Reporting on malfunction and breakdown shall be performed in accordance with Condition 5.10.5; and

   vii. Reporting on startup shall be performed in accordance with Condition 5.10.5.

5.10.2 Annual Emissions Report

a. The annual emissions report required pursuant to Condition 9.7 shall contain emissions information, including HAP emissions, for the previous calendar year.

b. The Permittee shall submit the following additional information from the prior calendar year with the Annual Emissions Report, due May 1st of each year, pursuant to Permit 95010001:

i. Iron and steel production (tons/month and tons/yr, each);

ii. Natural gas and BFG usage (mmft^3/month and mmft^3/yr, each); and

iii. Fuel oil usage (thousand gallons/month and thousand gallons/yr, for each type of oil).

c. The Permittee shall submit an annual report to the Illinois EPA with its Annual Emission Report describing the implementation of the Road Cleaning Program for the affected road segments, as defined in Condition 7.13.5(d), during the previous year. This report shall at a minimum provide: the number of times each road segment was cleaned; the number of times that scheduled cleaning was not performed, with explanation; a description of any significant changes in road cleaning equipment or cleaning practices, with explanation; and a description of other significant changes to the Program, including changes in contractors [Permit #06070088].

5.10.3 Reporting requirements from FESOP #94120017

a. The Permittee shall submit quarterly reports (every 3 calendar months) to the Illinois EPA. This report is due 30 days after the end of the reporting period and may be submitted on computer disk. This report shall contain the following information for the days during the quarter:

i. A summary showing the emissions of SO_2 for each unit operating group for each day and the 12 month rolling average in tons/year.

ii. A statement identifying any apparent violations which occurred during the quarter covered by the report or, if there have been no apparent violations, a statement to that effect.

iii. A summary of any COG flow meter downtime.

iv. Identification of any days for which data for at least 75% of the operating hours of the unit operating group was not obtained by an approved method; justification for not obtaining the data; and description of corrective action taken.

b. These reports shall be sent to IEPA Compliance Section in Springfield and IEPA Regional Office in Collinsville.

c. Copies of the Final Report for the tests identified in Condition 5.8(a)(iv) shall be submitted to the Illinois EPA along with the quarterly reports required by this CAAPP permit within 30 days after the reported quarter.

5.10.4 Other Source-Wide Reporting Requirements

a. i. A quarterly report shall be submitted to the Illinois EPA stating the following: the dates any necessary control measures were not implemented, a listing of those control measures, the reasons that the control measures were not implemented, and any corrective actions taken. This information includes, but is not limited to, those dates when controls were not applied based on a belief that application of such control measures would have been unreasonable given prevailing atmospheric conditions, which shall constitute a defense to the requirements of this Section. This report shall be submitted to the Illinois EPA thirty (30) calendar days from the end of a quarter. Quarters end March 31, June 30, September 30, and December 31 [35 IAC 212.316(g)(5)].

ii. The reporting requirements from the above are established for fugitive particulate matter control measures implemented for the certain operations identified in 35 IAC 212.316(b) through 212.316(f).

iii. Control measures for this condition are those identified in the Fugitive Particulate Matter Operating Program.

b. Upon written request by the Illinois EPA, a report shall be submitted to the Illinois EPA for any period specified in the request stating the following: the dates during which any process emission unit was in operation when the air pollution control equipment was not in operation or was not operating properly, documentation of causes for pollution control equipment not operating or not operating properly, and a statement of what corrective actions were taken and what repairs were made [35 IAC 212.324(g)(6)].

5.10.5-1 Reporting for Startups (State Authorization)

Pursuant to 39.5(7)(a) and (f)(ii) of the Act, when startup reports are required for an emission unit by unit specific conditions in Chapter 7 of this permit, such reports shall be submitted to the Illinois EPA, Air Compliance Section and Collinsville Regional Field Office on a semi-annual basis, and include the following information related to startups of such emission unit and associated air pollution control equipment.

a. If startups occurred during the reporting period, the report shall include the following:

i. The number of startups.

ii. The number of departures from established procedures.

iii. The number of exceedances of each applicable standard.

iv. A general explanation for the magnitude of the numbers reported and the significance or meaning of those numbers.

v. A general explanation for the departures.

vi. A general explanation for the exceedances.

vii. A general discussion of whether any improvements were made to startup practices

b. If there were no startups for the reporting period, a statement that “No startups occurred during this reporting period.”

c. Startups that resulted in excess emissions shall be addressed in the deviation reports as required by unit specific conditions in Chapter 7 of this permit.

5.10.5-2 Reporting for Malfunction or Breakdown (State Authorization)

a. The Permittee shall provide the following notification and reports to the Illinois EPA, Air Compliance Section and Collinsville Regional Field Office, pursuant to 35 IAC 201.263, concerning continued operation of an affected emission unit or related air pollution control equipment when such continued operation would cause a violation of a standard or limitation in 35 IAC Subtitle B, Chapter I, subchapter c:

i. If an emission unit or control device operates during a malfunction/breakdown, the Permittee shall immediately report such event to the Illinois EPA within 2 working days after such event occurs. The immediate notification shall be provided to the Illinois EPA’s Springfield Office (Compliance Section) by a telephone, facsimile, electronic mail or other alternative method of correspondence that constitutes the fastest available alternative. The immediate notification shall be followed by a letter to the Illinois EPA’s Springfield Office (Compliance Section), postmarked within 7 working days after the end of the event. The 7 day follow-up letter shall contain the name, title, and signature of the owner or operator or other responsible official certifying its accuracy, explaining the circumstances and reasons for event, describing all excess emissions and/or parameter monitoring exceedances which may have occurred during the malfunction/breakdown event, actions taken to minimize emissions or parameter exceedance and all repairs made in conjunction with such malfunction/breakdown event.

ii. If all the necessary information identified above is contained within the 2-day immediate notification and the notification was done by means of written correspondence, a 7-day follow-up letter is not required to be submitted.

iii. A summary of these malfunction/breakdown reports required by this permit shall be submitted to the Illinois EPA's Springfield Office Compliance Section on a quarterly basis and contain the following:

A. Date and time of malfunction/breakdown;

B. Emission unit(s)/control involved;

C. The duration of the event;

D. Probable cause of malfunction/breakdown; and

E. Repairs and other corrective actions taken.

5.10.5-3 Federal Startup Shutdown and Malfunction/Breakdown Requirements

a. For those emission units subject to a NESHAP standard and for which an SSM plan is required under 40 CFR 63.10(d)(5), the Permittee shall submit reports as required by the NESHAP including:

i. Periodic startup, shutdown or malfunction reports [40 CFR 63.10(d)(5)(i)]

A. 1. If actions taken by an owner or operator during a startup or shutdown (and the startup or shutdown causes the affected emission unit to exceed any applicable emission limitation in the relevant NESHAP emission standards specified in Section 7 of this permit), or malfunction of an affected emission unit (including actions taken to correct a malfunction) are consistent with the procedures specified in the source's startup, shutdown, and malfunction plan (see 40 CFR 63.6(e)(3)), the Permittee shall state such information in a startup, shutdown, and malfunction report.

2. Actions taken to minimize emissions during such startups, shutdowns, and malfunctions shall be summarized in the report and may be done in checklist form; if actions taken are the same for each event, only one checklist is necessary.

3. Such a report shall also include the number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded.

B. The startup, shutdown, and malfunction report shall consist of the following:

A letter, containing the name, title, and signature of the owner or operator or other responsible official who is certifying its accuracy.

C. Reports shall only be required if a startup, shutdown or malfunction occurred during the reporting period.

D. The SSM Report shall be submitted to the Illinois EPA semiannually and shall be delivered or postmarked by the 30th day following the end of each calendar half (or other calendar reporting period, as appropriate).

E. If the owner or operator is required to submit excess emissions and continuous monitoring system performance (or other periodic) reports required by this permit, the startup, shutdown, and malfunction reports required under 40 CFR 63.10(d) may be submitted simultaneously with the excess emissions and continuous monitoring system performance (or other) reports.

F. If startup, shutdown, and malfunction reports are submitted with excess emissions and continuous monitoring system performance (or other periodic) reports, and the owner or operator receives approval to reduce the frequency of reporting for the latter under 40 CFR 63.10(e), the frequency of reporting for the startup, shutdown, and malfunction reports also may be reduced if the Illinois EPA does not object to the intended change. The procedures to implement the allowance in the preceding sentence shall be the same as the procedures specified in 40 CFR 63.10(e)(3).

ii. Immediate startup, shutdown or malfunction reports [40 CFR 63.10(d)(5)(ii)]

A. Notwithstanding the allowance to reduce the frequency of reporting for periodic startup,

shutdown, and malfunction reports under 40 CFR 63.10(d)(5)(i), any time an action taken by an owner or operator during a startup or shutdown that caused the source to exceed any applicable emission limitation in the relevant NESHAP emission standards specified in Section 7 of this CAAPP, or malfunction (including actions taken to correct a malfunction) is not consistent with the procedures specified in the affected source's startup, shutdown, and malfunction plan, the owner or operator shall submit an immediate report stating the actions taken for that event within 2 working days after commencing actions inconsistent with the plan and a follow-up report submitted within 7 working days after the end of the event.

B. The immediate report shall consist of a telephone call (or facsimile (FAX) transmission) to the Illinois EPA.

C. The follow-up report shall consist of the following:

1. The name, title, and signature of the owner or operator or other responsible official who is certifying its accuracy and explaining the circumstances of the event.

2. The reasons for not following the startup, shutdown, and malfunction plan.

3. Description all excess emissions and/or parameter monitoring exceedances which are believed to have occurred (or could have occurred in the case of malfunctions).

4. And actions taken to minimize emissions in conformance with 40 CFR 63.6(e)(1)(i).

5.10.6 Separate copies of all reports required by this permit shall be sent to the IEPA Regional Office in Collinsville.

5.10.7 <u>40 CFR 63, Subpart DDDDD (Notification of Compliance)</u>

a. Pursuant to 40 CFR 63.7545(b), the Permittee must submit an initial Notification according to 40 CFR 63.9(b)(2).

b. Pursuant to 40 CFR 63.7545(e), the Permittee must submit a Notification of Compliance Status according to 40 CFR 63.9(h)(2)(ii). For the initial compliance demonstration for each affected unit, the Permittee must submit the Notification of Compliance Status, including all

performance test results and fuel analyses, before the close of business on the 60th day following the completion of all performance test and/or other initial compliance demonstrations for the affected unit according to 40 CFR 63.10(d)(2).

c. For subject emission units, for which Permittee must conduct an initial compliance demonstration, the report shall include the information specified in 40 CFR 63.9(h)(2) and 63.7545(e).

d. In addition to the information required by 40 CFR 63.9(h)(2), the notification of compliance status must include the following certification(s) of compliance, as applicable, and signed by a responsible official:

   i. “This facility complies with the requirements in 40 CFR 63.7540(a)(10) to conduct an annual or biennial tune-up, as applicable, of each unit.”

   ii. “This facility has had an energy assessment performed according to 40 CFR 63.7530(e).”

   iii. “No secondary materials that are solid waste were combusted in any affected unit.”

e. Pursuant to 40 CFR 63.7530(e), the Permittee must include with the Notification of Compliance Status a signed certification that the energy assessment was completed according to Table 3 of 40 CFR Part 63, Subpart DDDDD and is an accurate depiction of the affected facility.

f. Pursuant to 40 CFR 63.7530(d), the Permittee must submit a signed statement in the Notification of Compliance Status report that indicates a tune-up was completed on each existing unit firing natural gas with a heat input capacity of less than 10 million Btu per hour.

5.11 Source-Wide Operational Flexibility/Anticipated Operating Scenarios

No source-wide operational flexibility/anticipated operating scenarios have been established in this permit.

5.12 Source-Wide Compliance Procedures

Compliance Provisions for Condition 5.6.2(c) (adopted from FESOP 94120017):

a. Compliance with the lbs/3-hours limits in Condition 5.6.2(c) shall be demonstrated by using emission rate calculations for eight discrete 3-hour periods per day, with the first period beginning at midnight.

b. Compliance with the daily emission limits in Condition 5.6.2(c) shall be demonstrated by using emission rate calculations on a daily block basis (i.e., midnight to midnight).

c. The compliance calculations shall be the primary compliance method for determining compliance with the emission limits in Condition 5.6.2(c), except for the blast furnace casthouse baghouse and iron spout baghouse, for which stack testing shall be the primary means of determining compliance.

d. Total SO_2 emissions from an unit operating group for determination of compliance with the SO_2 limits in Condition 5.6.2(c) shall be the sum of the emissions resulting from the use of COG and fuel oil at the unit operating group, i.e.:

Lbs SO_2 per unit operating group = SO_2 emissions from fuel oil usage + SO_2 emissions from COG usage

Note: When FESOP Permit 94120017 was originally issued, the SO_2 emissions which would result from the use of blast furnace gas and natural gas in the unit operating groups were accounted for in the SO_2 limits of that permit. This was accomplished by lowering the permitted SO_2 from the SO_2 levels used for air quality modeling by an amount equal to the SO_2 which would have been emitted should the unit operating groups use blast furnace gas or natural gas continuously. The SO_2 emissions from blast furnace gas and natural gas were calculated using standard emission factors as found in AIRS Facility Subsystem, Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants, EPA Document Number EPA 450/4-90-003, and Compilation of Air Pollution Emission Factors, Vol. 1, Stationary Point and Other Sources, AP-42.

e. The SO_2 emissions attributable to fuel oil usage shall be calculated from the records required by the CAAPP permit for usage of fuel oil and the sulfur and heat content of oil (See Condition 5.9.4) and the following equation:

Lbs SO_2/period = gallons of oil burned per period x sulfur content in weight percent of the fuel oil used x density of the fuel oil used in pounds per gallon x 2.

f. The SO_2 emissions attributable to COG usage shall be calculated from the records required by the CAAPP permit for the amount of COG burned and the sulfur content of the COG (See Condition 5.9.1(e)) and the following equation:

Lbs SO_2/period = thousand standard cubic feet of COG burned per period x average H_2S content of the COG in grains per standard cubic foot for the period x 0.269.

g. Stack test measurement shall be the primary method of determining the compliance of the Blast Furnace Casthouse and Iron Spout Baghouse with the lbs/day limits in Condition 5.6.2(c). The secondary means of determining compliance shall be the following:

   i. The SO_2 attributable to the Blast Furnace Casthouse Baghouse shall be calculated using an emission factor of 0.173 lbs SO_2 per ton of hot metal cast.

   ii. The SO_2 attributable to the Iron Spout Baghouse shall be calculated using an emission factor of 0.0063 lbs SO_2 per ton of hot metal cast.

h. Compliance with the tons/yr limits in Condition 5.6.2(c)) shall be determined using a rolling total of 12 consecutive calendar months of data.

i. When fuel oil is used and data is not available for the fuel oil at the individual unit operating groups, the oil usage during such period shall be calculated from the data for total usage of oil apportioned among the individual operating groups using oil based on the relative heat inputs the unit operating group during that period.

j. Usage of COG shall be determined from data collected by the COG flow meters.

   Note: For this purpose, data from flow meters for both desulfurized and undesulfirized COG may be used in accordance with Condition 5.9.1(e)(i).

k. The average H_2S content of COG for the lbs/3-hours compliance calculations shall be calculated using an arithmetic average of all available H_2S data during the 3-hour period that COG was burned. In the event that the H_2S monitoring system is unable to obtain a single reading for the 3-hour period, the H_2S content for that 3-hour period shall be obtained by one of the alternative methods specified in Condition 7.3.9(f) of this permit (i.e., manual sampling of H_2S content or determined by type of coal used during that period and previous recorded H_2S content when using this coal type).

   For this purpose, data from H_2S monitoring systems for both desulfurized and undesulfurized COG, in accordance with Condition 5.9.1(e)(ii), shall be used as appropriate depending upon whether desulfurized or undesulfurized COG is being combustion.

l. The daily average H_2S content of COG for use in the lbs/day compliance calculations shall be calculated using an arithmetic average of all available hourly average H_2S content data for

that day, and at least data from 75% of the daily operating hours.

Note: For this purpose, data from the H_2S monitoring systems for both desulfurized and undesulfurized COG, in accordance with Condition 5.9.1(e)(ii).

5.13 General Procedures for Certain Permit Limits on Emissions

Pursuant to Sections 39.5(7)(b) and (p)(v) of the Act, these procedures are applicable for the emission limits in Conditions 7.1.6(b)(i) through (iv), 7.4.6(b) through (f), 7.5.6(c) through (g) and 7.6.6(a) through (e), which address the rates of emissions or “emission factors” (commonly in pounds/ton) and the annual emissions or “maximum emissions” (in tons/year) of certain emission units, as the Permittee determines compliance with these limits with “emission factors,” using the common meaning of this term. In particular, notwithstanding the fact that the above listed conditions set “emission factor limits” or limits on the rates of emissions, for purposes of this condition, an “emission factor” is a set value for the mass of a pollutant emitted by a particular emission unit relative to the amount of material that is processed or handled by the unit, or in the case of lead, a set value for the mass of lead emissions for each hour that the particular unit operates, which value is used in the determination of the emissions of the unit.

Note: For the emission units (i.e., operations and processes) that are subject to the above emission limits, Conditions 7.1.9(h), 7.4.9(h)(vii) and (i), 7.5.9(f) and (g), and 7.6.9(c) require the Permittee to keep records for the emissions factors that it is using to determine compliance with these emission limits, along with records for the emissions of these units. The specific emission factors being used by the Permittee for the various subject units, based on information provided by the Permittee as of the date of issuance of this revised permit, are found in Attachment 3 of this permit.

a. The emission factors used by the Permittee to determine compliance with these emission limits shall not understate actual emissions.

b. Compliance with these emission limits shall be determined as follows. For terms that are expressed in pounds per ton or, for lead, pounds per hour (i.e., the same terms as the relevant emission factor), compliance shall be determined by comparison against the relevant emission factor for the unit and mode of operation, as applicable. For each annual limit, compliance shall be determined by comparison against the annual emissions of the unit, calculated as the product of the actual annual operation of the unit and the relevant emission factor. If more than one emission factor is needed to address the actual annual emissions of a unit, to address different modes of operation, the annual emissions of the unit shall be calculated as the sum of the annual emissions, calculated as above, for each mode of operation of the unit for which there is a different emission factor. If there are additional emissions that are not accounted

for by the established emission factor(s), these additional emissions shall also be included in the calculation of annual emissions.

c. The Permittee shall, at a minimum, review and, if necessary, update the relevant emission factors that it is using as follows, to assure that the emission factors that it uses to calculate emissions for purposes of determining compliance with these limits are appropriate, i.e., do not understate actual emissions.

   i. For emission units that are subject to limits for which emission testing is required to be conducted by this permit, whenever such testing is conducted, relevant emission factors shall be reviewed based on the results of such testing and, if necessary, updated based on those results.

   ii. For emission units that are subject to limits for which emission testing is not required to be conducted by this permit, the relevant emission factors shall be reviewed and, if necessary, updated on at least an annual basis, considering new information on emissions of such units that has become available, including revisions of USEPA's *Compilation of Air Pollutant Emission Factors*, AP-42, other information published by USEPA, information related to other emission units operated by U.S. Steel, information presented in specific papers and reports concerning the steel industry, and other salient information.

d. The Permittee shall comply with the following reporting requirements related to the emission factors that it is using to determine compliance with these emission limits:

   i. If the Permittee updates the emission factors that it is using, as a result of its review of the relevant emission factors, as provided for by Condition 5.13(c)(i) or (ii), copies of the revised records for such emission factor(s) shall be submitted to the Illinois EPA in accordance with Condition 5.9.6(c)(ii).

   ii. At the same time that it submits its Annual Emission Report, as addressed by Condition 5.10.2, the Permittee shall also submit a report confirming its review of relevant emission factors in accordance with Condition 5.13(c)(i) and (ii) during the previous year, which report shall, for each applicable emission limit, include an identification of the testing conducted during the previous year, if any, or a description of all new information that was considered, if any, and the findings and conclusion of its review of such information and any updates that it made to the emission factors that it uses, with explanation.

e. Upon written notification from the Illinois EPA or USEPA that it has determined one or more of the following, the Permittee shall conduct appropriate further review for the emission factor(s)

that are the subject of such notification and submit a written response to the Illinois EPA and, if applicable, USEPA within 45 days, which response may be accompanied by updates to those emission factor(s).

i. The Permittee's records for the applicable emission factor(s), as addressed by Condition 5.9.6(c)(ii) or 5.13(d)(i) do not contain adequate documentation for the selected emission factor(s).

ii. The Permittee's report pursuant to Condition 5.13(d)(ii) does not provide adequate explanation for the updates that were made to the emission factor(s).

iii. The emission factor(s) used by the Permittee do not appear to appropriately address a new mode of operation of the subject unit.

iv. There is new information, as described in or included with the notification, that appears pertinent that the Permittee has not considered in its review for the emission factor(s).

5.14 Source-wide State-Only Conditions

5.14.1 Permitted Emissions for Fees

Emission limitations are not set for the source for the purpose of permit fees. The Permittee shall pay the applicable fee pursuant to Section 39.5 of the Act.

6.0 CONDITIONS FOR EMISSIONS CONTROL PROGRAMS

This section is reserved for emissions control programs. As of the date of issuance of this permit, there are no such programs applicable to this source.

7.0 UNIT SPECIFIC CONDITIONS FOR SPECIFIC EMISSION UNITS

7.1 Material Handling and Processing Operations

7.1.1 Description

Coal handling systems:

The crusher is mainly used in the winter to break-up frozen chunks of coal to prepare the coal to be processed in the pulverizer.

There are two coal pulverizers. Only one pulverizer can be used at any one time. The remaining pulverizer is maintained as a backup unit. The pulverizers reduce the size of the coal to prepare it for the coking process. A baghouse controls the discharge outlets of the coal pulverizers.

Blast furnace raw material handling systems:

Raw materials such as coke, iron-bearing materials, and fluxes are charged to blast furnaces in the iron making process. The materials are charged in the top of the furnace from skip cars, which are filled in the stockhouse from conveyors or hoppers. Iron pellets and coke are screened prior to charging.

New Coke Conveyance System:

The new coke conveyor system transfers coke from Gateway Energy to US Steel to be used in the existing Blast Furnaces.

Steel making system:

Raw materials used in the BOFs and LMF are delivered to the facility by both truck and railcar. The trucks and railcars are either unloaded to the ground or directly into an underground feed hopper. Materials unloaded to the ground are placed in storage piles, or in super sacks, endloaders are used to transfer the materials from the storage piles or super sacks to the underground feed hopper. The underground feed hopper then feeds material onto BOF material transfer conveyor C-1. This material transfer is controlled by the Trackhopper Baghouse, this bag house empties back onto C-1 conveyor.

Materials added in the BOF and LMF are transferred from the underground feed hopper, by a conveyor system consisting of three conveyors (nos. C-1, C-2, and C-3) arranged in series. From conveyor C-3 the materials are offloaded into storage bins 1 thru 10, or a rotating hopper known as the lazy susan, or onto conveyor C-5. The storage bins unload materials to conveyor C-4, which transfers and off-loads the materials into the BOF feed hoppers for #1 vessel or #2 vessel. The lazy susan feeds directly into the BOFs Alloy transfer car. Conveyor C-5 transfers materials to the LMF material handling system. All operations carried out within this unit take place within

enclosed structures. The transfer from conveyors C-1 to C-2 and C-2 to C-3 are controlled by the Binfloor Baghouse, this bag house empties into Bin #2.

Materials are transferred from the BOF Binfloor to the LMF on conveyor C-5. This conveyor off-loads into storage bins which transfer to conveyor C-6. The emissions from the transfer from conveyor C-5 to C-6 are handled by Baghouse #1. Additional raw materials used in the LMF are transferred from the Tripper Conveyor to a set of storage bins. Emissions generated by loadout of the Tripper Conveyor are controlled by Baghouse #2.

Note: This narrative description is for informational purposes only and is not enforceable.

7.1.2 List of Emission Units and Air Pollution Control Equipment

Area	Emission Unit Description	Emission Control Equipment	Date Constructed
Coal Handling and Processing	Coal Crusher	None	Pre-1974
	Coal Pulverizers (2)	Baghouse	
	Conveyors	None	
Blast Furnace	Screens (3) • Two Coke • One Iron Pellet	None	Pre-1974
	Conveyors and Feed Hoppers	None	
	Stock House Storage Bins	None	
	New Coke Conveyance System • Conveyors and Hoppers • Day Bins	Baghouses	2009
Steelmaking	Dump Pit Conveyor	Trackhopper Baghouse	Pre-1974
	Conveyors and Storage Bins	Bin floor Baghouse	
	LMF Conveyors and Storage Bins	Baghouse #1	Prior to 1986

7.1.3 Applicable Provisions and Regulations

a. i. The “affected material handling operations” for the purpose of these unit-specific conditions, are the emission units described in Conditions 7.1.1 and 7.1.2.

ii. The “affected crushing operations” for the purpose of these unit-specific conditions, are the crusher and pulverizers described in Conditions 7.1.1 and 7.1.2.

iii. The “affected screening operations” for the purpose of these unit-specific conditions, are the iron

pellet and coke screens described in Conditions 7.1.1 and 7.1.2.

iv. The “affected transfer operations” for the purpose of these unit-specific conditions, are the conveyors, storage bins, new coke conveyance system and feed hoppers described in Conditions 7.1.1 and 7.1.2.

b. Pursuant to 35 IAC 212.316(b), the Permittee shall not cause or allow fugitive particulate matter emissions generated by the affected crushing and screening operations to exceed an opacity of 10 percent.

c. Pursuant to 35 IAC 212.316(f), the Permittee shall not cause or allow fugitive particulate matter emissions generated by the affected transfer operations to exceed an opacity of 20 percent.

d. Pursuant to 35 IAC 212.321(a), the Permittee shall not cause or allow the emission of particulate matter into the atmosphere in any one hour period from the new coke conveyor system or LMF conveyors and LMF storage bins for which, either alone or in combination with the emission of particulate matter from all other similar process emission units for which construction or modification commenced on or after April 14, 1972, at a source or premises, exceeds the allowable emission rates specified in subsection (c) of 35 IAC 212.321 (see also Attachment 2).

e. Pursuant to 35 IAC 212.322(a), the Permittee shall not cause or allow the emission of particulate matter into the atmosphere in any one hour period from any affected material handling operation for which construction or modification commenced prior to April 14, 1972*, which, either alone or in combination with the emission of particulate matter from all other similar process emission units at a source or premises, exceeds the allowable emission rates specified in subsection (c) of 35 IAC 212.322 (see also Attachment 2).

* The new coke conveyor system and LMF conveyors and LMF storage bins constructed after April 14, 1972, is not subject to 35 IAC 212.322.

f. Pursuant to 35 IAC 212.458(b)(7) and (c), the Permittee shall not cause or allow emissions of PM10, other than that of fugitive particulate matter, into the atmosphere from any affected material handling operation to exceed 0.01 gr/scf during any one hour period, except for this mass emission limit shall not apply to those emission units with no visible emissions other than that of fugitive particulate matter; however, if a stack test is performed, this subsection is not a defense to a finding of a violation of the mass emission limits contained in this condition.

7.1.4 Non-Applicability of Regulations of Concern

The emission limitations of 35 IAC 212.324 are not applicable to the affected material handling operations, as provided by 35 IAC 212.324(a)(3), because the affected operations are subject to standards in 35 IAC Part 212, Subpart R, “Primary and Fabricated Metal Products and Machinery Manufacture”.

7.1.5 Control Requirements and Work Practices

a. The affected material handling operations shall be operated under the provisions of a fugitive particulate matter operating program consistent with the provisions of 35 IAC 212.309, 212.310 and 212.312 (see also Condition 5.3.2(a)) [35 IAC 212.309].

b. Pursuant to 35 IAC 212.307, material collected by control equipment on the affected material handling operations shall be handled in accordance with Condition 5.3.2(e).

c. For the air pollution control equipment on the affected operations, the Permittee shall comply with maintenance and repair requirements in 35 IAC 212.324(f), as follows, pursuant to 35 IAC 212.458(d):

The Permittee shall maintain and repair all air pollution control equipment in a manner that assures that the emission limits and standards in 35 IAC 212.458 shall be met at all times. Proper maintenance shall include the following minimum requirements:

i. Visual inspections of air pollution control equipment;

ii. Maintenance of an adequate inventory of spare parts; and

iii. Expeditious repairs, unless the emission unit is shutdown.

d. BACT/LAER requirements for the new coke conveyor system, from Permit 06070088:

i. PM and PM_{10} emissions from the day bins shall be controlled by [T1]:

A. Enclosure of the day bin so as to prevent visible fugitive emissions, as defined by 40 CFR 60.671.

B. Aspiration of the day bins or the enclosure in which they are enclosed to a control device, which device shall be operated in accordance with good air pollution control practice to

minimize emissions. For this purpose, the control device shall be a baghouse or other filtration type device unless the Permittee demonstrates and the Illinois EPA concurs that another type of control device is preferable due to considerations of operational safety.

ii. PM and PM_{10} emissions from the new coke conveyance system shall be controlled by enclosure so as to prevent visible fugitive emissions, as defined by 40 CFR 60.671 [T1].

iii. Emissions of PM and PM_{10} from the control devices for the new coke conveyance system shall not exceed 0.005 gr/dscf [T1].

Condition 7.1.5(d) represents the application of Best Available Control Technology and Lowest Achievable Emission Rate.

7.1.6 Production and Emission Limitations

a. Production and emission limits for the new coke conveyor system from Permit 06070088:

i. The new coke conveyance system shall not transfer more than 740,000 tons of coke per year [T1].

ii. The emissions from the new coke conveyance system shall not exceed 0.95 tons/year of PM and 0.45 tons/year of PM_{10} [T1].

iii. Compliance with the annual limits of Condition 7.1.6(a) shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total) [T1].

b. Emission limits for blast furnace and steel making material handling operations from Permit 95010001:

i. Emissions from Material HS and Deslagging Station shall not exceed the following limits [T1]:

Pollutant	Emission Factors (Lbs/Ton of steel)	Maximum Emissions (Tons/Yr)
PM	0.00355	6.35
PM_{10}	0.00355	6.35

ii. BOF Additive System (Trackhopper Baghouse) emissions shall not exceed the following limits [T1]:

Pollutant	Emission Factors (Lbs/Ton of steel)	Maximum Emissions (Tons/Yr)
PM	0.00032	0.57
PM_{10}	0.00032	0.57

iii. Flux conveyor & transfer points (Bin Floor Baghouse) emissions shall not exceed the following limits [T1]:

Pollutant	Emission Factors (Lbs/Ton of steel)	Maximum Emissions (Tons/Yr)
PM	0.0016	2.86
PM_{10}	0.0016	2.86

iv. Iron Pellet Screen emissions shall not exceed the following limits [T1]:

Pollutant	Emission Factors (Lbs/Ton Iron)	Maximum Emissions (Tons/Yr)
PM	0.00279	6.01
PM_{10}	0.00279	6.01

v. Compliance with the annual limits in Condition 7.1.6(b) shall be determined based on a calendar year [T1].

7.1.7 Testing Requirements

The following emission tests and opacity observations shall be conducted pursuant to Section 39.5.(7)(d) and (p) of the Act.

a. i. The Permittee shall measure the opacity from the affected crushing, screening and transfer operations unless prolonged weather conditions preclude scheduled observations. These observations shall be conducted by a qualified observer in accordance with Method 9, as further specified below, pursuant to Section 39.5(7)(d) of the Act.

A. This testing shall be conducted at least annually.

B. Upon written request by the Illinois EPA, such testing shall be conducted for specific affected operation(s) within 45 calendar days of the request or by the date agreed upon by the Illinois EPA, whichever is later. At least 30 days prior to the scheduled test date, the Permittee shall submit a detailed test plan to

the Illinois EPA, describing the manner of operation of the affected activity and all control measures that will be implemented during the testing. The results of the testing will be submitted within thirty calendar days of the completion of the tests.

ii. The duration of opacity observations for each test shall be at least 30 minutes (five 6-minute averages).

b. The Permittee shall test for opacity and PM/PM10 emissions from the baghouse for the coal pulverizers and either the trackhopper baghouse, bin floor baghouse or baghouse #1 as will be specified by the Illinois EPA within 30 days of receipt of the test protocol. These two tests shall be completed within 30 months of the effective date of this permit condition. The Permittee shall use the following methods:

Location of Sample Points	Method 1
Gas Flow and Velocity	Method 2, 2A – H
Flue Gas Weight	Method 3, 3A – C
Moisture	Method 4
PM/PM_{10} as provided for by 35 IAC 212.108	Method 5, 201 or 201A

7.1.8 Monitoring Requirements

The Permittee shall perform the following inspections, pursuant to Section 39.5(7)(p)(ii) of the Act:

a. Affected material handling operations other than the new coke conveyance system.

The Permittee shall perform quarterly inspections of the control measures, while the affected material handling operations are in use. For purposes of this condition, all affected material means each type of material handled. Types of material are materials such as: 1) coal; 2) coke; 3) limestone; 4) iron pellets; 5) alloy materials; 6) desulfurization reagents; and 7) slag materials. These inspections shall, at a minimum, include the following:

i. Verification that control measures, including reliance on characteristics of materials, is being properly implemented. For conveyors, these inspections shall include, where applicable, verification that all covers, enclosures and dribble pans are present and in good working condition. For crushers, these inspections shall also include verifications for choke feeding.

ii. For the baghouses on the affected material handling operations – a check of differential pressure and

inspection of the dust removal system, compressed air system, bag condition, fan condition and structural components.

iii. As part of the inspections, the Permittee shall perform observations for visible emissions by Method 22. These observations shall be conducted during the operations of each activity for a minimum of 18 minutes, or for activities that operate on a batch basis, for a minimum of six consecutive batches or 18 minutes. If visible emissions are observed, the Permittee shall take corrective action within 2 hours to return the status of the operations to no visible emissions or observations of opacity by Method 9 shall be conducted. For the purpose of this condition, returning the status of operations to no visible emissions does not include, for any activity, temporary idling or the lack of operations between batches.

b. Affected new coke conveyance system

i. The Permittee shall conduct inspections of the new coke conveyor system on at least a monthly basis for the specific purpose of verifying that control measures required to control emissions from the new coke conveyor system are being properly implemented.

ii. These inspections shall include observation for the presence of visible emissions, performed in accordance with USEPA Method 22, from the conveyors and day bins.

7.1.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. The Permittee shall keep the following file(s) and log(s):

File(s) containing the following information for the affected material handling operations with supporting information:

i. Information related to the dust collection equipment associated with the affected operations, including design control efficiency or performance specifications and maximum design particulate matter emissions, gr/dscf.

ii. The maximum design capacity of each operation, (tons/hr).

b. For the air pollution control equipment on affected operations, the Permittee shall keep the following records

related to maintenance and repair, as required by 35 IAC 212.458(d):

i. Records of inventory of spare parts and documentation of inspections, maintenance, and repairs of all air pollution control equipment shall be kept in accordance with 35 IAC 212.324(f) [35 IAC 212.324(g)(1)].

ii. Records documenting any period during which any process emission unit was in operation when the air pollution control equipment was not in operation or was malfunctioning so as to cause an emissions level in excess of the emissions limitation. These records shall include documentation of causes for pollution control equipment not operating or such malfunction and shall state what corrective actions were taken and what repairs were made [35 IAC 212.324(g)(2)].

iii. A written record of the inventory of all spare parts not readily available from local suppliers shall be kept and updated [35 IAC 212.324(g)(3)].

c. The Permittee shall keep the written records required by 35 IAC 212.316(g)(1) as follows:

i. For fugitive particulate matter emission units subject to 35 IAC 212.316, records related to the application of control measures for compliance with the opacity limitations of 35 IAC 212.316, including submittals to the Illinois EPA an annual report containing a summary of the information in these records.

ii. These records shall include at least the information specified by 35 IAC 212.316(g)(2), as follows:

A. The name and address of the source;

B. The name and address of the owner and/or operator of the source;

C. A map or diagram showing the location of all emission units controlled;

D. For application of physical or chemical control agents: the name of the agent, application rate and frequency, and total quantity of agent, and, if diluted, percent of concentration, used each day; and

E. A log recording incidents when control measures were not used and a statement of explanation.

iii. These records shall be handled as follows:

A. Copies of all records required by 35 IAC 212.316 shall be submitted to the Illinois EPA within ten (10) working days after a written request by the Illinois EPA and shall be transmitted to the Illinois EPA by a company-designated person with authority to release such records [35 IAC 212.316(g)(3)].

B. The records required under 35 IAC 212.316 shall be kept and maintained for at least five (5) years at the source and be available for inspection and copying by Illinois EPA representatives during working hours [35 IAC 212.316(g)(4)].

d. The Permittee shall maintain records for:

i. The amount of coke handled by the new coke conveyor system (tons/month and tons/year).

ii. The amount of iron pellets screened (tons/month and tons/year).

e. The Permittee shall maintain the following records for the inspections required by Condition 7.1.8:

i. For the inspections required by Condition 7.1.8(a) for each affected material handling operation:

A. Date and time the inspection was performed and name(s) of inspection personnel.

B. The observed condition of the control measures for each affected operation, including the presence of any visible emissions or accumulations of dust in the vicinity of the operation.

C. A description of any maintenance or repair associated with established control measures that are recommended as a result of the inspection and a review of outstanding recommendations for maintenance or repair from previous inspection(s), i.e., whether recommended action has been taken, is yet to be performed or no longer appears to be required.

D. A summary of the observed implementation or status of actual control measures.

ii. For the inspections required by Condition 7.1.8(b) for the affected new coke conveyor system, pursuant to Permit 06070088:

A. The Permittee shall maintain a file, which shall be kept current, that contains the maximum operating capacity of the new coke conveyance system (tons/day).

B. 1. The Permittee shall keep inspection and maintenance log(s) or other records for the control measures associated with the new coke conveyance system, including enclosures and fabric filters.

2. These records shall include the following information for the inspections required by Condition 7.1.8(a) and (b):

I. Date and time the inspection was performed.

II. The observed condition of the control measures, including the presence of any visible emissions.

III. A description of any maintenance or repair associated with the control measures that are recommended as a result of the inspection and a review of outstanding recommendations for maintenance or repair from previous inspection(s), i.e., whether recommended action has been taken, is yet to be performed or no longer appears to be required.

f. In the operational logs or other records for the operation of the affected material handling operations for steelmaking, the Permittee shall include information confirming routine implementation of normal practices for unloading of materials into the receiving hopper and housekeeping practices for this hopper and information identifying departures from those practices, with description, explanation, and corrective actions taken.

g. The Permittee shall maintain records of the following for each incident when any affected material handling operations and the new coke conveyor system operate without control measures:

i. The date of the incident and identification of the operations that were involved.

ii. A description of the incident, including the control measures that were not present or implemented; the control measures that were present, if any; other control measures or mitigation measures that were

implemented, if any; and the magnitude of the PM emissions during the incident.

iii. The time at and means by which the incident was identified, e.g., scheduled inspection or observation by operating personnel.

iv. The length of time after the incident was identified that the operations continued to operate before control measures were in place or the operations were shutdown (to resume operation only after control measures were in place) and, if this time was more than one hour, an explanation why this time was not shorter, including a description of any mitigation measures that were implemented during the incident.

v. The estimated total duration of the incident, i.e., the total length of time that the operations ran without control measures and the estimated amount of coal handled during the incident.

vi. A discussion of the probable cause of the incident and any preventative measures taken.

vii. A discussion whether any applicable emission standards, as listed in Condition 7.1.3, may have been violated during the incident, with supporting explanation.

h. The Permittee shall maintain the following records for the new coke conveyor system and each other operation subject to limits on PM/PM_{10} emissions in Condition 7.1.6:

i. A file containing the emission factors used by the Permittee to determine emissions of each operation, with supporting documentation. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of the affected operations do not understate actual emissions. These records shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

ii. Records for any periods of operation of such operations that are not otherwise addressed in the required records during which the established emission factor in Condition 7.1.9(f)(i) would understate actual emissions of such operation, with description of the period of operation and an estimate of the additional emissions during such period that would not be accounted for by the established factor, with supporting explanation and calculations.

iii. Records for the annual PM/PM_{10} emissions of each operation, based on operating data and appropriate emission factors for comparison to the limits in Conditions 7.1.6(b), with supporting documentation and calculations.

i. The Permittee shall keep records for all opacity measurements conducted in accordance with Method 9 that it conducts or that it orders to be conducted. For each occasion on which such measurements are made, these records shall include the identity of the observer, a description of the measurements that were made, the operating condition of the operations, the observed opacity, and copies of the raw data sheets for the measurements.

j. The Permittee shall keep copies of all tests performed on the affected material handling operations and new coke conveyor system.

7.1.10 Reporting Requirements

a. i. The Permittee shall submit quarterly and annual reports to the Illinois EPA in accordance with 35 IAC 212.316(g)(1) and (5) [35 IAC 212.316(g)].

ii. Pursuant to 35 IAC 212.324(g)(6), upon written request by the IEPA, a report shall be submitted to the IEPA for any period specified in the request stating the following: the dates during which any process emission unit was in operation when the air pollution control equipment was not in operation or was not operating properly, documentation of causes for pollution control equipment not operating or not operating properly, and a statement of what corrective actions were taken and what repairs were made.

iii. Pursuant to Permit 06070088 for the new coke conveyor system, the Permittee shall notify the Illinois EPA within 30 days of deviations from applicable emission standards or operating requirements that continue* for more than 24 hours.

* For this purpose, time shall be measured from the start of a particular event. The absence of a deviation for a short period shall not be considered to end the event if the deviation resumes. In such circumstances, the event shall be considered to continue until corrective actions are taken so that the deviation ceases or the Permittee takes the affected unit out of service for repairs.

b. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air

Compliance Section, within 30 days of deviations by the affected material handling operations and new coke conveyor system from applicable requirements as follows:

A. Requirements in Condition 7.1.3(b) through (f).

B. Requirements in Condition 7.1.5.

C. Requirements in Condition 7.1.6.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

iii. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations from permit requirements as part of the semiannual monitoring reports required by Condition 8.6.1.

iv. All deviation reports described in Condition 7.1.11(b) above shall contain the following:

A. Date, time and duration of the deviation;

B. Description of the deviation;

C. Probable cause of the deviation; and

D. Any corrective actions or preventive measures taken.

7.1.11 Operational Flexibility/Anticipated Operating Scenarios

Operational flexibility is not set for the affected material handling operations and new coke conveyor system.

7.1.12 Compliance Procedures

Compliance with the emission standards in Condition 7.1.3 and the operational/emission limits in Condition 7.1.6 is addressed by the testing requirements of Condition 7.1.7, inspection requirements of Condition 7.1.8 and recordkeeping requirements of Condition 7.1.9.

7.1.13 State-Only Conditions

State-only conditions are not being established.

7.2 Coke Production

7.2.1 Description

Two coke oven batteries (45 ovens each), dual collecting main by-product coke oven batteries, referred to as batteries A and B, are utilized at this iron and steel mill. Each is capable of processing 454,000 tons/year of coal. Potential emissions from these batteries consist of particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, volatile organic materials, and HAPs.

Topside:

Emission points include leaks from coke oven charging, lids, off takes, soaking and emergency flares. Coal is charged to the ovens through four charging port lids, on each oven, utilizing sequential charging with steam aspiration to the collecting mains. Each oven has two off takes to the collecting mains that duct raw coke oven gas from the coking process to the by-products plant (see Section 7.3 of this permit). Soaking occurs after the coking process is completed, when an oven is dampered off from the collecting mains and its off takes' standpipes are opened before beginning pushing. Each battery also has an emergency by-pass on the collecting main (one on each main, two per battery). In the event of an emergency which would lead to excess pressure in a main, e.g., loss of suction from the by-product plant, the by-pass opens. The raw coke oven gas is then combusted in the associated emergency flare.

Doors:

Emissions consist of leaks from coke oven doors. Each oven has two doors, with one on its push side and one on its coke side.

Pushing:

Once the coking cycle in an oven has been completed, the push and coke side doors are removed, respectively, by the pushing machine and coke-side door machines. A ram on the pushing machine pushes the coke out through a guide on the door machine. The coke falls through the guide, which is covered by a hood on the machine, and into the quench box. The emissions from oven pushing are controlled by the pushing system. This mobile control system consists of a venturi scrubber, mist eliminator and exhaust fan. The Permittee currently has two mobile scrubber cars for pushing (PCS cars #3 and #4). The quench box and car travel with this system to the coke quenching operation.

Coke Quenching:

In this operation, loads of hot coke from the ovens are quenched with water. There are two locations where quenching normally takes place. The primary is the West Quench Tower. This tower is equipped with a baffle system. The east quench station,

which is utilized as a backup for the West Tower, does not currently have a quench tower, however, the Permittee is currently engaged in a project to upgrade the quenching operations, adding a quench tower to the East Quench Station and replacing the conventional Quench Tower at the West Quench Station with a low emission quench tower (Construction Permit 08060026).

Underfiring:

Coke oven gas (COG) is combusted to generate the heat required to convert coal to coke. This COG would be treated by both by-products plant and, except during maintenance and outage, by the COG desulfurization system. Natural gas may also be added through the blending station in order to stabilize the heat content of the COG. Emissions from this unit occur at the main stacks of each battery and are mainly the by-products of combustion, including particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, and volatile organic materials.

Note: This narrative description is for informational purposes only and is not enforceable.

7.2.2 <u>List of Emission Units and Air Pollution Control Equipment</u>

Emission Unit	Description	Date Constructed	Emission Control Equipment
Coke Oven Batteries “A” and “B”	Coke Oven Battery “A”	Battery “A” was rebuilt between 1979 and 1980	Emergency Bypass Flares
	Coke Oven Battery “B”	Battery “B” was rebuilt between 1981 and 1982	Emergency Bypass Flares
	2 Larry Cars		None
	2 Pushing/Quench Cars		Mobile Venturi Scrubber (PCS Cars #3 & #4)
	East Quench Station (backup)		Tower and Baffles (planned)
	West Quench Station		Tower and Baffles
	Coke Oven Underfiring (coke oven combustion stacks)		None

7.2.3 Applicable Provisions

a. The “affected coke oven operations” for the purpose of these unit-specific conditions, are the emission units and activities described in Conditions 7.2.1 and 7.2.2.

b. The affected coke oven operations are subject to 35 IAC 212.443. Certain provisions of this regulation are discussed further in this subsection.

c. i. The following affected coke oven operations are subject to 40 CFR Part 63, Subpart L Coke Oven Batteries: charging, doors, lids, off takes, collecting mains and bleeder stacks. The Permittee is complying with the so-called LAER track under this NESHAP, as provided for by 40 CFR 63.304.

ii. For affected coke oven operations, the Permittee shall comply with applicable provisions of the NESHAP, 40 CFR 63 Subpart A.

d. i. The following affected coke oven operations are subject to 40 CFR Part 63, Subpart CCCCC: pushing, soaking, quenching and battery underfiring stacks.

ii. For affected operations at the coke oven battery, the Permittee shall comply with applicable provisions of the NESHAP, 40 CFR 63 Subpart A as specified in Table 1 in 40 CFR 63 Subpart CCCCC.

7.2.3-1 Applicable Standards: Coke Oven Charging

a. 35 IAC 212.443(b)(1)(A)

No person shall cause or allow the emission of visible particulate matter from any coke oven charging operation, from the introduction of coal into the first charge port, as indicated by the first mechanical movement of the coal feeding mechanism on the larry car, to the replacement of the final charge port lid for more than a total of 125 seconds over 5 consecutive charges; provided however that 1 charge out of any 20 consecutive charges may be deemed an uncountable charge at the option of the operator.

Compliance with this limit shall be determined in accordance with the applicable procedures in 35 IAC 212.443(b)(1)(B) and Condition 7.2.12.

b. 40 CFR 63.304(b)(2)(iv)

Emissions to the atmosphere from coke oven charging shall not exceed 12 seconds of visible emissions per charge, as determined by the procedures in 40 CFR 63.309(d)(2).

c. Battery B

The aggregate of visible emissions from the charging of coke ovens at Battery B shall not exceed a total 55 seconds during any 5 consecutive charges [T1].

Note: This limit is the determination of LAER for charging for Battery B made in Construction Permit C808048.

7.2.3-2 Applicable Standards: Leaks from Doors

a. 35 IAC 212.443(d)

i. No person shall cause or allow visible emissions from more than 10 percent of all coke oven doors at any time. Compliance shall be determined by a one pass observation of all coke oven doors on any one battery.

ii. No person shall cause or allow the operation of a coke oven unless there is on the plant premises at all times an adequate inventory of spare coke oven doors and seals and unless there is a readily available coke oven door repair facility.

b. Battery B

At no time shall there be any visible emissions from more than 5 percent of the door areas on Battery B [T1].

Note: This limit is the determination of LAER for door leaks for Battery B was established in Construction Permit C808048.

c. 40 CFR 63.304(b)(3)(ii)

3.3 percent leaking coke oven doors for each by-product coke oven battery not subject to the emission limitation 40 CFR 63.304(b)(3)(i), as determined by the procedures in 40 CFR 63.309(d)(1).

7.2.3-3 Applicable Standards: Leaks from Lids

a. 35 IAC 212.443(e)

No person shall cause or allow visible emissions from more than 5 percent of all coke oven lids at any time. Compliance shall be determined by a one pass observation of all coke oven lids.

b. Battery B

There shall be no visible emissions from more than 1 percent of the charging ports or lids [T1].

Note: This limit is the determination of LAER for lid leaks for Battery B made in Construction Permit C808048.

c. 40 CFR 63.304(b)(2)(ii)

0.4 percent leaking topside port lids, as determined by the procedures in 40 CFR 63.309(d)(1).

7.2.3-4 Applicable Standards: Leaks from Off Takes

a. 35 IAC 212.443(f)

No person shall cause or allow visible emissions from more than 10 percent of all coke oven off take piping at any time. Compliance shall be determined by a one pass observation of all coke oven off take piping.

b. Battery B

There shall be no visible emissions from more than 4 percent of the off take piping on the coke ovens on Battery B [T1].

Note: This limit is the determination of LAER for off take leaks for Battery B made in Construction Permit C808048.

c. 40 CFR 63.304(b)(2)(iii)

2.5 percent leaking off take system(s), as determined by the procedures in 40 CFR 63.309(d)(1).

7.2.3-5 Applicable Standards: Coke Oven Pushing

a. 35 IAC 212.443(c)(1)(A)

Emissions of uncaptured particulate matter from pushing operations shall not exceed an average of 20 percent opacity for 4 consecutive pushes considering the highest average of six consecutive readings in each push.

Compliance with this limit shall be determined in accordance with the procedures in 35 IAC 212.443(c)(1)(B) and Condition 7.2.12.

b. 35 IAC 212.443(c)(2)

i. The particulate emissions from control equipment used to control emissions during pushing operations shall not exceed 0.040 pounds per ton of coke pushed. Compliance shall be determined in accordance with the procedures set forth in 40 CFR Part 60, Appendix A, Methods 1-5, incorporated by reference in Section 212.113. Compliance shall be based on an arithmetic average of three runs (stack tests) and the

calculations shall be based on the duration of a push as defined in 35 IAC 212.443(c)(1)(A).

ii. The opacity of emissions from control equipment used to control emissions during pushing operations shall not exceed 20%. For a push of less than six minutes duration, the actual number of 15-second readings taken shall be averaged. Compliance shall be determined in accordance with 40 CFR Part 60, Appendix A, Method 9, incorporated by reference in 35 IAC 212.113, Section 2.5 of 40 CFR Part 60, Appendix A, Method 9, incorporated by reference in 35 IAC 212.113, for data reduction shall not be used for pushes of less than six minutes duration [35 IAC 212.443(c)(2)(B)].

c. 40 CFR 63.7290(a)(4)

Particulate matter emissions to the atmosphere from the mobile scrubber car for pushing which captures emissions during travel shall not exceed 0.04 lb/ton of coke.

d. Battery B

Pushing emissions from Battery B shall be captured and cleaned by a single-spot, coke guide evacuated, enclosed quench car/scrubber car system which meets the following limitations [T1]:

i. The gas cleaning device shall be operated to meet 0.04 pounds of particulate matter per ton of coke pushed during the pushing operation.

ii. Visible emissions from the gas cleaning device outlet and uncaptured fugitive emissions shall not exceed 20 percent opacity.

Note: These limits are the determination of LAER for pushing emissions from Battery B made in Construction Permit C808048.

7.2.3-6 Applicable Standards: Coke Quenching

a. i. 40 CFR 63.7295(a)(1)(i)

For the quenching of hot coke, the Permittee must meet the following requirements of 40 CFR 63.7295(a)(1)(i):

The concentration of total dissolved solids (TDS) in the water used for quenching must not exceed 1,100 milligrams per liter (mg/L).

ii. 40 CFR 63.7295(a)(2)

The Permittee must use acceptable makeup water, as defined in 40 CFR 63.7352, as makeup water for quenching.

iii. 40 CFR 63.7295(b)

For each quench tower at a coke oven battery, the Permittee must meet each of the following requirements:

A. Pursuant to 40 CFR 63.7295(b)(1), each tower is equipped with baffles such that no more than 5 percent of the cross sectional area of the tower may be uncovered or open to the sky;

B. Pursuant to 40 CFR 63.7295(b)(2), baffles in each quench tower shall be washed once each day that the tower is used to quench coke, except as specified below:

1. Baffles in a quench tower are not required to be washed if the highest measured ambient temperature remains less than 30 degrees Fahrenheit throughout that day (24-hour period). If the measured ambient temperature rises to 30 degrees Fahrenheit or more during the day, the Permittee shall resume daily washing.

2. The Permittee shall continuously record the ambient temperature on days that the baffles were not washed.

C. Pursuant to 40 CFR 63.7295(b)(3) and (4), the Permittee shall comply with inspection and repair provisions (see Condition 7.2.8-3).

b. 35 IAC 212.443(h)(1)

All coke oven quench towers shall be equipped with grit arrestors or equipment of comparable effectiveness. Baffles shall cover 95 percent or more of the cross sectional area of the exhaust vent or stack and must be maintained. Quench water shall not include untreated coke by-product plant effluent. All water placed on the coke being quenched shall be quench water.

c. 35 IAC 212.443(h)(2)

Total dissolved solids concentrations in the quench water shall not exceed a weekly average of 1200 mg/L.

7.2.3-7 Applicable Standards: Combustion (Battery) Stack

a. 35 IAC 212.443(g)

i. No person shall cause or allow the emissions of particulate matter from a coke oven combustion stack to exceed 110 mg/dscm (0.05 gr/dscf); and

ii. No person shall cause or allow the emission of particulate matter from a coke oven combustion stack to exceed 30% opacity. Compliance shall be determined in accordance with 40 CFR Part 60, Appendix A, Method 9, incorporated by reference in 35 IAC 212.113. However, the opacity limit shall not apply to a coke oven combustion stack when a leak between any coke oven and the oven's vertical or crossover flues is being repaired, after pushing coke from the oven is completed, but before resumption of charging. The exemption from the opacity limit shall not exceed three (3) hours per oven repaired. The owner or operator shall keep written records identifying the oven repaired, and the date, time, and duration of all repair periods. These records shall be subject to the requirements of 35 IAC 212.324(g)(4) and (g)(5).

b. 40 CFR 63.7296

The Permittee must not discharge to the atmosphere any emissions from any battery stack at an existing by-product coke oven battery that exhibits opacity greater than the following applicable limits:

i. Daily average of 15 percent opacity for a battery on a normal coking cycle.

ii. Daily average of 20 percent opacity for a battery on batterywide extended coking.

c. Battery B

Pursuant to Construction Permit 82060043, non-sulfate particulate matter emissions from the battery stack serving Battery B shall not exceed 0.03 gr/dscf [T1].

7.2.3-8 Applicable Standards: Bypass/Bleeder Stack

a. i. Pursuant to 40 CFR 63.307(a)(1), the Permittee shall operate and properly maintain a bypass/bleeder stack flare system that is capable of controlling 120 percent of the normal gas flow generated by the affected battery.

ii. Coke oven emissions shall not be vented to the atmosphere through bypass/bleeder stacks, except

through the flare system or an alternative control device as described in 40 CFR 63.307(d) [40 CFR 63.307(a)(2)].

iii. Each flare installed pursuant to 40 CFR 63.307 shall meet the applicable requirements specified by 40 CFR 63.307(b) with compliance determined as specified by 40 CFR 63.309(h).

b. Pursuant to 40 CFR 63.307(c), the flare shall be operated with no visible emissions, as determined by the methods specified in 40 CFR 63.309(h)(1), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

7.2.4 Non-Applicability of Regulations of Concern

a. The emission limitations of 35 IAC 212.324 are not applicable to any emission unit subject to a specific emissions standard or limitation contained in 35 IAC Part 212 Subpart R, Primary and Fabricated Metal Products and Machinery Manufacture, pursuant to 35 IAC 212.324 (a)(3).

b. The affected coke oven operations are not fuel combustion emission units as defined in 35 IAC 211.2470 and therefore are not subject to the standards for fuel combustion emission units in 35 IAC Parts 212, 214, 216 and 217.

c. This permit is issued based on the affected coke oven operations not being subject to the applicable requirements of 35 IAC 219.301 because there is 85 percent reduction of uncontrolled organic material that would otherwise be emitted into atmosphere, pursuant to 35 IAC 219.302.

7.2.5-1 Work Practices: Soaking Plan (40 CFR 63.7294)

Pursuant to 40 CFR 63.7294(a), the Permittee shall operate the coke ovens pursuant to a written work practice plan for soaking, which includes the measures specified by 40 CFR 63.7294(a), including, if soaking emissions are caused by leaks from the collecting main, the Permittee shall take corrective actions to eliminate soaking emissions in accordance with the actions identified in the soaking plan. If soaking emissions are not caused by leaks, the Permittee must determine whether the soaking emissions are due to incomplete coking. If incomplete coking is the cause of the soaking emissions, the Permittee must put the oven back on the collecting main until it is completely coked or the Permittee must ignite the standpipe emissions as specified by 40 CFR 63.7294(a)(4) and (5).

7.2.5-2 Work Practice Plan (40 CFR 63.306)

a. Pursuant to 40 CFR 63.306(c), for affected units subject to the NESHAP, 40 CFR 63 Subpart L, the Permittee shall implement a written emission control Work Practice Plan for each affected coke oven battery designed to achieve

compliance with visible emission limitations for coke oven doors, topside port lids, off take systems, and charging operations.

b. Pursuant to 40 CFR 63.306(a)(1) and (b), the Permittee shall organize the work practice plan to indicate clearly which parts of the plan pertain to each emission point subject to visible emission standards under 40 CFR Subpart L. Each of the following provisions, at a minimum, shall be addressed in the plan in sufficient detail and with sufficient specificity to allow USEPA and the Illinois EPA to evaluate the plan for completeness and enforceability:

i. An initial and refresher training program for all coke plant operating personnel with responsibilities that impact emissions, including contractors, in job requirements related to emission control and the requirements of 40 CFR Subpart L, including work practice requirements, that includes all the elements specified by 40 CFR 63.306(b)(1). Contractors with responsibilities that impact emission control may be trained by the Permittee or by qualified contractor personnel; however, the Permittee shall ensure that the contractor training program complies with the requirements of 40 CFR 63.306(b)(1).

ii. Procedures for controlling emissions from coke oven doors on by-product coke oven batteries, including the elements specified by 40 CFR 63.306(b)(2).

iii. Procedures for controlling emissions from charging operations on by-product coke oven batteries, including the elements specified by 40 CFR 63.306(b)(3).

iv. Procedures for controlling emissions from topside port lids on by-product coke oven batteries, including the elements specified by 40 CFR 63.306(b)(4).

v. Procedures for controlling emissions from off take system(s) on by-product coke oven batteries, including the elements specified by 40 CFR 63.306(b)(5).

vi. Procedures for each emission point subject to visible emission limitations under 40 CFR 63 Subpart L for maintaining a daily record of the performance of plan requirements pertaining to the daily operations of the affected coke oven operations as defined in Condition 7.2.3(c) and its emission control equipment, including the elements specified by 40 CFR 63.306(b)(7).

vii. Any additional work practices or requirements specified by the USEPA or Illinois EPA pursuant to 40 CFR 63.306(d).

c. Pursuant to 40 CFR 63.306(c) the Permittee shall implement the provisions of the work practice plan pertaining to a particular emission point:

i. Following the second independent exceedance of the visible emission limitation for the emission point in any consecutive 6-month period, by no later than 3 days after receipt of written notification of the second such exceedance from the certified observer. For this purpose, the second exceedance is “independent” if the criteria of 40 CFR 63.306(c)(1)(i)(A), (B) or (C) are met.

ii. And continue to implement such plan provisions until the visible emission limitation for the emission point is achieved for 90 consecutive days. After the visible emission limitation for a particular emission point is achieved for 90 consecutive days, any exceedances prior to the beginning of the 90 days are not included in making the above determination of exceedances.

d. Revisions to the work practice plan shall be done in accordance with 40 CFR 63.306(d) and (a)(2).

e. The Work Practice Plan, as submitted by the Permittee on November 12, 1993, (which contains various training and standard operating procedures for the A & B coke oven batteries), is incorporated herein by reference. The document constitutes the formal work practice plan required by 40 CFR 306(a) for each coke oven battery, addressing work practices for achieving compliance with the visible emissions limitations of Subpart L.

Any future revision to the aforementioned plan made by the Permittee during the permit term is automatically incorporated by reference provided that said revision is not expressly disapproved, in writing, by the Illinois EPA within 30 days of receipt of said revision. In the event that the Illinois EPA notifies the Permittee of a deficiency with any revision to the plan, the Permittee shall be required to revise and resubmit the plan within 30 days of receipt of notification to address the deficiency [Section 39.5(7)(a) of the Act].

7.2.5-3 <u>NESHAP Provisions for Startup, Shutdown and Malfunction</u>

a. Pursuant to 40 CFR 63.7310(a) and (c), for affected coke oven operations subject to 40 CFR 63 Subpart CCCCC:

i. The Permittee shall comply with the emission limitations, work practice standards, and operating and maintenance requirements of 40 CFR 63 Subpart CCCCC, at all times except periods of startup, shutdown, and malfunction as defined at 40 CFR 63.2.

ii. The Permittee shall develop and implement a written startup, shutdown and malfunction plan according to the provisions in 40 CFR 63.6(e)(3).

b. Pursuant to 40 CFR 63.310, for affected coke oven operations subject to 40 CFR 63 Subpart L:

i. At all times, including periods of startup, shutdown, and malfunction, the Permittee shall operate and maintain the affected coke oven operations, and associated pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions to the levels required by standards under 40 CFR Subpart L. Failure to adhere to the requirement of 40 CFR 63.310 shall not constitute a separate violation if a violation of an applicable performance or work practice standard has also occurred [40 CFR 63.310(a)].

ii. The Permittee shall develop and implement according to 40 CFR 63.310(c), a written startup, shutdown, and malfunction plan that describes procedures for operating the affected units, including associated air pollution control equipment, during a period of a startup, shutdown, or malfunction in a manner consistent with good air pollution control practices for minimizing emissions, and procedures for correcting malfunctioning process and air pollution control equipment as quickly as practicable [40 CFR 63.310(b)].

iii. Pursuant to 40 CFR 63.310(c), during a period of startup, shutdown, or malfunction the Permittee shall operate the battery (including associated air pollution control equipment) in accordance with the procedure specified in the startup, shutdown, and malfunction plan; and malfunctions shall be corrected as soon as practicable after their occurrence, in accordance with the plan.

iv. To satisfy the requirement for a startup, shutdown, and malfunction plan, the Permittee may use the standard operating procedures manual for the battery, provided the manual meets all the requirements of 40 CFR 63.310 and is made available for inspection at reasonable times when requested by the Administrator (USEPA) or Illinois EPA, as provided by 40 CFR 63.310(g).

v. The USEPA or Illinois EPA may require reasonable revisions to a startup, shutdown, and malfunction plan as provided by 40 CFR 63.310(h).

vi. Pursuant to 40 CR 63.310((i), if the Permittee demonstrates to the satisfaction of the Administrator (USEPA and Illinois EPA) that a startup, shutdown, or malfunction has occurred, then an observation occurring during such startup, shutdown, or malfunction shall not:

A. Constitute a violation of relevant requirements of 40 CFR 63 Subpart L;

B. Be used in any compliance determination under 40 CFR 63.309; or

C. Be considered for purposes of 40 CFR 63.306 (the work practice plan), until the Administrator (USEPA and Illinois EPA) has resolved the claim that a startup, shutdown, or malfunction has occurred, as further provided by 40 CFR 63.310(i)(3).

vii. The Permittee shall maintain all records related to startup, shutdown and malfunction, including internal reports which form the basis of each malfunction notification under 40 CFR 63.310(d) as required by 40 CFR 63.310(f).

7.2.5-4 Startup Authorization Pursuant to State Rule

Pursuant to 35 IAC 201.149 and Part 201, Subpart I, subject to the following terms and conditions, for the affected coke ovens, the Permittee is authorized to violate the applicable standards in 35 IAC 212.443 during startup. For this purpose a start-up is the resumption of normal production following the period when the battery has been idled.

Note: This authorization is provided because the Permittee has applied for such authorization in its CAAPP application, generally describing the efforts that will be used "…to minimize startup emissions, duration of individual starts, and frequency of startups".

a. This authorization does not relieve the Permittee from the continuing obligation to demonstrate that all reasonable efforts are made to minimize startup emissions, duration of individual startups and frequency of startups.

b. The Permittee shall conduct startup of the affected coke oven operations in accordance with the manufacturer's written instructions or other written procedures prepared by the Permittee and maintained at the source (see

Condition 7.2.9(g)(i)), that are specifically developed to minimize emissions from the startup.

c. The Permittee shall fulfill applicable recordkeeping of Condition 7.2.9(g).

d. The Permittee shall fulfill applicable reporting of Condition 5.10.5-1.

e. As provided by 35 IAC 201.265, an authorization in a permit for excess emissions during startup does not shield a Permittee from enforcement for any violation of applicable emission standard(s) that occurs during startup and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

7.2.5-5 Malfunction and Breakdown Authorization Pursuant to State Rule

a. Pursuant to 35 IAC 201.149 and Part 201, Subpart I, subject to the following terms and conditions, the Permittee is authorized to continue operation of the affected coke oven batteries in excess of the applicable state standards in 35 IAC 212.443 in the event of a malfunction or breakdown.

Note: This authorization is provided because the Permittee applied for such authorization in its CAAPP application, generally explaining why such continued operation would be required to prevent injury to personnel or severe damage to equipment, and describing the measures that will be taken to minimize emissions from any malfunctions and breakdowns.

i. This authorization only allows such continued operation as necessary to prevent injury to personnel or severe damage to equipment and does not extend to continued operation solely for the economic benefit of the Permittee.

ii. Upon occurrence of excess emissions due to malfunction or breakdown, the Permittee shall repair the responsible affected coke oven operations or other responsible equipment and/or re-establish the applicable control practices (e.g., the rail system for quench car).

iii. The Permittee shall fulfill the applicable recordkeeping and reporting requirements of Conditions 7.2.9(h) and Condition 5.10.5-2, respectively. For these purposes, time shall be measured from the start of a particular incident. The absence of excess emissions for a short period shall not be considered to end the incident if excess emissions resume.

iv. Following notification to the Illinois EPA (see Condition 5.10.5-2(a)(i))of a malfunction or breakdown with excess emissions, the Permittee shall comply with all reasonable directives of the Illinois EPA with respect to such incident.

v. This authorization does not relieve the Permittee from the continuing obligation to minimize excess emissions during malfunction or breakdown. As provided by 35 IAC 201.265, an authorization in a permit for continued operation with excess emissions during malfunction and breakdown does not shield the Permittee from enforcement for any such violation and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

b. During the period when only one quench station is available (i.e., the other quench station is not operable because of construction work on a new quench tower) or there is a malfunction or breakdown preventing hot coke from being moved to a tower-equipped quench station (e.g., rail line malfunction), the Permittee is authorized to continue operation of the coke ovens with emergency quenching, i.e., quenching without a quench tower or at a quench station that is experiencing a malfunction or breakdown (see Condition 7.2.5-5).

7.2.6 <u>Production and Emission Limitations</u>

a. i. The amount of coal charged to the affected Battery “B” shall not exceed 454,000 tons per year [Construction Permit C808048].

b. i. Emissions of PM from the mobile scrubber cars for pushing shall not exceed 4.2 lb/hr and 18.3 t/yr [T1].

Compliance with annual limits shall be determined from a running total of 12 months of data [Construction Permit 88070071].

ii. Spare cars, parts inventories and maintenance practices shall be maintained and implemented by the Permittee for the pushing operations (quench cars and mobile scrubbers) consistent with good air pollution control practices [Permit 88070071].

c. i. Supplementary natural gas usage for the coke ovens shall not exceed 20 million scf/month and 123 million scf/yr [T1].

ii. Emissions attributable to the combustion of natural gas for the underfiring of the batteries shall not exceed the following limits. Compliance with the

annual limits shall be determined from a running total of 12 months of data [T1]:

	Emissions	
Pollutant	(Tons/Month)	(Tons/Year)
NO_x	2.80	17.22
CO	0.84	5.17
PM	0.12	0.73
PM_{10}	0.11	0.62
VOM	0.06	0.34
SO_2	0.01	0.04

iii. The above limitations were established in the Permit 04110018.

d. i. Once shakedown of the new quench tower on the West Quench Station has been completed, the Permittee shall use the West Quench Station preferentially. For this purpose, on an annual basis*, excluding periods when the West Quench Station cannot be used due to malfunction or breakdown, the East Quench Station shall not quench more than: 5 percent of the total number of quenches or 15,000 tons of coke, whichever is greater, not to exceed 30,000 tons of coke per year.

* This limit shall apply for the 12 month period from July 1 of one year through June 30 of the following year. This limit shall also apply for the initial 12 months following shakedown of the West Quench Station with new quench tower.

ii. Shakedown of each affected quench tower shall be completed within 180 days of the initial quench with each tower.

iii. The above limitations were established in the Permit 08060026.

7.2.7-1 <u>Emission Testing for Coke Oven Pushing</u>

a. Testing requirements established by 40 CFR Part 63 Subpart CCCCC:

i. Pursuant to 40 CFR 63.7321, for each control device subject to an emission limit for particulate matter in 40 CFR 63.7290(a), the Permittee must conduct performance tests no less frequently than twice (at mid-term and renewal) during each term of the CAAPP permit (i.e., every 30 months).

ii. The Permittee must conduct each performance test according to the following requirements in 40 CFR 63.7322.

A. To determine compliance with a process-weighted mass rate of particulate matter (lb/ton of coke) from a control device applied to pushing emissions where a cokeside shed is not used, follow these test methods and procedures to determine the concentration of particulate matter according to the following test methods in Appendix A to 40 CFR Part 60:

1. Method 1 to select sampling port locations and the number of traverse points. Sampling sites must be located at the outlet of the control device and prior to any releases to the atmosphere.

2. Method 2, 2F, or 2G to determine the volumetric flow rate of the stack gas.

3. Method 3, 3A, or 3B to determine the dry molecular weight of the stack gas.

4. Method 4 to determine the moisture content of the stack gas.

5. Method 5 or 5D, as applicable, to determine the concentration of front half particulate matter in the stack gas.

B. During each particulate matter test run, sample only during periods of actual pushing when the capture system fan and control device are engaged. Collect a minimum sample volume of 30 dry standard cubic feet of gas during each test run. Three valid test runs are needed to comprise a performance test. Each run must start at the beginning of a push and finish at the end of a push (*i.e.*, sample for an integral number of pushes).

C. Determine the total combined weight in tons of coke pushed during the duration of each test run according to the procedures in the Permittee’s source test plan for calculating coke yield from the quantity of coal charged to an individual oven.

D. Compute the process-weighted mass emissions (E_p) for each test run using the following equation:

$$E_p = \frac{C \times Q \times T}{P \times K} \qquad \text{(Eq. 1)}$$

Where:

E_p = Process weighted mass emissions of particulate matter, lb/ton;

C = Concentration of particulate matter, gr/dscf;

Q = Volumetric flow rate of stack gas, dscf/hr;

T = Total time during a run that a sample is withdrawn from the stack during pushing, hr;

P = Total amount of coke pushed during the test run, tons; and

K = Conversion factor, 7,000 gr/lb.

b. Testing requirements to address 35 IAC 212.443(c)(2)

If the PM emissions measured during the emissions testing conducted pursuant to Condition 7.2.7-1(a) are more than 0.036 lb/ton, the Permittee shall conduct a follow-up test between 12 and 18 months after such test, unless subsequent emission testing conducted in the 12 month period following such test shows PM emissions are no more than 0.030 lb/ton.

7.2.7-2 <u>Testing Requirements for Coke Quenching</u>

a. Requirements of 40 CFR Part 63 Subpart CCCCC

i. Pursuant to 40 CFR 63.7333(f), the Permittee shall sample and analyze quench water for total dissolved solids on at least a weekly basis in accordance with the procedures specified by 40 CFR 63.7325(a).

ii. If the Permittee elects to comply with the TDS limit for quench water in 40 CFR 63.7295(a)(1)(i), the Permittee must conduct each performance test that applies to the affected quenching operations according to the following conditions in 40 CFR 63.7325(a)(1) and (2):

A. Take the quench water sample from a location that provides a representative sample of the quench water as applied to the coke (e.g., from the header that feeds water to the quench tower reservoirs). Conduct sampling under normal and representative operating conditions.

B. Determine the TDS concentration of the sample using Method 160.1 in 40 CFR part 136.3 (see residue—filterable”), except that you must dry the total filterable residue at 103 to 105°C instead of 180°C.

b. Requirements of 35 IAC 212.443(h)

i. Pursuant to 35 IAC 212.443(h)(3), the quench water shall be sampled for total dissolved solids concentrations in accordance with the methods specified in Standard Methods for the Examination of Water and Wastewater, Section 209C, “Total Filterable Residue Dried at 103-105°C” 15th Edition, 1980, incorporated by reference in 35 IAC 212.113. Analyses shall be performed on grab samples of the quench water as applied to the coke in accordance with the sampling schedule in Condition 7.2.12(c).

ii. If the quench station is not used during any given calendar week, the grab samples for that quench station need not be analyzed.

c. Testing requirements for West Quench Station from Permit 08060026

Within two years after initial startup of the West Quench Station with low emission quench tower, the Permittee shall have emission test(s) conducted for this quench station at its expense as follows:

i. The emissions test(s) shall be designed to measure the PM, PM_{10}, and $PM_{2.5}$ emission rates (lb/ton coke) from the quench tower under conditions that are representative of the maximum emissions as the station is normally operated.

ii. The Permittee shall install any facilities necessary to accommodate this emissions testing.

iii. The following methods and procedures shall be used for testing emissions of PM unless other method(s) are approved by the Illinois EPA as part of its review of the test plan.

A. The following USEPA Test Methods:

Refer to 40 CFR 60, Appendix A for USEPA test methods and www.epa.gov/ttn/emc/prelim.html for other test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3
Moisture	USEPA Method 4
PM	USEPA Method 5

B. Testing for emissions of filterable and condensable PM_{10} shall be conducted using an appropriate Test Method developed by USEPA, e.g., Method 201/201A or Other Test Method (OTM) 27 and Method 202 or OTM 28, or a Reference Method proposed by USEPA, subject to review by the Illinois EPA as part of the review of the test plan.

C. Testing for emissions of filterable $PM_{2.5}$ shall be conducted using an applicable Reference Method, as adopted by USEPA in 40 CFR Part 51, Appendix M, or in 40 CFR Part 60, Appendix A. If USEPA has not adopted a Reference Method for testing of filterable $PM_{2.5}$ when testing must be performed, testing for filterable $PM_{2.5}$ shall be conducted using an appropriate Test Method developed by USEPA, e.g., OTM 27, or a Reference Method proposed by USEPA, subject to review by the Illinois EPA as part of the review of the test plan.

iv. For this emission testing, test notification and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

7.2.7-3 Compliance Demonstrations and Emission Testing for Coke Oven Underfiring (combustion stacks)

a. For compliance demonstration with opacity limits, the Permittee must conduct each performance test that applies to the affected operations according to the following requirements in 40 CFR 63.7324(b):

To determine compliance with the daily average opacity limit for stacks of 15 percent for a by-product coke oven battery on a normal coking cycle or 20 percent for a by-product coke oven battery on batterywide extended coking, follow the test methods and procedures outlined below:

i. Using the continuous opacity monitoring system (COMS) required in 40 CFR 63.7330(e), measure and record the

opacity of emissions from each battery stack for a 24-hour period.

ii. Reduce the monitoring data to hourly averages as specified in 40 CFR 63.8(g)(2).

iii. Compute and record the 24-hour (daily) average of the COMS data.

b. Pursuant to Sections 39.5(7)(d) and (p) of the Act, the Permittee shall conduct emission tests for each coke oven combustion stack under conditions that are representative of maximum emissions as follows:

i. Testing for PM emissions (filterable PM from Battery A and filterable and filterable non-sulfate PM from Battery B) shall be conducted as follows:

A. Initial testing shall be conducted within 24 months of the effective date of this permit condition.

B. Thereafter, emission testing shall be repeated in 30 months, unless the PM emission rate measured from both stacks during the previous testing is less than 0.040 gr/dscf for filterable PM and less than 0.024 gr/dscf for filterable non-sulfate PM from the combustion stack on Battery B, in which case testing shall be repeated in 60 months.

C. Testing shall also be conducted for combustion stack(s) upon written request from the Illinois EPA as specified in the request. This testing shall be completed within 90 days of the date of the request or such later date agreed to by the Illinois EPA.

ii. In conjunction with the initial testing for PM emissions required by Condition 7.2.7-3(b)(i)(A), the Permittee shall also test for CO and NO_x from one of the coke oven combustion stacks, as selected by the Illinois EPA.

iii. The following USEPA test methods shall be used for testing of emissions, unless another USEPA test method is approved by the Illinois EPA. Refer to 40 CFR 51, Appendix M, and 40 CFR 60, Appendix A, for test methods.

Location of Sample Points	Method 1
Gas Flow and Velocity	Method 2
Flue Gas Weight	Method 3
Moisture	Method 4

PM (filterable)	Method 5
PM (non-sulfate filterable)	Method 5F
CO	Method 10
NO_x	Method 7 or 7E

iv. For this emission testing, test notification and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

v. With the report for emission testing, the Permittee shall also provide a summary of the opacity data monitored during the period of testing (6 minute averages and daily average), the sulfur content of COG being combusted during the period of testing, as measured by the monitoring system(s) for COG, the PM content of COG combusted during the period of testing, and data for the firing rate of the battery during testing (mmBtu or SCF of COG and natural gas per hour) for each test run, with supporting calculations.

c. Testing conditions above are established pursuant to Sections 39.5(7)(d) and (p) of the Act.

7.2.8-1 Monitoring Requirements for Charging, Doors, Lids and Off Takes

a. i. Pursuant to 40 CFR 63.309(a), daily performance tests shall be conducted by a certified observer each day, 7 days per week for the affected battery, as specified by 40 CFR 63.309, the results of which shall be used in accordance with procedures specified in 40 CFR 63 Subpart L to determine compliance with each of the applicable visible emission limitations for coke oven doors, topside port lids, off take systems, and charging operations in 40 CFR 63 Subpart L.

ii. The Permittee shall enter into a contract providing for the inspections and performance tests required under the NESHAP, 40 CFR 63 Subpart L, to be performed by a Method 303 certified observer. The inspections and performance tests will be conducted at the expense of the Permittee, during the period that the USEPA is the implementing agency [40 CFR 63.309(a)(5)(ii)].

A. The certified observer shall conduct daily performance tests according to the requirements specified in 40 CFR 63.309(c).

B. Pursuant to 40 CFR 63.309(c)(3), upon request of the certified observer the Permittee shall demonstrate pursuant to Reference Method 303 the accuracy of the pressure measurement device

for the collecting mains and shall not adjust the pressure to a level below the range of normal operation during or prior to the inspection.

C. In no case shall the owner or operator knowingly block a coke oven door, or any portion of a door for the purpose of concealing emissions or preventing observations by the certified observer, as prohibited by 40 CFR 63.309(c)(6).

D. 1. Pursuant to 40 CFR 63.309(e), the certified observer shall make available to the implementing agency, as well as to the Permittee, a copy of the daily inspection results by the end of the day and shall make available the calculated rolling average for each emission point to the Permittee as soon as practicable following each performance test. The information provided by the certified observer is not a compliance determination. For the purposes of notifying the owner or operator of the results obtained by a certified observer, the person does not have to be certified.

2. Pursuant to 40 CFR 63.306(d)(3), if the certified observer calculates that a second exceedance (or if applicable, a second independent exceedance) has occurred, the certified observer shall notify the Permittee. No later than 10 days after receipt of such notification, the Permittee shall notify the administrator (USEPA) and Illinois EPA of any finding of whether work practices are related to the cause or solution of the problem.

Note: Pursuant to 40 CFR 63.306(d)(6), the reviewing authority (USEPA) may disapprove the submitted finding if it determines that a revised work practice plan is needed to prevent exceedances of the applicable visible emission limitations.

iii. Pursuant to 40 CFR 63.309(f), compliance with the NESHAP, 40 CFR 63 Subpart L shall not be determined more often than the schedule provided for performance tests under 40 CFR 63.309. If additional valid emissions observations are obtained (or in the case

of charging, valid sets of emission observations), the arithmetic average of all valid values (or valid sets of values) obtained during the day shall be used in any computations performed to determine compliance under 40 CFR 63.309(d) or determinations under 40 CFR 63.306.

iv. Pursuant to 40 CFR 63.309(i), no observations obtained during any program for training or for certifying observers under 40 CFR 63 Subpart L shall be used to determine compliance with the requirements of 40 CFR 63 Subpart L or any other federally enforceable standard.

b. Pursuant to 40 CFR 63.308, for the collecting mains, the Permittee shall conduct daily inspections for leaks and promptly repair any leaks as specified by 40 CFR 63.308(a) through (d).

c. Pursuant to Section 39.5(7)(d) of the Act, the Permittee shall have daily inspections conducted for charging and doors, lids and off takes to confirm compliance by Battery A with 35 IAC 212.443(b), (d), (e) and (f) and by Battery B with LAER limit (See Conditions 7.2.3-1(c), 7.2.3-2(b), 7.2.3-3(b), and 7.2.3-4(b)). These inspections shall be conducted in accordance with applicable procedures in Condition 7.2.12(a). These inspections may be coordinated with the daily inspections required by the NESHAP, provided that appropriate observations are made and collected to address these applicable limits under state rule and permit.

7.2.8-2 Monitoring Requirements for Pushing

a. Pursuant to 40 CFR 63.7330(b), For each venturi scrubber applied to pushing emissions, the Permittee must at all times monitor the pressure drop and water flow rate using a CPMS according to the following requirements:

Pursuant to 40 CFR 63.7331(e), operate, and maintain CPMS to measure and record the pressure drop across the scrubber and scrubber water flow rate during each push according to the requirements in the site specific monitoring plan as well as the following:

i. Each CPMS must complete a measurement at least once per push [40 CFR 63.7331(e)(1)];

ii. Each CPMS must produce valid data for all pushes [40 CFR 63.7331(e)(2)]; and

iii. Each CPMS must determine and record the daily (24-hour) average of all recorded readings [40 CFR 63.7331(e)(3)].

b. Pursuant to 40 CFR 63.7330(d), For each capture system applied to pushing emissions, the Permittee must at all times operate and maintain a device to measure the fan RPM.

c. Pursuant to 40 CFR 63.7331(b), the Permittee must maintain and make available for inspection upon request by the Illinois EPA and USEPA a site-specific monitoring plan for each Continuous Parameter Monitoring System (CPMS) that addresses the following requirements:

   i. Installation of the CPMS sampling probe or other interface at a measurement location relative to each affected process unit such that the measurement is representative of control of the exhaust emissions (*e.g.*, on or downstream of the last control device) [40 CFR 63.7331(b)(1)];

   ii. Performance and equipment specifications for the sample interface, the parametric signal analyzer, and the data collection and reduction system [40 CFR 63.7331(b)(2)];

   iii. Performance evaluation procedures and acceptance criteria (*e.g.*, calibrations) [40 CFR 63.7331(b)(3)];

   iv. Ongoing operation and maintenance procedures in accordance with the general requirements of 40 CFR 63.8(c)(1), (3), (4)(ii), (7), and (8) [40 CFR 63.7331(b)(4)];

   v. Ongoing data quality assurance procedures in accordance with the general requirements of 40 CFR 63.8(d) [40 CFR 63.7331(b)(5)]; and

   vi. Ongoing recordkeeping and reporting procedures in accordance with the general requirements of 40 CFR 63.10(c), (e)(1), and (e)(2)(i) [40 CFR 63.7331(b)(6)].

d. Pursuant to 40 CFR 63.7331(d), the Permittee must operate and maintain the CPMS in continuous operation according to the site-specific monitoring plan.

e. Pursuant to 40 CFR 63.7332(a), except for monitor malfunctions, associated repairs, and required quality assurance or control activities (including as applicable, calibration checks and required zero and span adjustments), you must monitor continuously (or collect data at all required intervals) at all times the affected source is operating.

f. Pursuant to 40 CFR 63.7332(b), the Permittee may not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels, or in fulfilling a minimum data availability requirement, if applicable. You must use all the data collected during all other periods in assessing compliance. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitor to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

g. Pursuant to 40 CFR 63.7333(d)(3)(ii), check the fan RPM at least every 8 hours to verify the daily average fan RPM is at or above the minimum level in Condition 7.2.8-2(h) and recording the results of each check.

h. i. Pursuant to 40 CFR 63.7290(b)(1), for each venturi scrubber applied to pushing emissions, the Permittee must maintain the daily average pressure drop and scrubber water flow rate at or above (no lower than) the following minimum levels established as the site-specific operating limits during testing:

PCS Car	Scrubber Water Flow Rate, gal/min	Pressure Drop, in. wc
#3	860	37
#4	607	33

ii. Pursuant to 40 CFR 63.7290(b)(3)(ii), for each capture system the Permittee must maintain the daily average fan revolutions per minute (RPM) at or above (no lower than) the minimum level established as the site-specific operating limits during testing:

PCS Car	RPM
#3	1650
#4	1743

iii. Pursuant to 40 CFR 63.7323 (e)(1) through (3), the Permittee may change the operating limit for a venturi scrubber, capture system, or mobile control device that captures emissions during pushing if the Permittee meets the following requirements described below:

A. Submit a written notification to the Illinois EPA of Permittee’s request to conduct a new performance test to revise the operating limit.

B. Conduct a performance test to demonstrate that emissions of particulate matter from the

control device do not exceed the applicable limit in 40 CFR 63.7290(a).

C. Establish revised operating limits according to the applicable procedures in 40 CFR 63.7323.

i. The Permittee shall comply with the work practice standards for fugitive pushing emissions as specified by 40 CFR 63.7291. In particular:

i. The Permittee shall observe and record the opacity of fugitive pushing emissions as required by 40 CFR 63.7291(a)(1), (a)(2), (a)(3) and (a)(4).

ii. The Permittee shall undertake corrective action(s) in the event that the opacity of fugitive pushing emissions exceeds the applicable limit, as required by 40 CFR 63.7291(a)(5) through (a)(7).

iii. Pursuant to 40 CFR 63.7291(b), the Permittee may request to use an alternative to the work practice standards in 40 CFR 63.7291(a) using the procedure provided in 40 CFR 63.6(g).

j. For each by-product coke oven battery with vertical flues subject to the work practice standards for fugitive pushing emissions in 40 CFR 63.7291(a), the Permittee must demonstrate continuous compliance according to the following requirements of 40 CFR 63.7334(a)(1) through (8):

i. The Permittee shall observe and record the opacity of fugitive emissions for four consecutive pushes per operating day, except the Permittee may make fewer or non-consecutive observations as permitted by 40 CFR 63.7291(a)(3). The Permittee shall maintain records of the pushing schedule for each oven and records indicating the legitimate operational reason for any change in the pushing schedule according to 40 CFR 63.7291(a)(4).

ii. The Permittee shall observe and record the opacity of fugitive emissions from each oven in a battery at least once every 90 days. If an oven cannot be observed during a 90-day period, the Permittee shall observe and record the opacity of the first push of that oven following the close of the 90-day period that can be read in accordance with the procedures in 40 CFR 63.7334(a)(1) through (8).

iii. The Permittee shall make all observations and calculations for opacity observations of fugitive pushing emissions in accordance with Method 9 in appendix A to 40 CFR Part 60 using a Method 9

certified observer unless the Permittee has an approved alternative procedure under 40 CFR 63.7334(a)(7).

iv. The Permittee shall record pushing opacity observations at 15-second intervals as required in section 2.4 of Method 9 Appendix A to 40 CFR Part 60. The following requirements do not apply: (section 2.4 of Method 9) for a minimum of 24 observations; the data reduction requirements in (section 2.5 of Method 9); and obtaining at least 3 hours of observations (thirty 6-minute averages) to demonstrate initial compliance (40 CFR 63.6(h)(5)(ii)(B)) does not apply.

v. If fewer than six but at least four 15-second observations can be made, the Permittee shall use the average of the total number of observations to calculate average opacity for the push. Missing one or more observations during the push (*e.g.*, as the quench car passes behind a building) does not invalidate the observations before or after the interference for that push. However, a minimum of four 15-second readings must be made by the Permittee for a valid observation.

vi. The Permittee shall begin observations for a push at the first detectable movement of the coke mass. The Permittee shall end observations of a push when the quench car enters the quench tower.

A. For a battery without a cokeside shed, the Permittee shall observe fugitive pushing emissions from a position at least 10 meters from the quench car that provides an unobstructed view and avoids interferences from the topside of the battery. This may require the observer to be positioned at an angle to the quench car rather than perpendicular to it. Typical interferences for the observer to avoid include emissions from open standpipes and charging. Opacity of emissions shall be observed above the battery top with the sky as the background where possible. The Permittee shall record the oven number of any push not observed because of obstructions or interferences.

B. An observer may reposition after the push to observe emissions during travel if necessary.

vii. If it is infeasible to implement the procedures in 40 CFR 63.7334 (a)(1) through (6) for an oven due to physical obstructions, nighttime pushes, or other reasons, the Permittee may apply to an appropriate permitting authority (USEPA) for permission to use an alternative procedure. The application must provide a detailed explanation of why it is infeasible to use the procedures in 40 CFR 63.7334 (a)(1) through (6), identify the oven and battery numbers, and describe the alternative procedure. An alternative procedure must identify whether the coke in that oven is not completely coked, either before, during, or after an oven is pushed.

viii. For each oven observed that exceeds an opacity of 30 percent for any short battery, the Permittee must take corrective action and/or increase the coking time in accordance with 40 CFR 63.7291(a). The Permittee shall maintain records documenting conformance with the requirements in 40 CFR 63.7291(a).

k. Pursuant to Section 39.5(7)(d) of the Act, the Permittee shall have daily observations conducted for pushing to confirm compliance with 35 IAC 212.443(c)(1)(A) (Condition 7.2.3-5(a)). These observations shall be conducted in accordance with applicable procedures in Condition 7.2.12(b). These observations may be coordinated with the observations required by the NESHAP provided that appropriate observations are made and data collected to address the applicable standard under state rule. These observations shall also include, on a monthly basis, opacity observations for the stack of the mobile scrubber car.

l. For each coke oven battery with a capture system or control device applied to pushing emissions, the Permittee shall demonstrate continuous compliance with the operation and maintenance requirements in 40 CFR 63.7300(c) by meeting the following requirements outlined in 40 CFR 63.7335(b):

i. Making monthly inspections of capture systems according to 40 CFR 63.7300(c)(1) and recording all information needed to document conformance with these requirements; and

ii. Performing preventative maintenance for each control device according to 40 CFR 63.7300(c)(2) and recording all information needed to document conformance with these requirements.

7.2.8-3 Monitoring Requirements for Quenching

a. For each coke oven battery subject to the work practice standard for quenching in 40 CFR 63.7295(b), the Permittee must demonstrate continuous compliance according to the following requirements of 40 CFR 63.7334(e)(1) through (3):

   i. Maintaining baffles in each quench tower such that no more than 5 percent of the cross-sectional area of the tower is uncovered or open to the sky as required in 40 CFR 63.7295(b)(1);

   ii. Maintaining records that document conformance with the washing, inspection, and repair requirements in 40 CFR 63.7295(b)(2), including records of the ambient temperature on any day that the baffles were not washed; and

   iii. Maintaining records of the source of makeup water to document conformance with the requirement for acceptable makeup water in 40 CFR 63.7295(a)(2).

b. Pursuant to 40 CFR 63.7295(b), for the quench tower, the Permittee shall perform inspections on at least a monthly basis for damaged or missing baffles and initiate repair or replacement within 30 days, which shall be completed as soon as practicable, as specified by 40 CFR 63.7295(b)(3) and (4).

7.2.8-4 Monitoring Requirements for Combustion Stacks

a. Pursuant to 40 CFR 63.7330(e), for each coke oven battery stack, the Permittee must operate and maintain a COMS to measure and record the opacity of emissions exiting each stack according to the requirements in 40 CFR 63.7331(j)(1) through (5) and the following below:

   i. The Permittee must operate, and maintain each COMS according to the requirements in 40 CFR 63.8(e) and Performance Specification 1 in 40 CFR Part 60, Appendix B. The Permittee shall identify periods the COMS is out-of-control, including any periods that the COMS fails to pass a daily calibration drift assessment, quarterly performance audit, or annual zero alignment audit.

   ii. The Permittee must conduct a performance evaluation of each COMS according to the requirements in 40 CFR 63.8 and Performance Specification 1 in Appendix B to 40 CFR Part 60.

   iii. The Permittee must develop and implement a quality control program for operating and maintaining each

COMS according to the requirements in 40 CFR 63.8(d). At minimum, the quality control program must include a daily calibration drift assessment, quarterly performance audit, and an annual zero alignment audit of each COMS.

iv. Each COMS installed, operated and maintained by the Permittee must complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period. The Permittee must reduce the COMS data as specified in 40 CFR 63.8(g)(2).

v. The Permittee must determine and record the hourly and daily (24-hour) average opacity according to the procedures in 40 CFR 63.7324(b) using all the 6-minute averages collected for periods during which the COMS is not out-of-control.

b. Pursuant to Sections 39.5(7)(d) and (p) of the Act, the Permittee shall also record 6-minute average opacity data from the COMS required by Condition 7.2.8-4(a).

7.2.8-5 Monitoring Requirements for Emergency By-pass Bleeder Stacks

Pursuant to 40 CFR 63.309(h)(1), for a flare installed to meet the requirements of 40 CFR 63.307(b) (see Condition 7.2.3-8(b)):

If any emergency by-pass bleeder stack flare operates more than 5 minutes (cumulative) during any 2 hour period, visible emissions observations shall be conducted by using Method 22 in Appendix A of 40 CFR Part 60.

7.2.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected coke production operations, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. 40 CFR 63, Subpart CCCCC (40 CFR 63.7334(d))

For each by-product coke oven battery subject to the work practice standard for soaking in 40 63.7294(a), the Permittee must demonstrate continuous compliance by maintaining records that document conformance with requirements in 40 CFR 63.7294(a)(1) through (5).

b. 40 CFR 63, Subpart CCCCC (40 CFR 63.7342 and 63.7343)

i. The Permittee shall keep the following records specified in 40 CFR 63.7342 (a)(1) through (3):

A. A copy of each notification and report that the Permittee submitted to comply with 40 CFR 63 Subpart CCCCC, including all documentation supporting any initial notification or notification of compliance status that the Permittee submitted, according to the requirements in 40 CFR 63.10(b)(2)(xiv).

B. The records in 40 CFR 63.6(e)(3)(iii) through (v) related to startup, shutdown, and malfunction.

C. Records of performance tests, performance evaluations, and opacity observations as required in 40 CFR 63.10(b)(2)(viii).

ii. For each COMS or CEMS, the Permittee shall keep the following records specified in 40 CFR 63.7342(b)(1) through (4):

A. Records described in 40 CFR 63.10(b)(2)(vi) through (xi).

B. Monitoring data for COMS during a performance evaluation as required in 40 CFR 63.6(h)(7)(i) and (ii).

C. Previous (that is, superseded) versions of the performance evaluation plan as required in 40 CFR 63.8(d)(3).

D. Records of the date and time that each deviation started and stopped, and whether the deviation occurred during a period of startup, shutdown, or malfunction or during another period.

iii. The Permittee shall keep the records in 40 CFR 63.6(h)(6) for visual observations [40 CFR 63.7342(c)].

iv. The Permittee shall keep the records required in 40 CFR 63.7333 through 63.7335 to show continuous compliance with each emission limitation, work practice standard, and operation and maintenance requirement that applies to the Permittee [40 CFR 63.7342(d)].

v. The Permittee shall keep its records in a form suitable and readily available for expeditious review, according to 40 CFR 63.10(b)(1) [40 CFR 63.7343(a)].

vi. As specified in 40 CFR 63.10(b)(1), the Permittee shall keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record [40 CFR 63.7343(b)].

vii. The Permittee shall keep each record on site for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record, according to 40 CFR 63.10(b)(1). The Permittee may keep the records offsite for the remaining 3 years [40 CFR 63.7343(c)].

c. <u>40 CFR 63, Subpart CCCCC (40 CFR 63.7326)</u>

i. Pursuant to 40 CFR 63.7326(a)(2), For each venturi scrubber applied to pushing emissions, the Permittee shall have a record of the pressure drop and scrubber water flow rate measured during the performance test in accordance with 40 CFR 63.7323(a).

ii. Pursuant to 40 CFR 63.7326(a)(4)(iii), For each capture system applied to pushing emissions, the Permittee shall have a record of the fan RPM measured during the performance test in accordance with 40 CFR 63.7323(c)(3).

d. <u>40 CFR Part 63, Subpart L (40 CFR 63.311(f) and (g))</u>

The Permittee shall maintain files of all required information in a permanent form suitable for inspection at an onsite location for at least 1 year and must thereafter be accessible within 3 working days to the Administrator for the time period specified in 40 CFR 70.6(a)(3)(ii)(B). Copies of the work practice plan developed under 40 CFR 63.306 and the startup, shutdown, and malfunction plan developed under 40 CFR 63.310 shall be kept onsite at all times. The Permittee shall maintain the following information:

i. A copy of the work practice plan required by 40 CFR 63.306 and any revision to the plan [40 CFR 63.311(f)(3)];

ii. If the Permittee is required under 40 CFR 63.306I to implement the provisions of a work practice plan for a particular emission point, the following records shall be maintained by the Permittee regarding the implementation of plan requirements for that emission point during the implementation period [40 CFR 63.311(f)(4)]:

A. Copies of all written and audiovisual materials used in the training, the dates of each class, the names of the participants in each class, and documentation that all appropriate personnel have successfully completed the training required under 40 CFR 63.306(b)(1);

B. The records required to be maintained by the plan provisions implementing 40 CFR 63.306(b)(7);

C. Records resulting from audits of the effectiveness of the work practice program for the particular emission point, as required under 40 CFR 63.306(b)(2)(i), 63.306(b)(3)(i), 63.306(b)(4)(i), or 63.306(b)(5)(i); and

D. If the plan provisions for coke oven doors must be implemented, records of the inventory of doors and jambs as required under 40 CFR 63.306(b)(2)(vi).

iii. The design drawings and engineering specifications for the bypass/bleeder stack flare system or approved alternative control device or system as required under 40 CFR 63.307 [40 CFR 63.311(f)(5)].

iv. Records specified in 40 CFR 63.310(f) regarding the basis of each malfunction notification [40 CFR 63.311(f)(6)].

v. Records required to be maintained and reports required to be filed with the Illinois EPA under Subpart L shall be made available in accordance with the requirements of 40 CFR 63.311(g) by the Permittee to the authorized collective bargaining representative of the employees at a coke oven battery, for inspection and copying.

A. Requests under 40 CFR 63.311(g) shall be submitted in writing, and shall identify the records or reports that are subject to the request with reasonable specificity;

B. The Permittee shall produce the reports for inspection and copying within a reasonable period of time, not to exceed 30 days. A reasonable fee may be charged for copying (except for the first copy of any document), which shall not exceed the copying fee charged by the Illinois EPA under the Act;

C. Nothing in 40 CFR 63.311(g) shall require the production for inspection or copying of any portion of a document that contains trade secrets or confidential business information that the Illinois EPA would be prohibited from disclosing to the public under the Act; and

D. The inspection or copying of a document under 40 CFR 63.311(g) shall not in any way affect any property right of the owner or operator in such document under laws for the protection of intellectual property, including the copyright laws.

e. Implementation of the good air pollution control practices, as required by Condition 7.2.5-3(b)(i), shall be supported by maintaining logs or other records for the implementation of operation practices and for maintenance activities performed by Permittee.

f. Records of the total annual coke production at batteries “A” and “B” (ton/yr) and separately for the Battery B [39.5(7)(b) of the Act].

g. Records for Startups of Affected coke ovens, pursuant to Section 39.5(7)(b) of the Act

i. The Permittee shall maintain startup procedures for each affected coke oven, as required by Condition 7.2.5-4(b).

ii. The Permittee shall maintain the following records for each startup of an affected coke oven:

A. Date, time and duration of the startup.

B. A description of the startup and reason(s) for the startup.

C. Whether a violation of an applicable standard may have occurred during startup accompanied by the information in Condition 7.2.9(g)(iv) if a violation may have or did occur.

D. Whether the established startup procedures, maintained above, were followed accompanied by the information in Condition 7.2.9(g)(iii) if there were departure(s) from those procedures.

iii. If the established startup procedures were not followed during a startup, the Permittee shall maintain the following records:

A. A description of the departure(s) from the established procedures.

B. The reason(s) for the departure(s) from the established procedures.

C. An explanation of the consequences of the departure(s) for emissions, such as whether the departure(s) prolonged the startup or resulted in additional emissions, and if so:

1. The actions taken to minimize emissions and the duration of the startup; and

2. An explanation whether similar incidents might be prevented in the future and if so, the corrective actions taken or to be taken to prevent similar incidents.

iv. If a violation did or may have occurred during a startup, the Permittee shall maintain the following records:

A. Identification of the applicable standard(s) that were or may have been violated.

B. An explanation of the nature of such violation(s), including the magnitude of such excess emissions.

C. A description of the actions taken to minimize the magnitude of emissions and duration of the startup.

D. An explanation whether similar incidents could be prevented or ameliorated in the future and if so, a description of the actions taken or to be taken to prevent similar incidents in the future.

h. Records for Malfunctions or Breakdowns

Pursuant to 35 IAC 201.263, the Permittee shall maintain records of continued operation of the affected coke ovens as addressed by Condition 7.2.5-4, during malfunctions or breakdowns, which at a minimum, shall include the following records. The preparation of these records shall be completed within 45 days of an incident, unless the Permittee conducts a root cause analysis for the incident, in which case the preparation of these records, other than

the root cause analysis, shall be completed within 120 days of the incident.

i. Date, time and duration of the incident.

ii. A detailed description of the incident, including:

A. A chronology of significant events during and leading up to the incident.

B. Relevant operating data for the unit, including information such as operator log entries and directives provided by management during the incident.

C. The measures taken to reduce the quantity of emissions and the duration of the incident including the resources utilized to address the incident.

D. The magnitude of emissions during the incident.

iii. An explanation why continued operation of an affected coke oven was necessary to prevent personnel injury or prevent equipment damage.

iv. A discussion of the cause(s) or probable cause(s) of the incident including the following:

A. Whether the incident was sudden, unavoidable, or preventable, including:

1. Why the equipment design did not prevent the incident;

2. Why better maintenance could not have avoided the incident;

3. Why better operating practices could not have avoided the incident; and

4. Why there was no advance indication for the incident.

B. Whether the incident stemmed from any activity or event that could have been foreseen, avoided or planned for,

C. Whether the incident was or is part of a recurring pattern indicative of inadequate design, operation or maintenance.

v. A description of any steps taken to prevent similar future incidents or reduce their frequency and severity.

vi. As an alternative to keeping the records required by Condition 7.2.9(h)(iv), the Permittee may perform a root cause analysis. For this purpose, a root cause analysis is an analysis whose purpose is to determine, correct and eliminate the primary causes of the incident and the excess emissions resulting there from. If the Permittee performs a root cause analysis method that would define the problem, define all causal relationships, provide a causal path to the root cause, delineate the evidence, and provide solutions to prevent a recurrence. Such an analysis shall be completed within one year of the incident.

i. Quench stations

The Permittee shall maintain the following records for quenching operations:

i. A file listing the emissions factors used by the Permittee to determine the emissions of the various quenching operations, with supporting documentation and analysis. These records shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

ii. Records for the total number of quenches (ovens pushed), the total amount of coke quenched (tons) and the average amount of coke per quench (tons/quench) on a monthly and annual basis*.

iii. A log showing each period of time when coke was quenched at the East Quench Station, with number of quenches during the period and explanation of reason for use of the East Quench Station.

iv. Records on an annual basis* for the:

A. Total number of quenches.

B. For the East Quench Station:

1. Total number of quenches and amount of coke quenched at the East Quench Station.

2. Total number of quenches and amount of coke quenched at the East Quench Station due to malfunction and breakdown.

3. Percentage of total quenches that occurred at the East Quench Station.

C. For the emergency quench station:

1. Total number of quenches and amount of coke quenched at the emergency quench station.

2. Percentage of total quenches that occurred at the emergency quench station.

* These records shall be kept for the 12-month period from July 1 to June 30 and the initial 12-month period following shakedown of the West Quench Station with new quench tower.

v. Records for emissions of PM, PM_{10}, and $PM_{2.5}$ from each affected quench station and from the emergency quench station (tons/month and tons/year), with supporting calculations.

j. i. A file containing the emission rates (lb/hr and lb/ton) used by the Permittee to determine PM emissions from the mobile quench cars, with supporting documentation, which rates shall be reviewed when new data becomes available to assure that these rates do not understate actual emissions. These records shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

ii. Records of PM emissions of the mobile scrubber cars (tons/month and tons/year), with supporting calculations.

k. i. Monthly and annual records of supplementary natural gas usage (scf) for underfiring the coke oven batteries and associated emissions (tons) with supporting calculations.

ii. Records of emissions as addressed in Condition 7.2.6(c).

l. Records of observations of duration of charging, percentage of leaks or opacity that are conducted by the Permittee or on its behalf to determine compliance with 35 IAC 212.443(b) and (c)(1)(A) in addition to the observations required by Condition 7.2.8-1 and 7.2.8-2.

m. Records of all test reports and submittals related to emission testing required by Section 7.2 of this permit.

7.2.10 <u>Reporting Requirements</u>

a. Opacity Monitoring Reports for Combustion Stacks

Pursuant to Sections 39.5(7)(a), (d) and (p) of the Act, the Permittee shall provide the following reports for each coke oven battery to the Illinois EPA, including a copy directly to Collinsville Regional Office, on a quarterly basis.

i. “Excess opacity reports” that list all opacity measurements which exceed 30 percent, averages over a six minute period. These reports shall also provide, for each such incident, the percent opacity measured as well as the date and span of such incident. These reports shall state the reasons for excess opacity. These reports shall also specify the date of those periods during which the continuous monitoring system was not in operation.

ii. “Summary reports” that provide the average opacity, 6-minute average, measured during the reporting period and the distribution of opacity measurements, 6-minute average and hourly average, during the reporting period, by percent, in ranges as follows:

Ranges	
6-Minute Averages	Hourly Averages
≤ 2	≤ 1
> 2 and ≤ 5	> 1 and ≤ 3
> 5 and ≤ 10	> 3 and ≤ 6
> 10 and ≤ 15	> 6 and ≤ 10
> 15 and ≤ 20	> 10 and ≤ 15
> 20 and ≤ 30	> 15
> 30	

b. 40 CFR Part 63, Subpart CCCCC (40 CFR 63.7336)

Pursuant to 63.7336(a) the Permittee must report each instance in which it did not meet each emission limitation in Conditions 7.2.3-5(c), 7.2.3-6(a) and 7.2.3-7(b). This includes periods of startup, shutdown, and malfunction. The Permittee must also report each instance in which it did not meet each work practice standard or operation and maintenance requirement in Condition 7.2.8-2(h). These instances are deviations from the emission limitations (including operating limits), work practice standards, and operation and maintenance requirements. These deviations must be reported according to the requirements in 40 CFR 63.7341.

c. 40 CFR Part 63, Subpart CCCCC (40 CFR 63.7341)

i. Pursuant to 40 CFR 63.7341(a)(3) and (4), compliance report due dates. Unless the Illinois EPA has approved a different schedule, the Permittee shall submit quarterly compliance reports for battery

stacks and semiannual compliance reports for all other affected sources to the Illinois EPA according to the following requirements:

A. All quarterly compliance reports for battery stacks must be postmarked or delivered no later than one calendar month following the end of the quarterly reporting period. All semiannual compliance reports must be postmarked or delivered no later than July 31 or January 31, whichever date is the first date following the end of the semiannual reporting period.

B. If the Illinois EPA has established dates for submitting semiannual reports pursuant to 40 CFR 70.6(a)(3)(iii)(A), the Permittee may submit compliance reports according to the dates the Illinois EPA has established instead of according to the dates in 40 CFR 63.7341(a)(1) through (3).

ii. Quarterly compliance report contents. Each quarterly report must provide information on compliance with the emission limitations for battery stacks in 40 CFR 63.7296. The reports must include the information in 40 CFR 63.7341(c)(1) through (3), and as applicable, 40 CFR 63.7341(c)(4) through (8).

iii. Semiannual compliance report contents. Each compliance report must provide information on compliance with the emission limitations, work practice standards, and operation and maintenance requirements for all affected sources except battery stacks. The reports must include the following information [40 CFR 63.7341(c)]:

A. Company name and address.

B. Statement by a responsible official, with the official’s name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report.

C. Date of report and beginning and ending dates of the reporting period.

D. If the Permittee had a startup, shutdown, or malfunction during the reporting period and the Permittee took actions consistent with the startup, shutdown, and malfunction plan, the compliance report must include the information in 40 CFR 63.10(d)(5)(i).

E. If there were no deviations from the continuous compliance requirements in 40 CFR 63.7333(e) for battery stacks, a statement that there were no deviations from the emission limitations during the reporting period. If there were no deviations from the continuous compliance requirements in 40 CFR 63.7333 through 63.7335 that apply to the Permittee (for all affected sources other than battery stacks), a statement that there were no deviations from the emission limitations, work practice standards, or operation and maintenance requirements during the reporting period.

F. If there were no periods during which a continuous monitoring system (including COMS, continuous emission monitoring system (CEMS), or CPMS) was out-of-control as specified in 40 CFR 63.8(c)(7), a statement that there were no periods during which a continuous monitoring system was out-of-control during the reporting period.

G. For each deviation from an emission limitation in Subpart CCCCC (including quench water limits) and for each deviation from the requirements for work practice standards in Subpart CCCCC that occurs at an affected source where the Permittee is not using a continuous monitoring system (including a COMS, CEMS, or CPMS) to comply with the emission limitations in Subpart CCCCC, the compliance report must contain the following information (this includes periods of startup, shutdown, and malfunction):

1. The total operating time of each affected source during the reporting period.

2. Information on the number, duration, and cause of deviations (including unknown cause, if applicable) as applicable and the corrective action taken.

H. For each deviation from an emission limitation occurring at an affected source where the Permittee is using a continuous monitoring system (including COMS, CEMS, or CPMS) to comply with the emission limitation in Subpart CCCCC, the Permittee shall include the

following information (this includes periods of startup, shutdown, and malfunction):

1. The date and time that each malfunction started and stopped.

2. The date and time that each continuous monitoring system (including COMS, CEMS, or CPMS) was inoperative, except for zero (low-level) and high-level checks.

3. The date, time, and duration that each continuous monitoring system (including COMS, CEMS, or CPMS) was out-of-control, including the information in 40 CFR 63.8(c)(8).

4. The date and time that each deviation started and stopped, and whether each deviation occurred during a period of startup, shutdown, or malfunction or during another period.

5. A summary of the total duration of the deviation during the reporting period and the total duration as a percent of the total source operating time during that reporting period.

6. A breakdown of the total duration of the deviations during the reporting period into those that are due to startup, shutdown, control equipment problems, process problems, other known causes, and other unknown causes.

7. A summary of the total duration of continuous monitoring system downtime during the reporting period and the total duration of continuous monitoring system downtime as a percent of the total source operating time during the reporting period.

8. An identification of each HAP that was monitored at the affected source.

9. A brief description of the process units.

10. A brief description of the continuous monitoring system.

11. The date of the latest continuous monitoring system certification or audit.

12. A description of any changes in continuous monitoring systems, processes, or controls since the last reporting period.

iv. Immediate startup, shutdown, and malfunction report. If the Permittee had a startup, shutdown, or malfunction during the semiannual reporting period that was not consistent with the Permittee's startup, shutdown, and malfunction plan, the Permittee shall submit an immediate startup, shutdown, and malfunction report according to the requirements in 40 CFR 63.10(d)(5)(ii).

d. 40 CFR Part 63, Subpart L (40 CFR 63.311)

i. Semiannual compliance certification. The Permittee shall include the following information in the semiannual compliance certification [40 CFR 63.311(d)]:

A. Certification, signed by the Permittee, that no coke oven gas was vented, except through the bypass/bleeder stack flare system of a by-product coke oven battery during the reporting period or that a venting report has been submitted according to the requirements in 40 CFR 63.311(e).

B. Certification, signed by the Permittee, that a startup, shutdown, or malfunction event did not occur for a coke oven battery during the reporting period or that a startup, shutdown, and malfunction event did occur and a report was submitted according to the requirements in 40 CFR 63.310(e).

C. Certification, signed by the Permittee, that work practices were implemented if applicable under 40 CFR 63.306.

ii. Report for the venting of coke oven gas other than through a flare system. The Permittee shall report any venting of coke oven gas through a bypass/bleeder stack that was not vented through the bypass/bleeder stack flare system to the Administrator as soon as practicable but no later than 24 hours after the beginning of the event. A written report shall be submitted within 30 days of the event and shall include a description of the event and, if applicable, a copy of the notification for a

hazardous substance release required, pursuant to 40 CFR 63.311(e).

iii. 40 CFR Part 63, Subpart L (40 CFR 63.310)

A. Pursuant to 40 CFR 63.310(d), in order for the provisions of 40 CFR 63.310(i) to apply with respect to the observation (or set of observations) for a particular day, notification of a startup, shutdown, or a malfunction shall be made by the Permittee:

If practicable, to the certified observer if the observer is at the source during the occurrence; or to the enforcement agencies (USEPA and Illinois EPA), in writing, within 24 hours of the occurrence first being documented by personnel, and if the notification to the certified observer was not made, an explanation of why no such notification was made.

B. Pursuant to 40 CFR 63.310(e), within 14 days of the notification made under 40 CFR 63.310 (d), or after a startup or shutdown, the Permittee shall submit a written report to the Illinois EPA that describes the time and circumstances of the startup, shutdown, or malfunction; and describes actions taken that might be considered inconsistent with the startup, shutdown, or malfunction plan.

e. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by the affected coke oven operations from applicable requirements unless a NESHAP standard specifies a different timeframe as identified in Condition 7.2.11(c) and (d), as follows:

A. Requirements in Condition 7.2.3(d).

B. Requirements in Condition 7.2.3-1.

C. Requirements in Condition 7.2.3-2.

D. Requirements in Condition 7.2.3-3.

E. Requirements in Condition 7.2.3-4.

F. Requirements in Condition 7.2.3-5.

G. Requirements in Condition 7.2.3-6.

H. Requirements in Condition 7.2.3-7.

I. Requirements in Condition 7.2.3-8.

J. Requirements in Condition 7.2.5-1.

K. Requirements in Condition 7.2.5-2.

L. Requirements in Condition 7.2.6.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

iii. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

iv. All deviation reports described in Condition 7.2.10(e) above shall contain the following:

A. Date, time and duration of the deviation;

B. Description of the deviation;

C. Probable cause of the deviation; and

D. Any corrective actions or preventive measures taken.

f. Quench stations [08060026]

The Permittee shall provide the following notification and reports to the Illinois EPA, Air Compliance Section and Regional Field Office, pursuant to 35 IAC 201.263, concerning continued operation of quenching operations during malfunction or breakdown that does not meet the requirements of 35 IAC 212.443(h)(1):

i. For noncompliance due to malfunction or breakdown that lasts more than 30 minutes (quenching of four ovens):

A. The Permittee shall notify the Illinois EPA’s regional office by telephone as soon as possible during normal working hours, but no later than the next Agency business day.

B. Upon achievement of compliance, the Permittee shall give a written follow-up notice within 15 days to the Illinois EPA, Air Compliance Section and Regional Field Office, providing a detailed explanation of the event, the length of time during which operation continued under such conditions, the measures taken by the Permittee to minimize and correct deficiencies

with chronology, and when the repairs were completed.

C. If compliance is not achieved within 48 hours of the occurrence, the Permittee shall submit interim status reports to the Illinois EPA, Air Compliance Section and Regional Field Office, on a daily basis, until compliance is achieved. These interim reports shall provide a brief explanation of the nature of the malfunction or breakdown, corrective actions accomplished to date, actions anticipated to occur with schedule, and the expected date on which repairs will be complete.

ii. For noncompliance due to malfunction or breakdown that is no more than 30 minutes in duration, the Permittee shall provide the information for the incident or period with the periodic compliance reports required by 40 CFR 63, Subpart CCCCC.

iii. Within two years of initial startup of the low emission quench tower on the West Quench Station, the Permittee shall submit a report evaluating the reduction in filterable and total $PM_{2.5}$ and PM_{10} emissions achieved by this project, on both in terms of emissions per ton of coke quenched and in terms of annual emissions.

g. Reporting on the State malfunction and breakdown authorization shall be performed in accordance with Condition 5.10.5-2.

h. Reporting on the State startup authorization shall be performed in accordance with Condition 5.10.5-1.

i. Reporting on the Federal SSM authorization shall be performed in accordance with Condition 5.10.5-3.

7.2.11 Operational Flexibility/Anticipated Operating Scenarios

Operational flexibility is not set for the affected coke oven operations.

7.2.12 Compliance Procedures

For purposes of 35 IAC 212.443:

a. Coke Oven Charging, Leaks from Doors, Leaks from Lids and Leaks from Off Takes: Observations shall be conducted in accordance with 40 CFR 63, Appendix A, Method 303 which is consistent with the procedures specified in 35 IAC 280.104 to 280.107 and the Consent Decree, Civil Action No. 81-3009 referenced in Construction Permit C808048.

i. Battery A and B – Charging:

Observations shall be conducted in accordance with 40 CFR 63, Appendix A, Method 303 which is consistent with the procedures specified in 35 IAC 280.104 to 280.107 and the Consent Decree, Civil Action No. 81-3009 referenced in Construction Permit C808048.

Observation of charging emissions shall be made from any point or points on the topside of a coke oven battery from which a qualified observer can obtain an unobstructed view of the charging operation.

The qualified observer shall time the visible emissions with a stopwatch while observing the charging operation. Only emissions from the charge port and any part of the larry car shall be timed. The observation shall commence as soon as coal is introduced into the first charge port as indicated by the first charge port as indicated by the first mechanical movement of the coal feeding mechanism on the larry car and shall terminate when the last charge port lid has been replaced. Simultaneous emissions from more than one emission point shall be timed and recorded as one emission and shall not be added individually to the total time.

The qualified observer shall determine and record the total number of seconds that charging emissions are visible during the charging of coal to the coke oven.

For each charge observed, the qualified observer shall record the total number of seconds of visible emissions, the clock time for the initiation and completion of the charging operation and the battery identification and oven number.

The qualified observer shall not record any emissions observed after all charging port lids have been firmly seated following removal of the larry car, such as emissions occurring when a lid has been temporarily removed to permit spilled coal to be swept into the oven.

In the event that observations of emissions from a charge are interrupted due to events beyond the control of the observer, the data from that charge shall be invalidated and the observer shall note on his observation sheet the reason for invalidating the data. The observer shall then resume observation of the next consecutive charge or charges, and continue until he has obtained a set of consecutive charges immediately preceding the interrupted charge and the charge immediately following the interrupted charge shall constitute consecutive charges. Compliance

shall be determined by summing the seconds of charging emission observed during a set of five consecutive charges. Any one charge may be included in only one set of consecutive charges.

ii. Battery A and B – Doors:

Compliance with the percent door area leakage standard shall be determined in accordance with the following method:

Observations of door emissions shall be made from a minimum distance of 25 feet from each door. Each door shall be observed in sequence for only that period necessary to determine whether or not, at the time, there are visible emissions from any point on the door while the observer walks along the side of the battery. If the observer's view of a door is more than momentarily obstructed, as, for example, by door machinery, pushing machinery, coke guide, luter truck, or opaque steam plumes, he shall record the door obstructed and the nature of the obstruction and continue the observations with the next door in sequence which is not obstructed. The observer shall continue this procedure along the entire length of the battery for both sides and shall record the battery identification, battery side, and oven door identification number of each door exhibiting visible emissions. Before completing the traverse or immediately thereafter he shall attempt to reobserve the obstructed doors.

iii. Battery A and B – Charging Ports/Lids:

For purposes of determining compliance with limits on visible emissions from charging ports, observations of any visible emissions shall be made and recorded during the time an observer walks the topside of a battery from one end to the other. Each oven shall be observed in sequence. The observer may also observe off take pipe leaks during this traverse of the battery. The observer shall record the battery identification, the points of emissions from each oven, the oven number, and whether an oven was dampered off. Compliance shall be determined by application of the following formula which shall exclude the ports on up to 3 ovens ahead of the oven being pushed which are dampered off.

iv. Battery A and B – Off Takes:

For purposes of determining compliance with limits on visible emissions from off take pipes, observations of any visible emissions from the off take piping shall be made by traversing the topside of the

battery. During the traverse(s), the observer shall walk as near to the center of the battery as safety considerations permit but may walk as close as necessary to the off take piping to determine whether an observed emission is emanating from the off take piping. Each oven shall be observed in sequence. The observer may also observe charging port emissions during this traverse of the battery. The observer shall record the battery identification, the points of off take piping emission from any oven and the oven number.

b. Coke Oven Pushing:

i. Battery A and B:

Opacity readings shall be taken by a qualified observer located in a position where the oven being pushed, the coke receiving car and the path to the quench tower are visible. The opacity shall be read as the emissions rise and clear the top of the coke battery gas mains. The qualified observer shall record opacity readings of emissions originating at the receiving car and associated equipment and the coke oven, including the standpipe on the coke side of the oven being pushed. Opacity readings shall be taken in accordance with the procedures set forth in 40 CFR Part 60, Appendix A, Method 9, incorporated by reference in 35 IAC 212.113, except that Section 2.5 for data reduction shall not be used. The qualified observer referenced in this subsection shall be certified pursuant to 40 CFR Part 60, Appendix A, Method 9, incorporated by reference in 35 IAC 212.113.

ii. Battery A:

Opacity readings shall be taken at 15-second intervals, beginning from the time the coke falls into the receiving car or is first visible as it emerges from the coke guide whichever occurs earlier, until the receiving car enters the quench tower or quenching device. For a push of less than 90 seconds duration, the actual number of 15-second readings shall be averaged.

At least four consecutive pushes per day.

iii. Battery B:

Opacity readings shall be taken at 15-second intervals, beginning from the time the coke falls into the receiving car or is first visible as it emerges from the coke guide whichever occurs earlier, until the end of the sixth reading. During the

pushing operation, the observer shall observe all the pushing emissions including, but not limited to, fugitive emissions from the pushing emission control device and from open quench cars during travel.

At a minimum, one push per day.

c. Coke Quenching (35 IAC 212.443(h)(2))

i. Samples shall be taken from each quench station as separate grab samples or composite samples.

ii. Samples shall be collected a minimum of five days per week and analyzed to report a weekly concentration. The samples for each week shall be analyzed either:

A. Separately, with the average of the individual daily concentrations determined; or

B. As one composite sample, with equal volumes of the individual daily samples combined to form the composite sample.

7.2.13 State-Only Conditions

State-only conditions are not being established.

7.3 Coke By-Product Recovery Plant and COG Desulfurization System

7.3.1 Description

COG is made up of various organic materials volatilized during the coal-to-coke conversion process. The raw coke oven gas from U. S. Steel two existing coke oven batteries is processed in the coke by-product recovery plant, where various byproducts are removed. Once treated, the COG is used as a fuel in the coke batteries and in various boilers and furnaces throughout the facility.

Coke Oven Gas (COG) Processing Unit:

COG from the coke ovens first passes through the primary cooler where it is cooled. The cooling of COG causes tar, naphthalene, and liquor to condense. The cool COG is then pushed through the entire by-product plant with the aid of exhausters. More tar and liquor are removed by the centrifugal force created in the exhausters. Droplets of tar, naphthalene, and liquor accumulate and drain to the tar sump. Ammonia present in the COG is then removed by passing it through ammonia absorber. The removal of ammonia is accomplished by exposing the COG to a spray of sulfuric acid in the ammonia absorber. The COG then enters the Tar Spray Final Cooler where the COG is further cooled and most of the naphthalene is removed with tar injection. Next COG passes through the Light Oil Scrubber, which is designed to remove the remaining naphthalene and “Light Oils”.

From the light oil scrubber, the treated COG is normally further processed in the COG desulfurization system to remove sulfur. The COG is not always processed by desulfurization system because of the need for periodic maintenance on the system. The permit limits the amount of time during which this may occur. COG desulfurization system consists of a packed tower amine unit, hydrogen cyanide destruction unit, and a Claus sulfur recovery unit with tail gas oxidizer. The system removes hydrogen sulfide (H_2S) from the treated COG stream from the by-product plant. The COG desulfurization system is not part of the by-products recovery plant.

The COG stream from the by-product plant is sent to a pressure holding tank from where the COG is distributed to underfire the Coke Oven Batteries and various parts of the plant.

Light Oil Processing Unit:

Processing the Light Oil generated at the Light Oil Scrubber, also called Benzol Washer, is the main activity of this unit. In the Light Oil Scrubber, wash oil is used to scrub out Light Oil from the Coke Oven Gas. Next wash oil is cleaned and re-circulated back through the Light Oil scrubber as described below.

After scrubbing out the light oil in the Light Oil Scrubber, the wash oil passes through two oil to vapor heat exchangers, where the light oil is vaporized. The vapors are then passed through two cool water condensers to condense out the light oil. The light oil then passes through the Secondary Light Oil Separator, where any remaining wash oil and water is removed. The liquid oil is then pumped into one of six storage tanks.

After passing through the oil to vapor heat exchangers, the wash oil passes through steam heaters, the Wash Oil Still, coolers, and finally the Wash Oil Recirculating Tank before it is reintroduced in the Light Oil Scrubber.

Coal Tar Processing:

Tar is collected into a tar sump. The tar is decanted by passing through one of three decanters. Sludge from the decanters is dumped into hoppers from where it is collected by a company for further treatment. Tar from the decanters pass through two dehydration tanks where the water is removed. The tar is then pumped to a storage tank, where it is stored until shipment.

Note: This narrative description is for informational purposes only and is not enforceable.

7.3.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
By-Product Recovery	Coke oven Gas Processing Unit (coke oven gas transfer and handling; gas coolers; gas processing/cleaning unit)	Prior to 06/1982	Steam Blanketing
By-Product Recovery (Continued)	Light Oil Processing (stills; process condensers; sumps) Coal Tar Processing (tar collection and transfer; tar storage tanks) Tar Storage Tanks; Dehydration Tanks; Decanters; Light Oil Storage Tanks; Ammonia Liquor; Storage Tanks	Prior to 06/1982	Clean Gas Blanketing; Steam Blanketing; Negative Pressure Systems

Emission Unit	Description	Date Constructed	Emission Control Equipment
	Railcar/Truck Loading	2004	Vapor Recovery System; Negative Pressure
COG Desulfurization System	Packed tower amine unit and hydrogen cyanide destruction unit		Closed Systems
	Claus Sulfur Recovery Unit		Thermal Oxidizer
COG Flare	COG holding tank and flare		None

7.3.3 Applicable Provisions and Regulations

a. i. The “affected by-product recovery plant” for the purpose of these unit-specific conditions, is the group of emission units and/operations in the coke by-product recovery plant described in Conditions 7.3.1 and 7.3.2.

ii. The COG desulfurization system is the system for desulfurization of treated COG described in Conditions 7.3.1 and 7.3.2.

iii. The COG flare is the system for burning of excess of COG described in Conditions 7.3.1 and 7.3.2.

b. The affected by-product recovery plant is subject to the work practices in 40 CFR Part 61, Subpart L, National Emission Standards for Benzene Emissions from Coke By-Product Recovery Plants.

c. The affected by-product recovery plant is subject to the work practices in 40 CFR Part 61, Subpart V, National Emission Standards for Equipment Leaks (Fugitive Emissions).

d. The affected by-product recovery plant is subject to the work practices in 40 CFR Part 61, Subpart FF, National Emission Standard for Benzene Waste Operations.

e. No person shall cause or allow the loading of any organic material into any stationary tank having a storage capacity of greater than 946 liters (250 gallons), unless such tank is equipped with a permanent submerged loading pipe or an equivalent device approved by the Illinois EPA according to the provisions of 35 IAC 201, and further processed consistent with 35 IAC 219.108, or unless such tank is a pressure tank as described in 35 IAC 219.121(a) or is

fitted with a recovery system as described in 35 IAC 219.121(b)(2) [35 IAC 219.122(b)].

f. The affected by-product recovery plant, COG desulfurization system and COG flare are subject to 35 IAC 212.123(a), no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to the requirements of 35 IAC 212.122, except as allowed by 35 IAC 212.123(b) and 212.124.

g. SO_2 emissions from the affected by-product recovery plant and COG flare shall not exceed 2000 ppm pursuant to 35 IAC 214.301.

7.3.4 Non-Applicability of Regulations of Concern

a. The storage tanks used at the affected by-product recovery plant are not subject to 35 IAC 219.120 because of the exemption for vessels at coke by-product plants in 35 IAC 219.119(b).

b. The storage tanks used at the affected by-product recovery plant are not subject to 35 IAC 219.121 (Storage Containers of Volatile Petroleum Liquids (VPL)) because the liquids kept in those tanks are not the product of petroleum refinery and, therefore, do not meet the definition of VPL/petroleum liquids of 35 IAC Part 211.

c. This permit is issued based on the affected by-product recovery plant not being subject to the applicable requirements of 35 IAC 219.301 because there is 85% reduction of uncontrolled organic material that would otherwise be emitted into atmosphere, pursuant to 35 IAC 219.302.

d. The COG desulfurization system and COG flare are not subject to 40 CFR 63 Subpart L, National Emission Standards for Benzene Emissions from Coke By-Product Recovery Plants, because both COG systems are not involved in the separation and recovery of coal tar derivatives evolved from coal during the coking process of a coke oven battery.

e. This permit is issued based on the COG desulfurization system (thermal oxidizer) not being subject to 35 IAC 214.301 pursuant to 35 IAC 214.302, which provides that 35 IAC 214.301 shall not apply to processes designed to remove sulfur compounds from the flue gases of fuel combustion emission sources.

7.3.5 Operation of COG Flare during Malfunction and Breakdown

Pursuant to 35 IAC 201.149 and Part 201 Subpart I, subject to the following terms and conditions, the Permittee is authorized

to continue to operate the COG flare in excess of the applicable state standard in Condition 7.3.3(f) in the event of a malfunction or breakdown.

Note: This authorization is provided because the Permittee applied for such authorization in its CAAPP application, generally explaining why such continued operation would be required to prevent injury to personnel or severe damage to equipment, and describing the measures that will be taken to minimize emissions from any malfunctions and breakdowns.

a. This authorization only allows such continued operation as necessary to prevent injury to personnel or severe damage to equipment and does not extend to continued operation solely for the economic benefit of the Permittee.

b. Upon occurrence of excess emissions due to malfunction or breakdown, the Permittee shall, as soon as practicable, repair the COG flare, reduce flare load or remove it from service so that excess emissions cease.

c. The Permittee shall fulfill the applicable recordkeeping and reporting requirements of Conditions 7.3.10(h) and 5.10.5-2 For these purposes, time shall be measured from the start of a particular incident. The absence of excess emissions for a short period shall not be considered to end the incident if excess emissions resume.

d. Following notification to the Illinois EPA (see Condition 5.10.5-2(a)(i))of a malfunction or breakdown with excess emissions, the Permittee shall comply with all reasonable directives of the Illinois EPA with respect to such incident.

e. This authorization does not relieve the Permittee from the continuing obligation to minimize excess emissions during malfunction or breakdown. As provided by 35 IAC 201.265, an authorization in a permit for continued operation with excess emissions during malfunction and breakdown does not shield the Permittee from enforcement for any such violation and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

7.3.6 <u>Control Requirements and Work Practices</u>

a. 40 CFR Part 61, Subpart L:

i. The Permittee shall operate and maintain a Control System to meet the standards specified below in 40 CFR Part 61 Subpart L. This Control System consists of a Positive Pressure Gas Blanketing System supplied with clean coke oven gas controlling the light oil

area and a Negative Pressure or Steam Blanketing System controlling tar, ammonia and liquor tanks.

ii. These control systems shall be designed to operate with no detectable emissions (an organic chemical concentration more than 500 ppm above a background concentration), as determined by the methods specified in 40 CFR 61.245, pursuant to 40 CFR 61.132(b).

iii. The Permittee shall comply with 40 CFR 61.132 - Standard: Process vessels, storage tanks, and tar-intercepting sumps, which includes the following:

A. Each owner or operator of a furnace byproduct recovery plant shall enclose and seal all openings on each process vessel, tar storage tank, and tar-intercepting sump.

B. The owner or operator shall duct gases from each process vessel, tar storage tank, and tar-intercepting sump to the gas collection system, gas distribution system, or other enclosed point in the by-product recovery process where the benzene in the gas will be recovered or destroyed. This control positive pressure blanketing system shall be designed and operated for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background and visual inspections, as determined by the methods specified in 40 CFR 61.245(c).

1. Except, the owner or operator may elect to install, operate, and maintain a pressure relief device, vacuum relief device, an access hatch, and a sampling port on each process vessel, tar storage tank, and tar-intercepting sump. Each access hatch and sampling port must be equipped with a gasket and a cover, seal, or lid that must be kept in a closed position at all times, unless in actual use.

2. The owner or operator may elect to leave open to the atmosphere the portion of the liquid surface in each tar decanter necessary to permit operation of a sludge conveyor. If the owner or operator elects to maintain an opening on part of the liquid surface of the tar decanter, the owner or operator shall install, operate, and maintain a water leg seal on the tar decanter roof near the sludge

discharge chute to ensure enclosure of the major portion of liquid surface not necessary for the operation of the sludge conveyor.

C. Each owner or operator of a furnace coke by-product recovery plant also shall comply with the requirements of 40 CFR 61.132(a) through (c) for each benzene storage tank, BTX storage tank, light-oil storage tank, and excess ammonia-liquor storage tank.

iv. The Permittee shall comply with 40 CFR 61.133 - Standard: Light-oil sumps, which includes the following, pursuant to 40 CFR 61.133(a) and 61.133(c):

A. Each owner or operator of a light-oil sump shall enclose and seal the liquid surface in the sump to form a closed system to contain the emissions.

1. Except, the owner or operator may elect to install, operate, and maintain a vent on the light-oil sump cover. Each vent pipe must be equipped with a water leg seal, a pressure relief device, or vacuum relief device.

2. Except, the owner or operator may elect to install, operate, and maintain an access hatch on each light-oil sump cover. Each access hatch must be equipped with a gasket and a cover, seal, or lid that must be kept in a closed position at all times, unless in actual use.

3. The light-oil sump cover may be removed for periodic maintenance but must be replaced (with seal) at completion of the maintenance operation.

B. The venting of steam or other gases from the by-product process to the light-oil sump is not permitted [40 CFR 61.133(a)].

C. Following the installation of any control equipment used to meet the requirements of 40 CFR 61.133(a), the owner or operator shall monitor the connections and seals on each control system to determine if it is operating with no detectable emissions, using Method 21 (40 CFR Part 60, Appendix A) and the procedures specified in 40 CFR 61.245(c), and shall

visually inspect each source (including sealing materials) for evidence of visible defects such as gaps or tears. This monitoring and inspection shall be conducted semiannually and at any other time the cover is removed.

1. If an instrument reading indicates an organic chemical concentration more than 500 ppm above a background concentration, as measured by Method 21, a leak is detected.

2. If visible defects such as gaps in sealing materials are observed during a visual inspection, a leak is detected.

3. When a leak is detected, it shall be repaired as soon as practicable, but not later than 15 calendar days after it is detected.

4. A first attempt at repair of any leak or visible defect shall be made no later than 5 calendar days after each leak is detected [40 CFR 61.133(c)].

v. The Permittee shall comply with 40 CFR 61.135 - Standard: Equipment leaks.

A. Each piece of equipment in benzene service to which 40 CFR 61 Subpart L applies shall be marked in such a manner that it can be distinguished readily from other pieces of equipment in benzene service [40 CFR 61.135(c)].

B. Each owner or operator of equipment in benzene service shall comply with requirements of 40 CFR 61, Subpart V.

C. The provisions of 40 CFR 61.242-3 and 61.242-9 of Subpart V do not apply to Subpart L.

b. 40 CFR Part 61, Subpart V:

40 CFR 61.242-10: Standards: Delay of Repair

i. Delay of repair of equipment for which leaks have been detected will be allowed if repair within 15 days is technically infeasible without a process unit shutdown. Repair of this equipment shall occur before the end of the next process unit shutdown.

ii. Delay of repair of equipment for which leaks have been detected will be allowed for equipment that is

isolated from the process and that does not remain in VHAP (volatile hazardous air pollutant) service.

iii. Delay of repair for valves will be allowed if:

A. The owner or operator demonstrates that emissions of purged material resulting from immediate repair are greater than the fugitive emissions likely to result from delay of repair; and

B. When repair procedures are affected, the purged material is collected and destroyed or recovered in a control device complying with 40 CFR 61.242-11.

iv. Delay of repair for pumps will be allowed if:

A. Repair requires the use of a dual mechanical seal system that includes a barrier fluid system; and

B. Repair is completed as soon as practicable, but not later than 6 months after the leak was detected.

v. Delay of repair beyond a process unit shutdown will be allowed for a valve if valve assembly replacement is necessary during the process unit shutdown, valve assembly supplies have been depleted, and valve assembly supplies had been sufficiently stocked before the supplies were depleted. Delay of repair beyond the next process unit shutdown will not be allowed unless the next process unit shutdown occurs sooner than 6 months after the first process unit shutdown.

c. 40 CFR 61 Subpart FF (61.355(a)(3) through (a)(5)).

i. Pursuant to 40 CFR 61.355(a)(3), if the total annual benzene quantity from facility waste is equal to or greater than 10 Mg/yr (11 tons/yr), then the owner or operator shall comply with the requirements of 40 CFR 61.342(c), (d), or (e).

ii. Pursuant to 40 CFR 61.355(a)(4), if the total annual benzene quantity from facility waste is less than 10 Mg/yr (11 tons/yr) but is equal to or greater than 1 Mg/yr, (1.1 ton/yr), then the owner or operator shall:

A. Comply with the recordkeeping requirements of 40 CFR 61.356 and reporting requirements of 40 CFR 61.357; and

B. Repeat the determination of total annual benzene quantity from facility waste at least once per year and whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr (11 ton/yr) or more.

iii. Pursuant to 40 CFR 61.355(a)(5), if the total annual benzene quantity from facility waste is less than 1 Mg/yr (1.1 ton/yr), then the owner or operator shall:

A. Comply with the recordkeeping requirements of 40 CFR 61.356 and reporting requirements of 40 CFR 61.357; and

B. Repeat the determination of total annual benzene quantity from facility waste whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 1 Mg/yr (1.1 ton/yr) or more.

d. The COG flare shall be operated with a flame present at all times when COG is vented to the flare [Section 39.5(7)(a) of the Act].

7.3.7 <u>Production and Emission Limits for the COG Desulfurization System from Permit 06070022</u>

a. The Permittee shall operate COG desulfurization system (COG-DS) at all times the by-products plant is producing COG, except when undertaking maintenance or repairs of the system. This total “outage” period shall not exceed 35 days (840 hours) per calendar year.

b. i. Raw COG production during periods of time when the COG-DS is not operating shall not exceed 1,092 mmscf/year.

ii. Total amount of COG generated by Coke Oven Batteries A and B and processed by by-products plant shall not exceed 1,140 mmscf/month and 11,400 mmscf/year.

c. i. The COG-DS shall be operated and maintained in conformance with good air pollution control practices.

ii. The thermal oxidizer combustion chamber for the sulfur recovery unit shall be operated at a temperature that is greater than 1,100°F.

d. i. The H_2S content of the raw COG entering the COG-DS shall not exceed 500 grains of H_2S/100 scf of COG, daily average.

ii. The H_2S content of desulfurized COG exiting the COG-DS shall not exceed 66 grains/100 scf of COG, annual average.

iii. During periods of time when the COG-DS is operating, the H_2S content of COG shall not exceed the following limits: 25 grains of H_2S/100 scf of COG, monthly average, excluding outages, startup, shutdown, and upsets such as failure of fans, pumps or heat exchangers and aberrations in the composition or condition of the raw COG.

e. i. Emissions from the thermal oxidizer on the COG-DS shall not exceed the following limits:

PM_{10}		SO_2	
(Lbs/Hr)	(Tons/Yr)	(Lbs/Hr)	(Tons/Yr)
5.6	24.6	67.3	294.7

ii. Combined emissions of PM_{10} and SO_2 from the thermal oxidizer on COG-DS and combustion of coke oven gas shall not exceed 246.8 and 1,074.1 tons/year for PM_{10} and SO_2, respectively [T1].

iii. Compliance with the annual limits in Conditions 7.3.7(b) and (e) shall be determined from a running total of 12 months of data, unless otherwise specified [T1].

7.3.8 Testing Requirements

a. The Permittee, as the owner or operator of a by-products plant, subject to the provisions of 40 CFR Part 61 Subpart L, shall comply with the requirements in 40 CFR 61.245.

b. The Permittee shall determine the total annual benzene (TAB) quantity of the facility using the test methods and procedures for determination in 40 CFR 61.355(a)(5). In particular, if the total annual benzene quantity from facility waste is less than 1 Mg/yr (1.1 ton/yr), then the owner or operator shall repeat the determination of total annual benzene quantity from facility waste whenever there is a change in the process generating the waste that could cause the total annual benzene quantity from facility waste to increase to 1 Mg/yr (1.1 ton/yr) or more.

c. For the COG flare and the thermal oxidizer in the COG-DS, the Permittee shall conduct observations for visible emissions and/or opacity, using USEPA Method 22 and 9, respectively. These observations shall be conducted by individual(s) certified to observe opacity by USEPA Method 9. The observer(s) may either conduct observations for opacity or conduct observations for visible emissions, immediately followed by observations for opacity if visible

emissions are observed. Observations shall be conducted in at least a monthly basis for the COG flare and an annual basis for the COG-DS thermal oxidizer. In addition, for the COG flare, observations shall be coordinated with weather conditions so that at least two observations are made in each calendar year during elevated wind speed conditions, i.e., wind speed of at least 16 miles per hour.

d. Upon the written request from the Illinois EPA, the emission tests shall be conducted by the Permittee for the COG-DS to verify compliance with emission limits in Condition 7.3.7(e) as follows [Section 39.5(7)(d) and (p) of the Act]:

i. The following USEPA test methods shall be used, unless another USEPA method is approved by the Illinois EPA.

Location of Sample Points	Method 1
Gas Flow and Velocity	Method 2
Flue Gas Weight	Method 3
Moisture	Method 4
PM_{10}	Method 201 or 201A
SO_2	Method 6

ii. Observations of opacity shall be conducted during these emission tests in accordance with Method 9 and the results of these observations included in the reports for emission testing.

iii. For this emission testing, test notifications and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

7.3.9 <u>Monitoring Requirements</u>

a. For the coke by-product recovery plant, when equipment operated in benzene service is tested for compliance with or monitored for no detectable emissions, the owner or operator shall comply with the following requirements [40 CFR 61.245(c)]:

i. The requirements of 40 CFR 61.245 (b) (1) through (4) shall apply.

ii. The background level shall be determined, as set forth in Method 21.

iii. The instrument probe shall be traversed around all potential leak interfaces as close to the interface as possible as described in Method 21.

iv. The arithmetic difference between the maximum concentration indicated by the instrument and the background level is compared with 500 ppm for determining compliance.

b. Alternatives procedures are not established for each exhauster, as provided by 40 CFR 61.135(e) through (g) and 40 CFR 61.136(d). Therefore, pursuant to 40 CFR 61.135(d), each exhauster shall be monitored quarterly to detect leaks 10,000 ppm or greater by the methods specified in 40 CFR 61.245(b).

c. For the coke by-product recovery plant, the owner or operator shall monitor the connections and seals on each control system to determine if it is operating with no detectable emissions, using Method 21 (40 CFR Part 60, Appendix A) and procedures specified in 40 CFR 61.245(c), and shall visually inspect each source (including sealing materials) and the ductwork of the control system for evidence of visible defects such as gaps or tears. This monitoring and inspection shall be conducted on a semiannual basis and at any other time after the control system is repressurized with blanketing gas following removal of the cover or opening of the access hatch.

i. If an instrument reading indicates an organic chemical concentration more than 500 ppm above a background concentration, as measured by Method 21, a leak is detected.

ii. If visible defects such as gaps in sealing materials are observed during a visual inspection, a leak is detected.

iii. When a leak is detected, it shall be repaired by the Permittee as soon as practicable, but not later than 15 calendar days after it is detected.

iv. A first attempt at repair of any leak or visible defect shall be made by the Permittee no later than 5 calendar days after each leak is detected.

d. Pursuant to 40 CFR Part 61.132(a), the Permittee shall operate and maintain Control Systems on the coke by-product plant in accordance with the work practices in 40 CFR Part 61 Subpart L, as specified below. This Control System consists of a Positive Pressure Gas Blanketing System supplied with clean coke oven gas controlling the light oil area and a Negative Pressure or Steam Blanketing System controlling tar, ammonia and liquor tanks.

i. The following procedures shall be conducted on the control system on a semiannual basis and after each time the control system is repressurized and the Permittee shall [40 CFR 61.132(b)]:

A. Inspect the ductwork for evidence of visible defects such as gaps or tears.

B. Monitor the connections and seals to determine if operating with no detectable emissions.

ii. A maintenance inspection of the control system shall be conducted on an annual basis for evidence of system abnormalities such as blocked or plugged lines, sticking valves, plugged condensate traps and other maintenance defects that could result in abnormal system operation. The owner or operator shall make a first attempt at repair within 5 days, with repair within 15 days of detection [40 CFR 61.132(c)].

e. COG flare

Pursuant to Sections 39.5(7)(a) and (d) of the Act, for the COG flare:

i. The Permittee shall either:

A. Install, operate and maintain instrumentation, with alarm, to confirm the presence of a flame at the flare tip; or

B. Monitor for the presence of a pilot flame using a thermocouple or other equivalent device to detect the presence of a flame; or

C. Verify, once per shift, the presence of a flame at the tip of the flare, and that the flare gas header has a positive pressure.

ii. The Permittee shall perform the following inspections of the flare:

A. An inspection of the ignition system on an annual basis;

B. A detailed maintenance and repair inspection during the period when the flare is out of service and/or idled.

f. Monitoring requirements for COG established by FESOP 94120017, Permit 06070022 and Section 39.5(7)(a) of the Act:

i. The Permittee shall operate systems for monitoring the hydrogen sulfide (H_2S) content of the COG exiting the affected by-product plant and exiting the COG-DS.

The H_2S concentration shall be measured on a wet gas basis.

ii. These H_2S monitoring systems shall be equipped with a strip chart recorder or disk storage and shall be capable of recording the H_2S content in grains per standard cubic feet.

iii. These H_2S monitoring systems shall meet the applicable requirements of Performance Specification 7 of 40 CFR 60, Appendix B. These H_2S monitoring systems shall be operated, and data collected, reduced and maintained, in accordance with the applicable requirements of 40 CFR 60.13 and 35 IAC Part 201 Subpart L.

iv. The H_2S monitoring system for COG exiting the by-product plant shall comply with the following requirements for collection of data:

A. The system shall collect hourly average H_2S content data for at least 75% of the daily operating hours in which COG is not treated by the COG-DS (e.g., at 24 hours/day COG production, at least 18 hourly averages of H_2S content must be obtained). In the event that this minimum data requirement cannot be met by the H_2S monitoring system, the H_2S content data shall be supplemented or obtained by one of the following alternative methods.

I. H_2S determined by type of coal used during that period and previous recorded H_2S content when using this coal type. This method shall only be used for a maximum of 15 days per calendar year.

II. A manual sample of COG shall be taken daily and the H_2S content shall be determined by 40 CFR 60, Appendix A, Method 11, as adapted to measure higher ranges of H_2S. This value, or a value based on the mean of the daily values plus two standard deviations for the previous 90 days for which a reading was obtained, whichever is higher, shall be used. Should a coal blend change occur during the period this alternative method is being used, the mean value plus two standard deviations will be adjusted to reflect any potential change in the H_2S content from that of the previous coal blend.

B. The system shall collect H_2S content data for at least 75% of the daily operating hours in which COG is treated by the COG-DS with this data being the average over at least 5 minutes in each such operating hour. In the event that this minimum data requirement cannot be met by the H_2S monitoring system or can only be met with manual cycling of the H_2S monitoring system for treated COG data shall be supplemented or obtained by one of the following alternative methods:

I. H_2S data as obtained by manual sampling and analysis at least one per day; or

II. H_2S data as obtained from the H_2S monitoring system for treated COG at least twice per day, at least 8 hours apart.

C. The alternative methods provided for in this condition shall only be used in the event of a malfunction or breakdown of the H_2S monitoring systems, i.e., not during periods when a monitoring system is functioning properly to collect valid data.

v. These H_2S monitors shall be tested at least every 12 months in accordance with 40 CFR 60, Appendix B, Performance Specification 7. The results of these tests shall be sent to the IEPA's Division of Air Pollution, Control Permit Section and Regional Office within 14 days after summarizing of results. In addition, the results shall be maintained in accordance with the recordkeeping specified in this permit. For the H_2S monitoring system for COG exiting the by-product plant, this testing shall be conducted as follows:

A. The H_2S content in grains per standard cubic foot of COG shall be determined using 40 CFR 60, Appendix A, Method 11 as adapted to measure higher ranges of H_2S.

B. The following revisions shall be made to Method 11 to allow the measuring of higher ranges of H_2S:

1. Diluent air shall mean air containing less than 0.5 ppm total sulfur compounds and less than 10 ppm each of moisture and hydrocarbons.

2. 7.0 Procedure - Located after the sampling valve, there will be a gas mixing box with a metered supply of (heated) diluent air. This metered supply of diluent air will be introduced prior to sampling and adjusted so that the final dilution of the sample will be 1:20 (i.e., 0.05 liters/min of sample to 0.95 liters/min of dilution air).

3. 9.4 - Vm = Volume of gas sample through the gas meter (meter conditions), liters/20.

   Vm_{CSTD} = (Corrected) volume at standard conditions of gas sampled through the dry gas meter. (Standard Liters).

vi. In the event of malfunction or breakdown of the H2S monitoring systems, the Permittee shall repair and recalibrate the meter or monitoring systems as soon as practicable but no later than 10 days after the malfunction or breakdown is detected, unless prior Illinois EPA approval is obtained by submitting adequate justification to the Illinois EPA detailing the reasons for delay. Records of repair and recalibration must be maintained in accordance with the recordkeeping requirements of this permit. This condition does not relieve the Permittee of the minimum data collection requirements of this permit.

g. The Permittee shall equip the thermal oxidizer in the COG-DS with a continuous monitoring system, which shall be calibrated, maintained, and operated at all times the COG-DS thermal oxidizer is in operation, to monitor the combustion chamber temperature of the thermal oxidizer [Sections 39.5(7)(a) and (d) of the Act].

h. The Permittee shall sample and analyze the COG exiting the byproduct plant and treated COG from the COG-DS for PM content using appropriate ASTM methods or other comparable methodology. These measurements shall be conducted at least annually. The records for this activity shall also include data for the H_2S content of COG at the time of sampling [Sections 39.5.7(a) and (d) of the Act].

7.3.10 <u>Recordkeeping Requirements</u>

The Permittee shall maintain records of the following items for the affected by-product recovery plant, the COG-DS and COG flare, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. 40 CFR Part 61 Subpart L (40 CFR 61.138):

i. The following information pertaining to the design of control equipment installed to comply with 40 CFR 61.132 through 61.134 shall be recorded and kept in a readily accessible location:

A. Detailed schematics, design specifications, and piping and instrumentation diagrams.

B. The dates and descriptions of any changes in the design specifications.

ii. The following information pertaining to sources subject to 40 CFR 61.132 and sources subject to 40 CFR 61.133 shall be recorded and maintained for 2 years following each semiannual (and other) inspection and each annual maintenance inspection:

A. The date of the inspection and the name of the inspector.

B. A brief description of each visible defect in the source or control equipment and the method and date of repair of the defect.

C. The presence of a leak, as measured using the method described in 40 CFR 61.245(c). The record shall include the date of attempted and actual repair and method of repair of the leak.

D. A brief description of any system abnormalities found during the annual maintenance inspection, the repairs made, the date of attempted repair, and the date of actual repair.

b. 40 CFR Part 61 Subpart FF (40 CFR 61.356):

i. Each owner or operator of a facility subject to the provisions of Subpart FF shall comply with the recordkeeping requirements of 40 CFR 61.356. Each record shall be maintained in a readily accessible location at the facility site for a period not less than two years from the date the information is recorded unless otherwise specified [40 CFR 61.356(a)].

ii. Each owner or operator shall maintain records that identify each waste stream at the facility subject to Subpart FF, and indicate whether or not the waste stream is controlled for benzene emissions in accordance with this subpart. In addition the owner or operator shall maintain the following records [40 CFR 61.356(b)]:

A. For each waste stream not controlled for benzene emissions in accordance with Subpart FF, the records shall include all test results, measurements, calculations, and other documentation used to determine the following information for the waste stream: waste stream identification, water content, whether or not the waste stream is a process wastewater stream, annual waste quantity, range of benzene concentrations, annual average flow-weighted benzene concentration, and annual benzene quantity.

B. For each waste stream exempt from 40 CFR 61.342(c)(1) in accordance with 40 CFR 61.342(c)(3), the records shall include:

1. All measurements, calculations, and other documentation used to determine that the continuous flow of process wastewater is less than 0.02 liters (0.005 gallons) per minute or the annual waste quantity of process wastewater is less than 10 Mg/yr (11 ton/yr) in accordance with 40 CFR 61.342(c)(3)(i), or

2. All measurements, calculations, and other documentation used to determine that the sum of the total annual benzene quantity in all exempt waste streams does not exceed 2.0 Mg/yr (2.2 ton/yr) in accordance with 40 CFR 61.342(c)(3)(ii).

C. For each facility where process wastewater streams are controlled for benzene emissions in accordance with 40 CFR 61.342(d), the records shall include for each treated process wastewater stream all measurements, calculations, and other documentation used to determine the annual benzene quantity in the process wastewater stream exiting the treatment process.

D. For each facility where waste streams are controlled for benzene emissions in accordance with 40 CFR 61.342(e), the records shall include for each waste stream all measurements, including the locations of the measurements, calculations, and other documentation used to determine that the total benzene quantity does not exceed 6.0 Mg/yr (6.6 ton/yr).

E. For each facility where the annual waste quantity for process unit turnaround waste is determined in accordance with 40 CFR

61.355(b)(5), the records shall include all test results, measurements, calculations, and other documentation used to determine the following information: identification of each process unit at the facility that undergoes turnarounds, the date of the most recent turnaround for each process unit, identification of each process unit turnaround waste, the water content of each process unit turnaround waste, the annual waste quantity determined in accordance with 40 CFR 61.355(b)(5), the range of benzene concentrations in the waste, the annual average flow-weighted benzene concentration of the waste, and the annual benzene quantity calculated in accordance with 40 CFR 61.355(a)(1)(iii).

F. For each facility where wastewater streams are controlled for benzene emissions in accordance with 40 CFR 61.348(b)(2), the records shall include all measurements, calculations, and other documentation used to determine the annual benzene content of the waste streams and the total annual benzene quantity contained in all waste streams managed or treated in exempt waste management units.

iii. An owner or operator shall maintain a record for each visual inspection required by 40 CFR 61.343 through 61.347 that identifies a problem (such as a broken seal, gap or other problem) which could result in benzene emissions. The record shall include the date of the inspection, waste management unit and control equipment location where the problem is identified, a description of the problem, a description of the corrective action taken, and the date the corrective action was completed [40 CFR 61.356(g)].

c. 40 CFR Part 61 Subpart V (40 CFR 61.246):

i. A. Each owner or operator subject to the provisions of Subpart V shall comply with the recordkeeping requirements of 40 CFR 61.246 [40 CFR 61.246(a)(1)].

B. An owner or operator of more than one process unit subject to the provisions of Subpart V may comply with the recordkeeping requirements for these process units in one recordkeeping system if the system identifies each record by each process unit [40 CFR 61.246(a)(2)].

ii. When each leak is detected as specified in 40 CFR 61.242-2, 61.242-3, 61.242-7, 61.242-8, and 61.135,

the following requirements apply to the Permittee [40 CFR 61.246(b)]:

A. A weatherproof and readily visible identification, marked with the equipment identification number, shall be attached to the leaking equipment.

B. The identification on a valve may be removed after it has been monitored for 2 successive months as specified in 40 CFR 61.242-7(c) and no leak has been detected during those 2 months.

C. The identification on equipment, except on a valve, may be removed after it has been repaired.

iii. When each leak is detected as specified in 40 CFR 61.242-2, 61.242-3, 61.242-7, 61.242-8, and 61.135, the following information shall be recorded by the Permittee in a log and shall be kept for 2 years in a readily accessible location [40 CFR 61.246(c)]:

A. The instrument and operator identification numbers and the equipment identification number.

B. The date the leak was detected and the dates of each attempt to repair the leak.

C. Repair methods applied in each attempt to repair the leak.

D. Above 10,000 if the maximum instrument reading measured by the methods specified in 40 CFR 61.245(a) after each repair attempt is equal to or greater than 10,000 ppm.

E. Repair delayed and the reason for the delay if a leak is not repaired within 15 calendar days after discovery of the leak.

F. The signature of the owner or operator (or designate) whose decision it was that repair could not be effected without a process shutdown.

G. The expected date of successful repair of the leak if a leak is not repaired within 15 calendar days.

H. Dates of process unit shutdowns that occur while the equipment is unrepaired.

I. The date of successful repair of the leak.

iv. The following information pertaining to all equipment to which a standard applies shall be recorded in a log that is kept in a readily accessible location by the Permittee [40 CFR 61.246(e)]:

A. A list of identification numbers for equipment (except welded fittings) subject to the requirements of Subpart V.

B. 1. A list of identification numbers for equipment that the owner or operator elects to designate for no detectable emissions as indicated by an instrument reading of less than 500 ppm above background.

2. The designation of this equipment for no detectable emissions shall be signed by the owner or operator.

C. A list of equipment identification numbers for pressure relief devices required to comply with 40 CFR 61.242-4(a).

D. 1. The dates of each compliance test required in 40 CFR 61.242-2(e), 61.242-3(i), 61.242-4, 61.242-7(f), and 61.135(g).

2. The background level measured during each compliance test.

3. The maximum instrument reading measured at the equipment during each compliance test.

E. A list of identification numbers for equipment in vacuum service.

v. The following information pertaining to all valves subject to the requirements of 40 CFR 61.242-7(g) and (h) and to all pumps subject to the requirements of 40 CFR 61.242-2(g) shall be recorded by the Permittee in a log that is kept in a readily accessible location [40 CFR 61.246(f)]:

A. A list of identification numbers for valves and pumps that are designated as unsafe to monitor, an explanation for each valve or pump stating why the valve or pump is unsafe to monitor, and the plan for monitoring each valve or pump.

B. A list of identification numbers for valves that are designated as difficult to monitor, an explanation for each valve stating why the valve is difficult to monitor, and the planned schedule for monitoring each valve.

vi. The following information shall be recorded by the Permittee for valves complying with 40 CFR 61.243-2 [40 CFR 61.246(g)]:

A. A schedule of monitoring.

B. The percent of valves found leaking during each monitoring period.

vii. The following information shall be recorded in a log by the Permittee that is kept in a readily accessible location [40 CFR 61.246(h)]:

A. Design criterion required in 40 CFR 61.242-2(d)(5), 61.242-3(e)(2), and 61.135(e)(4) and an explanation of the design criterion; and

B. Any changes to this criterion and the reasons for the changes.

viii. The following information shall be recorded in a log by the Permittee that is kept in a readily accessible location for use in determining exemptions as provided in the applicability section of this subpart and other specific Subparts [40 CFR 61.246(i)]:

A. An analysis demonstrating the design capacity of the process unit, and

B. An analysis demonstrating that equipment is not in VHAP service.

ix. Information and data used to demonstrate that a piece of equipment is not in VHAP service shall be recorded in a log by the Permittee that is kept in a readily accessible location [40 CFR 61.246(j)].

d. The Permittee shall keep the following records for the COG flare [Section 39.5(7)(e) of the Act]:

i. Records of inspections and maintenance or repair activities conducted pursuant to Condition 7.3.9(e)(ii).

ii. H_2S content in the COG with supporting calculations of SO_2 emissions from the flare.

e. The following records for the COG-DS pursuant to Permit 06070022:

i. Temperature monitoring system for thermal oxidizer on the Claus Sulfur Recovery Unit:

A. Recorded data.

B. A log of operating time for the control system or devices, monitoring system, and the coke oven byproducts plant.

C. A maintenance log for the oxidizer and monitoring device detailing all routine and non-routine maintenance performed including dates and duration of any outages.

ii. Operating Records for the Packed Tower Amine Unit:

A. Amine temperature leaving the unit (°F).

B. Amine flow (gallons/minute).

C. COG flow into or out of the unit.

iii. Logs:

A. Operating logs.

B. Maintenance logs detailing all routine and non-routine maintenance performed including dates and duration of any outages.

iv. Production Records:

A. COG production during periods of time when the COG-DS is operating (mmscf/month and mmscf/year).

B. COG production during periods of time when the COG-DS is not operating (mmscf/month and mmscf/year).

v. Records of H_2S content in COG, with supporting data and calculations:

A. H_2S content of COG exiting the by-product plant, daily average.

B. H_2S content of COG, annual average.

C. H_2S content of treated COG, excluding outages, startup, shutdown, and upsets, monthly average.

vi. Emission Records for the COG Desulfurization System (Claus Sulfur Recovery Unit) [Sections 39.5.7(a) and (d) of the Act]

A. A file containing the emission factors used by the Permittee to determine emissions of PM_{10} and SO_2 from the Claus Sulfur Recovery Unit, with supporting documentation. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of this unit do not understate actual emissions. These records shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

B. Engineering calculations for typical and maximum hourly PM_{10} and SO_2 emissions (lbs/hour) Claus Sulfur Recovery Unit, with supporting documentation.

C. Records for the concentration of SO_2 and H_2S (percent by volume) in the tail gas of the Claus Sulfur Recovery Unit, which is sent to the thermal oxidizer, as measured by process instrumentation.

D. Records for any periods of operation of the Claus Sulfur Recovery Unit that are not otherwise addressed in the required records during which the established emission factor in Condition 7.3.10(e)(vi)(A) would understate actual emissions of this unit, with description of the period of operation and an estimate of the additional emissions during such period that would not be accounted for by the established factor, with supporting explanation and calculations.

D. Records for any periods of operation of the Claus Sulfur Recovery Unit that are not otherwise addressed in the required records during which the established emission rate in Condition 7.3.10(e)(vi)(B) would understate the actual emissions of this unit, with description of the period of operation, including date, time and duration, explanation, and an estimate of the additional emissions during such period that would not be accounted for by the established rate, with supporting explanation and calculations.

F. Records for the annual PM_{10} and SO_2 emissions of the Claus Sulfur Recovery Unit for comparison to the limits in Conditions 7.3.7(e), with supporting calculations.

Note: Records for PM_{10} and SO_2 emissions associated with combustion of COG at the facility are contained in Condition 5.9.1(e).

f. The following records for the H_2S monitoring system for COG exiting the by-product plant, pursuant to FESOP 94120017:

i. The hourly average, 3-hour average and daily average H_2S content of the COG in grains per standard cubic foot.

ii. The H_2S monitor strip chart or disk storage.

iii. Thousand standard cubic feet of COG used per 3-hours for slab reheat furnaces 1-3 and ladle drying preheaters and per day for each unit operating group.

iv. The calibration, maintenance and repair of the H_2S monitor used in compliance calculations.

g. Other Records

i. Records of the amount of raw coke oven gas being received from the coke ovens (scf/mo and acf/yr).

ii. Records of the following by-products being produced:

A. Clean coke oven gas (scf/mo and scf/yr);

B. Light oil (gal/mo and gal/yr); and

C. Tar (ton/mo and ton/yr).

iii. If the Permittee operates under manufacturer’s specifications or manufacturer’s instructions, such manufacturer’s documentation shall be kept at the source as part of the required records.

iv. Records of annual benzene waste generated on site (tons/yr).

v. Annual emissions of VOM from the affected by-product recovery plant.

h. Records for Malfunctions or Breakdowns

Pursuant to 35 IAC 201.263, the Permittee shall maintain records of continued operation of the affected COG flare as addressed by Condition 7.3.5 during malfunctions or breakdowns, which at a minimum, shall include the following records. The preparation of these records shall be completed within 45 days of an incident, unless the Permittee conducts a root cause analysis for the incident, in which case the preparation of these records, other than

the root cause analysis, shall be completed within 120 days of the incident.

i. Date, time and duration of the incident.

ii. A detailed description of the incident, including:

A. A chronology of significant events during and leading up to the incident.

B. Relevant operating data for the unit, including information such as operator log entries and directives provided by management during the incident.

C. The measures taken to reduce the quantity of emissions and the duration of the incident including the resources utilized to address the incident.

D. The magnitude of emissions during the incident.

iii. An explanation why continued operation of an affected COG flare was necessary to prevent personnel injury or prevent equipment damage.

iv. A discussion of the cause(s) or probable cause(s) of the incident including the following:

A. Whether the incident was sudden, unavoidable, or preventable, including:

1. Why the equipment design did not prevent the incident;

2. Why better maintenance could not have avoided the incident;

3. Why better operating practices could not have avoided the incident; and

4. Why there was no advance indication for the incident.

B. Whether the incident stemmed from any activity or event that could have been foreseen, avoided or planned for.

C. Whether the incident was or is part of a recurring pattern indicative of inadequate design, operation or maintenance.

v. A description of any steps taken or to be taken to prevent similar future incidents or reduce their frequency and severity.

vi. As an alternative to keeping the records required by Condition 7.3.10(h)(iv), the Permittee may perform a root cause analysis. For this purpose, a root cause analysis is an analysis whose purpose is to determine, correct and eliminate the primary causes of the incident and the excess emissions resulting there from. If the Permittee performs a root cause analysis method that would define the problem, define all causal relationships, provide a causal path to the root cause, delineate the evidence, and provide solutions to prevent a recurrence. Such an analysis shall be completed within one year of the incident.

7.3.11 Reporting Requirements

The Permittee shall submit the following reports pursuant to Section 39.5(7)(a) and (c) of the Act:

a. 40 CFR 61 Subpart L (40 CFR 61.138):

i. A report shall be submitted to the Illinois EPA semiannually starting 6 months after the initial reports required in 40 CFR 61.138(e) and 40 CFR 61.10, which includes the following information [40 CFR 61.138(f)]:

A. For sources subject to 40 CFR 61.132 and sources subject to 40 CFR 61.133:

1. A brief description of any visible defect in the source or ductwork;

2. The number of leaks detected and repaired; and

3. A brief description of any system abnormalities found during each annual maintenance inspection that occurred in the reporting period and the repairs made.

B. For equipment in benzene service subject to 40 CFR 61.135(a), information required by 40 CFR 61.247(b).

C. For each exhauster subject to 40 CFR 61.135 for each quarter during the semiannual reporting period:

1. The number of exhausters for which leaks were detected as described in 40 CFR 61.135(d) and (e)(5);

2. The number of exhausters for which leaks were repaired as required in 40 CFR 61.135(d) and (e)(6); and

3. The results of performance tests to determine compliance with 40 CFR 61.135(g) conducted within the semiannual reporting period.

D. A statement signed by the owner or operator stating whether all provisions of 40 CFR part 61, subpart L, have been fulfilled during the semiannual reporting period.

b. 40 CFR 61 Subpart V (40 CFR 61.247):

i. An owner or operator of any piece of equipment to which Subpart V applies shall submit a statement in writing notifying the Illinois EPA that the requirements of 40 CFR 61.242, 61.245, 61.246, and 61.247 are being implemented [40 CFR 61.247(a)(1)].

ii. A report shall be submitted to the Illinois EPA semiannually starting 6 months after the initial report required in 40 CFR 61.247(a), that includes the following information [40 CFR 61.247(b)]:

A. Process unit identification.

B. For each month during the semiannual reporting period:

1. Number of valves for which leaks were detected as described in 40 CFR 61.242-7(b) of 61.243-2.

2. Number of valves for which leaks were not repaired as required in 40 CFR 61.242-7(d).

3. Number of pumps for which leaks were detected as described in 40 CFR 61.242-2(b) and (d)(6).

4. Number of pumps for which leaks were not repaired as required in 40 CFR 61.242-2(c) and (d)(6).

5. Number of compressors for which leaks were detected as described in 40 CFR 61.242-3(f).

6. Number of compressors for which leaks were not repaired as required in 40 CFR 61.242-3(g).

7. The facts that explain any delay of repairs and, where appropriate, why a process unit shutdown was technically infeasible.

C. Dates of process unit shutdowns which occurred within the semiannual reporting period.

D. Revisions to items reported according to 40 CFR 61.247(a) if changes have occurred since the initial report or subsequent revisions to the initial report.

E. The results of all performance tests and monitoring to determine compliance with no detectable emissions and with 40 CFR 61.243-1 and 61.243-2 conducted within the semiannual reporting period.

c. 40 CFR 61 Subpart FF (40 CFR 61.357)

i. If the total annual benzene quantity from facility waste is less than 1 Mg/yr (1.1 ton/yr), then the owner or operator shall submit to the Illinois EPA and the Administrator a report that updates the information listed in 40 CFR 61.357(a)(1) through (a)(3) whenever there is a change in the process generating the waste stream that could cause the total annual benzene quantity from facility waste to increase to 1 Mg/yr (1.1 ton/yr) or more [40 CFR 61.357(b)].

ii. If the total annual benzene quantity from facility waste is less than 10 Mg/yr (11 ton/yr) but is equal to or greater than 1 Mg/yr (1.1 ton/yr) then the owner or operator shall submit to the Illinois EPA and the Administrator a report that updates the information listed in 40 CFR 61.357 (a)(1) through (a)(3). The report shall be submitted annually and whenever there is a change in the process generating the waste stream that could cause the total annual benzene quantity from facility waste to increase to 10 Mg/yr (11 ton/yr) or more. If the information in the annual report required by 40 CFR 61.357 (a)(1) through (a)(3) is not changed in the following year, the owner or operator may submit a statement to that effect [40 CFR 61.357(c)].

iii. If the total annual benzene quantity from facility waste is equal to or greater than 10 Mg/yr (11 ton/yr), then the owner or operator shall submit to the Illinois EPA and the Administrator reports described in 40 CFR 61.357(d) [40 CFR 61.357(d)].

d. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by the affected coke by-product recovery plant, COG system and COG flare from applicable requirements, unless a NESHAP standard specifies a different timeframe, as follows:

A. Requirements in Condition 7.3.3(e), (f) and (g).

B. Requirements in Condition 7.3.6.

C. Requirements in Condition 7.3.7.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

iii. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

iv. All required deviation reports described in Condition 7.3.11(d) above shall contain the following information:

A. Date, time and duration of the deviation;

B. Description of the deviation;

C. Probable cause of the deviation; and

D. Any corrective action or preventive measures taken.

e. Reporting on the State malfunction and breakdown authorization shall be performed in accordance with Condition 5.10.5-2.

f. Reporting on the Federal SSM authorization shall be performed in accordance with Condition 5.10.5-3.

7.3.12 <u>Operational Flexibility/Anticipated Operating Scenarios</u>

The following requirements established by Construction Permit 09030019 shall be followed during idling of the affected coke batteries and coke by-product recovery plant:

This permit authorizes operation of adsorber systems to control emissions from the equipment in the Coke By-Product Recovery Plant, as an alternative to the various blanketing systems on the by-products plant during idling or other interruptions in

these blanketing systems, as addressed by Permit 09030019, subject to the following requirements:

a. Each system will use a canister-type vessel containing activated carbon to “filter” organic material from the exhaust from the units. The adsorber vessels will not be regenerated on-site but replaced when the capacity of the vessel to adsorb organic material is approached.

b. Various equipment or affected operations at the by-products plant, including processing vessels such as tar decanters, light oil decanters and storage tanks which are subject to NESHAP (the associated operations).

   i. The affected adsorbers shall be designed and operated to achieve at least 98 percent control of emissions of benzene from the associated operations, as required by 40 CFR 61.139(a), with compliance determined in accordance with applicable requirements of 40 CFR 61.139(b) and (h).

   ii. As the by-products plant is subject to 40 CFR 61, Subpart L, the Permittee will continue to be subject to applicable requirements of 40 CFR 61, Subpart A, General Provisions for associated operations, including 40 CFR 61.12(c), which requires that the Permittee maintain and operate these operations, including associated equipment for air pollution control, in a manner consistent with good air pollution control practice for minimizing emissions.

   iii. A. The Permittee shall have access to sampling equipment and other capabilities necessary to conduct monitoring for the affected adsorbers, i.e., operational measurements for the concentration of benzene or hydrocarbons in the exhaust from the adsorbers.

   B. While the adsorbers serve to control emissions from the associated operations, the Permittee shall conduct applicable monitoring for the affected adsorbers required by 40 CFR 61, Subparts A and L, including 40 CFR 61.139(e).

   iv. For the associated operations while controlled by the adsorbers, the Permittee shall fulfill applicable recordkeeping requirements of 40 CFR 61, Subparts A and L, including 40 CFR 61.139(i).

   v. The Permittee shall keep a file for each adsorber system that contains documentation for the adsorption capacity of the adsorption vessel and engineering calculations for the rate at which the associated operations would generate emissions and the expected operating life of an adsorption vessel in days.

vi. The operating records that the Permittee maintains for the associated operations and adsorbers shall include the following information, in addition to other required information:

A. The date that an adsorber vessel is switched out, with reason and measured hydrocarbon concentration in the exhaust prior to switchout.

B. For periods when the adsorbers operated properly, i.e., in accordance with Condition 7.3.12(a), relevant information to generally confirm proper operation.

C. For periods when an adsorber did not operate properly, identification of each such period and the associated operations that were operating, with detailed information describing: 1) The operation of the adsorber, including the monitored exhaust concentration; 2) The potential consequences for additional emissions of organic material with an estimate of the additional emissions, with explanation; 3) The actions taken to restore proper operation; and 4) Any actions taken to prevent similar events in the future.

vii. The maintenance records that the Permittee maintains for the associated operations and adsorbers shall include the following information, in addition to other required information:

A. Until the operations are idled, date and time that an inspection or maintenance/repair activity on the units was performed, with description of activity and name(s) of the responsible personnel.

B. While the associated operations are idled, date and time that an inspection or maintenance/repair activity for the preservation measures on the operations was performed, with description of activity and name(s) of the responsible personnel.

viii. The Permittee shall fulfill applicable reporting requirements of 40 CFR 61, Subparts A and L, for the associated operations while they are controlled by the affected adsorbers.

ix. The Permittee shall notify the Illinois EPA of the following events for the coke by-product plant:

A. The date that existing control systems for the plant are shut off, within 15 days of such date. This report shall describe any difficulties that were encountered in the transition to control with the affected adsorbers, confirm the integrity of the ductwork of each affected adsorber, and include the results of initial measurements for the hydrocarbon concentrations in the exhaust from each affected adsorber, conducted in accordance with Condition 7.3.12(a).

B. The date that operation of all adsorbers is no longer required by 40 CFR 61, Subpart L, within 30 days of such date. This report shall indicate the date when the emptying and cleaning of each group of the associated operations was completed, the current status of each affected adsorber (i.e., physically removed from the plant, scheduled to be removed, or left in place pending further developments), and the actions that are planned to maintain the condition and integrity of the affected associated operations while they are idle.

Note: During a period when the affected plant is idle, even if all associated operations are cleaned and emptied, the Permittee must continue to submit the routine semiannual compliance reports required by 40 CFR 61, Subpart L.

C. The date that resumption of normal operation of the by-product plant is planned, at least 10 days prior to such date. This report shall generally describe the sequence of events that will accompany resumption of operation of the existing control systems for the plant.

7.3.13 Compliance Procedures

For the affected coke by-product recovery plant, COG system and COG flare, compliance with Conditions 7.3.3 and 7.3.7 is addressed by the work practices, testing, monitoring, recordkeeping and reporting requirements in Section 7.3 of this permit.

7.3.14 State-Only Conditions

State-only conditions are not being established.

7.4 Blast Furnaces

7.4.1 Description

Blast Furnaces and Casthouse:

Iron ore is converted to molten iron in the “A” and “B” Blast Furnaces. Iron ore, coke and a variety of fluxes (collectively called the burden) are charged into the top of the furnace, while heated air is blown up through the burden at a high velocity. Molten iron and slag accumulate in the bottom of the furnace, where a taphole is periodically drilled. The molten iron and slag pour out of the furnace into a trough, where the slag is separated from the iron. The iron moves down runners until it pours into torpedo cars. From here, the iron is taken to the Basic Oxygen Furnace (BOF) shop, where it is converted into steel. The slag travels down a separate runner and dumps into the slag pits. The molten slag is quenched with a mixture of water and potassium permanganate solution.

Charging of the Blast Furnace generates particulate matter emissions. Each furnace has a double-bell system to minimize emissions from charging.

Casthouse emissions consisting of particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, and organic materials are generated during tapping of the furnace and the miscellaneous operations that take place within the casthouse structure. Emissions are controlled by the Casthouse Baghouse and the Iron Spout Baghouse.

Emissions may also be discharged from a blast furnace during startup, malfunctions and shutdowns for routine maintenance. Each furnace is equipped with bleeder valves which will relieve to the atmosphere if the furnace becomes over pressurized. This can occur during furnace slops when material in the furnace bridges forming a void and then collapses. Slips can cause over pressurization. In this condition, the stock in the furnace will bridge and cause a void to develop. The void will increase until the bridge collapses. Backdrafting of the blast furnaces is conducted to perform certain repairs, both routine and non-routine. Steam is utilized to draw furnace gases back through the tuyeres and out of backdraft stacks.

Blast Air Stoves:

The blast air stoves heat the blast air for the blast furnaces. Emissions from the stoves consist of particulate matter, sulfur dioxide, nitrogen oxides, and carbon monoxide generated as by-products of the combustion of Blast Furnace Gas (BFG) and Coke Oven Gas (COG). In addition, the blast furnaces can also use fuel oil in the event that other fuels are not available.

The byproduct gases from the blast furnaces are first cleaned in a BFG Pretreatment system with mechanical separation and water

wash to remove entrained dust and are then combusted in the stoves for the blast furnaces and other units at the source. BFG is primarily made up of carbon monoxide. The heat generated by the combustion of these gases is used to heat the brick inside of the stoves. The air flow is switched and this stored heat is then transferred to the blast air that is blown into the blast furnaces as part of the iron making process. There are three stoves for each furnace, which enables a continuous supply of blast air to the blast furnace. Only two of the three stoves will burn at any given time. All three stoves are exhausted to a common stack.

Excess BFG is also used in the various other fuel combustion emission units at the source. BFG that cannot be used as fuel is flared in either BFG flare #1 or #2.

Note: This narrative description is for informational purposes only and is not enforceable.

7.4.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Blast Furnaces	• Blast Furnaces (A and B including charging and BFG pretreatment system)	Before 1972	None
	• Blast Furnace Casthouse (Tapping, Iron and Slag Runner, Slag Pits and Torpedo Car Loading Emissions From A and B Furnaces)		Casthouse Baghouse; and Iron Spout Baghouse;
	• Blast Furnace Gas Flare #1		None
	• (6) Blast Air Stoves (BFG,COG and natural Gas) (3 per each furnace)	Before 1972	None
	• Blast Furnace Gas Flare #2	2008	None
	• Slag pits	Before 1972	None

7.4.3 Applicable Provisions

a. The “affected blast furnace processes” for the purpose of these unit-specific conditions, are the emission units and activities described in Conditions 7.4.1 and 7.4.2.

b. Pursuant to 35 IAC 212.445, emissions of PM shall not exceed the following limits:

i. Uncaptured particulate matter from any opening in a blast furnace cast house shall not exceed 20 percent opacity on a six (6) minute rolling average basis beginning from initiation of the opening of the tap hole up to the point where the iron and slag stops flowing in the trough. Opacity observations shall be taken in accordance with the procedures of 40 CFR 60, Appendix A, Method 9 [35 IAC 212.445(a)].

ii. A. Particulate matter emissions from control equipment used to collect any of the emissions from the tap hole, trough, iron or slag runners or iron or slag spouts shall not exceed 0.023 g/dscm (0.010 gr/dscf). Compliance with this standard shall be determined in accordance with the procedures set out in 40 CFR 60, Appendix A, Methods 1 through 5, incorporated by reference in 35 IAC 212.113 and shall be based on the duration of a cast. For this purpose, a cast is defined as the initiation of the opening of the tap hole up to the point where the iron and slag stop flowing through the trough consistent with 35 IAC 212.445(a)(i) [35 IAC 212.445(b)(1)].

B. The opacity of emissions from control equipment used to collect any of the particulate matter emissions from the tap hole, trough, iron or slag runners or iron or slag spouts shall not exceed 10 percent on a six (6) minute rolling average basis [35 IAC 212.445(b)(2)].

c. Pursuant to 35 IAC 214.301, the affected blast furnace processes shall comply with the following: no person shall cause or allow the emission of sulfur dioxide into the atmosphere from any process emission source to exceed 2000 ppm.

d. The affected blast furnace processes other than the cast house are subject to 35 IAC 212.123(a), which provides that no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to the requirements of 35 IAC 212.122, except as allowed by 35 IAC 212.123(b) and 212.124.

e. Pursuant to 40 CFR 63.7790(a) and Paragraph 7 of Table 1, of 40 CFR 63 Subpart FFFFF, the emissions shall not exceed the following limits from each casthouse at an existing blast furnace:

i. Particulate matter emissions from a control device shall not exceed 0.01 gr/dscf; and

ii. Any secondary emissions that exit any opening in the casthouse or structure housing the blast furnace shall not exceed opacity greater than 20 percent (6 minute average).

f. Pursuant to 40 CFR 63.7790(b)(1), the Permittee must operate each capture system applied to emissions from blast furnace casthouse at or above the lowest value or settings established for the operating limits in the Permittee's operation and maintenance plan.

g. Pursuant to 35 IAC 212.316(f), uncaptured particulate matter emissions from blast furnace charging shall not exceed opacity of 20 percent.

h. Pursuant to 35 IAC 212.458(b)(7) and (c), blast furnace stoves shall comply with the following: No person shall cause or allow emissions of PM_{10} into the atmosphere to exceed 22.9 mg/scm (0.01 gr/scf) during any one hour period, provided that this limit shall not apply if there are no visible emissions, except if a stack test is performed, the absence of visible emissions is not a defense to a finding violation.

7.4.4 Non-Applicability of Regulations of Concern

a. The emission limitations of 35 IAC 212.324 are not applicable to any affected blast furnace processes that are subject to a specific emissions standard or limitation contained in 35 IAC Part 212 Subpart R, Primary and Fabricated Metal Products and Machinery Manufacture, pursuant to 35 IAC 212.324 (a)(3).

b. The affected blast furnace processes are not subject to 35 IAC 212.321 and 35 IAC 212.322, pursuant 35 IAC 212.441, which provides that, except where noted, 35 IAC 212.321 and 212.322 shall not apply to the steel manufacturing processes subject to 35 IAC 212.442 through 35 IAC 212.452.

c. This permit is issued based on the affected blast furnace processes not being subject to the applicable requirements of 35 IAC 219.301 because the affected processes do not emit photochemically reactive organic material as defined in 35 IAC 211.4690.

d. The affected blast furnace processes are not subject to 35 IAC 216.121 because the affected blast furnace processes are not the fuel combustion emission sources, as defined 35 IAC 211.2470.

e. Pursuant to 40 CFR 63.7491(g), the Blast Furnace Stoves are not subject to any applicable requirements in 40 CFR Part

63, Subpart DDDDD, NESHAP: Industrial, Commercial, and Institutional Boilers and Process Heaters.

7.4.5-1 Work Practices: Operation and Maintenance Plan (40 CFR 63.7800)

a. As required by 40 CFR 63.6(e)(1)(i), the Permittee shall always operate and maintain the affected blast furnace processes that are subject 40 CFR 63 Subpart FFFFF, including air pollution control and monitoring equipment, in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels required by 40 CFR 63 Subpart FFFFF.

b. The Permittee shall prepare and operate at all times each capture system or control device according to a written operation and maintenance plan for affected blast furnace casthouse. Each written operation and maintenance plan shall address the following elements:

i. Monthly inspections of the equipment that is important to the performance of the total capture system (*e.g.*, pressure sensors, dampers, and damper switches). This inspection must include observations of the physical appearance of the equipment (*e.g.*, presence of holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in the ductwork, and fan erosion). The operation and maintenance plan also must include requirements to repair any defect or deficiency in the capture system before the next scheduled inspection.

ii. Preventative maintenance for each control device, including a preventative maintenance schedule that is consistent with the manufacturer’s instructions for routine and long-term maintenance.

iii. Operating limits for each capture system applied to emissions from a blast furnace casthouse. The Permittee shall establish the operating limits according to the following requirements in 40 CFR 63.7800(b)(3)(i) through (iii):

A. Select operating limit parameters appropriate for the capture system design that are representative and reliable indicators of the performance of the capture system. At a minimum, the Permittee shall use appropriate operating limit parameters that indicate the level of the ventilation draft and the damper position settings for the capture system when operating to collect emissions, including revised settings for seasonal variations.

Appropriate operating limit parameters for ventilation draft include, but are not limited to, volumetric flow rate through each separately ducted hood, total volumetric flow rate at the inlet to the control device to which the capture system is vented, fan motor amperage, or static pressure.

B. For each operating limit parameter selected as described above, the Permittee shall designate the value or setting for the parameter at which the capture system operates during the process operation. If the operation allows for more than one process to be operating simultaneously, the Permittee shall designate the value or setting for the parameter at which the capture system operates during each possible configuration that the source may operate.

C. Include documentation in the plan to support selection of the operating limits established for the capture system. This documentation must include a description of the capture system design, a description of the capture system operating during production, a description of each selected operating limit parameter, a rationale for why the Permittee chose the parameter, a description of the method used to monitor the parameter according to the requirements of 40 CFR 63.7830(a), and the data used to set the value or setting for the parameter for each process configurations.

iv. Pursuant to 40 CFR 63.7800(b)(4), corrective action procedures for baghouses equipped with bag leak detection systems. In the event a bag leak detection system alarm is triggered, the Permittee shall initiate corrective action to determine the cause of the alarm within 1 hour of the alarm, initiate corrective action to correct the cause of the problem within 24 hours of the alarm, and complete the corrective action. Corrective actions may include, but are not limited to:

A. Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other condition that may cause an increase in emissions [40 CFR 63.7800(b)(4)(i)].

B. Sealing off defective bags or filter media [40 CFR 63.7800(b)(4)(ii)].

C. Replacing defective bags or filter media or otherwise repairing the control device [40 CFR 63.7800(b)(4)(iii)].

D. Sealing off a defective baghouse compartment [40 CFR 63.7800(b)(4)(iv)].

E. Cleaning the bag leak detection system probe, or otherwise repair the bag leak detection system [40 CFR 63.7800(b)(4)(v)].

F. Shutting down the process producing the particulate emissions [40 CFR 63.7800(b)(4)(vi)].

7.4.5-2 Work Practices: Startup, Shutdown and Malfunction

a. Provisions Related to 40 CFR 63, Subpart FFFFF

i. Pursuant to 40 CFR 63.7810, the Permittee must be in compliance with the emission limitations and operation and maintenance requirements in 40 CFR 63 Subpart FFFFF at all times, except during periods of startup, shutdown and malfunction as defined in 40 CFR 63.2

ii. Pursuant to 40 CFR 63.7810(c), the Permittee shall develop a written startup, shutdown, and malfunction plan for the affected blast furnaces and casthouses according to the provisions established in 40 CFR 63.6(e)(3).

iii. Pursuant to 40 CFR 63.7835, consistent with 40 CFR 63.6(e) and 63.7(e)(1), deviations that occur during a period of startup, shutdown, or malfunction are not violations if the Permittee demonstrates that it was operating in accordance with 40 CFR 63.6(e)(1).

iv. The Permittee shall fulfill the applicable reporting requirements identified in 40 CFR 63.10(d) (Condition 5.10.5(b)) and 40 CFR 63.7841(b)(4).

v. The Permittee shall keep records in accordance with 40 CFR 63.7842(a)(2) related to startup, shutdown and malfunction.

b. Startup and Malfunction/Breakdown Authorizations

i. Malfunction and Breakdown, pursuant to 201.149 and Part 201, Subpart I

A. Subject to the following terms and conditions, the Permittee is authorized to continue operation of the affected blast furnace processes in excess of the applicable state standards in 35 IAC 212.445(b)(1) in the event of a malfunction or breakdown. This shall include blast furnace over pressurization, slips, use of auxiliary tap-holes, and back-drafting associated with periods of malfunction and breakdown.

Note: This authorization is provided because the Permittee applied for such authorization in its CAAPP application, generally explaining why such continued operation would be required to prevent injury to personnel or severe damage to equipment, and describing the measures that will be taken to minimize emissions from any malfunctions and breakdowns.

B. This authorization only allows such continued operation as necessary to prevent injury to personnel or severe damage to equipment and does not extend to continued operation solely for the economic benefit of the Permittee.

C. Upon occurrence of excess emissions due to malfunction or breakdown, the Permittee shall repair the affected emission/process units and/or re-establish applicable control practices.

D. The Permittee shall fulfill the applicable recordkeeping and reporting requirements of Conditions 7.4.9(e) and 5.10.5-2, respectively. For these purposes, time shall be measured from the start of a particular incident. The absence of excess emissions for a short period shall not be considered to end the incident if excess emissions resume.

E. Following notification to the Illinois EPA (see Condition 5.10.5-2(a)(ii))of a malfunction or breakdown with excess emissions, the Permittee shall comply with all reasonable directives of the Illinois EPA with respect to such incident.

F. This authorization does not relieve the Permittee from the continuing obligation to minimize excess emissions during malfunction or breakdown. As provided by 35 IAC 201.265, an authorization in a permit for continued operation with excess emissions during malfunction and breakdown does not shield the

Permittee from enforcement for any such violation and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

ii. Startup, pursuant to 35 IAC 201.149 and Part 201, Subpart I

A. Subject to the following terms and conditions, for the affected blast furnace, the Permittee is authorized to violate the applicable standards of 35 IAC 212.445(b)(1), 212.445(b)(2) and 35 IAC 214.301 during startup.

Note: This authorization is provided because the Permittee applied for such authorization in its CAAPP application, generally describing the efforts that will be used "…to minimize startup emissions, duration of individual starts, and frequency of startups".

B. This authorization does not relieve the Permittee from the continuing obligation to demonstrate that all reasonable efforts are made to minimize startup emissions, duration of individual startups and frequency of startups.

C. The Permittee shall follow the written startup, shutdown, and malfunction plan for the affected blast furnace processes prepared pursuant to 40 CFR 63.6(e)(3) and Condition 7.4.5-2. In addition, the Permittee shall also review the operating condition of the affected blast furnace process prior to initiating startup.

D. The Permittee shall fulfill applicable recordkeeping requirements of Condition 7.4.9(d).

E. The Permittee shall fulfill applicable reporting requirements of Condition 5.10.5-1.

F. As provided by 35 IAC 201.265, an authorization in a permit for excess emissions during startup does not shield a Permittee from enforcement for any violation of applicable emission standard(s) that occurs during startup and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

7.4.5-3 Work Practices from State Permits

a. Except during periods of runner maintenance, the hot metal runners and the short slag runner shall be covered with permanent type runner covers [72080034, 72080036, T1].

b. Water spraying of the slag for the purpose of cooling and minimizing slag load-out emissions will take place after completion of the slagging operation and prior to slag-loadout [85030039, T1].

c. BFG flare #1 shall be operated with no visible emissions as determined by USEPA Method 22, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours [0607023, T1].

d. Requirements for BFG Flare #2 from Permit 06070023:

i. BFG flare #2 shall be operated to comply with the following equipment work practices [T1]:

A. BFG flare #2 shall be operated with no visible emissions as determined by the methods specified in 40 CFR 60.18(f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

B. BFG flare #2 shall be operated with a flame present at all times.

ii. Emissions of PM and PM_{10} from BFG flare #2 shall be controlled by the existing BFG pretreatment system, which entails treatment by dust catchers and wet scrubbers [T1].

iii. BFG and natural gas shall be the only fuels combusted in BFG flare #2 [T1].

7.4.5-4 Other Work Practices

The following requirements are established pursuant to Section 39.5(7)(a) of the Act:

a. The Permittee shall maintain the double-bell system of the blast furnaces in order to minimize emissions from furnace charging.

b. The Permittee shall develop and implement operating practices plan for slag handling processing associated with the slag pits for minimizing emissions and keeping them below the levels established in Condition 7.4.6(e).

7.4.6 Production and Emission Limitations from Existing Permits

a. i. Total combined production of hot metal (a.k.a., iron) from blast furnaces A and B shall not exceed 9,849 net tons per day, averaged over any calendar month [72080034,7208036,95010001, T1]; and

ii. Maximum amount of pellets charged shall not exceed 4,308,581 tons/yr [95010001, T1].

b. Casthouse Baghouse emissions shall not exceed the following limits [95010001, T1]:

Pollutant	Emission Factors (Lbs/Ton Iron)	Maximum Emissions (Tons/Yr)
PM	0.0703	111.19
PM_{10}	0.0703	111.19
SO_2	0.2006	422.00
NO_x	0.0144	22.79
VOM	0.0946	149.68

c. Blast Furnace uncaptured fugitives emissions shall not exceed the following limits [95010001, T1]:

Pollutant	Emission Factors (Lbs/Ton Iron)	Maximum Emissions (Tons/Yr)
PM	0.031	49.06
PM_{10}	0.0155	24.53
SO_2	0.0104	21.94
NO_x	0.0007	1.14
VOM	0.0047	7.42

d. Blast Furnace Charging emissions shall not exceed the following limits [95010001, T1]:

Pollutant	Emission Factors (Lbs/Ton Pellets)	Maximum Emissions (Tons/Yr)
PM	0.0024	5.17
PM_{10}	0.0024	5.17

e. Slag Pits emissions shall not exceed the following limits [95010001, T1]:

Pollutant	Emission Factors (Lbs/Ton Iron)	Maximum Emissions (Tons/Yr)
PM	0.00417	6.60
PM_{10}	0.00417	6.60
SO_2	0.0100	15.83

f. Iron Spout Baghouse emissions shall not exceed the following limits [95010001, T1]:

Pollutant	Emission Factors (Lbs/Ton Iron)	Maximum Emissions (Tons/Yr)
PM	0.02548	40.32
PM_{10}	0.02548	40.32
SO_2	0.0073	13.89

g. Total emissions from blast furnace operations shall not exceed the following limits, tons/yr [95010001, T1]:

	PM*	PM_{10}*	SO_2	NO_x	VOM
Blast Furnace Operations	212	188	474	24	157

* Limit does not address the iron pellet screen (See Section 7.1)

h. Compliance with the daily limit of Condition 7.4.6(a)(i) shall be determined from a monthly total of the relevant daily data divided by the number of days in the month [95010001].

i. Compliance with the annual limits of Condition 7.4.6(a)(2) and Conditions 7.4.6(b) through (g) shall be determined based on a calendar year [95010001].

j. Overlapping casting of “A” and “B” Blast Furnaces shall not exceed a casting rate of 6 tons per minute per furnace [72080034 and 7208036, T1].

k. The PM content of the BFG burned at the facility shall not exceed 0.01 grains/dscf [06070023, T1].

7.4.7 Testing Requirements

a. Blast furnace casthouse pursuant to NESHAP.

The Permittee shall comply with the following testing requirements pursuant to 40 CFR Part 63 Subpart FFFFF:

i. Pursuant to 40 CFR 63.7821(c), for each emissions unit equipped with a baghouse, the Permittee must conduct performance tests no less frequently than once every five years.

ii. Test methods for compliance demonstration with the emission limits for particulate matter [40 CFR 63.7822(b)]:

A. Determine the concentration of particulate matter according to the following test methods in Appendix A to 40 CFR Part 60.

1. Method 1 to select sampling port locations and the number of traverse points. Sampling sites must be located at the outlet of the control device and prior to any releases to the atmosphere.

2. Method 2, 2F, or 2G to determine the volumetric flow rate of the stack gas.

3. Method 3, 3A, or 3B to determine the dry molecular weight of the stack gas.

4. Method 4 to determine the moisture content of the stack gas.

5. Method 5, 5D, or 17, as applicable, to determine the concentration of particulate matter (front half filterable catch only).

B. Collect a minimum sample volume of 60 dry standard cubic feet (dscf) of gas during each particulate matter test run. Three valid test runs are needed to comprise a performance test.

iii. Test methods for compliance demonstration with the opacity limits [40 CFR 63.7823(b) and (c)]:

A. The Permittee shall conduct each visible emissions performance test such that the opacity observations overlap with the performance test for particulate matter [40 CFR 63.7823(b)].

B. To determine compliance with the applicable opacity limit for a blast furnace casthouse, the Permittee shall:

1. Use a certified observer to determine the opacity of emissions according to Method 9 in Appendix A to 40 CFR Part 60.

2. Obtain a minimum of 30 6-minute block averages. For a blast furnace casthouse, the Permittee shall make observations during tapping of the furnace. Tapping begins when the furnace is opened, usually by creating a hole near the

bottom of the furnace, and ends when the hole is plugged.

b. Blast furnace casthouse.

The Permittee shall comply with the following testing requirements pursuant to Sections 39.5(7)(d) and (p) of the Act:

i. For uncaptured emissions (roof monitor) or secondary emissions:

A. The Permittee shall have the opacity (6-minute average), of the exhaust of the building housing the blast furnace casthouse determined by a qualified observer in accordance with USEPA Method 9 while the affected blast furnace(s) are being tapped, as further specified below.

B. The duration of opacity observations for each test shall be at least 30 minutes unless no visible emissions are observed as determined by USEPA Method 22 or the average opacities for the first 12 minutes of observations conducted for the point of release that displays the greatest opacity, 6-minute average, are both no more than 10.0 percent.

C. 1. Observations of opacity shall be conducted on the following frequency unless absence of adequate daylight or weather conditions preclude scheduled observation, in which case, the next observations shall be conducted on the next day during which observations of opacity can properly be conducted in accordance with USEPA Method 9:

I. On a weekly basis (at least once every 7 operating days of the casthouse) except as provided below.

II. On a daily basis (at least 5 days out of 7 operating days of the casthouse) if the maximum opacity observed during any of the five previous observations was 18 percent or more, 6-minute average, continuing on a daily basis until the maximum opacities measured in five consecutive daily observations are all less than 18 percent, 6-minute average, at which time

observations on a weekly basis shall resume.

2. Upon written request by the Illinois EPA, additional opacity observations shall be conducted within five operating days for the casthouse from the date of the request by the Illinois EPA or on the date agreed upon by the Illinois EPA, whichever is later. For such observations conducted pursuant to a request from the Illinois EPA:

   I. The Permittee shall notify the Illinois EPA at least 24 hours in advance of the date and time of these observations, in order to enable the Illinois EPA to witness the observations. This notification shall include the name and employer of the qualified observer(s).

   II. The Permittee shall promptly notify the Illinois EPA of any changes in the time or date for observations.

   III. The duration of these observations shall cover a complete heat or cycle of the affected blast furnace.

   IV. The Permittee shall provide a copy of the current certification for the opacity observer and observer's readings to the Illinois EPA at the time of the observations, if the Illinois EPA personnel are present.

D. The Permittee shall keep records for all opacity measurements for the casthouse made in accordance with USEPA Method 9 that the Permittee conducts or that are conducted at its behest by individuals who are qualified to make such observations. For each occasion on which such measurements are made, these records shall include the formal report for the measurements if conducted pursuant to Condition 7.4.7(b)(i)(2), or otherwise the identity of the observer, a description of the measurements that were made, the operating condition of the casthouse, the observed opacity, and copies of the raw data sheets for the measurements.

ii. Emissions from control equipment [35 IAC 212.445(b)]:

A. Upon request from the Illinois EPA, compliance with emission limits of 35 IAC 212.445(b)(1)(see also Condition 7.4.3(b)(ii)(A)) shall be determined in accordance with the procedures set out in 40 CFR Part 60, Appendix A, Methods 1 through 5, incorporated by reference in 35 IAC 212.113, and shall be based on the arithmetic average of three runs. Calculations shall be based on the duration of a cast defined in 35 IAC 212.445(a)(1).

B. Upon request from the Illinois EPA, opacity readings, for verifying compliance with emission limit of 35 IAC 212.445(b)(2)(see also Condition 7.4.3(b)(ii)(B)), shall be taken in accordance with the observation procedures set out in 40 CFR part 60, Appendix A, Method 9, incorporated by reference in 35 IAC 212.113.

c. Additional Emission Testing for the Casthouse Baghouse and the Iron Spout Baghouse, pursuant to Sections 39.5(7)(d) and (p) of the Act:

i. As part of the emission testing required by Condition 7.4.7(a), the Permittee shall also measure the SO_2, NO_x and VOM emissions from each baghouse.

ii. The following USEPA Test Methods shall be used for testing of emissions, unless another USEPA Test Method is approved by the Illinois EPA.

Location of Sample Points	Method 1
Gas Flow and Velocity	Method 2
Flue Gas Weight	Method 3
Moisture	Method 4
SO_2	Method 6
NO_x	Method 7
VOM	Method 25

iii. For this emission testing, test notification and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

d. BFG Flares:

Pursuant to Sections 39.5(7)(d) and (p) of the Act, the Permittee shall conduct observations for each BFG flare for the presence of visible emissions and/or opacity, using USEPA Method 22 and 9, respectively. These observations shall be conducted on at least a monthly basis for each

flare. In addition, observations shall be coordinated with weather conditions so that at least two observations are made in each calendar year during elevated wind speed conditions, i.e., wind speed of at least 16 miles per hour. These observations shall be conducted by individual(s) certified to observe opacity by USEPA Method 9. The observer(s) shall initially conduct observations for visible emissions. If any visible emissions are observed, the observations shall continue for two hours or until the cumulative duration of visible emissions exceeds ten minutes, whichever occurs first. If any visible emissions are observed, observations for opacity shall also be conducted.

7.4.8 Monitoring Requirements

a. Monitoring requirements pursuant to 40 CFR 63.7830(a)

For each capture system subject to an operating limit in 40 CFR 63.7790(b)(1) established in the Permittee's capture system operation and maintenance plan, the Permittee must install, operate, and maintain a CPMS according to the following requirements:

Dampers that are manually set and remain in the same position are exempt from the requirement to install and operate a CPMS. If dampers are not manually set and remain in the same position, the Permittee shall make a visual check at least once every 24 hours to verify that each damper for the capture system is in the same position as during the initial performance test.

b. Monitoring requirements pursuant to 40 CFR 7830(b)(1)

The casthouse baghouse and iron spout baghouse shall each be equipped with a bag leak detection system which the Permittee shall operate and maintain according to the following requirements of 40 CFR 63.7831(f):

i. The system must be certified by the manufacturer to be capable of detecting emissions of particulate matter at concentrations of 10 milligrams per actual cubic meter (0.0044 grains per actual cubic foot) or less [40 CFR 63.7831(f)(1)].

ii. The system must provide output of relative changes in particulate matter loadings [40 CFR 63.7831(f)(2)].

iii. The system must be equipped with an alarm that will sound when an increase in relative particulate loadings is detected over a preset level. The alarm must be located such that it can be heard by the appropriate plant personnel [40 CFR 63.7831(f)(3)].

iv. Each system that works based on the triboelectric effect must be installed, operated, and maintained in a manner consistent with the guidance document, “Fabric Filter Bag Leak Detection Guidance,” EPA–454/R–98–015, September 1997 [40 CFR 63.7831(f)(4)].

v. Following the initial adjustment, do not adjust the sensitivity or range, averaging period, alarm set points, or alarm delay time, except as detailed in your operation and maintenance plan. Do not increase the sensitivity by more than 100 percent or decrease the sensitivity by more than 50 percent over a 365-day period unless a responsible official certifies, in writing, that the baghouse has been inspected and found to be in good operating condition [40 CFR 63.7831(f)(6)].

c. The Permittee shall conduct inspections of each baghouse at the specified frequencies according to the following requirements [40 CFR 63.7830(b)(4)]:

i. Monitor the pressure drop across each baghouse cell each day to ensure pressure drop is within the normal operating range identified in the operation and maintenance plan manual.

ii. Confirm that dust is being removed from hoppers through weekly visual inspections or other means of ensuring the proper functioning of removal mechanisms.

iii. Check the compressed air supply for pulse-jet baghouses each day.

iv. Monitor cleaning cycles to ensure proper operation using an appropriate methodology.

v. Check bag cleaning mechanisms for proper functioning through monthly visual inspection or equivalent means.

vi. Make monthly visual checks of bag tension on reverse air and shaker-type baghouses to ensure that bags are not kinked (kneed or bent) or laying on their sides. You do not have to make this check for shaker-type baghouses using self-tensioning (spring-loaded) devices.

vii. Confirm the physical integrity of the baghouse through quarterly visual inspections of the baghouse interior for air leaks.

viii. Inspect fans for wear, material buildup, and corrosion through quarterly visual inspections, vibration detectors, or equivalent means.

d. Site-specific monitoring plan requirements pursuant to 40 CFR 63.7831(a)

For each CPMS required in 40 CFR 63.7830, the Permittee shall develop and make available for inspection upon request by the Illinois EPA a site-specific monitoring plan that addresses the following requirements of 40 CFR 63.7831(a)(1) through (a)(6), including:

i. Installation of the CPMS sampling probe or other interface at a measurement location relative to each affected process unit such that the measurement is representative of control of the exhaust emissions (*e.g.*, on or downstream of the last control device) [40 CFR 63.7831(a)(1)];

ii. Performance and equipment specifications for the sample interface, the parametric signal analyzer, and the data collection and reduction system [40 CFR 63.7831(a)(2);

iii. Performance evaluation procedures and acceptance criteria (*e.g.*, calibrations) [40 CFR 63.7831(a)(3);

iv. Ongoing operation and maintenance procedures in accordance with the general requirements of 40 CFR 63.8(c)(1), (c)(3), (c)(4)(ii), (c)(7), and (c)(8) [40 CFR 63.7831(a)(4);

v. Ongoing data quality assurance procedures in accordance with the general requirements of 40 CFR 63.8(d) [40 CFR 63.7831(a)(5); and

vi. Ongoing recordkeeping and reporting procedures in accordance with the general requirements of 40 CFR 63.10(c), (e)(1), and (e)(2)(i) [40 CFR 63.7831(a)(6).

e. Pursuant to 40 CFR 63.7831(b), unless otherwise specified by the NESHAP, each CPMS must:

i. Complete a minimum of one cycle of operation for each successive 15-minute period and collect a minimum of three of the required four data points to constitute a valid hour of data;

ii. Provide valid hourly data for at least 95 percent of every averaging period; and

iii. Determine and record the hourly average of all recorded readings.

f. Pursuant to 40 CFR 63.7831(c), the Permittee shall conduct a performance evaluation of each CPMS in accordance with the site-specific monitoring plan.

g. Pursuant to 40 CFR 63.7831(d), the Permittee shall operate and maintain the CPMS in continuous operation according to the site-specific monitoring plan.

h. Pursuant to 40 CFR 63.7790(b)(1) and 63.7800(b)(3)(i), the Permittee shall operate each capture system applied to emissions from a blast furnace casthouse at or above the lowest value or settings as established in the Permittee's operation and maintenance plan and which are currently as follows:

i. Casthouse Baghouse:

A. Motor amperage (total), both blast furnaces casting: 245 amps

B. Motor amperage, one blast furnace casting: 125 amps

ii. Iron Spout Baghouse:

A. Motor amperage, both blast furnaces casting (total): 245 amps

B. Motor amperage, one blast furnace casting: 131 amps

C. Blast Furnace A iron spout damper positions (3): 2 or less open all of the time; 3 open less than 5 minutes

D. Blast Furnace B tilting runner damper position: open

i. Pursuant to 40 CFR 63.7824(c), the Permittee may change the operating limits for the capture system if the Permittee meets the following requirements:

i. Submits a written notification to the Illinois EPA of the Permittee's request to conduct a new performance test to revise the operating limit.

ii. Conducts a performance test to demonstrate compliance with the applicable emission in Table 1 to 40 CFR 63 Subpart FFFFF.

iii. Establishes revised operating limits according to the applicable procedures in 40 CFR 63.7824(a).

j. Monitoring and Collecting Data pursuant to 40 CFR 63.7832:

i. Except for monitoring malfunctions, out-of-control periods as specified in 40 CFR 63.8(c)(7), associated repairs, and required quality assurance or control activities (including as applicable, calibration checks and required zero and span adjustments), the Permittee shall monitor continuously (or collect data at all required intervals) at all times an affected source is operating.

ii. The Permittee may not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels or to fulfill a minimum data availability requirement, if applicable. The Permittee shall use all the data collected during all other periods in assessing compliance.

iii. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

k. Pursuant to the operation and maintenance requirements of the O/M plan required by 40 CFR 63.7800(b), the Permittee shall comply with following inspection procedures for the capture systems:

Monthly inspections of the equipment that is important to the performance of the total capture system. This inspection must include observations of the physical appearance of the equipment (e.g., presence of holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in the ductwork, and fan erosion). Repair of any defect or deficiency in the capture system shall be done before the next scheduled inspection.

l. Inspection and Monitoring for BFG Flares [Section 39.5(7)(d) of the Act]

i. For BFG flare #1, the Permittee shall either:

A. Install, operate and maintain instrumentation, with alarm, to confirm the presence of a flame at the flare tip; or

B. Monitor the presence of a pilot flame in accordance with Condition 7.4.8(l)(ii); or

C. Verify daily, the following to ensure BFG flare #1 is operating: The presence of a flame or thermal plume at the tip of the flare and that the flare gas header has a positive pressure.

ii. For BFG flare #2, the Permittee shall monitor the presence of a flare pilot flame using a thermocouple or other equivalent device to detect the presence of a flame.

iii. The Permittee shall perform detailed inspections of each BFG flare every 18 months. These inspections shall include all maintenance and repair activities performed based on the inspection results. If the flare cannot be inspected within 18 months, as required, the Permittee may request in writing from IEPA's Permit Section an extension of time to complete this inspection. The request for an extension must be supported with adequate justification for the extension and an assurance that the flare is continuing to operate without any problems. Under no circumstances shall the extension go beyond an additional 6 months.

m. Pursuant to Permits 72080034 and 72080036 [T1]:

i. The Permittee shall maintain and operate a pressure drop continuous recording system on the casthouse baghouse. The recorded data shall be retained for a period of six months shall be made available to the Illinois EPA personnel upon request.

ii. The Permittee shall maintain and operate a continuous pressure drop recording system on the iron spout baghouse.

n. The Permittee shall conduct observations for opacity for operations associated with the blast furnace in accordance with USEPA Method 9 for a minimum of 30 minutes for each operation unless no visible emissions are observed during the first 12 minutes of observations:

i. Blast furnace charging: Annually

ii. Blast furnace stoves stacks: Semiannually

iii. Slag pits: Quarterly

7.4.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected Blast Furnaces Processes, pursuant to Sections 39.5(7)(a), (e) and (p) of the Act:

a. 40 CFR Part 63 Subpart FFFFF (40 CFR 63.7842 and 63.7843):

i. The Permittee shall keep the following records, as specified in 40 CFR 63.7842 (a)(1) through (a)(3):

A. A copy of each notification and report that the Permittee submitted to comply with 40 CFR 63 Subpart FFFFF, including all documentation supporting any initial notification or notification of compliance status that the Permittee submitted, according to the requirements in 40 CFR 63.10(b)(2)(xiv).

B. The records in 40 CFR 63.6(e)(3)(iii) through (v) related to startup, shutdown, and malfunction.

C. Records of performance tests, performance evaluations, and opacity observations as required in 40 CFR 63.10(b)(2)(viii).

ii. The Permittee shall keep the records in 40 CFR 63.6(h)(6) for visual observations.

iii. The Permittee shall keep the records required in 40 CFR 63.7833 and 63.7834 (including a current copy of the operation and maintenance plan) to show continuous compliance with each emission limitation and operation and maintenance requirement that applies to the Permittee.

iv. The Permittee shall keep its records in a form suitable and readily available for expeditious review, according to 40 CFR 63.10(b)(1).

v. As specified in 40 CFR 63.10(b)(1), the Permittee shall keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record.

vi. The Permittee shall keep each record on site for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report,

or record, according to 40 CFR 63.10(b)(1). The Permittee may keep the records offsite for the remaining 3 years.

b. 40 CFR Part 63 Subpart FFFFF [40 CFR 63.7834(b)]:

The Permittee shall maintain a current copy of the operation and maintenance plan required in 40 CFR 63.7800(b) onsite and available for inspection upon request.

c. The following records of Permits #72080034, #72080036 and #95010001:

i. The Permittee shall maintain records for each beaching event in which iron is beached that, as a minimum, shall include:

A. An explanation why beaching occurred.

B. The date, time and duration of beaching.

C. The measures used to reduce the amount of beaching.

D. The maximum rate of beaching, tons/minute, (or information showing that the beaching rate did not exceed 20 tons/minute).

d. Records for Startups of Affected Blast Furnace Processes, pursuant to Section 39.5(7)(b) of the Act

i. The Permittee shall maintain startup procedures for each affected blast furnace process, as required by Condition 7.4.5-2(b)(ii)(C).

ii. The Permittee shall maintain the following records for each startup of an affected blast furnace process:

A. Date, time and duration of the startup.

B. A description of the startup and reason(s) for the startup.

C. Whether a violation of an applicable standard may have occurred during startup accompanied by the information in Condition 7.4.9(d)(iv) if a violation may have or did occur.

D. Whether the established startup procedures, maintained above, were followed accompanied by the information in Condition 7.4.9(d)(iii) if there were departure(s) from those procedures.

iii. If the established startup procedures were not followed during a startup, the Permittee shall maintain the following records:

A. A description of the departure(s) from the established procedures.

B. The reason(s) for the departure(s) from the established procedures.

C. An explanation of the consequences of the departure(s) for emissions, such as whether the departure(s) prolonged the startup or resulted in additional emissions, and if so,

1. The actions taken to minimize emissions and the duration of the startup; and

2. An explanation whether similar incidents might be prevented in the future and if so, the corrective actions taken or to be taken to prevent similar incidents.

iv. If a violation did or may have occurred during a startup, the Permittee shall maintain the following records:

A. Identification of the applicable standard(s) that were or may have been violated.

B. An explanation of the nature of such violation(s), including the magnitude of such excess emissions.

C. A description of the actions taken to minimize the magnitude of emissions and duration of the startup.

D. An explanation whether similar incidents could be prevented or ameliorated in the future and if so, a description of the actions taken or to be taken to prevent similar incidents in the future.

e. Records for Malfunctions or Breakdowns

Pursuant to 35 IAC 201.263, the Permittee shall maintain records of continued operation of the affected Blast Furnace Processes as addressed by Condition 7.4.5-2(b)(i), during malfunctions or breakdowns, which at a minimum, shall include the following records. The preparation of these records shall be completed within 45 days of an incident, unless the Permittee conducts a root cause analysis for the incident, in which case the preparation of

these records, other than the root cause analysis, shall be completed within 120 days of the incident.

i. Date, time and duration of the incident.

ii. A detailed description of the incident, including:

A. A chronology of significant events during and leading up to the incident.

B. Relevant operating data for the unit, including information such as operator log entries and directives provided by management during the incident.

C. The measures taken to reduce the quantity of emissions and the duration of the incident including the resources utilized to address the incident.

D. The magnitude of emissions during the incident.

iii. An explanation why continued operation of an affected blast furnace was necessary to prevent personnel injury or prevent equipment damage.

iv. A discussion of the cause(s) or probable cause(s) of the incident including the following:

A. Whether the incident was sudden, unavoidable, or preventable, including:

1. Why the equipment design did not prevent the incident;

2. Why better maintenance could not have avoided the incident;

3. Why better operating practices could not have avoided the incident; and

4. Why there was no advance indication for the incident.

B. Whether the incident stemmed from any activity or event that could have been foreseen, avoided or planned for.

C. Whether the incident was or is part of a recurring pattern indicative of inadequate design, operation or maintenance.

v. A description of any steps taken to prevent similar future incidents or reduce their frequency and severity.

vi. As an alternative to keeping the records required by Condition 7.4.9(e)(iv), the Permittee may perform a root cause analysis. For this purpose, a root cause analysis is an analysis whose purpose is to determine, correct and eliminate the primary causes of the incident and the excess emissions resulting there from. If the Permittee performs a root cause analysis method that would define the problem, define all causal relationships, provide a causal path to the root cause, delineate the evidence, and provide solutions to prevent a recurrence. Such an analysis shall be completed within one year of the incident.

f. Recordkeeping for Backdrafting.

The Permittee shall maintain records for each period when an affected blast furnace is backdrafted. These records shall include, at a minimum for each occurrence, the blast furnace identification, date and timeframe of backdraft, reason for backdrafting (e.g., planned shutdowns and/or routine maintenance), and steps taken to minimize emissions during the backdraft period.

g. Records for BFG Flares

The Permittee shall maintain the following records for BFG flares:

i. Records of opacity observations performed as required by Condition 7.4.7(d).

ii. Records of inspections and maintenance activities conducted pursuant to Condition 7.4.8(l).

iii. For BFG flare #2, date and duration of any time when the pilot flame monitoring equipment of the affected unit was not in operation, with explanation.

iv. Date and duration of any time when there was no pilot flame present at the flare, with explanation.

v. Date, duration and description of any other deviations.

h. The Permittee shall maintain the following operating records for the affected blast furnaces:

i. Monthly and annual usage of natural gas, blast furnace gas and coke oven gas (million ft^3) used by the affected blast furnace stoves.

ii. Blast Furnace hot metal production (total combined daily, monthly and annual in tons), including documentation on iron and slag losses.

iii. Records of iron pellets charged (tons/month and tons/year).

iv. Records of slag processed (tons/month and tons/year).

v. For overlapping tapping of both furnaces, records to demonstrate that the tapping rate of each furnace does not exceed 6 tons per minute.

vi. If the Permittee operates under manufacturer's specifications or manufacturer's instructions, the Permittee shall maintain such manufacturer's documentation, which shall be kept at the facility as part of the required records.

vii. Records identifying process upsets in the operations at the casthouse that result in the generation of additional opacity or PM emissions, such as refractory clay falling into the trough during a missed stop. For these upsets, these records shall include the time of the upset, a description of the upset and a discussion of the consequences for opacity and PM emissions from the casthouse.

i. The Permittee shall keep the following records related to the emissions of the affected blast furnace processes to verify compliance with the applicable limits in Condition 7.4.6(b) through (g):

i. A file containing the emission factors used by the Permittee to determine emissions of different pollutants from the various processes, with supporting documentation. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of the processes do not understate actual emissions, including review when emission testing is conducted for such processes. These records shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

ii. Records for any periods of operation of such processes that are not otherwise addressed in the required records during which the established emission factor in Condition 7.4.9(i)(i) would understate actual emissions of the process, with description of the period of operation and an estimate of the additional emissions during such period that would not be accounted for by the established factor, with supporting explanation and calculations.

iii. Records for the annual emissions of such processes for comparison to the limits in Conditions 7.4.6(b) through (f), with supporting calculations.

iv. Records for combined annual emissions of the affected processes, based on the summation of the above data, for comparison to the limits in Condition 7.4.6(g).

7.4.10 Reporting Requirements

a. 40 CFR 63 Subpart FFFFF (40 CFR 63.7841):

i. Compliance report due dates. The Permittee shall submit the semiannual compliance reports to the Illinois EPA according to the following requirements:

A. Semi-annual compliance report must cover the semiannual reporting period from January 1 through June 30 or the semiannual reporting period from July 1 through December 31.

B. Each compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date comes first after the end of the semiannual reporting period.

ii. Compliance report contents. Each compliance report must include the following information:

A. Company name and address.

B. Statement by a responsible official, with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report.

C. Date of report and beginning and ending dates of the reporting period.

D. If the Permittee had a startup, shutdown, or malfunction during the reporting period and the Permittee took actions consistent with the source’s startup, shutdown, and malfunction plan, the compliance report must include the information in 40 CFR 63.10(d)(5)(i).

E. If there were no deviations from the continuous compliance requirements in 40 CFR 63.7833 and 63.7834 that apply to the Permittee, a statement that there were no deviations from the emission limitations or operation and

maintenance requirements during the reporting period.

F. If there were no periods during which a continuous monitoring system (including a CPMS, COMS, or continuous emission monitoring system (CEMS)) was out-of-control as specified in 40 CFR 63.8(c)(7), a statement that there were no periods during which the CPMS was out-of-control during the reporting period.

G. For each deviation from an emission limitation in 40 CFR 63.7790 that occurs at an affected source where the Permittee is not using a continuous monitoring system (including a CPMS, COMS, or CEMS) to comply with an emission limitation in Subpart FFFFF, the compliance report must contain the information described in Condition 7.4.10(a)(ii) and the following information (this includes periods of startup, shutdown, and malfunction):

1. The total operating time of each affected source during the reporting period.

2. Information on the number, duration, and cause of deviations (including unknown cause, if applicable) as applicable and the corrective action taken.

H. For each deviation from an emission limitation occurring at an affected source where the Permittee is using a continuous monitoring system (including a CPMS or COMS) to comply with the emission limitation in Subpart FFFFF, the Permittee must include the information described in Condition 7.4.10(a)(ii) and the following information (this includes periods of startup, shutdown, and malfunction):

1. The date and time that each malfunction started and stopped.

2. The date and time that each continuous monitoring was inoperative, except for zero (low-level) and high-level checks.

3. The date, time, and duration that each continuous monitoring system was out-of-control as specified in 40 CFR 63.8(c)(7), including the information in 40 CFR 63.8(c)(8).

4. The date and time that each deviation started and stopped, and whether each deviation occurred during a period of startup, shutdown, or malfunction or during another period.

5. A summary of the total duration of the deviation during the reporting period and the total duration as a percent of the total source operating time during that reporting period.

6. A breakdown of the total duration of the deviations during the reporting period including those that are due to startup, shutdown, control equipment problems, process problems, other known causes, and other unknown causes.

7. A summary of the total duration of continuous monitoring system downtime during the reporting period and the total duration of continuous monitoring system downtime as a percent of the total source operating time during the reporting period.

8. A brief description of the Blast Furnace processes.

9. A brief description of the continuous monitoring system.

10. The date of the latest continuous monitoring system certification or audit.

11. A description of any changes in continuous monitoring systems, processes, or controls since the last reporting period.

iii. Immediate startup, shutdown, and malfunction report. If the Permittee had a startup, shutdown, or malfunction during the semiannual reporting period that was not consistent with the source’s startup, shutdown, and malfunction plan, the Permittee shall submit an immediate startup, shutdown, and malfunction report according to the requirements in 40 CFR 63.10(d)(5)(ii).

b. Reporting requirements for malfunctions and breakdowns (Permits #72080034, #72080036 and #95010001):

The Permittee shall notify the Illinois EPA's regional office by telephone as soon as possible during normal working hours, but no later than the next Agency business day, upon the occurrence of excess emissions due to malfunctions or breakdowns. The Permittee shall submit a quarterly report to the Illinois EPA's regional office in Collinsville providing an explanation of the occurrence of such events.

c. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by the affected blast furnace processes from applicable requirements unless a NESHAP standard specifies a different timeframe, as follows:

A. Requirements in Condition 7.4.3(b) through (f).

B. Requirements in Condition 7.4.5-1.

C. Requirements in Condition 7.4.5-3.

D. Requirements in Condition 7.4.5-4.

E. Requirements in Condition 7.4.6(a) through (j).

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

iii. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

iv. All required deviation reports described in Condition 7.4.10(c) above shall contain the following information:

A. Date, time and duration of the deviation;

B. Description of deviation;

C. Probable cause of the deviation;

D. Any corrective action or preventative measures taken;

d. Reporting on the State startup authorization shall be performed in accordance with Condition 5.10.5-1.

e. Reporting on the Federal SSM authorization shall be performed in accordance with Condition 5.10.5-3.

7.4.11 Operational Flexibility

Backdrafting the blast furnaces in order to conduct planned/routine maintenance (not associated with malfunction and breakdowns) shall follow procedures designed to minimize the release of emissions during such activities.

7.4.12 Compliance Procedures

a. For affected blast furnace processes, compliance with the applicable standards of Condition 7.4.3 is addressed by the work practices, testing, monitoring, recordkeeping and reporting requirements in Section 7.4 of this permit.

b. Compliance with the production/emission limits of Conditions 7.4.6 and 5.6.2 is addressed by the work practices, testing, monitoring, recordkeeping, and reporting requirements in Sections 7.4 and 5 of this permit.

7.4.13 Compliance Schedule and Current Enforcement Status

a. The Permittee shall comply with the following schedule of compliance related to SO_2 emissions from combustion of Blast Furnace Gas in various emission units at the source, as established in accordance with Consent Order No. 05-CH-750 (December 18, 2007 as amended on December 23, 2009):

Commitment	Timing
Use the correct emission factor for the Blast Furnace Gas SO_2 emissions when calculating, recording and reporting SO_2 emissions and for any other purpose under the Act.	Immediately and at all times going forward.
Work with the Illinois EPA, including providing additional information to the Agency when requested.	Within 30 days of the request.
Obtain a revised PSD Construction Permit.	Subject to Agency final issuance.

b. Submittal of Progress Reports

Quarterly Progress Reports shall be submitted beginning with the fourth quarter of 2009 and ending upon the achievement of compliance. Each quarterly report shall be submitted no later than 30 days after the end of the

corresponding calendar quarter. The Progress Report shall contain at least the following:

i. The required date for achieving commitments, and actual dates when such commitments were achieved.

ii. Any commitments accepted by the Permittee or otherwise established for the affected BOF as part of the resolution of the above referenced Consent Order, with the associated timing for each commitment.

iii. A discussion of progress in complying with commitments that is subject to future deadlines.

iv. If any commitment was not met, an explanation of why the required timeframe or commitment was not met, and any preventive or corrective measures adopted to achieve required commitment.

c. After completion of all required commitments and certification of compliance, as identified in Condition 7.4.13(a) no further Quarterly Progress Reports are required to be submitted.

Note: US Steel informed the Illinois EPA during deliberations on Consent Order 05-CH-750 of possible violations involving SO2 emissions from use of Blast Furnace Gas. The violations involved exceedances of the SO2 limit in Construction Permit 95010001 issued on July 23, 1996. The violations were addressed, working with the Office of the Illinois Attorney General, in Consent Order 05-CH-750, which was entered on December 18, 2007 in the Circuit Court for the Third Judicial Circuit, Madison County, Illinois. This Consent Order required US Steel to submit a complete and accurate application including required SO2 modeling to modify Construction Permit 95010001 by January 31, 2008. That application has been submitted by US Steel.

7.4.14 <u>State-Only Conditions</u>

State-only conditions are not being established.

7.5 Basic Oxygen Processes

7.5.1 Description

Reladling and Desulfurization Stations:

Molten iron from the blast furnaces is transported to the BOF by torpedo cars. The iron is then transferred to the charging ladles at the reladling station. In the desulfurization stations a combination of lime and magnesium is injected into the molten iron to remove the sulfur. The sulfur reacts with the lime and magnesium and forms a layer of slag on the surface of the iron. A collection system with a positive pressure baghouse is used to control emissions of particulate matter from these stations.

Slag Skimming:

After the molten iron is desulfurized, the ladle it is moved to this station where a mechanical arm is used to scrape slag from the surface of the iron. This slag is scraped from the iron ladles and into slag pots. A collection system with a baghouse is used to control emissions from this process.

Basic Oxygen Furnaces (BOF):

A fresh BOF charge usually begins with scrap metal. The scrap is charged into the BOF vessel. Molten iron is then charged into the vessel. A secondary hood is utilized to capture emissions during the charge. During periods of reduced molten iron availability scrap may be preheated with a natural gas fired lance to increase the temperature and reduce the amount of molten iron needed for a heat of steel. The BOF is then closed off and an oxygen lance is inserted to begin the melting and refining process. The oxygen lance openings on each BOF is equipped with steam rings. The steam rings are control measures for emissions of particulate matter from the BOF during the “oxygen blow” or refining phase when oxygen is being fed into the furnaces. The steam rings would inject steam in the area between the oxygen lance and the “lance hole” in the lid of the furnaces, acting to suppress the emissions of particulate through this area during the refining phase. In the BOF, the injected oxygen reacts exothermically with the carbon in the iron generating heat which melts the scrap and reducing the amount of carbon in the bath thus converting the iron to steel. When the refining process is completed, the molten steel is poured into a steel transfer ladle. Materials such as aluminum, silica, and manganese are added, as required, depending upon the particular steel alloy being produced. After the molten steel is tapped, the remaining slag is then dumped into a slag ladle. Emissions from these operations are captured and controlled with an electrostatic precipitator (ESP).

Ladle Preheating and Drying:

In this unit, lances combust either natural gas or coke oven gas to produce the heat needed to dry and preheat iron and steel handling ladles. The refractory linings of freshly re-bricked or repaired ladles must be completely dried and preheated before use. The drying process is necessary because any moisture left in the refractory would immediately vaporize and expand when the ladles are filled with molten iron or steel. This sudden expansion could cause the refractory lining to split which would allow the molten iron and steel to come into contact with, and damage the shell of the ladle. Emissions from this unit consist of particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide and organic materials generated by fuel combustion.

Ladle Metallurgy Furnaces (LMF) and Argon Stirring Stations:

At the LMF station and the argon stirring stations, final adjustments are made to the composition of a ladle of steel and the steel is held pending casting. At the LMF station, electricity can also be used to heat a ladle of steel if it has cooled below the range at which steel can be cast.

If the steel does not need to be reheated and at most minor adjustments are needed to its composition, the ladle of steel goes to one of the two argon stirring stations. At these stations, stirring lances are inserted into the steel and argon is pumped into the steel to maintain uniform composition and temperature. A baghouse is also used to control emissions from the operations.

Note: This narrative description is for informational purposes only and is not enforceable.

7.5.2 <u>List of Emission Units and Air Pollution Control Equipment</u>

Location	Basic Oxygen Process Descriptions	Date Constructed	Emission Control Equipment
Basic Oxygen Process Furnace Shop (BOPF)	Hot Metal Transfer Station	Prior to 05/1983	Reladle/ Desulfurization Baghouse
	(2) Hot Metal Desulfurization Stations		
	Slag Skimming Station	1985	Skimmer Baghouse
	Basic Oxygen Furnaces (BOF) #1 and #2 with Steam Rings	Prior to 08/1972	Electrostatic Precipitator
	Ladle Drying/Preheating (coke oven gas and natural gas modes)	Prior to 08/1972	None

Location	Basic Oxygen Process Descriptions	Date Constructed	Emission Control Equipment
	Ladle Metallurgy Furnace (LMF) Station	Prior to 1986	Baghouse #2
	Argon Stirring Stations	Around 1988	

7.5.3 Applicable Provisions

a. Pursuant to 35 IAC 212.446, emissions of particulate matter from basic oxygen processes shall be controlled as follows:

i. Charging, Refining and Tapping (BOF Operations). Particulate matter emissions from all basic oxygen furnaces (BOF) shall be collected and ducted to pollution control equipment. Emissions from basic oxygen furnace operations during the entire cycle (operations from the beginning of the charging process through the end of the tapping process) shall not exceed the allowable emission rate specified by 35 IAC 212.322. For purposes of computing the process weight rate, nongaseous material charged to the furnace and process oxygen shall be included. No material shall be included more than once [35 IAC 212.446(a)].

ii. Hot Metal Transfer, Hot Metal Desulfurization and Ladle Lancing.

Particulate matter emissions from hot metal transfers to a mixer or ladle, hot metal desulfurization operations and ladle lancing shall be collected and ducted to pollution control equipment, and emissions from the pollution control equipment shall not exceed 69 mg/dscm (0.03 gr/dscf) [35 IAC 212.446(b)(1)].

iii. For openings in the building housing the BOF, no person shall cause or allow emissions to exceed an opacity of 20 percent, as determined by averaging any 12 consecutive observations taken at 15 second intervals [35 IAC 212.446(c)].

b. Pursuant to 35 IAC 212.458, no person shall cause or allow emissions of PM_{10}, other than that of fugitive particulate matter, into the atmosphere to exceed the following limits during any one hour period:

i. 32.25 ng/J (0.075 lbs/mmBtu) of heat input from the burning of coke oven gas (at ladle dryers/preheaters) [35 IAC 212.458(b)(9)].

ii. 27.24 kg/hr (60 lbs/hr) and 0.1125 kg/Mg (0.225 lbs/T) of total steel in process whichever limit is more stringent for the total of all basic oxygen furnace operations (charging, refining and tapping, as described in 35 IAC 212.446(a)) and measured at the BOF stack [35 IAC 212.458(b)(23)].

iii. 22.9 mg/scm (0.01 gr/scf) from any process emissions unit, except as otherwise provided in 35 IAC 212.458 or in 212.443 and 212.446 [35 IAC 212.458(b)(7)].

c. Pursuant to 35 IAC 212.123(a), no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to the requirements of 35 IAC 212.122, except as allowed by 35 IAC 212.123(b) and 212.124.

d. The Basic Oxygen Processes are subject to 40 CFR Part 63, Subpart FFFFF, Integrated Iron and Steel Manufacturing Facilities. Applicable provisions of this NESHAP are addressed below and in other conditions of this section of the permit.

e. Pursuant to 40 CFR 63.7790(a) and Table 1 to 40 CFR Part 63 Subpart FFFFF, the emissions from the Basic Oxygen Processes shall not exceed the following limits applicable to operation at existing basic oxygen process furnace (BOPF) identified in paragraphs 9 through 12 of Table 1 to Subpart FFFFF:

i. The Permittee must not cause to be discharged to the atmosphere any gases that exit from a primary emission control system for a BOPF with an open hood system at an existing BOPF shop that contain, on a flow-weighted basis, particulate matter in excess of 0.02 gr/dscf during the steel production cycle.

ii. For each hot metal transfer, slag skimming, and hot metal desulfurization operation, the Permittee must not cause to be discharged to the atmosphere any gases that exit from a control device that contain particulate matter in excess of 0.01 gr/dscf.

iii. For each ladle metallurgy furnace operation, the Permittee must not cause to be discharged to the atmosphere any gases that exit from a control device that contain particulate matter in excess of 0.01 gr/dscf.

iv. For each roof monitor on the BOPF Shop, the Permittee must not cause to be discharged to the atmosphere any secondary emissions that exit any opening in the BOPF shop or any other building housing the BOF or basic

oxygen process that exhibit opacity greater than 20 percent (3-minute average).

f. Pursuant to 40 CFR 63.7790(b)(3), for the electrostatic precipitator applied to control emissions from a BOF, the Permittee must maintain the hourly average opacity of emissions exiting the control device at or below 10 percent.

g. The basic oxygen furnaces are subject to 35 IAC 214.301, which provides that no person shall cause or allow the emission of sulfur dioxide into the atmosphere from any process emission source to exceed 2000 ppm.

7.5.4 Non-Applicability of Regulations of Concern

a. Pursuant to 35 IAC 212.324(a)(3) and 212.316(f), the emission limitations of 35 IAC 212.324 and 212.316 are not applicable to the basic oxygen processes because these operations are subject to specific emission standards and limitations contained in 35 IAC Part 212 Subpart R, as addressed in Condition 7.5.3(a).

b. Except where noted, 35 IAC 212.321 and 35 IAC 212.322 shall not apply to the steel manufacturing processes subject to 35 IAC 212.442 through 35 IAC 212.452 [35 IAC 212.441].

c. This permit is issued based on the affected basic oxygen processes not being subject to the applicable requirements of 35 IAC 219.301 because these processes do not emit photochemically reactive organic material as defined in 35 IAC 211.4690.

d. The basic oxygen processes are not subject to 35 IAC 216.121 because they are not fuel combustion emission units as defined in 35 IAC 211.2470.

7.5.5-1 Work Practices Provisions for Operation and Maintenance Plan (40 CFR 63.7800)

a. Pursuant to 40 CFR 63.6(e)(1)(i), the Permittee must always operate and maintain the basic oxygen processes, including air pollution control and monitoring equipment, in a manner consistent with good air pollution control practices for minimizing emissions at least to the levels required by 40 CFR 63 Subpart FFFFF.

b. The Permittee shall prepare and operate at all times according to a written operation and maintenance plan for each capture system or control device subject to an operating limit in 40 CFR 63.7790(b). Each plan shall address the following elements:

i. Monthly inspections of the equipment that is important to the performance of the total capture system (*e.g.*, pressure sensors, dampers, and damper switches). This inspection shall include observations of the physical appearance of the equipment (*e.g.*, presence of holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in the ductwork, and fan erosion). The operation and maintenance plan also must include requirements to repair any defect or deficiency in the capture system before the next scheduled inspection.

ii. Preventative maintenance for each control device, including a preventative maintenance schedule that is consistent with the manufacturer’s instructions for routine and long-term maintenance.

iii. Corrective action procedures for baghouses equipped with bag leak detection systems. In the event a bag leak detection system alarm is triggered, the Permittee shall initiate corrective action to determine the cause of the alarm within 1 hour of the alarm, initiate corrective action to correct the cause of the problem within 24 hours of the alarm, and complete the corrective action as soon as practicable. Corrective actions may include, but are not limited to:

A. Inspecting the baghouse for air leaks, torn or broken bags or filter media, or any other condition that may cause an increase in emissions.

B. Sealing off defective bags or filter media.

C. Replacing defective bags or filter media or otherwise repairing the control device.

D. Sealing off a defective baghouse compartment.

E. Cleaning the bag leak detection system probe, or otherwise repair the bag leak detection system.

F. Shutting down the process producing the particulate emissions.

iv. Corrective action procedures for electrostatic precipitator (ESP) equipped with COMS. In the event an ESP exceeds the operating limit in 40 CFR 63.7790(b)(3), the Permittee shall take corrective

actions consistent with the site-specific monitoring plan in accordance with 40 CFR 63.7831(a).

7.5.5-2 Work Practices Provisions for Startup, Shutdown and Malfunction Plans and associated procedures

a. NESHAP Provisions

i. Pursuant to 40 CFR 63.7810, the Permittee must be in compliance with the emission limitations and operation and maintenance requirements in 40 CFR 63 Subpart FFFFF at all times, except during periods of startup, shutdown and malfunction as defined in 40 CFR 63.2

ii. Pursuant to 40 CFR 63.7810(c), the Permittee shall develop a written startup, shutdown, and malfunction plan for BOF according to the provisions of 40 CFR 63.6(e)(3).

iii. Pursuant to 40 CFR 63.7835:

A. Consistent with 40 CFR 63.6(e) and 63.7(e)(1), deviations from NESHAP requirements that occur during a period of startup, shutdown, or malfunction are not violations if the Permittee demonstrates to the Illinois EPA that the Permittee was operating in accordance with 40 CFR 63.6(e)(1).

B. The Illinois EPA will determine whether deviations that occur during a period of startup, shutdown, or malfunction are violations, according to the provisions in 40 CFR 63.6(e).

iv. The Permittee shall fulfill the applicable reporting requirements identified in Condition 5.10.5(b) and 40 CFR 63.7841(b)(4) and (c).

v. The Permittee shall keep records in accordance with 40 CFR 63.7842(a)(2) related to startup, shutdown and malfunction.

b. Provisions of State Emission Standards, pursuant to 35 IAC 201.149 and Part 201 Subpart I

i. Subject to the following terms and conditions, the Permittee is authorized to continue to operate in violation of the applicable standards as specified below in the event of a malfunction or breakdown.

A. For the basic oxygen furnace, the applicable state standards in Condition 7.5.3(a)(iii), (b)(ii) and (c)), and

B. For the LMF, the applicable state standards in Conditions 7.5.3(b)(iii) and (c).

Note: This authorization is provided because the Permittee applied for such authorization in its CAAPP application, generally explaining why such continued operation would be required to prevent injury to personnel or severe damage to equipment, and describing the measures that will be taken to minimize emissions from any malfunctions and breakdowns.

ii. This authorization only allows such continued operation as necessary to prevent injury to personnel or severe damage to equipment and does not extend to continued operation solely for the economic benefit of the Permittee.

iv. Upon occurrence of excess emissions due to malfunction or breakdown, the Permittee shall, as soon as practicable, repair the units and/or re-establish applicable control practices.

v. The Permittee shall fulfill the applicable recordkeeping requirements of Condition 7.5.9(g) and reporting requirements of Condition 5.10.5-2.

vi. Following notification to the Illinois EPA (see Condition 5.10.5-2(a)(i)) of a malfunction or breakdown with excess emissions, the Permittee shall comply with all reasonable directives of the Illinois EPA with respect to such incident.

vii. This authorization does not relieve the Permittee from the continuing obligation to minimize excess emissions during malfunction or breakdown. As provided by 35 IAC 201.265, an authorization in a permit for continued operation with excess emissions during malfunction and breakdown does not shield the Permittee from enforcement for any such violation and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

7.5.5-3 <u>Work Practices from Permits 72080043, 95010001 and 10080021</u>

a. Pursuant to Permit 72080043 [T1]:

i. Overlapping operations of the BOF vessels is allowed under the following conditions:

A. The hot metal charge of the second vessel shall be initiated and completed during the time between completion of the blow and start of tap on the first vessel while sufficient draft at the ESP capture system is established and maintained for both vessels.

B. The charge and/or blow on one vessel shall not begin until sufficient draft has been established at the associated ESP capture system (a.k.a., doghouse) and the alloy addition at the vessel tapping has been completed for at least 1 minute.

C. Sufficient draft at the ESP capture system of the vessel being tapped shall be maintained for at least 1 minute after alloy addition has been completed. After such period, the capture system draft may be transferred over to the other vessel in order to satisfy Condition (A) above.

D. Only overlapping of the hot metal charge of the second vessel after the end of blow and prior to onset of tap of the first vessel and overlapping of tapping of the first vessel, after alloy addition, and the hot metal charge and/or blow on the second vessel are allowed.

E. Condition (B) and (C) above shall be part of the Standard Operating Procedure (SOP) of the BOF vessels.

ii. Each BOF vessel shall be equipped with a Fume Suppression System which shall be in use at all times that tapping is occurring during overlapping operations.

b. Pursuant to Permit 95010001 [T1]:

i. The BOF capture system shall be operated at the above minimum set points (see Condition 7.5.6(h)) until and unless the Illinois EPA approves a lower minimum set point based on a demonstration that a better level of particulate matter control will occur, except for purposes of emissions testing as related to the set point [T1].

ii. The Permittee shall operate, maintain, and repair the BOF ESP in a manner that assures compliance with the conditions of Permit 95010001 [T1].

iii. The Permittee shall maintain an adequate inventory of spare parts for the BOF ESP at all times [T1].

c. Pursuant to Permit 10080021 [T1]:

i. Beginning October 31, 2012, during the refining phase of operation, the steam rings on the BOFs shall be operated in accordance with written procedures developed by the Permittee that set forth the timing and rate of steam injection as related to furnace operation and reflect good air pollution control practice to minimize emissions of particulate matter.

ii. Prior to October 31, 2012, during the refining phase of operation, the steam rings on the BOFs shall be operated in accordance with good air pollution control practice to minimize emissions of particulate matter.

7.5.6 Production and Emission Limitations from Permit 95010001

a. Total combined production of liquid steel from the affected BOFs shall not exceed 11,000 net tons per day, averaged over any calendar month [T1].

b. BOF Shop Emissions (tons/yr total) shall not exceed the following limits [T1]:

PM	PM_{10}	NO_x	VOM	CO	Lead
510	451	70	12	16,097	1.43

c. BOF ESP Stack (charge, refine, tap) emissions shall not exceed the following limits [T1]:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.16	262.80
PM_{10}	0.16	262.80
NO_x	0.0389	69.63
VOM	0.0060	10.74
CO	8.993	16,097.47
Lead	0.1934 lbs/hr	1.26

d. BOF Roof Monitor emissions shall not exceed the following limits [T1]:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.0987	176.71
PM_{10}	0.06614	118.40
Lead	0.0129 lbs/hr	0.08

e. Hot Metal Desulfurization and Hot Metal Transfer emissions shall not exceed the following limits [T1]:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.03721	58.88
PM_{10}	0.03721	58.88
VOM	0.0010	1.58
Lead	0.0133 lbs/hr	0.09

f. Hot metal charging and ladle slag skimming emissions shall not exceed the following limits [T1]:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.0050	7.94
PM_{10}	0.0050	7.94

g. Emissions from Argon Stirring Station and Material Handling Tripper (Ladle Metallurgy Baghouse #2) shall not exceed the following limits (see Section 7.1):

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.00715	12.80
PM_{10}	0.00715	12.80

h. The stack gas pulpit set point of the BOF ESP control system shall be set in accordance with the following, so as to establish sufficient particulate matter capture efficiency of the charging and primary hoods [T1]:

i. Set point requirements while only a single BOF vessel is in operation:

A. Minimum set point during charging operation: 550,000 cfm;

B. Minimum set point during refining operation: 650,000 cfm; and

C. Minimum set point during tapping operation: 200,000 cfm (until one minute after completing alloy addition).

ii. During dual operation of BOF vessels (a.k.a., overlapping BOF operation) the minimum set point shall be 700,000 cfm.

i. Compliance with the annual limits shall be determined on a calendar year basis [T1].

Note: These provisions (Conditions 7.5.6(a) through (i)) were originally established in Construction Permit 95010001.

j. Emissions of particulate matter from the Ladle metallurgy station and the existing argon stirring station shall not exceed 16.20 TPY [T1].

k. The maximum process weight for 1) argon stirring, 2) ladle reheat, 3) alloy addition, 4) ladle slag skimming, and 5) hot metal desulfurization shall not exceed 356.7 t/hr for 8,760 hours per year [T1].

Note: These provisions (Conditions 7.5.6(j) and (k)) were originally established in Permit 83050042.

7.5.7 Testing Requirements

a. Testing requirements in 40 CFR Part 63 Subpart FFFFF:

i. Pursuant to 40 CFR 63.7821(b), for the Basic Oxygen Furnaces (which are equipped with a control device other than a baghouse), the Permittee shall conduct subsequent performance tests no less frequently than twice (at mid-term and renewal) during each term of the title V operating permit (i.e., this CAAPP permit).

ii. Pursuant to 40 CFR 63.7821(c), for each Basic Oxygen Furnace Process equipped with a baghouse, the Permittee shall conduct subsequent performance tests no less frequently than once during each term of the Title V operating permit (every 60 months).

iii. The Permittee shall use the following test methods for compliance demonstration with the emission limits for particulate matter [40 CFR 63.7822(b)]:

A. The Permittee shall determine the concentration of particulate matter according to the following test methods in Appendix A to 40 CFR Part 60.

1. Method 1 to select sampling port locations and the number of traverse points. Sampling ports must be located at the outlet of the control device and prior to any releases to the atmosphere.

2. Method 2, 2F, or 2G to determine the volumetric flow rate of the stack gas.

3. Method 3, 3A, or 3B to determine the dry molecular weight of the stack gas.

4. Method 4 to determine the moisture content of the stack gas.

5. Method 5, 5D, or 17, as applicable, to determine the concentration of particulate matter (front half filterable catch only).

B. The Permittee shall collect a minimum sample volume of 60 dry standard cubic feet (dscf) of gas during each particulate matter test run. Three valid test runs are needed to comprise a performance test.

iv. Pursuant to 40 CFR 63.7822(g), for the BOF ESP (which is a primary emission control system applied to emissions from a BOF with an open hood system), the Permittee shall complete the following requirements:

A. Sample only during the steel production cycle. The Permittee shall conduct sampling under conditions that are representative of normal operation. The Permittee shall record the start and end time of each steel production cycle and each period of abnormal operation; and

B. Sample for an integral number of steel production cycles. The steel production cycle begins when the scrap is charged to the BOF and ends 3 minutes after the slag is emptied from the vessel into the slag pot.

v. Pursuant to 40 CFR 63.7822(h), for a control device applied to emissions from BOPF shop ancillary operations (hot metal transfer, slag skimming, hot metal desulfurization, or ladle metallurgy), the Permittee shall sample only when the operation(s) is being conducted.

vi. The Permittee shall conduct each visible emissions performance test such that the opacity observations overlap with the performance test for particulate matter [40 CFR 63.7823(b)].

vii. The following test methods shall be used for opacity observations pursuant to 40 CFR 63.7823(d):

Using a certified observer, the Permittee shall determine the opacity of emissions according to Method 9 in Appendix A to Part 60 as specified below:

A. Instead of procedures in section 2.4 of Method 9 in Appendix A to 40 CFR Part 60, the Permittee shall record observations to the nearest 5 percent at 15-second intervals for at least three steel production cycles.

B. Instead of procedures in section 2.5 of Method 9 in Appendix A to 40 CFR Part 60, the Permittee shall determine the 3-minute block average opacity from the average of 12 consecutive observations recorded at 15-second intervals.

b. Pursuant to Sections 39.5(7)(d) and (p) of the Act, in conjunction with the testing of emissions required for an emission unit in the BOF shop by the NESHAP (Condition 7.5.7(a) which requires testing at the midterm and renewal of this CAAPP permit), the Permittee shall also have testing conducted to measure emissions of other pollutants as follows.

i. Testing shall be conducted for PM/PM_{10}*, lead and other pollutants as follow: BOF Furnaces (ESP) – NO_x, VOM and CO; and Hot Metal Desulfurization and Slag Skimming (Baghouses) – VOM.

* As an alternative to measurements for PM_{10} emissions, the measured results for PM, as determined in accordance with the NESHAP, shall be considered PM10, as provided for by 35 IAC 212.108.

ii. The relevant test method specified by the NESHAP or the following USEPA test methods shall be used for this testing, unless another USEPA test method is approved by the Illinois EPA during the review of a Test Plan submitted by the Permittee prior to testing.

Location of Sample Points	Method 1
Gas Flow and Velocity	Method 2
Flue Gas Weight	Method 3
Moisture	Method 4
VOM	Method 18 or 25A
NO_x	Method 7E or 19
CO	Method 10 or 10B
Lead	Method 29

iii. For this emission testing, test notifications and reporting shall be done by the Permittee in accordance with Condition 8.6.2 and 8.6.3 of this permit.

c. As provided by 35 IAC 212.446(c), observations to determine compliance with the opacity standard in 35 IAC 212.446(c) (see Condition 7.5.3(a)(iii)) shall be performed in accordance with 40 CFR Part 60, Appendix A, Method 9, incorporated by reference in 35 IAC 212.113, except that compliance shall be determined by averaging any 12 consecutive observations taken at 15 second intervals.

7.5.8 Monitoring and Inspection Requirements

a. Monitoring (40 CFR 63.7830)

i. For the capture system for secondary emissions from the Basic Oxygen Furnaces (which are subject to an operating limit in 40 CFR 63.7790(b)(1) established in Permittee's capture system operation and maintenance plan), the Permittee shall install, operate, and maintain a continuous parameter monitoring system (CPMS) according to the requirements in 40 CFR 63.7831(e) and the requirements in 40 CFR 63.7830(a)(1) through (3).

ii. The Permittee shall operate and maintain a bag leak detection system on Baghouse #2 and the slag skimmer baghouse according to 40 CFR 63.7831(f) and monitor the relative change in particulate matter loadings according to the requirements in 40 CFR 63.7832.

iii. The Permittee shall conduct inspections of each baghouse at the specified frequencies according to the following requirements [40 CFR 63.7830(b)(4)]:

A. Monitor the pressure drop across each baghouse cell each day to ensure pressure drop is within the normal operating range identified in the operation and maintenance manual.

B. Confirm that dust is being removed from hoppers through weekly visual inspections or other means of ensuring the proper functioning of removal mechanisms.

C. Check the compressed air supply for pulse-jet baghouses each day.

D. Monitor cleaning cycles to ensure proper operation using an appropriate methodology.

E. Check bag cleaning mechanisms for proper functioning through monthly visual inspections or equivalent means.

F. Make monthly visual checks of bag tension on reverse air and shaker-type baghouses to ensure that bags are not kinked (kneed or bent) or laying on their sides. The Permittee does not have to make this check for shaker-type baghouses using self-tensioning (spring-loaded) devices.

G. Confirm the physical integrity of the baghouse through quarterly visual inspections of the baghouse interior for air leaks.

H. Inspect fans for wear, material buildup, and corrosion through quarterly visual inspections, vibration detectors, or equivalent means.

iv. For the ESP controlling the BOF furnaces (which are subject to an opacity limit of 10 percent, hourly average, pursuant to 40 CFR 63.7790(b)(3)), the Permittee shall operate and maintain a continuous opacity monitoring system (COMS) according to the requirements in 40 CFR 63.7831(h) and monitor the hourly average opacity of emissions exiting the stack according to the requirements in 40 CFR 63.7832 [40 CFR 63.7830(d)].

If the hourly average opacity for the ESP exceeds the operating limit, the Permittee shall follow the following procedures [40 CFR 63.7833(g)]:

A. The Permittee shall initiate corrective action to determine the cause of the exceedance within 1 hour. During any period of corrective action, the Permittee must continue to monitor and record all required operating parameters for equipment that remains in operation. Within 24 hours of the exceedance, the Permittee shall measure and record the hourly average operating parameter value for the emission unit on which corrective action was taken. If the hourly average parameter value meets the applicable operating limit, then the corrective action was successful and the emission unit is in compliance with the applicable operating limit.

B. If the required initial corrective action was not successful, the Permittee shall complete additional corrective action within the next 24 hours (48 hours from the time of the exceedance). During any period of corrective action, the Permittee shall continue to monitor

and record all required operating parameters for equipment that remains in operation. After this second 24-hour period, the Permittee shall again measure and record the hourly average operating parameter value for the emission unit on which corrective action was taken. If the hourly average parameter value meets the applicable operating limit, then the corrective action was successful and the emission unit is in compliance with the applicable operating limit.

C. For purposes of 40 CFR 63.7833(g)(1) and (2), in the case of an exceedance of the hourly average opacity operating limit for an ESP, measurements of the hourly average opacity based on visible emission observations in accordance with Method 9 may be taken to evaluate the effectiveness of corrective action.

D. If the second attempt at corrective action required in paragraph 40 CFR 63.7833 (g)(2) was not successful, the Permittee shall report the exceedance as a deviation in the next semiannual compliance report according to 40 CFR 63.7841(b).

b. Installation, operation, and maintenance requirements for monitors [40 CFR 63.7831]

i. For the slag skimmer baghouse and Baghouse #2 (which are subject to 40 CFR 63.7830(b)(1)), the Permittee shall operate and maintain the bag leak detection system according to the following requirements [40 CFR 63.7831(f)]:

A. The system must be certified by the manufacturer to be capable of detecting emissions of particulate matter at concentrations of 10 milligrams per actual cubic meter (0.0044 grains per actual cubic foot) or less.

B. The system must provide output of relative changes in particulate matter loadings.

C. The system must be equipped with an alarm that will sound when an increase in relative particulate loadings is detected over a preset level. The alarm must be located such that it

can be heard by the appropriate plant personnel.

D. Each system that works based on the triboelectric effect must be installed, operated, and maintained in a manner consistent with the guidance document, “Fabric Filter Bag Leak Detection Guidance,” EPA-454/R-98-015, September 1997. The Permittee may install, operate, and maintain other types of bag leak detection systems in a manner consistent with the manufacturer’s written specifications and recommendations.

E. To make the initial adjustment of the system, the Permittee shall establish the baseline output by adjusting the sensitivity (range) and the averaging period of the device. Then, the Permittee shall establish the alarm set points and the alarm delay time.

F. Following the initial adjustment, the Permittee may not adjust the sensitivity or range, averaging period, alarm set points, or alarm delay time, except as detailed in the Permittee’s operation and maintenance plan. The Permittee may not increase the sensitivity by more than 100 percent or decrease the sensitivity by more than 50 percent over a 365-day period unless a responsible official certifies, in writing, that the baghouse has been inspected and found to be in good operating condition.

G. Where multiple detectors are required, the system’s instrumentation and alarm may be shared among detectors.

ii. For the ESP (which is subject to the opacity limit in 40 CFR 63.7790(b)(3)), the Permittee shall install, operate, and maintain a COMS according to the following requirements in 40 CFR 63.7831 (h)(1) through (4):

A. The Permittee shall install, operate, and maintain each COMS according to Performance Specification 1 in 40 CFR Part 60, Appendix B.

B. The Permittee shall conduct a performance evaluation of each COMS according to 40 CFR 63.8 and Performance Specification 1 in Appendix B to 40 CFR Part 60.

C. Each COMS must complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period.

D. COMS data must be reduced to 6-minute averages as specified in 40 CFR 63.8(g)(2) and to hourly averages where required by 40 CFR 63 Subpart FFFFF.

c. Pursuant to the operation and maintenance requirements of the O/M plan required by 40 CFR 63.7800(b), the Permittee shall comply with following inspection procedures for the capture systems and controls:

Monthly inspections of the equipment that is important to the performance of the total capture system. This inspection must include observations of the physical appearance of the equipment (e.g., presence of holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in the ductwork, and fan erosion). Repair of any defect or deficiency in the capture system shall be done before the next scheduled inspection.

d. Monitoring of capture and control systems for Basic Oxygen Furnaces (from Permit 95010001):

i. The Permittee shall operate and maintain the waste gas suction monitor system for the capture system for the Basic Oxygen Furnace that continually measures and records each operation (i.e., for each charge, each refine, each tap) of each steel production cycle the static pressure in the main downcommer duct of the ESP emissions capture and transport system.

A. The Permittee shall use the waste gas suction monitoring system as a mechanism to ensure sufficient draft is maintained in the emissions capture hoods and transport ducts so as to maximize emissions capture and transport and minimize uncaptured emissions and emission leaks.

B. The Permittee shall operate and maintain the system to ensure that accurate and useful data is collected.

C. The Permittee shall continuously record the static pressure in the main down comer duct of the ESP emissions capture and transport system.

ii. The Permittee shall calibrate, operate, and maintain a continuous strip chart recorder or disk storage of the ESP stack gas flow rate as measured by the stack gas flow meter during ESP use.

iii. The stack gas flow meter shall be calibrated on at least a quarterly basis.

iv. A. The Permittee shall visually inspect at least monthly all visible BOF vessel enclosures, hooding and ducts used to capture and transport emissions for the BOF ESP control system.

B. A log shall be maintained of these inspections which includes observations of the physical appearance of the capture system and any noted deficiencies (e.g., the presence of any holes in ductwork or hoods, flow constrictions caused by dents or accumulated dust in ductwork, and fan erosion).

C. Any leaks or areas otherwise noted to be in need of repair, shall be repaired expeditiously.

e. Opacity observations for 35 IAC 212.446(c);

The following opacity observations shall be performed pursuant to Section 39.5(7)(a) and (p) of the Act:

i. The Permittee shall have the opacity of the exhaust of the building housing the BOF determined by a qualified observer in accordance with USEPA Method 9 while the affected BOF(s) is operating, as further specified below.

A. Observations of opacity shall be conducted on the following frequency unless absence of adequate daylight or weather conditions preclude scheduled observation, in which case, the next observations shall be conducted on the next operating day of the BOF during which observations of opacity can reasonably be conducted in accordance with USEPA Method 9, except that reading shall be taken as a 3-minute average (12 consecutive observations taken 15 seconds intervals).

B. If a baghouse is not installed for control of tapping emissions from the BOF, these readings shall be performed for at least five days out of every seven. A day is defined as any day when a BOF is in operation for a minimum of

four hours during conditions that are acceptable for Method 9 readings. A minimum of 60 consecutive minutes of opacity readings must be obtained and must encompass at least one steel production cycle. A production cycle is defined as the beginning of scrap charging to the completion of deslagging of the steelmaking vessel. Results of these readings shall be reduced to three minute rolling averages.

C. Beginning 30 days after initial startup of a baghouse for control of tapping emissions from the BOFs, the Permittee shall have the opacity of the exhaust of the building housing the BOF determined by a qualified observer in accordance with USEPA Method 9 while the affected BOF(s) are operating, as further specified below.

1. The duration of opacity observations for each test shall be one complete steel making cycle.

2. Observations of opacity shall be conducted on the following frequency unless absence of adequate daylight or weather conditions preclude scheduled observation, in which case, the next observations shall be conducted on the next operating day of the BOF during which observations of opacity can reasonably be conducted in accordance with USEPA Method 9.

3. On a weekly basis (at least once every seven operating days of BOF) except as provided below.

4. On a daily basis (at least 5 days out of seven operating days of BOF) if any of the five previous 3-minute average observations measured opacity of 18 percent or more, continuing on a daily basis until the maximum opacities measured in five consecutive daily observations are all less than 18 percent, at which time observations on a weekly basis shall resume.

ii. Upon written request by the Illinois EPA, additional opacity observations shall be conducted within 5 operating days for the BOF from the date of the request by the Illinois EPA or on the date agreed upon by the Illinois EPA, whichever is later. For

such observations conducted pursuant to a request from the Illinois EPA:

A. The Permittee shall notify the Illinois EPA at least 24 hours in advance of the date and time of these observations, in order to enable the Illinois EPA to witness the observations. This notification shall include the name and employer of the qualified observer(s).

B. The Permittee shall promptly notify the Illinois EPA of any changes in the time or date for observations.

C. The duration of these observations shall cover a complete heat or cycle of the affected BOF.

D. The Permittee shall provide a copy of the current certification for the opacity observer and observer’s readings to the Illinois EPA at the time of the observations, if the Illinois EPA personnel are present.

E. The Permittee shall keep records for all opacity measurements for the BOF made in accordance with USEPA Method 9 for the affected operations that the Permittee conducts or that are conducted at its behest by individuals who are qualified to make such observations. For each occasion on which such measurements are made, these records shall include the formal report for the measurements, a description of the measurements that were made, the operating condition of the affected operations, the observed opacity, and copies of the raw data sheets for the measurements.

iii. A. The Permittee shall determine the opacity from the BOF ESP stack for at least one hour on any normal work day that the continuous opacity monitor on the BOF ESP stack has an outage that exceeds two consecutive hours and is still down. The readings shall commence as soon as possible after the opacity monitor has been down for two consecutive hours. If meteorological conditions or lack of visibility preclude these observations from being conducted, then this shall be noted in the log book.

B. The opacity shall be determined in accordance with the observation procedures set out in 40 CFR Part 60, Appendix A, Method 9.

f. Monitoring and Collecting Data [40 CFR 63.7832]:

i. For purposes of the NESHAP, 40 CFR 63 Subpart FFFFF, except for monitoring malfunctions, out-of-control periods as specified in 40 CFR 63.8(c)(7), associated repairs, and required quality assurance or control activities (including as applicable, calibration checks and required zero and span adjustments), the Permittee shall monitor continuously (or collect data at all required intervals) at all times a subject control/capture system is operating.

ii. The Permittee may not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels or to fulfill a minimum data availability requirement, if applicable. The Permittee shall use all the data collected during all other periods in assessing compliance.

iii. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not malfunctions.

g. Operational Monitoring for Steam Rings from Construction Permit 10080021:

The Permittee shall install, maintain and operate a continuous monitoring system on each steam ring for the steam valve position (open or closed) and the rate at which steam is being injected.

7.5.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. 40 CFR 63 Subpart FFFFF (40 CFR 63.7842 and 63.7843)

i. The Permittee shall keep the following records specified in 40 CFR 63.7842 (a)(1) through (a)(3):

A. A copy of each notification and report that the Permittee submitted to comply with 40 CFR 63 Subpart FFFFF, including all documentation supporting any initial notification or notification of compliance status that the Permittee submitted, according to the requirements in 40 CFR 63.10(b)(2)(xiv).

B. The records in 40 CFR 63.6(e)(3)(iii) through (v) related to startup, shutdown, and malfunction.

C. Records of performance tests, performance evaluations, and opacity observations as required in 40 CFR 63.10(b)(2)(viii).

ii. For each COMS, the Permittee shall keep the following records specified in 40 CFR 63.7842 (b)(1) through (4):

A. Records described in 40 CFR 63.10(b)(2)(vi) through (xi).

B. Monitoring data for a performance evaluation as required in 40 CFR 63.6(h)(7)(i) and (ii).

C. Previous (that is, superseded) versions of the performance evaluation plan as required in 40 CFR 63.8(d)(3).

D. Records of the date and time that each deviation started and stopped, and whether the deviation occurred during a period of startup, shutdown, or malfunction or during another period.

iii. The Permittee shall keep the records specified in 40 CFR 63.6(h)(6) for visual observations.

iv. The Permittee shall keep the records required in 40 CFR 63.7833 and 63.7834 to show continuous compliance with each emission limitation and operation and maintenance requirement that applies to the Permittee.

v. The Permittee shall keep the records in a form suitable and readily available for expeditious review, according to 40 CFR 63.10(b)(1).

vi. As specified in 40 CFR 63.10(b)(1), the Permittee shall keep each record for 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record.

vii. The Permittee shall keep each record on site for at least 2 years after the date of each occurrence, measurement, maintenance, corrective action, report, or record, according to 40 CFR 63.10(b)(1). The

Permittee may keep the records offsite for the remaining 3 years.

viii. The Permittee shall maintain a current copy of the operation and maintenance plan required in 40 CFR 63.7800(b) onsite and available for inspection upon request.

ix. A. The Permittee shall maintain a copy of the site-specific monitoring plan for each CPMS required by 40 CFR 63.7830, pursuant to 40 CFR 63.7831(a).

B. If the Permittee operates under manufacturer's specifications or manufacturer's instructions, such manufacturer's documentation shall be kept at the source as part of the required records.

b. Recordkeeping from Permits 72080043 and 95010001:

i. Operating time of the BOFs;

ii. Operating time of the capture systems and performance parameters, including air flow and fan amperage through the fan motors, gas temperature at inlet to ESP, damper settings, and steam injection rate;

iii. Operating time of the ESP and performance parameters, including voltage and amperage of each transformer/rectifier set, number of sections in use;

iv. All routine and nonroutine maintenance performed, including dates and duration of outages, inspection schedule and findings, leaks detected, repair actions, and replacements;

v. Total production of molten steel at the BOFs (daily, monthly, and annual production in tons);

vi. The Permittee shall keep a continuous strip chart recorder or disk storage of the stack gas flow rate during ESP use.

vii. The Permittee shall records for each steel production cycle the various stack gas flow rates for each process (i.e., for each charge, each refine, each tap) of each steel production cycle. That is, the Permittee shall be able to distinguish the measured flow rate of stack gas during each production cycle.

ix. Records of all opacity observations.

c. Recordkeeping carried over from Permit 08110016:

The operating and maintenance records that the Permittee maintains for the ESP shall include the following information for the induced draft fans on the ESP, in addition to other required information:

i. The periods of time when the BOFs operated with less than three properly functioning fans, with description and explanation.

ii. The periods of time when the BOFs are operating and a spare fan is not available, with the identity of the fan(s) that were not available and explanation, e.g., spare fan not available due to regularly scheduled maintenance or spare fan not available due to unplanned breakdown of the main bearings.

d. Recordkeeping for the steam rings on the BOF furnaces from Construction Permit 10080021:

i. A. The Permittee shall maintain a record of the steam valve position (open or closed) and the rate at which steam is being injected, as determined by the continuous monitoring systems required by Condition 7.5.8(g).

B. In addition to keeping records of the data measured by these monitoring systems, the Permittee shall keep records of the operation, calibration and maintenance of these systems.

ii. The Permittee shall maintain an operating log or other records for the BOF and steam rings that contain information generally documenting the steam rings are being operated in accordance with Condition 7.5.5-3(c), including information for the timing of the refining phase of each heat of a BOF furnace.

iii. The Permittee shall maintain detailed records of the following information for each heat in a BOF furnace in which the steam ring was not operated during the refining phase:

A. Identification of the heat and the duration of the incident, i.e., start time and time normal operation was achieved or the refining phase was completed.

B. Description of the incident, impact on effectiveness of the steam ring, probable cause, and corrective actions.

C. Verification that the established procedures were followed or a description and explanation why procedures were not followed.

Note: These records may be kept with other logs or records that the Permittee keeps for the BOF furnaces and their instrumentation and need not be kept as a separate record.

e. The Permittee shall keep annual records (tons/year) of steel processed at the slag skimming station, the argon stirring station and ladle metallurgy furnace station.

f. Emission Records

The Permittee shall keep the following records related to the emissions of the affected basic oxygen processes to verify compliance with the applicable limits in Conditions 7.5.6(b) through (g):

i. A file containing the emission factors used by the Permittee to determine emissions of different pollutants from such processes, with supporting documentation. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of the affected processes do not understate actual emissions, including review when emission testing is conducted for an affected process. These records shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c), except that copies of the initial records shall be submitted to the Illinois EPA no later than August 3, 2012.

ii. Records for any periods of operation of an affected process that are not otherwise addressed in the required records during which the established emission factor in Condition 7.5.9(f)(i) would understate actual emissions of the process, with description of the period of operation and an estimate of the additional emissions during such period that are not accounted for by the established factor, with supporting explanation and calculations.

iii. Records for the annual emissions of such processes for comparison to the limits in Conditions 7.5.6(c) through (g), with supporting calculations.

iv. Records for combined annual emissions of such affected processes, based on the summation of the above data, for comparison to the limits in Condition 7.5.6(b).

g. In the operational logs or other records for the operation of the affected basic oxygen processes, the Permittee shall keep records identifying process upsets that result in the generation of additional opacity or PM emissions, such as loss of the slag cover on the molten metal in a vessel or a spill of molten metal. For these upsets, these records shall include the time of the upset, a description of the upset, and a discussion of the consequences for PM emissions from the affected basic oxygen processes.

h. Records for Malfunctions or Breakdowns

Pursuant to 35 IAC 201.263, the Permittee shall maintain records of continued operation of the affected Basic Oxygen Furnace and Ladle Metallurgy Furnace as addressed by Condition 7.5.5-2(b), during malfunctions or breakdowns, which at a minimum, shall include the following records. The preparation of these records shall be completed within 45 days of an incident, unless the Permittee conducts a root cause analysis for the incident, in which case the preparation of these records, other than the root cause analysis, shall be completed within 120 days of the incident.

i. Date, time and duration of the incident.

ii. A detailed description of the incident, including:

A. A chronology of significant events during and leading up to the incident.

B. Relevant operating data for the unit, including information such as operator log entries and directives provided by management during the incident.

C. The measures taken to reduce the quantity of emissions and the duration of the incident including the resources utilized to address the incident.

D. The magnitude of emissions during the incident.

iii. An explanation why continued operation of an affected basic oxygen furnace was necessary to prevent personnel injury or prevent equipment damage.

iv. A discussion of the cause(s) or probable cause(s) of the incident including the following,

A. Whether the incident was sudden, unavoidable, or preventable, including:

1. Why the equipment design did not prevent the incident;

2. Why better maintenance could not have avoided the incident;

3. Why better operating practices could not have avoided the incident; and

4. Why there was no advance indication for the incident.

B. Whether the incident stemmed from any activity or event that could have been foreseen, avoided or planned for.

C. Whether the incident was or is part of a recurring pattern indicative of inadequate design, operation or maintenance.

v. A description of any steps taken or to be taken to prevent similar future incidents or reduce their frequency and severity.

vi. As an alternative to keeping the records required by Condition 7.5.9(g)(iv), the Permittee may perform a root cause analysis. For this purpose, a root cause analysis is an analysis whose purpose is to determine, correct and eliminate the primary causes of the incident and the excess emissions resulting there from. If the Permittee performs a root cause analysis method that would define the problem, define all causal relationships, provide a causal path to the root cause, delineate the evidence, and provide solutions to prevent a recurrence. Such an analysis shall be completed within one year of the incident.

7.5.10 <u>Reporting Requirements</u>

a. 40 CFR Part 63, Subpart FFFFF (40 CFR 63.7841)

i. Compliance report due dates. Unless the Administrator has approved a different schedule, the Permittee shall submit a semiannual compliance report to the permitting authority according to the following requirements:

A. Semi-annual compliance report must cover the semiannual reporting period from January 1 through June 30 or the semiannual reporting period from July 1 through December 31.

B. Each compliance report must be postmarked or delivered no later than July 31 or January 31, whichever date comes first after the end of the semiannual reporting period.

ii. Compliance report contents. Each compliance report shall include the following information:

A. Company name and address.

B. Statement by a responsible official, with that official's name, title, and signature, certifying the truth, accuracy, and completeness of the content of the report.

C. Date of report and beginning and ending dates of the reporting period.

D. If the Permittee had a startup, shutdown, or malfunction during the reporting period and the Permittee took actions consistent with the source's startup, shutdown, and malfunction plan, the compliance report must include the information in 40 CFR 63.10(d)(5)(i).

E. If there were no deviations from the continuous compliance requirements in 40 CFR 63.7833 and 63.7834 that apply to the Permittee, a statement that there were no deviations from the emission limitations or operation and maintenance requirements during the reporting period.

F. If there were no periods during which a continuous monitoring system (including a CPMS, COMS, or continuous emission monitoring system (CEMS)) was out-of-control as specified in 40 CFR 63.8(c)(7), a statement that there were no periods during which the CPMS was out-of-control during the reporting period.

G. For each deviation from an emission limitation in 40 CFR 63.7790 that occurs at each Basic Oxygen Process where the Permittee is not using a continuous monitoring system (including a CPMS, COMS, or CEMS) to comply with an emission limitation in 40 CFR Subpart FFFFF, the compliance report must contain the information described in Condition 7.5.10(a)(ii)(A) through (F) and the following information (this includes periods of startup, shutdown, and malfunction):

1. The total operating time of each Basic Oxygen Process during the reporting period.

2. Information on the number, duration, and cause of deviations (including unknown cause, if applicable) as applicable and the corrective action taken.

H. For each deviation from an emission limitation occurring at each Basic Oxygen Furnace Process where the Permittee is using a continuous monitoring system (including a CPMS or COMS) to comply with the emission limitation in 40 CFR 63 Subpart FFFFF, the Permittee shall include the following information (this includes periods of startup, shutdown, and malfunction):

1. The date and time that each malfunction started and stopped.

2. The date and time that each continuous monitoring was inoperative, except for zero (low-level) and high-level checks.

3. The date, time, and duration that each continuous monitoring system was out-of-control as specified in 40 CFR 63.8(c)(7), including the information in 40 CFR 63.8(c)(8).

4. The date and time that each deviation started and stopped, and whether each deviation occurred during a period of startup, shutdown, or malfunction or during another period.

5. A summary of the total duration of the deviation during the reporting period and the total duration as a percent of the total source operating time during that reporting period.

6. A breakdown of the total duration of the deviations during the reporting period including those that are due to startup, shutdown, control equipment problems, process problems, other known causes, and other unknown causes.

7. A summary of the total duration of continuous monitoring system downtime during the reporting period and the total duration of continuous monitoring system downtime as a percent of the total source

operating time during the reporting period.

8. A brief description of the Basic Oxygen Processes.

9. A brief description of the continuous monitoring system.

10. The date of the latest continuous monitoring system certification or audit.

11. A description of any changes in continuous monitoring systems, processes, or controls since the last reporting period.

iii. Immediate startup, shutdown, and malfunction report. If the Permittee had a startup, shutdown, or malfunction during the semiannual reporting period that was not consistent with the source's startup, shutdown, and malfunction plan, the Permittee shall submit an immediate startup, shutdown, and malfunction report according to the requirements in 40 CFR 63.10(d)(5)(ii).

b. Monthly Opacity Exceedance Report.

Monthly opacity exceedance reports for the BOF ESP shall be sent to the Illinois EPA Regional Office. These reports shall contain all opacity measurements which exceed 30 percent, averaged over a six minute period. These "excess opacity" reports shall provide, for each such incident, the percent opacity measured as well as the date and span of such incident. These reports shall state the reasons for the excess opacity. The reports shall also specify the dates of those periods during which the continuous monitoring system was not in operation [Section 39.5(7)(f)(ii) of the Act].

c. Reporting Requirements from Permit 08110016:

After the initial year of operation (12 calendar months) of the BOF with an ESP with four fans, the Permittee shall submit a report to the Illinois EPA that evaluates the impacts of the addition of a fourth fan to the ESP on the particulate matter emissions of the BOF. This report shall, at a minimum, include the following information and address impacts on both stack emissions of particulate matter (i.e., emissions from the ESP stack) and uncaptured emissions of particulate matter (e.g., emissions from the roof monitor of the BOPF Shop). This report shall be

submitted by the end of the third month following the initial year of operation with an ESP with four fans.

i. A description of typical operating scenarios in which the availability of a spare fan resulted in a decrease in short-term emissions, with an assessment of the changes in the hourly emission rates, with supporting documentation and calculations.

ii. A description of typical operating scenarios, if any, in which the availability of a spare fan resulted in an increase in short-term emissions, with an assessment of the changes in the hourly emission rates, with supporting documentation and calculations.

iii. An assessment of the overall effect of the addition of a fourth fan on actual annual emissions of the BOF, with supporting operating data and calculations.

d. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by the Basic Oxygen Furnace Processes from applicable requirements, unless a NESHAP standard specifies a different timeframe, as follows:

A. Requirements in Condition 7.5.3.

B. Requirements in Condition 7.5.5-1.

C. Requirements in Condition 7.5.5-3.

D. Requirements in Condition 7.5.6(a) through (k).

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

iii. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

iv. All required deviation reports described in Condition 7.5.10(d) above shall contain the following information:

A. Date, time and duration of the deviation;

B. Description of the deviation;

C. Probable cause of the deviation; and

D. Any corrective action or preventative measures taken.

e. Reporting on malfunction and breakdown shall be performed in accordance with Condition 5.10.5-2

f. Reporting Requirements from Permit 10080021:

i. Within six months of initial startup of the steam rings on the affected BOFs, the Permittee shall submit to the Illinois EPA: 1) A Project Report; and 2) A draft of the Permittee's written operating procedures for the steam rings, as required by Condition 7.5.5-3(c), for review and comment by the Illinois EPA. This Project Report shall include the following:

A. An assessment, with supporting documentation, of the effect of the steam rings on the opacity and, as feasible, particulate loading of the exhaust from the roof monitor of the BOPF Shop during refining, correlated with the rate of steam injection and other operating parameters of the BOF's and their control system; and

B. An identification of circumstances, if any, in which the steam rings must be operated to maintain compliance with applicable emission standards.

ii. The Permittee shall submit reports to the Illinois EPA on a semi-annual basis that include the following information for the operation of the steam rings on the affected BOFs:

A. Total number of heats during the reporting period.

B. Number of heats during the reporting period without steam rings operating properly, by type of incident, e.g., breakdown of the steam ring interrupting operation, malfunction of the steam ring with insufficient steam flow, or breakdown of support system.

g. Reporting on the Federal SSM authorization shall be performed in accordance with Condition 5.10.5-3.

7.5.11 <u>Operational Flexibility/Anticipated Operating Scenarios</u>

The Basic Oxygen Furnaces shall only be operated as top oxygen injected vessels, except that, for purposes of checkout and emission testing only, the furnaces may be operated as peripheral and bottom oxygen injected furnaces for a maximum of

120 days. Any further operation of the furnaces as other than top oxygen injected vessels shall be pursuant to a permit granted for such additional operation [72080043].

7.5.12 Compliance Procedures

a. Compliance with the applicable standards of Condition 7.5.3 is addressed by the work practices, testing, monitoring, recordkeeping and reporting requirements in Section 7.5 of this permit.

b. Compliance with the production/emission limits of Conditions 7.5.6 and 5.6.2 is addressed by the work practices, testing monitoring, recordkeeping and reporting requirements in Sections 7.5 and 5 of this permit.

7.5.13 Compliance Schedule and Current Enforcement Status

a. The Permittee shall comply with the following schedule of compliance applicable to BOF shop emissions and established in accordance with modified Consent Order 05-CH-750 (December 23, 2009):

Commitment	Timing
Certify compliance	March 31, 2011

b. Submittal of Progress Reports

Quarterly Progress Reports shall be submitted beginning with September 2011 and ending upon the achievement of compliance. Each quarterly report shall be submitted no later than 5 days after the end of the corresponding calendar month. The Progress Report shall contain at least the following:

i. The required date for achieving commitments, and actual dates when such commitments were achieved.

ii. Any commitments accepted by the Permittee or otherwise established for the affected BOF as part of the resolution of the above referenced Consent Order, with the associated timing for each commitment.

iii. A discussion of progress in complying with commitments that are subject to future deadlines.

iv. If any commitment was not met, an explanation of why the required timeframe or commitment was not met, and any preventive or corrective measures adopted to achieve required commitment.

c. After completion of all required commitments and certification of compliance, as identified in Condition

7.5.13(a) no further Quarterly Progress Reports are required to be submitted.

7.5.14 State-Only Conditions

State-only conditions are not being established.

7.6 Continuous Casting

7.6.1 Description

There are two continuous casting lines in operation in the caster building. Ladles of molten steel are hoisted by crane and placed in revolving turrets located at the top of the casters. Each turret holds two ladles at a time. When one ladle of steel has been cast the turret is rotated and the second ladle is tapped. The empty ladle is then replaced with a full one. The tapping process involves opening the taphole located on the bottom of the ladle and allowing the molten steel to flow into an intermediate chamber called a “Tundish”. The Tundish has a taphole in the bottom through which the molten steel flows directly into the casters. The Tundish maintains a steady stream of molten steel flowing into the caster while ladles are being changed.

The molten steel from the casters continuously passes through a system of rollers and straighteners. Water is sprayed onto the slab throughout this process to complete the solidification of the slab.

Note: This narrative description is for informational purposes only and is not enforceable.

7.6.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Continuous Casting	Steel Deslagging Station	Pre-1986	None
	Caster Molds 1 and 2	Pre-1990	None
	Casters #1 and #2: Spray Chambers	Pre-1981 (#1) Around 1988 (#2)	None
	Slab Cut-off	N/A	None
	Slab Ripping	N/A	None

7.6.3 Applicable Provisions and Regulations

a. The “affected continuous casting operations” for the purpose of these unit-specific conditions are the operations and emission units described in Conditions 7.6.1 and 7.6.2.

b. Pursuant to 35 IAC 212.458(b) and (c), the affected continuous casting operations shall comply with the following:

No person shall cause or allow emissions of PM_{10}, other than that of fugitive particulate matter, into the atmosphere to exceed the following limits during any one hour period:

i. 22.9 mg/scm (0.01 gr/scf) from any process emissions unit provided however that this limit shall not apply if there are no visible emissions, except if a stack test is performed, the absence of visible emissions is not a defense to a finding of violation [35 IAC 212.458(b)(7) and (c)]; and

ii. 5 percent opacity for continuous caster spray chambers or continuous casting operations [35 IAC 212.458(b)(8)].

Note: These standards currently do not apply to slab cut-off and slab ripping processes which are not vented through stacks.

c. Pursuant to 35 IAC 212.316(f), the affected continuous casting operations shall comply with the following:

No person shall cause or allow fugitive particulate matter emissions from any emission unit to exceed an opacity of 20 percent.

7.6.4 Non-Applicability of Regulations of Concern

a. The emission limitations of 35 IAC 212.324 are not applicable to any emission unit subject to a specific emissions standard or limitation contained in 35 IAC Part 212 Subpart R, Primary and Fabricated Metal Products and Machinery Manufacture, pursuant to 35 IAC 212.324(a)(3).

b. The affected continuous casting operations are not subject to 40 CFR Part 63 Subpart FFFFF, Integrated Iron and Steel Manufacturing, because continuous casting is not defined as part of BOPF and shop ancillary operations in 40 CFR 63.7782(c).

c. The affected continuous casting operations are not subject to 35 IAC 212.309 and 212.310 because those operations are not identified in 35 IAC 212.304 through 212.308.

7.6.5 Control Requirements and Work Practices

Pursuant to 35 IAC 212.450, particulate matter emissions from liquid steel charging in continuous casting operations shall be controlled by chemical or mechanical shrouds.

7.6.6 Production and Emission Limits from Permit 95010001 [T1]:

a. Emissions from Deslagging Station and associated Material Handling System (see Section 7.1) shall not exceed the following limits:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.00355	6.35
PM_{10}	0.00355	6.35

b. Emissions from Caster Molds – Casting shall not exceed the following limits:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.006	10.74
PM_{10}	0.006	10.74
NO_x	0.050	89.50

c. Emissions from Casters Spray Chambers shall not exceed the following limits:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.00852	15.25
PM_{10}	0.00852	15.25

d. Emissions from Slab Cut-off shall not exceed the following limits:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.0071	12.71
PM_{10}	0.0071	12.71

e. Emissions from Slab Ripping shall not exceed the following limits:

Pollutant	Emission Factor (Lbs/Ton)	Maximum Emissions (Tons/Yr)
PM	0.00722	12.92
PM_{10}	0.00722	12.92

f. Total Emissions from Continuous Casting operations shall not exceed the following limits:

	PM (Tons/Yr)	PM_{10} (Tons/Yr)	NO_x (Tons/Yr)
Continuous Casting Operations	71	71	90.0

g. Compliance with annual limits shall be determined on a calendar year basis [T1].

7.6.7 Testing Requirements

a. The Permittee shall conduct opacity observations for the affected continuous casting operations as specified below [Sections 39.5(7)(d) and (p) of the Act]:

i. Semi-annual observations shall be performed by a qualified observer in accordance with USEPA Method 9 for each spray chamber stack and continuous caster building openings while the casters are operating. The duration of opacity observations for each stack and the building shall be at least 30 minutes unless no visible emissions are observed from a stack or the building during the first 12 minutes of observations.

ii. Upon written request by the Illinois EPA, additional opacity observations shall be conducted within 5 operating days from the date of the request or by the date agreed upon by the Illinois EPA, whichever is later. For these observations:

A. The Permittee shall notify the Illinois EPA at least 24 hours in advance of the date and time of these observations, in order to enable the Illinois EPA to witness the observations. This notification shall include the name and employer of the qualified observer(s).

B. The Permittee shall promptly notify the Illinois EPA of any changes in the time or date for observations.

C. The duration of these observations shall be three hours for each spray chamber stack.

D. The Permittee shall provide a copy of the current certification for the opacity observer and observer’s readings to the Illinois EPA at the time of the observations, if the Illinois EPA personnel are present.

b. The Permittee shall have emission tests conducted for the PM/PM_{10} emissions of the spray chambers of the affected continuous casting operations as specified below to verify

compliance with emission limits in Condition 7.6.6(c) [Sections 39.5(7)(d) and (p) of the Act]:

i. A. Emission testing shall be conducted within 30 months of the effective date of this permit condition. This testing shall be conducted for one caster as selected by the Illinois EPA.

B. Upon written request from the Illinois EPA, additional emission testing shall be conducted within 90 operating days from the date of the request or by the date agreed upon by the Illinois EPA, whichever is later.

ii. The following USEPA test methods shall be used for this testing, unless another USEPA method is approved by the Illinois EPA:

A.	Location of Sample Points	Method 1
B.	Gas Flow and Velocity	Method 2
C.	Flue Gas Weight	Method 3
D.	Moisture	Method 4
E.	PM/PM_{10}	Methods 5, 201 or 201A

iii. Observations for visible emissions and opacity shall be conducted during all emission tests in accordance with USEPA Methods 22 and 9, respectively, and the results of these observations included in the reports for emission testing.

iv. For this emission testing, test notifications and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

7.6.8 Monitoring Requirements

The Permittee shall perform monthly inspections of the continuous casting operations. These inspections shall include [Sections 39.5(7)(a) and (d) of the Act]:

a. Inspection of the mechanical shrouds on the continuous casting operations to ensure their physical presence and integrity.

b. Observations for visible emissions from stacks conducted in accordance with Method 22. If visible emissions are observed, opacity observations by Method 9 shall be conducted within one week.

7.6.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected continuous casting operations, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. Amount of steel cast (ton/mo and ton/yr).

b. The Permittee shall maintain records of the inspections required by Condition 7.6.8.

c. The Permittee shall keep the following records related to the emissions of the affected continuous casting operations:

i. A file containing the emission factors used by the Permittee to determine emissions of different pollutants from the various affected operations, with supporting documentation. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of the affected operations do not understate actual emissions. These records shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

ii. Records for any periods of operation of an affected operations that are not otherwise addressed in the required records during which the established emission factor in Condition 7.6.9(c)(i) would understate actual emissions, with description of the period of operation and an estimate of the additional emissions during such period that would not be accounted for by the established factor, with supporting explanation and calculations.

iii. Records for the annual emissions of the various affected operations for comparison to the limits in Conditions 7.6.6(a) through (e), with supporting calculations.

iv. Records for combined annual emissions of the affected continuous casting operations, based on the summation of the above data, for comparison to the limits in Condition 7.6.6(f).

d. The Permittee shall keep records for all opacity readings for the affected continuous casting operations conducted in accordance with Condition 7.6.7.

7.6.10 Reporting Requirements

a. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by

the affected continuous casting operations from applicable requirements, as follows:

A. Requirements in Condition 7.6.3(b) and (c).

B. Requirements in Condition 7.6.6.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

b. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

c. All deviation reports described in Condition 7.6.10 above shall contain the following:

i. Date, time and duration of the deviation;

ii. Description of the deviation;

iii. Probable cause of the deviation; and

iv. Any corrective action or preventive measures taken.

7.6.11 Operational Flexibility/Anticipated Operating Scenarios

Operational flexibility is not set for the affected continuous casting operations.

7.6.12 Compliance Procedures

For affected continuous casting, compliance with the applicable standards of Conditions 7.6.3(b) and (c) and with the limitations of Condition 7.6.6 is addressed by the work practices, testing, monitoring, recordkeeping and reporting requirements in Section 7.6 of this permit.

7.6.13 State-Only Conditions

State-only conditions are not being established.

7.7 Hot Strip Mill Reheat Furnaces

7.7.1 Description

Steel slabs are heated in the slab reheat furnaces, so they can be formed further in the facility's hot strip mill. Some of the slabs are shipped to the facility from outside suppliers.

The following fuels or combination of these fuels are fired by all the four furnaces: natural gas and coke oven gas (COG). In the past, the reheat furnaces also fired oil, but they no longer have that capability.

Note: This narrative description is for informational purposes only and is not enforceable.

7.7.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Reheat Furnaces	Slab Reheat Furnaces #1, #2 & #3 equipped with low-NO_x burners Nominal firing rate: 322 mmBtu/hr each	Pre-1972	None
	Slab Reheat Furnace #4 equipped with low-NO_x burners Nominal firing rate: 495 mmBtu/hr	Pre-1977	None

7.7.3 Applicable Provisions and Regulations

a. The "affected slab reheat furnaces" for the purpose of these unit-specific conditions, are the emission/production units as described in Conditions 7.7.1 and 7.7.2 above.

b. The affected slab reheat furnaces are subject to 35 IAC 212.458(b)(10) and (c), which provide that no person shall cause or allow emissions of PM_{10}, other than that of fugitive particulate matter, into the atmosphere to exceed 38.7 ng/J (0.09 lbs/mmBtu) of heat input from the slab furnaces at steel plants in the vicinity of Granite City during any one hour period, provided however that this limit shall not apply if there are no visible emissions, except if a stack test is performed, the absence of visible emissions is not a defense to a finding of violation.

c. The affected slab reheat furnace #4 is subject to 35 IAC 212.321(a), which provides that:

No person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any new process emission unit, which either alone or in combination with the emission of particulate matter from all other similar process emission units for which construction or modification commenced on or after April 14, 1972, at a source or premises, exceeds the allowable emission rates specified in 35 IAC 212.321(c) (See also Attachment 2) [35 IAC 212.321(a)].

d. The affected slab reheat furnaces #1, #2 and #3 are subject to 35 IAC 212.322(a), which provides that:

No person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any process emission unit for which construction or modification commenced prior to April 14, 1972, which, either alone or in combination with the emission of particulate matter from all other similar existing process emission units at a source or premises, exceeds the allowable emission rates specified in 35 IAC 212.322(c) (See also Attachment 2) [35 IAC 212.322(a)].

e. Pursuant to 35 IAC 214.301, the affected slab reheat furnaces shall comply with the following: no person shall cause or allow the emission of sulfur dioxide into the atmosphere from any process emission source to exceed 2000 ppm.

f. Pursuant to 35 IAC 212.123(a), the affected slab reheat furnaces shall comply with the following: no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to the requirements of 35 IAC 212.122, except as allowed by 35 IAC 212.123(b) and 212.124.

g. Pursuant to 35 IAC 212.458(b)(7) and (c), the affected slab reheat furnaces shall comply with the following:

No person shall cause or allow emissions of PM_{10}, other than that of fugitive particulate matter, into the atmosphere to exceed the following limits during any one hour period:

22.9 mg/scm (0.01 gr/scf) from any process emissions unit provided however that this limit shall not apply if there are no visible emissions, except if a stack test is performed, the absence of visible emissions is not a defense to a finding of violation [35 IAC 212.458(b)(7) and (c)].

7.7.4 <u>Non-Applicability of Regulations of Concern</u>

a. The emission limitations of 35 IAC 212.324 are not applicable to the affected slab reheat furnaces, because

they are subject to a specific emissions standard or limitation contained in 35 IAC Part 212 Subpart R, pursuant to 35 IAC 212.324 (a)(3).

b. The affected slab reheat furnaces are not subject to 40 CFR Part 63 Subpart FFFFF, Integrated Iron and Steel Manufacturing, because reheat furnaces are not covered by this NESHAP [see 40 CFR 63.7782(c)].

c. This permit is issued based on the Permittee not being subject to the work practice and recordkeeping requirements of 35 IAC 212.324(f) because the affected slab reheat furnaces do not use air pollution control equipment for particulate matter.

7.7.5 Startup Provisions

a. Pursuant to 35 IAC 201.149 and Part 201 Subpart I, subject to the following terms and conditions for affected slab reheat furnaces, the Permittee is authorized to violate the applicable opacity standards in 35 IAC 212.123(a) of Condition 7.7.3(f) during startup.

Note: This authorization is provided because the Permittee applied for such authorization in its CAAPP application, generally describing the efforts that will be used "…to minimize startup emissions, duration of individual starts, and frequency of startups".

i. This authorization does not relieve the Permittee from the continuing obligation to demonstrate that all reasonable efforts are made to minimize startup emissions, duration of individual startups and frequency of startups.

ii. The Permittee shall conduct startup of the affected slab reheat furnaces in accordance with written procedures prepared by the Permittee and maintained at the source (see Condition 7.7.10(d)(i)) for the affected slab reheat furnaces, that are specifically developed to minimize emissions from startups and that include, at a minimum:

A. A review of the operational condition of the affected reheat furnaces prior to initiating startup of the furnaces;

B. Initiation of startups to provide adequate time to implement the established startup procedures;

C. Sequential startup of the burners in the different zones of each furnace; and

D. Temperature levels achieved during startup.

iii. The Permittee shall fulfill applicable recordkeeping of Condition 7.7.10(d).

iv. The Permittee shall fulfill applicable reporting of Condition 5.10.5-1.

b. As provided by 35 IAC 201.265, an authorization in a permit for excess emissions during startup does not shield a Permittee from enforcement for any violation of applicable emission standard(s) that occurs during startup and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

7.7.6 Control Requirements and Work Practices

a. Pursuant to Permit 06070022, the affected slab reheat furnaces shall be equipped, operated, and maintained with low NO_x burners. The low NO_x burners shall be operated and maintained in conformance with good air pollution control practices. These low-NO_x burners shall be operated in the following zones of the affected slab reheat furnace [T1R]:

i. Slab reheat furnaces #1 through #3: heat and intermediate zones; and

ii. Slab reheat furnace #4: heat zone.

b. The affected slab reheat furnaces are allowed to burn natural gas and coke oven gas only as a fuel [Section 39.5(7)(a)of the Act].

7.7.7 Operating and Emission Limits

The following operating and emission limits are established for the affected slab reheat furnaces [06070022, T1]:

a. Operation of the affected slab reheat furnaces shall not exceed the following limits:

Emission Unit	Total Gas Usage (mmBtu/year)	COG Usage (mmBtu/year)
Slab Reheat Furnace #3	1,654,304	1,187,790
Slab Reheat Furnace #4	2,206,238	1,544,367
Total (Furnaces 1-4)	7,169,150	2,421,388

b. Emissions of NO_x from the affected slab reheat furnaces shall not exceed the following limits:

Furnace	Limit (Lbs/mmBtu)
Slab Reheat Furnace #1	0.150
Slab Reheat Furnace #2	0.150
Slab Reheat Furnace #3	0.264
Slab Reheat Furnace #4	0.283

c. Emissions of NO_x from the affected slab reheat furnaces (combined) shall not exceed 73 tons/month and 724.09 tons/year.

d. Compliance with above annual limits shall be determined from a running total of 12 months of data.

7.7.8 Testing Requirements

a. Pursuant to Section 39.5(7)(d) and (p) of the Act, the Permittee shall conduct a performance test on each affected slab reheat furnace within 18 months of the effective date of this permit condition and furnish the Illinois EPA a written report of the results of such test(s).

i. These tests shall be conducted while the reheat furnace is firing COG at the maximum level in the normal mix of fuel for the furnace.

ii. The following methods and procedures shall be used for testing of emissions, unless another method is approved by the Illinois EPA: Refer to 40 CFR 60, Appendix A, for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3
Moisture	USEPA Method 4
NO_x	USEPA Method 7E or 19

b. The Permittee shall conduct tests for PM/PM_{10} and NO_x emissions of the affected reheat furnaces upon written request from the Illinois EPA, for furnace(s) and fuel mix, as specified in the request. This testing shall be completed within 90 days of the request of by such later date agreed to by the Illinois EPA. For NO_x, this testing shall be conducted in accordance with Condition 7.7.8(a)(i). For PM/PM_{10}, testing shall be conducted using USEPA Test Methods as specified in 35 IAC 212.108(a).

c. For all required emission tests, the Permittee shall conduct opacity observations in accordance with USEPA Method 9 during each run and report the results in the test report. The duration of observations for each run shall be 30-minutes unless visible emissions are not observed during

the first 12 minutes. Notwithstanding the above, if weather conditions during the period of testing are not suitable for conducting opacity observations, observations may be conducted within 48 hours of the time of testing, in which case, the duration of observations shall be 3 hours unless visible emissions are not observed during the first 36 minutes of observations.

d. With the reports for all emission testing, the Permittee shall also provide the sulfur content of the COG being combusted during the period of testing, as measured by the monitoring system for COG, and sulfur content of the mixed fuel combusted during the period of testing, with supporting calculations.

e. For this emission testing, test notifications and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

7.7.9 Monitoring Requirements

The affected slab reheat furnaces are subject to the following monitoring requirements, pursuant to Sections 39.5(7)(a) and (d) of the Act:

a. The Permittee shall conduct opacity observations for each affected slab reheat furnace on a semi-annual basis, in accordance with USEPA Method 9, for a minimum of 30 minutes per furnace, unless no visible emissions are observed during the first 12 minutes of observations. The results of these observations shall be reported to the Illinois EPA within 45 days after each observation is conducted.

b. Unless annual performance tests or continuous monitoring for emissions of NO_x is being conducted for an affected slab reheat furnace pursuant to 35 IAC Part 217, Subpart D, the Permittee shall perform combustion evaluations/inspections of the burners on each affected slab reheat furnace on a regular basis, including inspections of the various components of the burner for their condition and proper functioning, and diagnostic measures of the NO_x concentration in the exhaust of the furnace before and after performance evaluation. These inspections/evaluations shall be conducted on a semi-annual basis if accommodated by the schedule for maintenance outages on an affected furnace, and otherwise on at least an annual basis.

7.7.10 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected slab reheat furnaces, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. i. Records for heat input:

A. For COG (mmBtu/month and mmBtu/year) for all affected slab reheat furnaces (combined) and for furnaces #3 and #4 (individually).

B. For natural gas (mmBtu/month and mmBtu/year) for all affected slab reheat furnaces (combined) and for furnaces #3 and #4 (individually).

ii. Records for the amount for each type of fuel used (mmscf/mo).

b. A log or other records that will serve to identify the fuel or fuels being fired during each hour in each affected reheat furnace:

i. For furnaces # 1, 2 and 3, whether natural gas or COG is being fired.

ii. For furnace #4, the setting for the mix of natural gas and COG that is being fired.

c. Records for all emission tests and opacity observations for the affected slab reheat furnaces.

d. Records for Startups of Affected Slab reheat furnaces, pursuant to Section 39.5(7)(b) of the Act

i. The Permittee shall maintain startup procedures for each affected slab reheat furnace, as required by Condition 7.7.5(a)(ii).

ii. The Permittee shall maintain the following records for each startup of an affected furnace:

A. Date, time and duration of the startup.

B. A description of the startup and reason(s) for the startup.

C. Whether a violation of an applicable standard may have occurred during startup accompanied by the information in Condition 7.7.9(d)(iv) if a violation may have or did occur.

D. Whether the established startup procedures, maintained above, were followed accompanied by the information in Condition 7.7.9(d)(iii) if there were departure(s) from those procedures.

iii. If the established startup procedures were not followed during a startup, the Permittee shall maintain the following records:

A. A description of the departure(s) from the established procedures.

B. The reason(s) for the departure(s) from the established procedures.

C. An explanation of the consequences of the departure(s) for emissions, such as whether the departure(s) prolonged the startup or resulted in additional emissions, and if so,

1. The actions taken to minimize emissions and the duration of the startup; and

2. An explanation whether similar incidents might be prevented in the future and if so, the corrective actions taken or to be taken to prevent similar incidents.

iv. If a violation did or may have occurred during a startup, the Permittee shall maintain the following records:

A. Identification of the applicable standard(s) that were or may have been violated.

B. An explanation of the nature of such violation(s), including the magnitude of such excess emissions.

C. A description of the actions taken to minimize the magnitude of emissions and duration of the startup.

D. An explanation whether similar incidents could be prevented or ameliorated in the future and if so, a description of the actions taken or to be taken to prevent similar incidents in the future.

e. A maintenance and repair log for each affected slab reheat furnace, listing each activity performed with date.

f. The following records related to the emissions of PM/PM_{10}, SO_2, and NO_x from the affected slab reheat furnaces:

i. A file containing the emission factors used by the Permittee to determine emissions of pollutants other than SO_2 from the affected slab reheat furnaces, with supporting documentation. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of the affected furnace do not understate actual emissions. These records shall be

prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

ii. If different emission factors are used for furnaces #1 and #2, records for the individual usage of fuels by these furnaces (scf/month and scf/year).

iii. Records of emissions of PM/PM_{10}, SO_2, NO_x from the affected slab reheat furnaces (tons/month and tons/year), with supporting calculations.

7.7.11 Reporting Requirements

a. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by the affected slab reheat furnaces from applicable requirements, as follows:

A. Requirements in Condition 7.7.3(b) through (f).

B. Requirements in Condition 7.7.6.

C. Requirements in Condition 7.7.7.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

b. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

c. All deviation reports described in Condition 7.7.11 above shall contain the following:

i. Date, time and duration of the deviation;

ii. Description of the deviation;

iii. Probable cause of the deviation; and

v. Any corrective action or preventive measures taken.

d. Reporting on the State startup authorization shall be performed in accordance with Condition 5.10.5-1.

7.7.12 Operational Flexibility/Anticipated Operating Scenarios

No operational flexibility has been established for the affected slab reheat furnaces.

7.7.13 Compliance Procedures

For affected slab reheat furnaces, compliance with the applicable standards of Condition 7.7.3 and with the operating and emission limits of Condition 7.7.7 is addressed by the work practices, testing, monitoring, recordkeeping and reporting requirements in Section 7.7 of this permit.

7.7.14 State-Only Conditions

Pursuant to 35 IAC 217.150, 217.152, and 217.160, by the applicable compliance date for 35 IAC Part 217 Subparts D and I, the Permittee shall comply with applicable requirements of these rules for the affected slab reheat furnaces, including:

a. Certifying to the Illinois EPA that the affected slab reheat furnaces will be in compliance with the applicable emission limitation(s) of 35 IAC 217.244(a) by the applicable compliance date.

b. Operation of each affected slab reheat furnaces in a manner consistent with good air pollution control practices to minimize NO_x emissions,

c. Compliance with the applicable NO_x emission limitation(s) in accordance with 35 IAC 217.154 or 217.157.

d. Compliance with the applicable monitoring, recordkeeping and reporting requirements in accordance with 35 IAC 217.157(b) and 217.156.

7.8 Finishing Operations

7.8.1 Description

Pickling Line:

Coils are processed in this unit to clean the steel and prepare it for other treatments such as cold rolling or galvanizing. At the start of the pickling line, the coils are unwound and the leading edge of each coil is trimmed off square. The leading edge of each coil is then spot (resistance) welded to the trailing edge of the previous coil. By joining the coils in this manner the pickling line runs a continuous ribbon of steel and does not need to be taken out of production to reload. After the steel coils are joined the steel is passed through an acid bath. This acid bath consists of four dip tanks arranged in series and uses a solution of hydrochloric acid and water to clean the surfaces of the steel sheet. A scrubbing system with mist eliminator is used to control hydrogen chloride emissions from this process. When the steel comes out of the fourth acid dip tank it is passed through a cold rinse tank in which cool water is used to rinse the acid off of the steel. The next step is to pass the steel through a hot rinse tank. In this tank hot water is used to rinse any remaining acid away from the steel and to raise the temperature of the steel to speed the drying process. The steel is then passed through a hot air dryer to complete the drying process. The steel that is to be shipped is coated with oil immediately prior to recoiling to inhibit corrosion. In the final step of the pickling process, the steel is recoiled.

Galvanizing Line Steel Preparation:

Steel coils that are to be galvanized in this unit are first joined end to end by spot (resistance) welding the leading edge of one coil to the trailing edge of another coil. The steel is then passed through a rinse station where it is rinsed with either a weak alkaline solution or a weak acid solution. The purpose of this rinse is to clean the steel and break down any oils that may be on the surfaces. The emissions from this unit are exhausted to a packed column wet scrubber. After cleaning and rinsing the steel is dried by a steam dryer.

Galvanizing Line Finishing Processes:

After the steel is coated with zinc, it is cooled and then dipped into a “Chem-treat” bath. This non-organic chemical puts a layer of rust-preventative on the steel. The steel is coated with oil to protect the surfaces, recoiled, and sprayed with edge sealer (oil) to protect the edges of the steel. The oil applied to the steel is a light petroleum based oil used to inhibit corrosion. Edge sealers are oils used to protect the edges of the steel and inhibit corrosion.

Note: This narrative description is for informational purposes only and is not enforceable.

7.8.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Finishing Operations	HCL Pickling Line	Pre-1973	Two Fume Scrubbers
	Galvanizing Line #7A; the line is comprised of the following significant components: • Cleaner section • Natural Gas furnace • Galvanizing pot • Miscellaneous heaters	Pre-1973	Fume Scrubber
	Galvanizing Line #8; the line is comprised of the following significant components: • Cleaner Section (with fume scrubber) • Natural gas fired Furnace (with NO_x catalytic converter) • 2 Galvanizing Pots • Space Heaters • Miscellaneous Heaters • Melting Kettle Building and Storage Areas Heaters	1995	Fume Scrubber; NO_x catalytic converter
	Coating Operations	Pre-1973	None

7.8.3 Applicable Provisions and Regulations

a. The “affected finishing operations” for the purpose of these unit-specific conditions, are the emission units described in Conditions 7.8.1 and 7.8.2.

b. Pursuant to 35 IAC 212.458(b)(7) and (c), the affected finishing operations shall comply with the following:

No person shall cause or allow emissions of PM_{10}, other than that of fugitive particulate matter, into the atmosphere to exceed the following limits during any one hour period:

22.9 mg/scm (0.01 gr/scf) from any process emissions unit provided however that this limit shall not apply if there are no visible emissions, except if a stack test is performed. The absence of visible emissions is not a defense to a finding of violation [35 IAC 212.458(b)(7) and (c)]

c. The following process emission units in the affected finishing operation constructed or modified prior to April 14, 1972 are subject to IAC 212.322(a): cleaner section and galvanizing pot of Galvanizing Line #7A and coating operations. No person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any process emission unit for which construction or modification commenced prior to April 14, 1972, which, either alone or in combination with the emission of particulate matter from all other similar process emission units at a source or premises, exceeds the allowable emission rates specified in subsection (c) of 35 IAC 212.322 (see also Attachment 2) [35 IAC 212.322(a)].

d. The following process emission units in the affected finishing operation constructed or modified on or after April 14, 1972 are subject to IAC 212.321(a): cleaner section, two galvanizing pots and the melting kettle of Galvanizing Line #8. No person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any process emission unit for which construction or modification commenced on or after April 14, 1972, which, either alone or in combination with the emission of particulate matter from all other similar process emission units at a source or premises, exceeds the allowable emission rates specified in subsection (c) of 35 IAC 212.321 (see also Attachment 2) [35 IAC 212.321(a)].

e. Coating operations performed as part of the affected finishing operations are subject to 35 IAC 219.204, with which the Permittee must comply by application of compliant coating as established by 35 IAC 219.204(d) for coil coating:

i. No owner or operator of an affected coil coating operation shall apply at any time any coating in which the VOM content exceeds the following emission limitations. The following emission limitation is expressed in units of VOM per volume of coating (minus water and any compounds which are specifically exempted from the definition of VOM) as applied at each coating applicator:

kg/l	lb/gal
0.20	1.7

ii. Compounds which are specifically exempted from the definition of VOM should be treated as water for the purpose of calculating the “less water” part of the coating composites.

f. The HCL pickling line operates as a part of the affected finishing operations and is subject to 40 CFR Part 63 Subpart CCC “National Emission Standards for Hazardous Air Pollutants for Steel Pickling—HCl Process Facilities and Hydrochloric Acid Regeneration Plants”. Specific requirements of Subpart CCC are set forth later in this subsection.

g. Pursuant to 35 IAC 212.123(a), no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to the requirements of 35 IAC 212.122, except as allowed by 35 IAC 212.123(b) and 212.124.

7.8.4 Non-Applicability of Regulations of Concern

a. The emission limitations of 35 IAC 212.324 are not applicable to any emission unit subject to a specific emissions standard or limitation contained in 35 IAC Part 212 Subpart R, pursuant to 35 IAC 212.324 (a)(3).

b. This permit is issued based on the coating operations operated as a part of the affected finishing operations not being subject to 40 CFR 63 Subpart SSSS “National Emission Standards for Hazardous Air Pollutants: Surface Coating of Metal Coil” pursuant to the definition of coating used by Subpart SSSS (Decorative, protective, or functional materials that consist only of solvents, protective oils, acids, bases, or any combination of these substances are not considered coatings for the purposes of Subpart SSSS).

c. This permit is issued based on the coating operations operated as a part of the affected finishing operations not being subject to 40 CFR 63 Subpart MMMM “National Emission Standards for Hazardous Air Pollutants for Surface Coating of Miscellaneous Metal Parts and Products” pursuant to definition of coating used by Subpart MMMM (Decorative, protective, or functional materials that consist only of solvents, protective oils, acids, bases, or any combination of these substances are not considered coatings for the purposes of Subpart MMMM).

d. The pickling operations are not subject to 35 IAC 212.321 or 212.322 pursuant to 35 IAC 266.190.

7.8.5-1 NESHAP Emission Standards

a. The affected pickling line is subject to 40 CFR 63.1157(a), which provides that no owner or operator of an existing affected continuous or batch pickling line at a steel pickling facility shall cause or allow to be discharged into the atmosphere from such line:

i. Any gases that contain HCl in a concentration in excess of 18 parts per million by volume (ppmv); or

ii. HCl at a mass emission rate that corresponds to a collection efficiency of less than 97 percent.

b. This standard shall apply at all times, including startup, shutdown and malfunction/breakdown, as 40 CFR 63.6(f) has been vacated.

7.8.5-2 NESHAP Work Practices (Galvanizing Lines)

Affected Galvanizing Furnaces #7A and #8 as well as miscellaneous heaters on Galvanizing Line #8 are subject to the NESHAP, 40 CFR Part 63, Subpart DDDDD. Pursuant to 40 CFR 63.7499, these affected units are in the Gas 1 Subcategory for purposes of this NESHAP, as they only burn natural gas.

a. Beginning on of the compliance date of this NESHAP, the Permittee must conduct a tune-up on each affected unit as follows:

i. For Galvanizing Furnaces #7A and #8, the Permittee must conduct a tune-up of each furnace annually [40 CFR 63.7540(a)(10)].

ii. For miscellaneous heaters on galvanizing line #8, the Permittee must conduct a biennial tune-up of each heater [40 CFR 63.7540(a)(11)].

iii. If a unit is not operating on the required date for a tune-up, the tune-up must be conducted within one week of startup [40 CFR 63.7540(a)(12)].

b. Pursuant to 40 CFR 63.7540(a)(10), each required tune-up shall consist of the following:

i. As applicable, inspect the burner, and clean or replace any components of the burner as necessary (the burner inspection may be delayed until the next scheduled unit shutdown, but each burner must be inspected at least once every 36 months) [40 CFR 63.7640(a)(10)(i)];

ii. Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer's specifications, if available [40 CFR 63.7640(a)(10)(ii)];

iii. Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly [40 CFR 63.7640(a)(10)(iii)];

iv. Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available [40 CFR 63.7640(a)(10)(iv)];

v. Measure the concentrations in the effluent stream of CO in parts per million, by volume (ppmv), and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made) [40 CFR 63.7640(a)(10)(v)].

c. Pursuant to 40 CFR 63.7640(a)(10)(vi), the Permittee shall maintain on-site and submit, if requested by the Illinois EPA, an annual report containing the following for the required tune-ups:

i. The concentrations of CO in the effluent stream in ppmv, and oxygen in volume percent, measured before and after the adjustments of the furnace;

ii. A description of any corrective actions taken as a part of the combustion adjustment; and

iii. The type and amount of fuel used over the 12 months prior to the annual adjustment, but only if the unit was physically and legally capable of using more than one type of fuel during that period. Units sharing a fuel meter may estimate the fuel use by each unit.

7.8.6 <u>Control Requirements and Work Practices</u>

a. Hydrochloric acid storage vessels. The owner or operator of an affected vessel shall provide and operate, except during loading and unloading of acid, a closed-vent system for each vessel. Loading and unloading shall be conducted either through enclosed lines or each point where the acid is exposed to the atmosphere shall be equipped with a local fume capture system, ventilated through an air pollution control device [40 CFR 63.1159(b)].

Note: HCL storage tanks associated with the affected pickling line are insignificant activities addressed in

Section 3.0 of this permit. Loading and unloading is currently conducted through enclosed lines.

b. Maintenance requirements [40 CFR 63.1160(b)]

i. The Permittee shall comply with the operation and maintenance requirements prescribed under 40 CFR 63.6(e) for the HCL pickling line.

ii. In addition to the requirements specified in 40 CFR 63.6(e), the Permittee shall operate in accordance with an operation and maintenance plan that it prepares for each emission control device. Such plan shall be consistent with good maintenance practices and, for a scrubber emission control device, shall at a minimum address the following:

A. Require monitoring and recording the pressure drop across the scrubber once per shift while the scrubber is operating in order to identify changes that may indicate a need for maintenance;

B. Require the manufacturer’s recommended maintenance at the recommended intervals on fresh solvent pumps, re-circulating pumps, discharge pumps, and other liquid pumps, in addition to exhaust system and scrubber fans and motors associated with those pumps and fans;

C. Require cleaning of the scrubber internals and mist eliminators at intervals sufficient to prevent buildup of solids or other fouling;

D. Require an inspection of each scrubber at intervals of no less than 3 months with:

1. Cleaning or replacement of any plugged spray nozzles or other liquid delivery devices;

2. Repair or replacement of missing, misaligned, or damaged baffles, trays, or other internal components;

3. Repair or replacement of droplet eliminator elements as needed;

4. Repair or replacement of heat exchanger elements used to control the temperature of fluids entering or leaving the scrubber; and

5. Adjustment of damper settings for consistency with the required air flow.

E. If the scrubber is not equipped with a viewport or access hatch allowing visual inspection, alternate means of inspection approved by the Administrator may be used.

F. The owner or operator shall initiate procedures for corrective action within 1 working day of detection of an operating problem and complete all corrective actions as soon as practicable. Procedures to be initiated are the applicable actions that are specified in the maintenance plan. Failure to initiate or provide appropriate repair, replacement, or other corrective action is a violation of the maintenance requirement of 40 CFR 63, Subpart CCC.

G. The owner or operator shall maintain a record of each inspection, including each item identified in 40 CFR 63.1160(b)(2)(iv), that is signed by the responsible maintenance official and that shows the date of each inspection, the problem identified, a description of the repair, replacement, or other corrective action taken, and the date of the repair, replacement, or other corrective action taken.

7.8.7 Production and Emission Limits from Permit 95010005 [T1].

a. The operation of Galvanizing Line #8 shall not exceed the following [T1]:

i. The maximum firing rate of the furnace shall not exceed 54.6 million British thermal units (mmBtu) per hour.

ii. The maximum firing rate of each of the five space heaters shall not exceed 3.44 mmBtu/hour.

iii. The total combined maximum firing rate of the building and storage area heaters shall not exceed 9.84 mmBtu/hour.

iv. The total combined natural gas usage of the 11 miscellaneous heaters shall not exceed 21,895 ft^3/hour and 191.8 million ft^3/year.

v. The operation of the melting kettle shall not exceed 32,000 tons of product/month and 384,000 tons of product/year.

b. The emissions of Galvanizing Line #8 shall not exceed the following [T1]:

i. Furnace

A. The NO_x emissions of the furnace shall not exceed 2.07 lbs/hour and 9.04 tons/year.

B. Emissions of other pollutants from the furnace shall not exceed the following limits:

Carbon Monoxide:	8.37 tons/year
Particulate Matter:	0.72 tons/year
PM_{10}:	0.72 tons/year
VOM:	0.67 tons/year
SO_2:	0.14 tons/year

ii. Five Space Heaters (total)

A. The total combined NO_x emissions of the 5 space heaters shall not exceed 1.69 lbs/hour and 7.39 tons/year.

B. Total emissions of other pollutants from the 5 space heaters shall not exceed the following limits:

Carbon Monoxide:	1.48 tons/year
Particulate Matter:	0.22 tons/year
PM_{10}:	0.22 tons/year
VOM:	0.39 tons/year
SO_2:	0.04 tons/year

iii. Drying Oven and the Building and Storage Area Heaters (total)

A. The total combined NO_x emissions of the drying oven and the building and storage area heaters shall not exceed 0.97 lbs/hour and 4.29 tons/year.

B. Total emissions of other pollutants from the drying oven and the building and storage area heaters shall not exceed the following limits:

Carbon Monoxide:	0.85 tons/year
Particulate Matter:	0.13 tons/year
PM_{10}:	0.13 tons/year
VOM:	0.22 tons/year
SO_2:	0.03 tons/year

iv. Miscellaneous Heaters (total)

A. Total combined NO_x emissions of the 11 miscellaneous heaters shall not exceed 2.19 lbs/hour and 9.60 tons/year.

B. Total combined emissions of other pollutants from the 11 miscellaneous heaters shall not exceed the following limits:

Carbon Monoxide:	1.92 tons/year
Particulate Matter:	0.29 tons/year
PM_{10}:	0.29 tons/year
VOM:	0.51 tons/year
SO_2:	0.06 tons/year

v. Cleaner Section

Emissions of particulate matter from the cleaner section, which is controlled with a fume scrubber, shall not exceed 0.24 lbs/hour and 1.06 tons/year.

vi. Melting Kettle

Particulate matter emissions from the melting kettle shall not exceed 0.16 tons/month and 1.92 tons/year.

vii. Other emission units

Emissions of NO_x, CO, PM, VOM and SO_2 from the welder, two galvanizing pots and chemical treatment tank shall not exceed negligible rates of 0.1 lb/hour and 0.44 tons/year for each pollutant from each such emission unit.

c. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total) [T1].

7.8.8 <u>Testing Requirements</u>

a. For testing emissions of the HCl Pickling Line pursuant to 40 CFR 63, Subpart CCC:

i. The Permittee shall use the following test methods in Appendix A of 40 CFR Part 60 pursuant to 40 CFR 63.1161(d), unless an equivalent alternative measurement method is approved by the Administrator, to determine compliance under 40 CFR 63.1157(a):

A. Method 1, to determine the number and location of sampling points, with the exception that no traverse point shall be within one inch of the stack or duct wall;

B. Method 2, to determine gas velocity and volumetric flow rate;

C. Method 3, to determine the molecular weight of the stack gas;

D. Method 4, to determine the moisture content of the stack gas; and

E. Method 26A, "Determination of Hydrogen Halide and Halogen Emissions from Stationary Sources—Isokinetic Method," to determine the HCl mass flows at the inlet and outlet of a control device or the concentration of HCl discharged to the atmosphere, and also to determine the concentration of Cl_2 discharged to the atmosphere from acid regeneration plants. If compliance with a collection efficiency standard is being demonstrated, inlet and outlet measurements shall be performed simultaneously. The minimum sampling time for each run shall be 60 minutes and the minimum sample volume 0.85 dry standard cubic meters (30 dry standard cubic feet). The concentrations of HCl and Cl_2 shall be calculated for each run as follows:

C_{HCl} (ppmv) = 0.659 C_{HCl} (mg/dscm),
and C_{C12} (ppmv) = 0.339 C_{C12} (mg/dscm),

where C(ppmv) is concentration in ppmv and C(mg/dscm) is concentration in milligrams per dry standard cubic meter as calculated by the procedure given in Method 26A.

ii. Pursuant to 40 CFR 63.1162(a)(1), the Permittee shall conduct performance tests a minimum of once every 2 years to measure the HCl mass flows at the control device inlet and outlet or the concentration of HCL exiting the control.

iii. If any performance test shows that the HCL emission limitation is being exceeded, then the owner or operator is in violation of the emission limit.

b. Upon written request from the Illinois EPA, emission tests shall be conducted by the Permittee for the furnace, melting kettle and cleaner section (all of galvanizing line #8) to verify compliance with emission limits in Condition 7.8.7, as follows [Section 39.5(7)(d) and (p) of the Act].

i. The following USEPA test methods shall be used, unless another USEPA method is approved by the Illinois EPA.

A.	Location of Sample Points	Method 1
B.	Gas Flow and Velocity	Method 2
C.	Flue Gas Weight	Method 3
D.	Moisture	Method 4
E.	PM/PM_{10} (furnace, kettle, and cleaner section)	Methods 5, 201 or 201A
vi.	NO_x (furnace)	Method 7E or 19

ii. Observations of opacity shall be conducted during these emission tests in accordance with Method 9 and the results of these observations included in the reports for emission testing.

c. Upon written request by the Illinois EPA, the Permittee shall conduct opacity observations from any finishing operation, as specified in the request, as follows [Sections 39.5(7)(d) and (p) of the Act]:

i. These observations shall be conducted within 45 calendar days of the requires or by the date agreed upon by the Illinois EPA, whichever is later.

ii. The readings shall be performed by a qualified observer in accordance with USEPA Method 9 while the affected finishing operation is operating.

d. For this testing, test notifications and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

7.8.9 <u>Monitoring Requirements</u>

a. For the affected pickling line, the Permittee shall comply with the following requirements of 40 CFR 63.1160(b)(2) and 63.1162(a)(2) Section 39.5(7)(a):

i. The Permittee shall operate, and maintain systems for the measurement and recording of the scrubber makeup water flow rate and, if required, recirculation water flow rate. These flow rates shall be monitored continuously and recorded at least once per shift while the scrubber is operating.* If operation of the wet scrubber results in excursions of scrubber makeup water flow rate and recirculation water flow rate less than the minimum values established, the Permittee shall initiate corrective action within 1

working day as specified by the maintenance requirements in 40 CFR 63.1160(b)(2). Failure to initiate or provide appropriate repair, replacement, or other corrective action is a violation of the maintenance requirement of 40 CFR 63.1160(b)(2).

ii. The Permittee shall monitor and record the pressure drop across the scrubber once per shift* while the scrubber is operating in order to identify changes that may indicate a need for maintenance. The Permittee shall initiate procedures for corrective action within 1 working day of detection of an operating problem and complete all corrective actions as soon as practicable. Procedures to be initiated are the applicable actions that are specified in the maintenance plan. Failure to initiate or provide appropriate repair, replacement, or other corrective action is a violation of the maintenance requirement of 40 CFR 63.1160(b)(2).

* See also Condition 7.8.9(g)

iii. Corrective action as referenced in Condition 7.8.9(a)(i) and (ii) and as prescribed by “the Operation and Maintenance Plan” required by Condition 7.8.6(b)(ii), shall consist of the following:

A. Notify the pickle line shift manager or cold mill shift manager as soon as practicable but not later than the end of the shift of the operating problem detected.

B. The pickle line shift manager or cold mill shift manager shall notify the mechanical or electrical shift manager no later than the end of the shift.

C. Any of the above shift managers shall investigate the nature of the operating problem and implement corrective actions, such as manufacturer’s recommended maintenance on:

1. Pumps;

2. Exhaust systems;

3. Fans and motors;

4. Clean scrubber internals and mist eliminators to remove buildup of solids or other fouling.

D. The pickle line or cold mill shift manager shall complete an upset conditions report upon completion of corrected action.

b. Pursuant 40 CFR 63.1162(a)(4), failure to record each of the operating parameters (scrubber makeup water flow rate and recirculated water flow rate) is a violation of the monitoring requirements of 40 CFR 63 Subpart CCC.

c. Pursuant to 40 CFR 63.1162(a)(5), each monitoring device shall be certified by the manufacturer to be accurate to within 5 percent and shall be calibrated in accordance with the manufacturer’s instructions but not less frequently than once per year.

d. Pursuant to 40 CFR 63.1161(b), the Permittee may reestablish compliant operating parameter values as part of any performance test that is conducted subsequent to the initial test or tests.

e. Pursuant to 40 CFR 63.1160(b)(2)(ii) through (iv), the Permittee shall conduct the following maintenance requirements:

   i. Cleaning of the scrubber internals and mist eliminators at intervals sufficient to prevent buildup of solids or other fouling;

   ii. Inspect each scrubber at intervals of no less than 3 months with:

      A. Cleaning or replacement of any plugged spray nozzles or other liquid delivery devices;

      B. Repair or replacement of missing, misaligned, or damaged baffles, trays, or other internal components;

      C. Repair or replacement of droplet eliminator elements as needed;

      D. Repair or replacement of heat exchanger elements used to control the temperature of fluids entering or leaving the scrubber; and

      E. Adjustment of damper settings for consistency with the required air flow.

f. The owner or operator of an affected hydrochloric acid* storage vessel shall inspect each vessel semiannually to determine that the closed-vent system and either the air pollution control device or the enclosed loading and unloading line, whichever is applicable, are installed and operating when required [40 CFR 63.1162(c)].

   * See also Condition 7.8.9(g)

g. Notwithstanding the requirements of 40 CFR 63, Subpart CCC, the Permittee shall:

   i. Record monitored operating data for each scrubber at least twice per shift and initiate corrective action for the scrubber if any recorded data indicates an operating problem with a scrubber;

   ii. Inspect the affected HCL storage vessels on at least a quarterly basis to confirm compliance.

h. Testing for VOM content of coatings shall be performed as follows [35 IAC 219.105(a) and 219.211(a) and Section 39.5(7)(b) of the Act]:

   i. Upon written request by the Illinois EPA, the VOM content of specific coatings used by the coating operations shall be determined according to USEPA Reference Method 24 of 40 CFR 60 Appendix A and the procedures of 35 IAC 219.105(a) and 219.211(a); or

   ii. This testing may be performed by the supplier of a material provided that the supplier provides appropriate documentation for such testing to the Permittee and the Permittee's records directly reflect the application of such materials.

i. Pursuant to Sections 39.5(7)(a) and (d) of the Act, the Permittee shall measure or monitor the pressure differential and scrubbant flow rate on the fume scrubbers controlling the cleaner sections on Galvanizing Lines #7A and #8, as follows:

   i. The pressure differential shall be determined in inches of water column.

   ii. Scrubbant flow rate shall be determined in gallons per minute (gpm).

   iii. Pressure differential and scrubbant flow rate shall be recorded at least once per shift if data is not automatically recorded.

j. Pursuant to Sections 39.5(7)(a) and (d) of the Act, the Permittee shall operate instrumentation for the #8 Galvanizing Furnace for the NO_x concentration (ppm) in the flue gas exhaust stream and the inlet temperature (°C or °F) of the associated NO_x catalytic converter, as follows:

   i. NO_x concentration (ppm) and inlet temperature shall be recorded at least once per shift if hourly average data is not automatically recorded.

ii. The Permittee shall follow manufacturer's procedures for the operation and maintenance of the NO_x instrumentation.

7.8.10 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected finishing operations, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. Recordkeeping required for the pickling line by the NESHAP:

i. The "general records" required by the NESHAP, as required by 40 CFR 63.10(b)(2) and 63.1165.

ii. Records of the following, as required by 40 CFR 63.1165(b), which records shall be retained for 5 years from the date of each record:

A. Scrubber makeup water flow rate and recirculation water flow rate if a wet scrubber is used;

B. Calibration and manufacturer certification that monitoring devices are accurate to within 5 percent; and

C. Each maintenance inspection and repair, replacement, or other corrective action.

iii. The Permittee shall keep the written operation and maintenance plan on record after it is developed to be made available for inspection, upon request, by the Illinois EPA for the life of the affected source or until the source is no longer subject to the provisions of 40 CFR 63 Subpart CCC. In addition, if the operation and maintenance plan is revised, the Permittee shall keep the previous (i.e., superseded) versions of the plan on record to be made available for inspection by the Illinois EPA for a period of 5 years after each revision to the plan.

iv. If the Permittee operates under manufacturer's specifications or manufacturer's instructions, such manufacturer's documentation shall be kept at the source as part of the required records.

b. Recordkeeping requirements for galvanizing lines:

Pursuant to Sections 39.5(7)(a) and (f) of the Act, the Permittee shall keep the following records for the various emission units on the galvanizing lines:

i. The following records related to the tune-ups conducted on furnaces and process heaters on the lines pursuant to 40 CFR 63.7540(a)(10):

A. Records for each tune-up that include the following: Date and time tune-up was conducted and responsible person; Identification of the unit; Summary of inspections performed and required maintenance; Results of all calibrations performed; and CO concentrations in ppmv in the effluent stream and oxygen in volume percent, before and after the adjustments are made.

B. A copy of the manufacturers specifications for burners used for optimization of emissions and flame pattern during tune-ups.

ii. Records for emission tests, opacity observations, engineering calculations and other compliance determinations conducted for units to verify compliance with applicable standards, limitations and other requirements in Conditions 7.8.3, 7.8.6 and 7.8.7.

iii. Pursuant to 40 CFR 63.7555(h), if the Permittee uses an alternative fuel other than natural gas during a period of natural gas curtailment or supply interruption, the Permittee must keep records of the total hours per calendar year that alternative fuel is burned.

c. Recordkeeping for Galvanizing Line #8:

i. The following design and operating records for Galvanizing Line #8:

A. A file containing the rated heat input capacity of the furnace and each other fuel burning unit (mmBtu/hour), with supporting documentation.

B. Records of monthly and annual natural gas usage (mmscf/mo and mmscf/yr) for the furnace and other fuel burning units on the line.

ii. For the melting kettle, the following records:

A. Records of production (tons of product per month and year).

B. A file containing the emission factor used by the Permittee to calculate PM emissions from the kettle, with supporting documentation, which file shall be reviewed and updated if needed when new emission data become available

to assure that the factor does not understate actual PM emissions.

C. Records for actual PM emissions (lbs/month and tons/year), with supporting calculations.

iii. For the furnace and associated catalytic converter, the following records:

A. Engineering calculations for typical and maximum hourly NO_x emissions before and after control by catalytic converter (lbs/hour), with supporting documentation for the controlled emission rate from the furnace.

B. The normal range of operating parameters (inlet temperature and NO_x concentration in the exhaust stream) for the catalytic converter.

C. An operating log or other records for the catalytic converter that include information confirming proper operation on a daily basis and provide detailed information for any upset of the catalytic converter.

D. An inspection and maintenance log or other records for the catalytic converter that identify activities performed, with date, description and the responsible individual(s).

E. Usage or purchases of reagent for the catalytic converter (pounds/year).

F. Records for actual NO_x emissions of the furnace (tons/year), with supporting calculations.

G. A file containing the emission factors used by the Permittee to calculate emissions of PM/PM_{10}, CO, VOM and SO_2 from the furnace, with supporting documentation, and either engineering calculations for the maximum annual emissions of these pollutants (tons/year) or records of actual emissions of these pollutants (tons/year) to verify compliance with applicable limits.

iv. For the various emission units that combust fuel on the line, the following records:

A. A file containing engineering calculations for the maximum hourly emissions of NO_x (lbs/hour) from each unit or group of units, with supporting documentation.

B. A file containing the emission factors used by the Permittee to calculate emissions from these units, with supporting documentation, and either engineering calculations for the maximum annual emissions of NO_x and other pollutants (tons/year) from each unit or group of units or records of actual emissions(tons/year) to verify compliance with applicable limits.

v. For the cleaner section, the following records:

A. Engineering calculations for typical and maximum hourly PM emissions before and after control by the scrubber (lbs/hour), with supporting documentation for the controlled emission rate from the unit.

B. The normal range of operating parameters of the scrubber.

C. An operating log or other records for the scrubber that include information confirming proper operation on a daily basis and provide detailed information for any upset of the scrubber.

D. An inspection and maintenance log or other records for the scrubber that identify activities performed, with date, description and the responsible individual(s).

E. Records for actual PM emissions (tons/year), with supporting calculations.

vi. A. The records required by Conditions 7.8.10(c)(ii)(B), (c)(iii)(G) and (c)(iv)(B) shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

B. Copies of the initial records required by Conditions 7.8.10(c)(iii)(A), (c)(iv)(A) and (c)(v)(A) shall be sent to the Illinois EPA within 45 days of the effective date of these conditions. Copies of revisions to these conditions shall be sent to the Illinois EPA in accordance with Condition 5.9.6(c)(ii).

d. Recordkeeping for the coating operations:

i. Records for coating usage (gal/mo and gal/yr, by coating or category of coating).

ii. Records of the VOM content of each coating or category of coating as applied (pounds/gallon, less exempt compounds), with supporting documentation.

iii. Records for testing or analysis conducted for the VOM content of coatings (pounds/gallon, less exempt compounds) that include identification of the tested coating(s), the results of the analysis, documentation for the analysis methodology, and identification of the person or party that performed the analysis.

7.8.11 Reporting Requirements

a. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by the affected finishing operations from applicable requirements unless a NESHAP standard specifies a different time frame, as follows:

A. Requirements in Condition 7.8.3(b) through (e).

B. Requirements in Condition 7.8.5-1.

C. Requirements in Condition 7.8.6.

D. Requirements in Condition 7.8.7.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

iii. The Permittee shall notify the Illinois EPA of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

iv. All deviation reports required by Condition 7.8.11(a) above shall contain the following:

A. Date, time and duration of the deviation;

B. Description of the deviation;

C. Probable cause of the deviation; and

D. Any corrective action or preventive measures taken.

b. The Permittee shall comply with the reporting requirements of 40 CFR 63.1164, including the following:

i. Reporting results of performance tests. As required by 40 CFR 63.10(d)(2), the owner or operator of an affected source shall report the results of any

performance test as part of the notification of compliance status required in 40 CFR 63.1163.

ii. Progress reports. The owner or operator of an affected source who is required to submit progress reports under 40 CFR 63.6(i) shall submit such reports to the Administrator (or the State with an approved permit program) by the dates specified in the written extension of compliance.

iii. Periodic startup, shutdown, and malfunction reports. Pursuant to 40 CFR 63.6(e), the owner or operator of an affected source shall operate and maintain each affected emission source, including associated air pollution control equipment, in a manner consistent with good air pollution control practices for minimizing emissions at least to the level required by the standard at all times, including during any period of startup, shutdown, or malfunction. Malfunctions must be corrected as soon as practicable after their occurrence.

A. Plan. As required by 40 CFR 63.6(e)(3), the owner or operator shall develop a written startup, shutdown, and malfunction plan that describes, in detail, procedures for operating and maintaining the source during periods of startup, shutdown, or malfunction, and a program of corrective action for malfunctioning process and air pollution control equipment used to comply with the relevant standards.

B. Reports. As required by 40 CFR 63.10(d)(5)(i), if actions taken by an owner or operator during a startup, shutdown, or malfunction of an affected source (including actions taken to correct a malfunction) are consistent with the procedures specified in the startup, shutdown, and malfunction plan, the owner or operator shall state such information in a semiannual report. The report, to be certified by the owner or operator or other responsible official, shall be submitted semiannually and delivered or postmarked by the 30th day following the end of each calendar half.

C. Immediate Reports. Any time an action taken by an owner or operator during a startup, shutdown, or malfunction (including actions taken to correct a malfunction) is not consistent with the procedures in the startup, shutdown, and malfunction plan, the owner or operator shall comply with all requirements of 40 CFR 63.10(d)(5)(ii).

c. Pursuant to 35 IAC 219.211(c)(3), for the affected coating operations, the Permittee shall notify the Illinois EPA in the following instances:

i. Any record showing violation of 35 IAC 219.204 shall be reported by sending a copy of such record to the Illinois EPA within 30 days following the occurrence of the violation.

ii. At least 30 calendar days before changing the method of compliance from 35 IAC 219.204 to 35 IAC 219.205 or 219.207, the Permittee shall comply with all requirements of 35 IAC 219.211(d)(1) or (e)(1), respectively. Upon changing the method of compliance from 35 IAC 219.204 to 35 IAC 219.205 or 219.207, the Permittee shall comply with all requirements of 35 IAC 219.204(d) or (e), respectively.

d. i. If the Permittee operates a unit using a fuel other than natural gas, to fire the affected unit during a period of natural gas curtailment or supply interruption, as defined in 40 CFR 63.7575, the Permittee must submit a notification of alternative fuel use within 48 hours of the declaration of each period of natural gas curtailment or supply interruption. The notification must include the information specified in 40 CFR 63.7545(f)(1) through (f)(5) [40 CFR 63.7545(f)].

ii. If the Permittee intends to use fuel other than natural gas and other than during a period of natural gas curtailment or supply interruption as addressed by 40 CFR 63.7545(f), the Permittee must provide 30 days prior notice of the date upon which the fuels will be switched [40 CFR 63.7545(h)].

7.8.12 Operational Flexibility/Anticipated Operating Scenarios

Operational flexibility is not set for the affected finishing operations.

7.8.13 Compliance Procedures

For affected finishing operations, compliance with the applicable standards, limitations and requirements of Conditions 7.8.3, 7.8.5 and 7.8.7 is addressed by the work practices, testing, monitoring, recordkeeping and reporting requirements in Section 7.8 of this permit.

7.8.14 State-Only Conditions

Pursuant to 35 IAC 217.150, 217.152, and 217.160, by the applicable compliance date for 35 IAC Part 217 Subparts D and I, the Permittee shall comply with applicable requirements of these rules for the affected galvanizing furnaces, including:

a. Certifying to the Illinois EPA that each affected galvanizing furnaces will be in compliance with the applicable emission limitation(s) of 35 IAC 217.244(a) by the applicable compliance date.

b. Operation of each affected galvanizing furnaces in a manner consistent with good air pollution control practices to minimize NO_x emissions.

c. Compliance with the applicable NO_x emission limitation(s) in accordance with 35 IAC 217.154 or 217.157.

d. Compliance with the applicable monitoring, recordkeeping and reporting requirements in accordance with 35 IAC 217.157(b) and 217.156.

7.9 Wastewater Treatment Plant

7.9.1 Description

Primary Wastewater Treatment System:

The system is used to treat waste process water generated in both the iron and steelworks manufacturing areas in the facility. Emissions from this system are attributed to the blast furnace (BF) clarifiers, dust ponds, BF ditch, BF lagoon, steelworks ditch, steel works lagoon, and the wastewater treatment plant, itself. The ditches are used to transfer the BF and steelworks wastewater streams to the lagoons. The wastewater treatment plant is a simple system used to remove suspended solids and breakdown organic prior to discharge.

By-Products Wastewater Treatment System:

The system is used to treat waste process water generated in the coke oven by-product plant. Waste process water from the by-products plant is piped to the by-products wastewater treatment plant. The water treated in this system is primarily made up of process wastewater used to cool the processes and equipment used in the by-products plant. The treatment process carried out consists of the use of biological activity to breakdown the organic materials contained in the waste stream.

Note: This narrative description is for informational purposes only and is not enforceable.

7.9.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Wastewater Treatment	Equalization Tanks	N/R	None
	BFG Clarifiers		
	Aeration Basin Clarifiers		
	Lagoons		
	Sand Filters		

7.9.3 Applicable Provisions and Regulations

The “affected wastewater treatment system” for the purpose of these unit-specific conditions is the treatment systems described in Conditions 7.9.1 and 7.9.2.

7.9.4 Non-Applicability of Regulations of Concern

a. The affected wastewater treatment systems are not subject to the operating and control requirements of 40 CFR 61 Subpart FF in general and 40 CFR 61.344 or 40 CFR 61.343 in particular, as provided by 40 CFR 61.342(a). This determination is based on the amount of benzene waste

generated on site being less than 10 Mg/yr (11 ton/yr). If conditions at the facility change and the total annual benzene calculation increases to 10 Mg/yr or more, the facility will become subject to operating and control requirements of 40 CFR 61 Subpart FF and the Permittee must apply for a revision to this permit, which could affect applicable requirements for the affected wastewater treatment plant.

b. The affected wastewater treatment system is not subject to 40 CFR Part 63, Subpart QQ, National Emission Standards for Surface Impoundments. This determination is based on the applicability criteria of 40 CFR 63.940, which provides that 40 CFR 63 Subpart QQ applies to impoundments when an applicable Subpart of Parts 40 CFR 60, 61 or 63 references the use of Subpart QQ for air emission control. However, applicable Subpart FF does not reference to 40 CFR 63 Subpart QQ.

c. This permit is issued based on the affected wastewater treatment system not being subject to the applicable requirements of 35 IAC 219.301 because the affected plant does not emit photochemically reactive organic material as defined in 35 IAC 211.4690.

7.9.5 Control Requirements and Work Practices

Control requirements and work practices are not set for the affected wastewater treatment systems.

7.9.6 Production and Emission Limitations

The production and emission limits are not set for the affected wastewater treatment systems.

7.9.7 Testing Requirements

Testing requirements are not set for the affected wastewater treatment systems.

7.9.8 Monitoring Requirements

If operation(s) at the facility change, the Permittee shall evaluate whether the change affects the wastewater treatment systems such that it become subject to the requirements of 35 IAC 219.301 and must apply for a revision of this permit.

7.9.9 Recordkeeping Requirements

No recordkeeping requirements are established at this time.

7.9.10 Reporting Requirements

a. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days if the following occurs:

   i. The affected wastewater treatment systems become subject to the control requirements of 40 CFR 61 Subpart FF;

   ii. The affected wastewater treatment system become subject to 35 IAC 219.301.

b. The notifications described in Condition 7.9.10 above shall contain the following:

   i. Date of applicability;

   ii. Emission units(s)/operation involved; and

   iii. Method by which compliance would be demonstrated.

7.9.11 Operational Flexibility/Anticipated Operating Scenarios

Operational flexibility is not set for the affected wastewater treatment systems.

7.9.12 Compliance Procedures

Compliance procedures are not set for the affected wastewater treatment systems.

7.9.13 State-Only Conditions

State-only conditions are not established.

7.10 Boilers

7.10.1 Description

Boilers 11 and 12 are located in Boiler House 2 and are rated at 225 mmBtu/hour each. Each of these boilers are physically capable of combusting various combinations of natural gas, coke oven gas (COG) and blast furnace gas (BFG). The Permittee has a construction permit to install Flue Gas Recirculation on these boilers for control of NO_x emissions (Construction Permit 10080022).

The Permittee completed construction of a new boiler pursuant to Construction Permit 06070023. The new boiler (Power Boiler #1) is used for cogeneration, producing both electricity and process steam as it supplies high pressure steam which is sent to a steam turbine that generates electricity for use at the source. Low-pressure steam from this turbine is used for manufacturing operations at the source.

BFG is a primary fuel for this boiler. Natural gas would be used for the pilot flame and also for combustion control.

A cooling tower operates in conjunction with the new boiler and associated steam turbine.

Portable boilers not yet constructed.

Note: This narrative description is for informational purposes only and is not enforceable.

7.10.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Boilers	Boiler House 2 Boiler 11 & 12 – 225 mmBtu/Hr each	Pre-1973	Flue Gas Recirculation (planned)
	Power Boiler #1 (nominal capacity 505 mmBtu/hour)	2009	None
Portable Boilers	Portable Boilers #1 through #4 (planned)	Planned	Low NO_x burners and Flue Gas Recirculation (planned)
Cooling Tower	Cooling Tower associated with Power Boiler #1	2009	None

7.10.3 Applicable Provisions and Regulations

a. i. The “affected boilers” for the purpose of these unit-specific conditions, are Boiler #11 and #12 and Power

Boiler #1 as described in Conditions 7.10.1 and 7.10.2.

ii. The “affected cooling tower” for the purpose of these unit-specific conditions is the unit described in Conditions 7.10.1 and 7.10.2.

b. i. Affected Boilers #11 and #12 may be subject to 40 CFR Part 63, Subpart DDDDD, NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters. For these boilers, pursuant to 40 CFE 63.7540(a), unless an affected boiler is operating as a blast furnace gas fuel-fired boiler, as defined in 40 CFR 63.7575, or is otherwise not subject to this NESHAP, beginning on the compliance date of this NESHAP for existing sources, the Permittee shall comply with each applicable emission limit, operating limit, and work practice standard in Table 2 of this NESHAP according to the methods specified in Table 8 to this NESHAP and relevant provisions in 40 CFR 63.7540(a)(1) through (11), as applicable.

ii. In particular, if affected Boiler #11 or #12 is in the Gas 2 subcategory (other gaseous fuel) pursuant to 40 CFR 63.7499, the Permittee shall comply with the following emission limits beginning on the applicable compliance date of 40 CFR 63 Subpart DDDDD, pursuant to 40 CFR 63.7500(a)(1) and Table 2 of this NESHAP:

A. Particulate Matter (PM) emissions shall not exceed 0.043 lb per mmBtu of heat input or 0.026 lb per mmBtu of steam output (3-run average).

B. Hydrogen Chloride (HCl) emissions shall not exceed 0.0017 lb per mmBtu of heat input or 0.001 lb per mmBtu of steam output.

C. Mercury (Hg) emissions shall not exceed 1.3E-05 lb per mmBtu of heat input or 7.8E-06 lb per mmBtu of steam output.*

D. CO emissions shall not exceed 9 ppm by volume on a dry basis corrected to 3 % oxygen or 0.005 lb per mmBtu of steam output.

E. Dioxin/Furans (D/F) emissions shall not exceed 0.08 ng/dscm (TEQ) corrected to 7% oxygen or 3.9E-11 (TEQ) lb per mmBtu of steam output.*

* 1.3E-05 = 0.00013
7.8E-06 = 0.0000078
3.9E-11 = 0.000000000039

c. Affected Boilers #11 and #12 shall not exceed the PM_{10} limitation of 35 IAC 212.458(b)(9):

32.25 ng/J (0.075 lbs/mmBtu) of heat input from the burning of COG.

d. The affected Power Boiler #1 is subject to the NSPS for Industrial-Commercial-Institutional Steam Generating Units, 40 CFR 60 Subpart Db. (See relevant recordkeeping requirements in Condition 7.10.9.)

e. For affected boilers #11 and #12, pursuant to 35 IAC 214.421, no person shall cause or allow the emission of sulfur dioxide into the atmosphere in any one hour period from any existing fuel combustion emission source at a steel mill located in the Chicago or St. Louis (Illinois) major metropolitan area burning any solid, liquid or gaseous fuel, or any combination thereof, to exceed the allowable emission rate determined by the following equation:

$$E = S_S H_S + S_d H_d + S_R H_R + S_G H_G$$

i. Symbols in the equation mean the following:

E = allowable sulfur dioxide emission rate;

S_S = solid fuel sulfur dioxide emission standard which is applicable;

S_d = distillate oil sulfur dioxide emission standard determined from the table in 35 IAC 214.421(d) and equal to 0.46 kg/MW-hr (0.03 lb/mmBtu);

S_R = residual oil sulfur dioxide emission standard which is applicable;

S_G = maximum by-product gas sulfur dioxide emissions which would result if the applicable by-product gas which was burned had been burned alone at any time during the 12 months preceding the latest operation, on or before March 28, 1983, of an emission source using any by-product gas;

H_S = actual heat input from solid fuel;

H_d = actual heat input from distillate fuel oil;

H_R = actual heat input from residual fuel oil;

H_G = actual heat input from by-product gases, such as those produced from a blast furnace.

ii. Metric or English units may be used in the equation as follows:

Parameter	Metric	English
E	kg/hr	lbs/hr
S_S, S_R, S_G	kg/MW-hr	lbs/mmBtu
S_d	0.46 kg/MW-hr	0.3 lbs/mmBtu
H_S, H_d, H_R, H_G	MW	mmBtu/hr

f. The affected boilers are subject to 35 IAC 216.121 which provides that no person shall cause or allow the emission of carbon monoxide into the atmosphere from a fuel combustion emission unit to exceed 200 ppm, corrected to 50 percent excess air [35 IAC 216.121].

g. The affected power boiler #1 is subject to 35 IAC 212.122(a), which provides that no person shall cause or allow the emission of smoke or other particulate matter into the atmosphere from any fuel combustion emission unit for which construction or modification commenced on or after April 14, 1972, with actual heat input greater than 73.2 MW (250 mmBtu/hr), having an opacity greater than 20 percent.

h. The affected boilers #11 and #12 are subject to 35 IAC 212.123(a), which provides that no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to 35 IAC 212.122.

i. Startup Provisions (All affected Boilers)

Pursuant to 35 IAC 201.149 and Part 201, Subpart I, subject to the following terms and conditions for affected Boilers #11, #12 and Power Boiler #1, the Permittee is authorized to violate the applicable opacity and carbon monoxide standards in 35 IAC 212.122(a), 212.123(a) and 216.121 (Conditions 7.10.3(g),(h) and (f)) during startup.

Note: This authorization is provided because the Permittee applied for such authorization in its CAAPP application, generally describing the efforts that will be used "…to minimize startup emissions, duration of individual starts, and frequency of startups."

i. This authorization does not relieve the Permittee from the continuing obligation to demonstrate that all reasonable efforts are made to minimize startup emissions, duration of individual startups and frequency of startups.

ii. The Permittee shall conduct startup of the affected boilers in accordance with the manufacturer's written instructions or other written procedures prepared by

the Permittee and maintained at the source (see Condition 7.10.9(d)(i)) for the affected boilers, that are specifically developed to minimize emissions from startups and that include, at a minimum a review of the operational condition of the affected boilers prior to initiating startup of the boiler.

iii. The Permittee shall fulfill applicable recordkeeping requirements of Condition 7.10.9(d).

iv. The Permittee shall fulfill applicable notification and reporting requirements of Condition 5.10.5-1.

v. As provided by 35 IAC 201.265, an authorization in a permit for excess emissions during startup does not shield a Permittee from enforcement for any violation of applicable emission standard(s) that occurs during startup and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

j. Malfunction or Breakdown Provisions (All affected Boilers)

Pursuant to 35 IAC 201.149 and Part 201, Subpart I, subject to the following terms and conditions, the Permittee is authorized to continue to operate affected boilers #11, #12 and Power Boiler #1 in excess of the applicable opacity and carbon monoxide standards in 35 IAC 212.122(a), 212.123(a) and 216.121 (Conditions 7.10.3(g),(h) and (f)) in the event of a malfunction or breakdown.

Note: This authorization is provided because the Permittee has applied for such authorization in its CAAPP application, generally explaining why such continued operation would be required to prevent injury to persons or severe damage to equipment, and describing the measures that will be taken to minimize emissions from any malfunctions and breakdowns.

i. This authorization only allows such continued operation as necessary to prevent injury to persons or severe damage to equipment and does not extend to continued operation solely for the economic benefit of the Permittee.

ii. Upon occurrence of excess emissions due to malfunction or breakdown, the Permittee shall as soon as practicable reduce boiler load, repair the affected boiler, remove the affected boiler from service or undertake other action so that excess emissions cease.

iii. The Permittee shall fulfill the applicable recordkeeping and reporting requirements of Condition

7.10.9(e) and Condition 5.10.5-2. For these purposes, time shall be measured from the start of a particular incident. The absence of excess emissions for a short period shall not be considered to end the incident if excess emissions resume.

iv. Following notification to the Illinois EPA (see Condition 5.10.5-2(a)(i)) of a malfunction or breakdown with excess emissions, the Permittee shall comply with all reasonable directives of the Illinois EPA with respect to such incident.

v. This authorization does not relieve the Permittee from the continuing obligation to minimize excess emissions during malfunction or breakdown. As provided by 35 IAC 201.265, an authorization in a permit for continued operation with excess emissions during malfunction and breakdown does not shield the Permittee from enforcement for any such violation and only constitutes a prima facie defense to such an enforcement action provided that the Permittee has fully complied with all terms and conditions connected with such authorization.

7.10.4 Non-Applicability of Regulations of Concern

a. The emission limitations of 35 IAC 212.324 are not applicable to any emission unit subject to a specific emissions standard or limitation contained in 35 IAC Part 212 Subpart R, pursuant to 35 IAC 212.324 (a)(3).

b. Affected Boilers #11 and #12 are not subject to 35 IAC 217.141 because the heat input capacity of each of these boilers is below the applicability threshold of this rule (250 mmBtu/hr).

c. Power Boiler #1

i. Affected power boiler #1 is not subject to the NSPS for Electric Utility Steam Generating Units (40 CFR 60, Subpart Da) because it is not an electric utility steam generating unit as the term is defined in 40 CFR 60.41Da.

ii. Affected power boiler #1 is not subject to 40 CFR 60, Subpart D because it is subject to the NSPS in 40 CFR 60 Subpart Db as it meets the applicability requirements under 40 CFR 60.40b(a) [40 CFR 60.40b(j)].

iii. Affected Power Boiler #1 is not subject to the SO_2 standards of 40 CFR 60, Subpart Db because it meets the exemption provided at 40 CFR 60.42b(k)(2) [See also Condition 7.10.5(b)].

iv. Affected Power Boiler #1 is not subject to the NO_x standards of 40 CFR 60, Subpart Db pursuant to 40 CFR 60.44b(c), because it has an annual capacity factor for natural gas of 10 percent or less and is subject to a federally enforceable requirement that limits operation to an annual capacity factor of 10 percent or less for natural gas [See Condition 7.10.6(a)(iii)].

v. Affected Power Boiler #1 is not subject to particulate matter standards under 40 CFR 60, Subpart Db because it does not fire solid or liquid fuels.

d. Affected Power Boiler #1 is not subject to 35 IAC 217.121 because it is not “fossil fuel-fired” as defined by 35 IAC 211.2425, i.e., a unit for which fossil fuels provide more than 50 percent of the annual heat input to the unit.

e. Pursuant to 40 CFR 63.7491(k), Power Boiler #1 is not subject to 40 CFR Part 63 Subpart DDDDD because this boiler is a blast furnace gas fuel-fired boiler as defined in 40 CFR 63.7575.

f. Cooling Tower:

i. The affected cooling tower is not subject to 35 IAC 219.986(d), because the cooling tower does not cool process water.

ii. The affected cooling tower is not subject to 40 CFR Part 63 Subpart Q because no chromium-based water treatment chemicals are used.

7.10.5 Control Requirements

a. Requirements for affected Power Boiler #1 from Permit 06070023

i. Emissions of PM and PM_{10} from the affected Power Boiler #1 shall be controlled by the existing BFG pretreatment system, which entails treatment by dust catchers and wet scrubbers [T1].

ii. BFG and natural gas shall be the only fuels fired in the affected Power Boiler #1 [T1].

iii. Affected Power Boiler #1 shall be operated for the primary purpose of supplying steam and electricity to the source with no more than 219,000 MW-hour of excess electricity sent to any utility power distribution system for sale in any calendar year from the electrical generator associated with the unit [T1].

b. Pursuant to 40 CFR 60.42b(k)(2), the sulfur content of the fuel fired in Power Boiler #1 shall not exceed 0.16 lb/mmBtu.

c. Requirements for affected Boilers #11 and #12

Only natural gas, coke oven gas and blast furnace gases are allowed to use as the fuels.

d. Requirements for affected Cooling Tower

Pursuant to 40 CFR 63.402, the Permittee shall not use chromium-based water treatment chemicals in the water cooling tower.

7.10.5-1 Work Practice Requirements

a. Pursuant to Sections 39.5(7)(a) and (d) of the Act, unless the Permittee conducts continuous emission monitoring for CO for an affected boiler, the Permittee shall conduct an annual tune-up for the boiler, as follows, to maintain compliance with 35 IAC 216.121. If annual tune-ups or combustion adjustments are required for an affected boiler pursuant to 40 CFR 63, Subpart DDDDD, these tune-ups shall also be conducted in accordance of applicable provisions of this NESHAP.

i. Each annual tune-up must be no more than 13 months after the previous tune-up. If the boiler is not operating on the required date for a tune-up, the tune-up must be conducted within one week of startup.

ii. Each tune-up shall consist of the following:

A. As applicable, inspect the burner, and clean or replace any components of the burner as necessary (the burner inspection may be delayed until the next scheduled unit shutdown, but each burner must be inspected at least once every 36 months);

B. Inspect the flame pattern, as applicable, and adjust the burner as necessary to optimize the flame pattern. The adjustment should be consistent with the manufacturer’s specifications, if available;

C. Inspect the system controlling the air-to-fuel ratio, as applicable, and ensure that it is correctly calibrated and functioning properly; and

D. Optimize total emissions of CO. This optimization should be consistent with the manufacturer's specifications, if available.

iii. Measure the concentrations in the effluent stream of CO in parts per million by volume (ppmv), and oxygen in volume percent, before and after the adjustments are made (measurements may be either on a dry or wet basis, as long as it is the same basis before and after the adjustments are made); and

iv. Submit a report to the Illinois EPA within 30 days of each tune-up that contains the following information:

A. The identity of the boiler, the date of the tune-up and the individual(s) who performed the tune-up and a summary of their experience with combustion tune-ups of boilers.

B. The concentrations of CO in the effluent stream in ppmv and oxygen in volume percent, measured before and after the adjustments of the boiler;

C. A description of any corrective actions taken as a part of the combustion adjustment; and

D. The type and amount of fuel used over the 12 months prior to the annual adjustment.

b. Pursuant to 40 CFR 63.7530(h), for an affected boiler that is subject to emission limits in 40 CFR 63 Subpart DDDDD, the Permittee must minimize the boiler's startup and shutdown periods following the manufacturer's recommended procedures, if available. If manufacturer's recommended procedures are not available, the Permittee must follow recommended procedures for a boiler of similar design for which manufacturer's recommended procedures are available.

7.10.6 <u>Operational, Production and Emission Limitations</u>

a. Limitations for affected Power Boiler #1 from Permit 06070023:

Note: Permit 06070023 includes certain limitations that apply to the combination of affected power boiler #1 and BFG flare #2, which is a new flare that was also constructed with the boiler. BFG flare #2 is generally addressed in Section 7.4 of this CAAPP permit.

i. The maximum design firing rate of affected Power Boiler #1 shall not exceed 505 mmBtu/hour [T1].

ii. The maximum design BFG input of affected Power Boiler #1 shall not exceed 476 mmBtu/hour [T1].

iii. Fuel usage for affected Power Boiler #1 and BFG flare #2 (see Section 7.4) shall not exceed the following limits (rolling 12-month basis) [T1]:

A. Natural gas: 341,666 mmBtu/year.

B. BFG and natural gas fuel usage combined: 4,511,426 mmBtu/year.

iv. Emissions of PM from affective Power Boiler #1, as measured by USEPA Method 5, shall not exceed 0.03 lb/mmBtu of exhaust [T1].

v. A. Emissions from affective Power Boiler #1 shall not exceed the following limits [T1]:

Pollutant	Mode	
	BFG* (Lbs/mmBtu)	Natural Gas (Lbs/mmBtu)
NO_x	0.05	0.12
CO	0.15	0.0824
VOM	---	0.0054
PM/PM_{10}	0.101	0.0075
SO_2	0.20	0.0006
Indiv. Metal HAP	0.00066	0.00066
Total HAPs	0.0053	0.0053

* BFG mode entails firing a mix of BFG with up to 10 percent natural gas.

B. Compliance with these limits shall be determined as a 3-hour average unless continuous emissions monitoring is conducted, in which compliance shall be determined as a daily average (24 operating hours).

C. Combined emissions from affected Power Boiler #1 and BFG flare #2 (see Section 7.4) shall not exceed the following limits [T1]:

Pollutant	Emissions	
	Tons/Month	Tons/Year
NO_x	12.5	124.74
CO	33.9	338.36
VOM	0.1	0.92
PM/PM_{10}	22.9	228.39
SO_2	45.2	451.14
Indiv. Metal HAP	0.2	1.5
Total HAPs	1.2	12.0

D. Compliance with annual limits in Condition 7.10.6(a) shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12

month total), unless otherwise specified in a particular condition.

b. Limits for the affected Cooling Tower from Permit 06070023 [T1]:

i. The total dissolved solids content of water circulating in the affected cooling tower shall not exceed 4,190 ppm on a monthly basis.

ii. Emissions of PM/PM_{10} from the affected cooling tower shall not exceed 0.39 tons/month and 3.86 tons/year. Compliance with the annual limit shall be determined from a running total of 12 months of data.

7.10.7-1 Current Testing Requirements

The Permittee shall conduct emission testing for the affected boilers as provided below pursuant to Sections 39.5(7)(c),(d) and (p) of the Act.

a. Requirements for affected Boilers #11 and #12:

i. PM and CO emissions shall be measured to determine compliance with 35 IAC 212.458(b)(9) (Condition 7.10.3(c)) and 35 IAC 216.121 (Condition 7.10.3(f)) in accordance with procedures in USEPA Methods 1 through 4 and Method 5 (or Method 201A), as provided in 35 IAC 212.108, and Method 10 or 10B.

ii. The testing shall be completed within 30 months of the effective date of this permit condition and may be done on either affected Boiler #11 or #12, as selected by the Illinois EPA.

iii. In addition to other required information, the test report shall include data for the sulfur and PM content of BFG and COG during the period of testing, with supporting data.

b. Requirements for affected Power Boiler #1:

i. Permittee shall conduct emission tests at least every five years on the affected Power Boiler #1.

ii. CO, NO_x, SO_2, PM_{10}, PM and VOM emissions shall be determined in accordance with the test methods identified below.

iii. These tests shall also include measurements of emissions of metals if the Permittee elects to conduct emissions testing to verify compliance with the limits for metal HAPs, as an alternative to applying data for the metal HAP content of material collected during pretreatment of the BFG.

iv. The following USEPA test methods shall be used for testing of emissions, unless another USEPA method is approved by the Illinois EPA.

Location of Sample Points	Method 1
Gas Flow and Velocity	Method 2
Flue Gas Weight	Method 3
Moisture	Method 4
SO_2	Method 6
PM/PM_{10} (filterable	Methods 201 or 201A*
PM (condensable)	Method 202
VOM	Method 18 or 25A
NO_x	Method 7E or 19
CO	Method 10 or 10B
Metals	Method 29

* The Permittee may also use Method 5 as an alternative to Method 201A, provided that the measured results shall be considered PM_{10}.

v. In addition to other required information, the test report shall include data for the sulfur and PM content of BFG and the metals content of the material removed from raw BFG by the pretreatment system during the period of testing, with supporting calculations.

c. For this emission testing, test notifications and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

d. Observation of opacity shall be conducted during all emission tests of affected boilers in accordance with Method 9 and the results of these observations included in the reports for emission testing.

7.10.7-2 <u>Additional Performance Testing Requirements (40 CFR Part 63, Subpart DDDDD)</u>

a. Pursuant to 40 CFR 63.7505(c) and 63.7510, if affected Boiler #11 or #12 is subject to emission limits in 40 CFR 63 Subpart DDDDD, the Permittee must demonstrate compliance with all limits that are applicable using performance testing according to 40 CFR 63.7(a)(2) and 63.7520 and fuel analysis according to 40 CFR 63.7521, including a continuous emissions monitoring system (CEMS) where applicable, in a timely manner. The Permittee may demonstrate compliance with the applicable emission limit for hydrogen chloride or mercury using fuel analysis if the emission rate calculated according to 40 CFR 63.7530(c) is less than the applicable emission limit. Otherwise, the Permittee must demonstrate compliance for hydrogen chloride or mercury using performance testing.

i. Pursuant to 40 CFR 63.7545(d),the Permittee must submit a Notification of Intent to conduct a performance test at least 60 days before the performance test is scheduled to begin.

ii. Pursuant to 40 CFR 63.7510(a), performance tests shall be conducted according to 40 CFR 63.7520(a), (c), (d) and (e) and Table 5 to 40 CFR 63, Subpart DDDDD fuel analysis for each type of fuel burned in the boiler shall be conducted according to 40 CFR 63.7521(a),(b) and (e) and Table 6 to 40 CFR 63, Subpart DDDDD, and performance evaluations for the oxygen monitor shall be conducted according to 40 CFR 63.7525.

b. Pursuant to 40 CFR 63.7530(g), if the Permittee elects to demonstrate that the gaseous fuel fired in affected Boiler #11 or #12 meets the specifications of an “other gas 1 fuel” as defined in 40 CFR 63.7575, an initial fuel specification analyses according to 40 CFR 63.7521(f) through (i) must be conducted.

i. If the mercury and hydrogen sulfide constituents in the gaseous fuels will never exceed the specifications included in the definition, the Permittee shall include a signed certification with the Notification of Compliance Status that the initial fuel specification test meets the gas specifications outlined in the definition of other gas 1 fuels.

ii. Pursuant to 40 CFR 63.7540(c), if the Permittee elects to demonstrate that the unit meets the specifications for hydrogen sulfide and mercury for the other gas 1 subcategory and cannot submit a signed certification under 40 CFR 63.7545(g) because the constituents could exceed or vary above the specifications, the Permittee must conduct monthly fuel specification testing of the gaseous fuels, according to the procedures in 40 CFR 63.7521(f) through (i) and 40 CFR 63.7540(c) and maintain records of the results of the testing as outlined in 40 CFR 63.7555(g).

7.10.8-1 Current Monitoring Requirements

Pursuant to 39.5(7)(a) and (d) of the Act, all affected boilers and the cooling tower are subject to the following monitoring requirements:

a. Opacity Observations

The Permittee shall conduct opacity observations for each affected boiler semi-annually in accordance with 40 CFR Part 60, Appendix A, Method 9. The duration of these

observations shall be a minimum of 30 minutes for each boiler.

b. Cooling Tower

i. The Permittee shall sample and analyze the water being circulated in the affected cooling tower on at least a monthly basis for the total dissolved solids content.

ii. Upon written request by the Illinois EPA, the Permittee shall have the water circulating in the affected cooling tower sampled and analyzed for the presence of hexavalent chromium in accordance with the procedures of 40 CFR 63.404(a) and (b).

c. Analysis of BFG

i. The Permittee shall sample and analyze cleaned BFG after the pretreatment system for sulfur content (lb/scf and lb/mmBtu), using appropriate ASTM methods or other comparable methodology. These measurements shall be conducted on at least a quarterly basis. The records for this activity shall also include operating data for the blast furnaces and the BFG pretreatment system at the time of sampling.

ii. The Permittee shall sample and analyze the cleaned BFG after the pretreatment system for PM content (gr/scf and lbs/mmBtu) and the material collected by the BFG pretreatment system for HAP metal content (by weight, dry basis, for individual metals as addressed by Method 29) using appropriate ASTM methods or other comparable methodology. These measurements shall be conducted at least every two years. The records for this activity shall also include operating data for the blast furnaces and the BFG pretreatment system at the time of sampling.

7.10.8-2 Additional Monitoring Requirements (40 CFR Part 63 Subpart DDDDD)

Unless an affected boiler is operating as a blast furnace gas fuel-fired boiler, as defined in 40 CFR 63.7575, or is otherwise exempt, beginning on the compliance date of this NESHAP for existing sources, the Permittee must:

a. Install, operate, and maintain a continuous oxygen monitor according to the procedures in 40 CFR 63.7525 (a)(1) through (6) and 63.7535. The oxygen level shall be monitored at the outlet of the boilers [40 CFR 63.7525(a)].

b. Monitor the operating parameters identified in Items 7, 8 and 9 of Table 8 of 40 CFR 63 Subpart DDDDD [40 CFR 63.7540(a)].

c. Operation above the established maximum or below the established minimum operating limits shall constitute a deviation of established operating limits listed in Table 4 of 40 CFR 63 Subpart DDDDD except during performance tests conducted to determine compliance with the emission limits or to establish new operating limits. Operating limits must be confirmed or reestablished during performance tests [40 CFR 63.7540(a)(1)].

7.10.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. Affected Power Boiler #1:

i. A file which contains supporting documentation which demonstrates the maximum design firing rate of the affected boiler (mmBtu/hour), the maximum design BFG input, and the manufacturer's guarantees for the emission rates of the natural gas burners in the affected boiler.

ii. NSPS Data

A. The applicable recordkeeping required by the NSPS for startup, shutdown and malfunction, pursuant to 40 CFR 60.7(b).

B. Daily records of the fuel consumption, pursuant to 40 CFR 60.49b(d)(1).

iii. Fuel usage

A. Records for the amounts of fuel burned by type (mmBtu/month and mmBtu/year) for the affected boiler.

B. Records for the amounts of fuel burned for the affected boiler and the new BFG flare, combined, by type (mmBtu/month and mmBtu/year).

iv. Emissions

The Permittee shall keep the following records related to the emissions of affected Power Boiler #1 to verify compliance with the applicable limits in Condition 7.10.6(a):

A. A file containing the emission factors used by the Permittee to determine emissions of pollutants other than SO2 from the affected boiler and BFG Flare #2, with supporting documentation. These records shall be reviewed

and updated by the Permittee as necessary to assure that the emission factors that it uses to determine emissions of the affected boiler do not understate actual emissions. These records shall be prepared and copies sent to the Illinois EPA in accordance with Condition 5.9.6(c).

B. Records of emissions of NO_x, CO, VOM, PM/PM_{10}, SO_2 and HAPs (tons/month and tons/year) from this boiler, with supporting calculations.

C. Records of summation of emissions of NO_x, CO, VOM, PM/PM_{10}, SO_2 and HAPs from this boiler and BFG Flare #2 (tons/month and tons/year), with supporting calculations.

v. Records of the electricity from the generator associated with Power Boiler #1 sent to the grid for sale per calendar year (MW-hours).

b. Affected Cooling Tower:

i. The Permittee shall keep records of the water circulation capacity of the cooling tower (gallons/minute, hourly average), with supporting calculations.

ii. The Permittee shall keep records of emissions of PM/PM_{10} (tons/month and tons/year), with supporting calculations.

c. Affected Boilers #11 and #12:

i. The following operating information for each boiler:

Usage of each type of fuel (natural gas, COG and BFG gas), in million ft^3 per month and million ft^3 per year.

ii. The Permittee shall keep inspection, maintenance, and repair logs with dates and the nature of such activities for each boiler.

iii. A file containing the emission factors used by the Permittee to determine emissions of NO_x and CO from affected Boilers #11 and #12, with supporting documentation. These records shall be reviewed and updated by the Permittee as necessary to assure that the emission factors that it uses to determine NO_x and CO emissions of these boilers do not understate actual emissions.

d. Records for Startups of Affected Boilers, pursuant to Section 39.5(7)(b) of the Act

i. The Permittee shall maintain startup procedures for each affected boiler, as required by Condition 7.10.3(i)(ii).

ii. The Permittee shall maintain the following records for each startup of an affected boiler:

A. Date, time and duration of the startup.

B. A description of the startup and reason(s) for the startup.

C. Whether a violation of an applicable standard may have occurred during startup accompanied by the information in Condition 7.10.9(d)(iv) if a violation may have or did occur.

D. Whether the established startup procedures, maintained above, were followed accompanied by the information in Condition 7.10.9(d)(iii) if there were departure(s) from those procedures.

iii. If the established startup procedures were not followed during a startup, the Permittee shall maintain the following records:

A. A description of the departure(s) from the established procedures.

B. The reason(s) for the departure(s) from the established procedures.

C. An explanation of the consequences of the departure(s) for emissions, such as whether the departure(s) prolonged the startup or resulted in additional emissions, and if so:

1. The actions taken to minimize emissions and the duration of the startup; and

2. An explanation whether similar incidents might be prevented in the future and if so, the corrective actions taken or to be taken to prevent similar incidents.

iv. If a violation did or may have occurred during a startup, the Permittee shall maintain the following records:

A. Identification of the applicable standard(s) that were or may have been violated.

B. An explanation of the nature of such violation(s), including the magnitude of such excess emissions.

C. A description of the actions taken or to be taken to minimize the magnitude of emissions and duration of the startup.

D. An explanation whether similar incidents could be prevented or ameliorated in the future and if so, a description of the actions taken or to be taken to prevent similar incidents in the future.

e. Records for Malfunctions or Breakdowns

Pursuant to 35 IAC 201.263, the Permittee shall maintain records of continued operation of the affected boilers as addressed by Condition 7.10.3(j), during malfunctions or breakdowns, which at a minimum, shall include the following records. The preparation of these records shall be completed within 45 days of an incident, unless the Permittee conducts a root cause analysis for the incident, in which case the preparation of these records, other than the root cause analysis, shall be completed within 120 days of the incident.

i. Date, time and duration of the incident.

ii. A detailed description of the incident, including:

A. A chronology of significant events during and leading up to the incident.

B. Relevant operating data for the unit, including information such as operator log entries and directives provided by management during the incident.

C. The measures taken to reduce the quantity of emissions and the duration of the incident including the resources utilized to address the incident.

D. The magnitude of emissions during the incident.

iii. An explanation why continued operation of an affected boiler was necessary to prevent personnel injury or prevent equipment damage.

iv. A discussion of the cause(s) or probable cause(s) of the incident including the following:

A. Whether the incident was sudden, unavoidable, or preventable, including:

1. Why the equipment design did not prevent the incident;

2. Why better maintenance could not have avoided the incident;

3. Why better operating practices could not have avoided the incident; and

4. Why there was no advance indication for the incident.

B. Whether the incident stemmed from any activity or event that could have been foreseen, avoided or planned for.

C. Whether the incident was or is part of a recurring pattern indicative of inadequate design, operation or maintenance.

v. A description of any steps taken or to be taken to prevent similar future incidents or reduce their frequency and severity.

vi. As an alternative to keeping the records required by Condition 7.10.9(e)(iv), the Permittee may perform a root cause analysis. For this purpose, a root cause analysis is an analysis whose purpose is to determine, correct and eliminate the primary causes of the incident and the excess emissions resulting there from. If the Permittee performs a root cause analysis method that would define the problem, define all causal relationships, provide a causal path to the root cause, delineate the evidence, and provide solutions to prevent a recurrence. Such an analysis shall be completed within one year of the incident.

f. Records for the emission testing conducted on the affected boilers.

g. If the Permittee operates under manufacturer’s specifications or manufacturer’s instructions, such manufacturer’s documentation shall be kept at the source as part of the required records.

h. Unless an affected boiler is operating as a blast furnace gas fuel-fired boiler, as defined in 40 CFR 63.7575, or is otherwise exempt, beginning on the compliance date of this NESHAP for existing sources, the Permittee must keep records in accordance with 40 CFR 63.7555(a) through (h) as applicable.

7.10.10 Reporting Requirements

a. i. The Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations of the affected boilers and affected cooling tower from the following applicable requirements unless a NESHAP standard specifies a different time frame, pursuant to Section 39.5(7)(f)(ii) of the Act:

A. Requirements in Condition 7.10.3(b), (d) and (e) through (h).

B. Requirements in Condition 7.10.5.

C. Requirements in Condition 7.10.6.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

b. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

c. All deviation reports described in Condition 7.10.10(a) and (b) above shall contain the following:

i. Date, time and duration of the deviation;

ii. Description of the deviation;

iii. Probable cause of the deviation; and

iv. Any corrective actions or preventive measures taken.

d. Reporting on the State malfunction and breakdown authorization shall be performed in accordance with Condition 5.10.5-2.

e. For affected Power Boiler #1, the Permittee shall comply with the applicable reporting requirements of the NSPS, as specified in 40 CFR 60.7 and 60.49b.

f. Unless an affected boiler is operating as a blast furnace gas fuel-fired boiler, as defined in 40 CFR 63.7575, or is otherwise exempt, beginning on the compliance date of this NESHAP for existing sources, the Permittee must report each instance in which it did not meet each emission limit and operating limit in Tables 1 through 4 to 40 CFR 63 Subpart DDDDD that are applicable. These instances are deviations from the established emission limits. These deviations must be reported according to the requirements in 40 CFR 63.7550.

g. Reporting on the State startup authorization shall be performed in accordance with Condition 5.10.5-1.

h. Reporting on the Federal SSM authorization shall be performed in accordance with Condition 5.10.5-3.

7.10.11 Compliance Procedures

For affected boilers, compliance with the applicable standards of Condition 7.10.3, the work practice requirements of Condition 7.10.5-1, and the production/operating and the emission limits of Condition 7.10.6 is addressed by the work practices, testing, monitoring, recordkeeping and reporting requirements in Section 7.10 of this permit.

7.10.12 State-Only Conditions

a. Applicable requirements for affected Boilers #11 and #12 from Permit 10080022:

i. Pursuant to 35 IAC 217.150, 217.152, and 217.160, by the applicable compliance date for 35 IAC Part 217 Subparts D and E, the Permittee shall comply with applicable requirements of these rules for the affected boilers, including:

A. Compliance with the applicable NO_x emissions limitation in lb/mmBtu, calculated in accordance with 35 IAC 217.164(b), on an ozone season (May 1 through September 30) and annual basis [35 IAC 217.164(b)].

B. Operation of each affected boiler in a manner consistent with good air pollution control practices to minimize NO_x emissions [35 IAC 217.150(e)].

C. Certifying to the Illinois EPA that the affected boilers will be in compliance with the applicable emissions limitation of 35 IAC 217.164 by the applicable compliance date [35 IAC 217.152 and 217.155(b)].

D. Installation, operation and maintenance of a Continuous Emissions Monitoring System (CEMS) on each affected boiler to measure emissions of NO_x, with accompanying recordkeeping and reporting for the operation and maintenance of each CEMS [35 IAC 217.157(a)(2) and 217.156(b)(9), (b)(10) and (j)].

ii. Recordkeeping Requirements [39.5(7)(e) of the Act]

Beginning on the compliance date of 35 IAC 217 Subparts D and E, the Permittee shall keep the following records for each Boiler #11 and #12:

A. Usage of each type of fuel (natural gas, coke oven gas and blast furnace gas), in million ft^3 per month and million ft^3 per year.

B. The actual heat input in mmBtu per ozone season and mmBtu per year, for each fuel, with supporting documentation for the heat content of each fuel.

C. The applicable NO_x emission limitation in lb/mmBtu for each ozone season and each calendar year, calculated in accordance with 35 IAC 217.164(b).

D. The average hourly NO_x emission data.

E. The ozone season and annual NO_x emissions (pounds).

F. The ozone season average and annual average NO_x emission rates (lbs/mmBtu heat input) calculated within 30 days of the end of the averaging periods (i.e. calculated by October 30 for ozone season averaging period and by January 30 for annual averaging period).

G. Inspection, maintenance, and repair logs with dates and the nature of such activities for each affected boiler.

iii. Reporting Requirements [39.5(7)(f) of the Act]

If there is any deviation of the requirements of Condition 7.10.12, the Permittee shall promptly report to the Illinois EPA as specified below and report shall include a description of the deviation, the probable cause of the deviation, corrective actions taken, and any preventive measures taken:

A. Deviations from the NO_x emission limitation in 35 IAC 217.164(b) shall be reported within 30 days of such occurrence.

B. Other deviations shall be reported in a semi-annual report.

7.10.13 Construction Permit Conditions for Equipment that is not yet built

Applicable requirements for portable Boilers #1 through #4 from Permit 10100042:

a. Pursuant to the NSPS, 40 CFR 60.11(d), at all times the Permittee shall, to the extent practicable, maintain and operate each portable boiler in a manner consistent with good air pollution control practices for minimizing emissions.

b. Pursuant to 35 IAC 216.121, the emission of carbon monoxide (CO) from each portable boiler shall not exceed 200 ppm, corrected to 50 percent excess air.

c. Pursuant to 35 IAC 212.123(a), the opacity of the exhaust from each portable boiler shall not exceed 30 percent, except as provided in 35 IAC 212.123(b).

d. This permit is issued based on the emissions of HAPs as listed in Section 112(b) of the Clean Air Act from the affected boilers being less than 10 tons per year of a single HAP and 25 tons per year of any combinations of such HAPs, so that these boilers are considered a minor source for HAPs.

e. This permit is issued based on the portable boilers not being subject to the control requirements of 35 IAC 217, Subparts D and E, which establish requirements that reflect Reasonably Available Control Technology (RACT) for boilers related to emission of nitrogen oxide (NO_x). This is because the NO_x emissions from each portable boiler are restricted to less than 15 tons per year and to less than 5 tons per ozone season, pursuant to 35 IAC 217.150(a), as addressed further.

f. Natural gas shall be the only fuel fired in the portable boilers.

g. The maximum design heat input capacity of each portable boiler, as defined by the NSPS, 40 CFR 60.41c, shall not exceed 100 mmBtu/hour.

   Note: If a portable boiler were to have a heat input capacity of greater than 100 mmBtu/hr, it would be subject to the NSPS, 40 CFR 60 Subpart Db, rather than Subpart Dc.

h. i. The total consumption of natural gas by the portable boilers shall not exceed 1,738 million scf per year, combined.

   ii. Beginning Calendar year 2012 or such later date, the natural gas usage by each portable boiler shall not exceed 812 million scf per year and 267 million scf

during each ozone season (May 1 through September 30).

i. The portable boilers shall only be used to address interruptions in the normal steam supply to the Granite City Works. For this purpose, the portable boilers and existing boilers may operate simultaneously, as may be needed to ensure availability of the portable boilers and facilitate transitions between existing boilers and the portable boilers.

j. i. Short-term emissions from each portable boiler shall not exceed 0.036 lb of NO_x/mmBtu and 3.6 and 3.8 lbs/hour, for NO_x and CO, respectively.

ii. Annual emissions from the portable boilers, combined shall not exceed the following limits. These limits are established based on total fuel usage of 1,738 million scf per year. Compliance with these limitations and the annual fuel consumption limit shall be determined from a running total of 12 months of data.

Pollutant	Emission Limit (ton/year)
NO_x	31.9
CO	33.2
VOM	3.5
$PM/PM_{10}/PM_{2.5}$	1.1
SO_2	1.3
Individual HAP[1]	1.8
Total HAP	3.5

[1] Individual HAP refers to individual pollutants, such as Formaldehyde, Benzene, Toluene, Hexane, etc.

k. Beginning Calendar Year 2012, the NO_X emissions of each portable boiler shall be less than the applicability thresholds of 35 IAC 217, Subparts D and E, i.e., less than 15 tons per year and less than 5 tons during each ozone season.

l. The Permittee shall operate and maintain the portable boilers in accordance with good air pollution control practices to assure proper functioning of equipment and minimize malfunctions, including maintaining the boiler in accordance with written procedures developed for this purpose.

m. Within 90 days after a written request from the Illinois EPA or such later date agreed to by the Illinois EPA, the Permittee shall have NO_X and CO emissions of portable

boiler(s), as specified in the request, measured by an independent testing service approved by the Illinois EPA.

n. The Permittee shall maintain the following records for the portable boilers:

i. A file containing the following information:

A. The maximum design heat input capacity of each portable boiler, mmBtu/hour, with supporting documentation.

B. The maximum fuel flow rate to each portable boiler, in scf/hour and mmBtu/hour, with supporting documentation.

C. The guarantee or other information for the NO_x and CO emission rates of each portable boiler, in lb/hour and in lb/mmBtu (NO_x only), with supporting documentation.

ii. An operating log or other records for the portable boilers that, at a minimum, shall include the following information:

A. Information identifying each period when portable boiler(s) are operated, with the explanation why the boiler(s) need to be operated to maintain the normal steam supply for the source.

B. If the maximum design heat input capacity of the portable boiler is more than 95 mmBtu/hour, operating records to demonstrate that the boiler is not fired at more than 100 mmBtu/hour.

C. Information for each startup and shutdown, including date, time and duration, as required by 40 CFR 60.7(b).

D. Information for any incident in which the operation of each portable boiler continued during malfunction or breakdown, as required by 40 CFR 60.7(b). These records shall include date, time, and duration; a description of the incident; whether emissions exceeded or may have exceeded any applicable standard; a description of the corrective actions taken to reduce emissions and the duration of the incident; and a description of the preventative actions taken.

iii. An inspection, maintenance, and repair log with dates and the nature of such activities for the portable boilers.

iv. The following records for the natural gas usage of the portable boilers:

A. Natural gas usage of each boiler, pursuant to 40 CFR 60.48c(g) (scf/month).

B. Total natural gas usage of the boilers (scf/year).

v. Records of the monthly and annual emissions of NO_x, CO, $PM/PM_{10}/PM_{2.5}$, VOM, SO_2, and HAPs from the boilers (tons/month and tons/year), with supporting data and calculations.

vi. Beginning Calendar year 2012, records of NO_x emissions for each portable boiler for the calendar year (ton/year) and for the ozone season (ton/season).

o. Pursuant to 40 CFR 60.7(a)(3) and 60.48c(a), the Permittee shall furnish the Illinois EPA with written notification of initial startup of each portable boiler. This notification shall be submitted within 15 days after the initial startup of the portable boiler, postmarked by such date, and include the following information. For this purpose, a separate notification shall be provided each time that portable boiler(s) are installed at the Granite City Works.

i. The design heat input capacity of the boiler and identification of the fuels to be combusted in the boiler, pursuant to 40 CFR 60.48c(a)(1).

ii. The annual capacity factor at which the Permittee anticipates operating the boiler based on fuel fired, pursuant to 40 CFR 60.48c(a)(3).

iii. With the notification required from above, the Permittee shall also provide the manufacturer and serial number of portable boiler(s).

p. The Permittee shall notify the Illinois EPA of deviations of the portable boilers with the requirements of Condition 7.10.13 within 30 days of an occurrence. Reports shall describe the deviation, the probable cause of such deviations, the corrective actions taken, and any preventive measures taken.

7.11 Internal Combustion Engine

7.11.1 Description

A diesel fuel fired emergency engine-generator is used for power outages at the facility.

Note: This narrative description is for informational purposes only and is not enforceable.

7.11.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Engine	Emergency Engine-Generator (maximum power output 3,500 HP)	2001	None

7.11.3 Applicable Provisions and Regulations

a. The “affected engine” for the purpose of these unit-specific conditions, is the emission unit described in Conditions 7.11.1 and 7.11.2.

b. The affected engine is subject to 35 IAC 212.458(b)(7) and (c), which provides that its PM_{10} emissions shall not exceed 22.9 mg/scm (0.01 gr/scf), provided however that this limit shall not apply if there are no visible emissions, except if a stack test is performed. The absence of visible emissions is not a defense to a finding violation.

c. The affected engine is subject to 35 IAC 212.123(a), which provides that no person shall cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from any emission unit other than those emission units subject to the requirements of 35 IAC 212.122, except as allowed by 35 IAC 212.123(b) and 212.124.

d. The affected engine is subject to 35 IAC 214.301 and 35 IAC 214.304/214.122, which provides that no person shall cause or allow the emission of sulfur dioxide into the atmosphere from any process emission source to exceed 2000 ppm and from any fuel burning process emission unit burning distillate oil to exceed 0.3 lbs/mmBtu.

7.11.4 Non-Applicability of Regulations of Concern

a. The affected engine is not subject to 40 CFR Part 63 Subpart ZZZZ because it is not a spark ignition engine.

b. The affected engine is not subject to 40 CFR Part 60 Subpart IIII, because the affected engine was manufactured before 2006 and was not modified or reconstructed

thereafter, so does not meet applicable criteria in 40 CFR 60.4200(a).

c. The affected engine is not subject to 35 IAC Part 217, because the affected engine is not a type of process emission unit addressed by Part 217.

d. The affected engine is not subject to the requirements of 35 IAC 212.321 because it does not have a process weight rate as defined in 35 IAC 211.5250.

e. The affected engine is not subject to 35 IAC 216.121, because the affected engine is not by definition a fuel combustion emission unit.

f. 35 IAC 212.324 is not applicable to the affected engine pursuant to 35 IAC 212.324(a)(3), because the affected engine is subject to 35 IAC 212.458(b)(7), an emission limitation in 35 IAC Part 212, Subpart R.

7.11.5 Control Requirements and Work Practices

The operation of the emergency generator is limited to 500 hours per year [00060003, T1].

7.11.6 Production and Emission Limitations from Permit 00060003 [T1]

a. Emissions of the affected engine shall not exceed the following limits:

Pollutant	Emissions (lbs/hr)	Emissions (T/yr)
PM	2.48*	0.62
CO	21.11*	5.3
NO_x	79.49*	19.9
SO_2	12.54	3.1

* Operation at a level of 10 percent higher than the applicable hourly emissions limits above is allowed during startup.

b. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total) [T1].

7.11.7 Testing Requirements

Upon the written request from the Illinois EPA, the emission tests shall be conducted by the Permittee for the affected engine to verify compliance with emission limits in Condition 7.11.6 as follows [Sections 39.5(7)(c), (d) and (p) of the Act].

a. The following USEPA test methods shall be used, unless another USEPA method is approved by the Illinois EPA.

Location of Sample Points	Method 1
Gas Flow and Velocity	Method 2
Flue Gas Weight	Method 3
Moisture	Method 4
PM	Method 5
NO_x	Method 7E or 19
CO	Method 10 or 10B

b. Observations of opacity shall be conducted during these emission tests in accordance with Method 9 and the results of these observations included in the reports for emission testing.

c. For this emission testing, test notifications and reporting shall be done by the Permittee in accordance with Conditions 8.6.2 and 8.6.3 of this permit.

7.11.8 Monitoring Requirements

a. The Permittee shall perform annual sampling and analysis for sulfur content (lbs/mmBtu) in the fuel for the affected engine or obtain a certification for each fuel supplied delivery for the affected engine [Section 39.5(7)(d) of the Act].

b. The Permittee shall conduct opacity observations for the affected engine in accordance with Method 9 on an annual basis if the affected engine starts for purposes of reliability testing. The duration of Method 9 test shall be equal to 30 minutes or the duration of the reliability test, whichever is less [Section 39.5(7)(p) of the Act].

7.11.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected engine, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. A file for the affected engine containing:

i. The manufacturer's emission guarantees or emission data for the engine, for PM, CO and NO_x, both during normal operation and startup (lbs/hour and lbs/gallon) and manufacturer's data for fuel consumption and exhaust flow rate from the engine, with supporting documentation.

ii. Engineering calculations to demonstrate that PM emissions comply with 35 IAC 212.458(b)(7) and to determine the greatest sulfur content (lbs/mmBtu) in fuel with which compliance with 35 IAC 214.301 and 35 IAC 214.304/214.122 would be shown.

iii. The emission rate(s) used by the Permittee to determine emissions of the affected engine when these rates are different from the manufacturer's rates, accompanied by supporting documentation. Copies of these records shall be submitted to the Illinois EPA, with initial records submitted within 15 days of the date that the records are prepared or 30 days after the effective date of this permit, whichever is later and subsequent revisions to these records submitted within 15 days of the date that the Permittee completes preparation of revised records.

b. Records of fuel consumption (gal/month and gal/year).

c. Records of hours of operation (hrs/yr).

d. Records for number of startups.

e. Records for the sulfur content (lbs/mmBtu) of fuel as determined by sampling and analyses of fuel or copies of supplier certifications for sulfur content of fuel and identification of any use of oil whose sulfur content exceeded the level for compliance, as determined pursuant to Condition 7.11.9(a)(ii).

f. Records of emissions of PM, CO, NO_x and SO_2 (tons/month and tons/year) from the engine with supporting calculations. For this purpose, PM, CO and NO_x emissions shall be calculated from fuel usage and number of startups and the manufacturer's emission guarantees for emission rates or such higher emission rate(s) that accurately reflect actual operation of the engine. SO_2 emissions shall be calculated from the sulfur content of the fuel and fuel usage, assuming complete conversion of sulfur to SO_2.

g. Records for stack tests and opacity observations.

7.11.10 <u>Reporting Requirements</u>

a. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by the affected engine as follows:

A. Requirements in Condition 7.11.3(b), (c) and (d).

B. Requirements in Condition 7.11.5.

C. Requirements in Condition 7.11.6.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

b. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

c. All deviation reports described in Condition 7.11.10 above shall contain the following:

i. Date, time and duration of the deviation;

ii. Description of the deviation;

iii. Probable cause of the deviation; and

iv. Any corrective action or preventive measures taken.

7.11.11 Operational Flexibility/Anticipated Operating Scenarios

Operational flexibility is not set for the affected engine.

7.11.12 Compliance Procedures

For the affected engine, compliance with the applicable standards of Condition 7.11.3, the control/work practice requirements of Condition 7.11.5, and the production/emission limits of Condition 7.11.6 is addressed by testing, monitoring, recordkeeping and reporting requirements in Section 7.11 of this permit.

7.11.13 State-Only Conditions

State-only conditions are not being established.

7.12 Gasoline Storage and Dispensing

7.12.1 Description

Gasoline storage and dispensing is conducted for the Permittee's fleet of gasoline fueled vehicles. There are several such stations at the facility, so that fleet vehicles do not have to travel on public roads to reach the fueling stations.

Note: This narrative description is for informational purposes only and is not enforceable.

7.12.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Gasoline Storage	Four storage tanks located at: Storeroom (1,000 gallons capacity); Machine Shop (1,000 gallons capacity); Wastewater Facility (250 gallons capacity); Blast Furnace Facility(1,000 gallons capacity)	N/A	Control Practices: Submerged loading pipe (all tanks) and Stage I system (tanks with 1,000 gallons capacity)

7.12.3 Applicable Provisions and Regulations

a. The "affected gasoline storage tanks", for the purpose of these unit-specific conditions are the tanks described in Conditions 7.12.1 and 7.12.2 above.

b. The affected gasoline storage tank at the wastewater facility is subject to the following:

   No person shall cause or allow the loading of any organic material into any stationary tank having a storage capacity of greater than 946 l (250 gal), unless such tank is equipped with a permanent submerged loading pipe [35 IAC 219.122(b)].

c. Pursuant to 35 IAC 219.583(c)(1), the affected gasoline storage tanks at the storeroom, machine shop and blast furnace facility are subject to the following requirements of 35 IAC 219.583(a): No person shall cause or allow the transfer of gasoline from any delivery vessel into any stationary storage tank at a gasoline dispensing facility unless:

   i. The tank is equipped with a submerged loading pipe [35 IAC 219.583(a)(1)].

ii. The vapors displaced from the storage tank during filling are processed by a vapor control system [35 IAC 219.583(a)(2)].

iii. All tank vent pipes are equipped with pressure/vacuum relief valves that are designed and shall be set to resist a pressure of at least 3.5 inches water column and to resist a vacuum of no less than 6.0 inches water column [35 IAC 219.583(a)(3)].

d. Pursuant to 35 IAC 219.585(a), all the affected gasoline storage tanks are subject to the following: No person shall sell, offer for sale, dispense, supply, offer for supply, or transport for use in Illinois gasoline whose Reid vapor pressure exceeds the applicable limitations set forth below during the regulatory control periods, which shall be June 1 to September 15.

i. The Reid vapor pressure of gasoline, a measure of its volatility, shall not exceed 7.2 psi (9.68 kPa) during the regulatory control period [35 IAC 219.585(b)].

ii. The Reid vapor pressure of ethanol blend gasolines having at least nine percent (9%) but not more than ten percent (10%) ethyl alcohol by volume of the blended mixture, shall not exceed the limitations for gasoline set forth in Condition 7.12.2(d)(i) above by more than 1.0 psi (6.9 kPa) [35 IAC 219.585(c)].

7.12.4 Non-Applicability of Regulations of Concern

a. This permit is issued based on the affected gasoline storage tank not being subject to the NSPS for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels), 40 CFR Part 60, Subpart Kb, because each tank is less than 40 cubic meters (10,566 gallons).

b. This permit is issued based on the affected gasoline storage tanks not being subject to 35 IAC 219.121, because each affected tank is less than 40,000 gallons [35 IAC 219.121].

c. This permit is issued based on the affected gasoline storage tanks not being subject to 35 IAC 219.122(a), because each affected tank is less than 40,000 gallons [35 IAC 219.122].

d. The affected gasoline storage tanks are not subject to 35 IAC 219.301 because the affected gasoline storage tanks do not use organic material. In addition, the storage tanks are regulated by 35 IAC 219.122(b) and 35 IAC 219.583(c)(1).

e. The affected gasoline storage and dispensing operations are not part of a bulk gasoline plant (35 IAC 219.581) or bulk gasoline terminals (35 IAC 219.582) pursuant to relevant definitions in 35 IAC Part 211.

f. This permit is issued based on the gasoline storage and dispensing operations performed at wastewater facility not being subject to 35 IAC 219.583(a)(2) and (a)(3) pursuant to 35 IAC 219.583(b)(3), because the tank capacity is less than 575 gallons.

g. The affected gasoline storage tanks are not eligible for the exemption from the permitting in 35 IAC 219.583(e) because they are not located at retail dispensing operations, as defined at 35 IAC 211.5630.

7.12.5 Control Requirements and Work Practices

The affected gasoline storage tanks (other than the affected gasoline storage tank at the wastewater facility) are subject to the following control requirements and work practices:

a. Pursuant to 35 IAC 219.583(c), each owner of a gasoline dispensing operation shall:

i. Install all control systems and make all process modifications required by Condition 7.12.3(c) (see also 35 IAC 219.583(a)) [35 IAC 219.583(c)(1)];

ii. Provide instructions to the operator of the gasoline dispensing operation describing necessary maintenance operations and procedures for prompt notification of the owner in case of any malfunction of a vapor control system [35 IAC 219.583(c)(2)]; and

iii. Repair, replace or modify any worn out or malfunctioning component or element of design [35 IAC 219.583(c)(3)].

b. Pursuant to 35 IAC 219.583(d), each operator of a gasoline dispensing operation shall:

i. Maintain and operate each vapor control system in accordance with the owner’s instructions [35 IAC 219.583(d)(1)];

ii. Promptly notify the owner of any scheduled maintenance or malfunction requiring replacement or repair of a major component of a vapor control system [35 IAC 219.583(d)(2)];

iii. Maintain gauges, meters or other specified testing devices in proper working order [35 IAC 219.583(d)(3)]; and

iv. Pursuant to 35 IAC 219.583(d)(4), operate the vapor collection system and delivery vessel unloading points in a manner that prevents:

A. A reading equal to or greater than 100 percent of the lower explosive limit (LEL measured as propane) when tested in accordance with the procedure described in EPA 450/2-78-051 Appendix B [35 IAC 219.583(d)(4)(A)]; and

B. Avoidable leaks of liquid during the filling of storage tanks [35 IAC 214.583(d)(4)(B)].

v. Within 15 business days after discovery of the leak by the owner, operator, or the Agency, repair and retest a vapor collection system which exceeds the limits of Condition 7.12.5(iv) above [35 IAC 219.583(d)(5)].

c. Pursuant to 35 IAC 219.584(a), the Permittee shall ensure that each gasoline delivery vessel that comes on to the property to fill the affected gasoline storage tanks at the storeroom, machine shop, or blast furnace facility are complying with the following:

i. Shall have a vapor space connection that is equipped with fittings which are vapor tight;

ii. Shall have its hatches closed at all times during unloading operations, unless a top loading vapor recovery system is used;

iii. Shall not internally exceed a gauge pressure of 18 inches of water or a vacuum of 6 inches of water;

iv. Shall be designed and maintained to be vapor tight at all times during normal operations;

v. Shall not be refilled in Illinois at other than a bulk gasoline terminal that complies with the requirements of 35 IAC 219.582 or a bulk gasoline plant that complies with the requirements of 35 IAC 219.581(b).

vi. Shall have a sticker affixed to the tank adjacent to the tank manufacturer's data plate which contains the tester’s name, the tank identification number and the date of the test. The sticker shall be in a form prescribed by the Illinois EPA.

7.12.6 <u>Production and Emission Limitations</u>

Production and emission limitations are not set for the affected gasoline storage tanks.

7.12.7 Testing Requirements

a. Pursuant to 35 219.583(a)(4), the Permittee shall demonstrate compliance with the pressure/vacuum relief valves specifications of Condition 7.12.3(c)(iii) at a gasoline dispensing operation by measuring and recording the pressure indicated by a pressure/vacuum gauge at each tank vent pipe 30 days after installation of each pressure/vacuum relief valve, and at least annually thereafter. The test shall be performed on each tank vent pipe within two hours after product delivery into the respective storage tank. For manifold tank vent systems, observations at any point within the system shall be adequate.

b. The Permittee shall test the relief valves whenever there is a modification of an existing vapor control system [39.5(7)(d) and (p) of the Act].

7.12.8 Monitoring Requirements

The Permittee shall perform the following monitoring pursuant to Sections 39.5(7)(a) and (d) of the Act.

a. The Permittee shall perform semi-annual inspections of the gasoline storage and dispensing operations at the storeroom, machine shop and blast furnace while the tank is being filled.

   i. Retractors, hoses, breakaways, swivels

   ii. Adapters, vapor caps, rubber gaskets, and spill containment buckets

b. The Permittee shall perform an annual inspection of the gasoline storage tank at wastewater facility and dispensing operation to ensure that a submerged loading pipe is physically present and the condition of the pipe for integrity.

7.12.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected gasoline storage tanks, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. Records of the testing and repair of the vapor collection system and pressure/vacuum relief valves, pursuant to Condition 7.12.7.

b. Records of gasoline throughput (gallons per month and gallons per year).

c. For the affected gasoline storage tanks during the regulatory control period, the Permittee shall keep the following records:

i. Retain a copy of an invoice, bill of lading, or other documentation used in normal business practice stating that the Reid vapor pressure of the gasoline complies with the Reid vapor pressure standard as provided in 35 IAC 219.585(h)(1)(A);

ii. Maintain records on the Reid vapor pressure, quantity received and date of delivery of any gasoline or ethanol blends arriving at the gasoline operation [35 IAC 219.585(h)(2)].

d. Copies of the annual certification(s) from the supplier of gasoline that all the delivery vessels have been tested and are in compliance with the requirements of Condition 7.12.5(c).

e. A copy of operating and maintenance procedures and instructions for the tanks and vapor control systems.

f. Records for all inspections.

7.12.10 Reporting Requirements

a. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations by the affected gasoline storage tanks from applicable requirements, as follows:

A. Requirements in Condition 7.12.3(b) through (d).

B. Requirements in Condition 7.12.5(a) and (b).

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

b. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

c. All deviation reports described in Condition 7.12.10 above shall contain the following:

i. Date, time and duration of the deviation;

ii. Description of the deviation;

iii. Probable cause of the deviation; and

iv. Any corrective action or preventive measures taken.

7.12.11 Operational Flexibility/Anticipated Operating Scenarios

Operational flexibility is not set for the affected gasoline storage tanks.

7.12.12 Compliance Procedures

For the affected gasoline storage tanks, compliance with the applicable standards of Condition 7.12.3 is addressed by the work practices, testing, monitoring, recordkeeping and reporting requirements described in Section 7.12 of this permit.

7.12.13 State-Only Conditions

State-only conditions are not being established.

7.13 Fugitive Dust

7.13.1 Description

Fugitive dust is emitted from vehicle traffic, unloading operations, wind erosion of piles, roadways, parking lots and other open areas at the facility. The source also emits fugitive dust from an on-site landfill for furnace dusts and other industrial wastes.

Note: This narrative description is for informational purposes only and is not enforceable.

7.13.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Date Constructed	Emission Control Equipment
Fugitive Emissions	Landfill Vehicular Traffic on Roadways, Parking Lots and Other Open Areas Unloading Operations Storage Piles and associated activities Beaching Areas	N/A	N/A

7.13.3 Applicable Provisions and Regulations

a. The “affected activities” for the purpose of these unit-specific conditions, are the activities described in Conditions 7.13.1 and 7.13.2 above.

b. The affected activities are subject to 35 IAC 212.306 which provides that all normal traffic pattern roads and parking facilities which are located on mining or manufacturing property shall be paved or treated with water, oils or chemical dust suppressants. All paved areas shall be cleaned on a regular basis. All areas treated with water, oils or chemical dust suppressants shall have the treatment applied on a regular basis, as needed, in accordance with the operating program required by 35 IAC 212.309, 212.310 and 212.312.

c. All storage piles of materials with uncontrolled emissions of fugitive particulate matter in excess of 45.4 Mg per year (50 T/yr) which are located within a source whose potential particulate emissions from all emission units exceed 90.8 Mg/yr (100 T/yr) shall be protected by a cover or sprayed with a surfactant solution or water on a regular basis, as needed, or treated by an equivalent method, in

accordance with the operating program required by 35 IAC 212.309, 212.310 and 212.312 of 35 IAC Part 212 Subpart K [35 IAC 212.304(a)].

d. Applicable emission limitations established by 35 IAC 212.316:

i. Emission Limitations for Storage Piles. No person shall cause or allow fugitive particulate matter emissions from any storage pile to exceed an opacity of 10 percent, to be measured four ft from the pile surface.

ii. Additional Emissions Limitations for the Granite City Vicinity as defined in 35 IAC 212.316(e)(1):

Emissions Limitations for Roadways or Parking Areas Located at Integrated Iron and Steel Manufacturing Plants. No person shall cause or allow fugitive particulate matter emissions from any roadway or parking area located at a slag processing facility or integrated iron and steel manufacturing plant to exceed an opacity of 5 percent.

iii. Pursuant to 35 IAC 212.316(f), emission limitation for all other activities (see the definition for emission unit in 35 IAC 211.1950). Unless an activity has been assigned a particulate matter, PM_{10}, or fugitive particulate matter emissions limitation elsewhere in 35 IAC 212.316 or in Subparts R or S of 35 IAC Part 212, no person shall cause or allow fugitive particulate matter emissions from any such activity to exceed an opacity of 20 percent.

e. All conveyor loading operations to storage piles specified in 35 IAC 212.304 shall utilize spray systems, telescopic chutes, stone ladders or other equivalent methods in accordance with the operating program required by 35 IAC 212.309, 212.310 and 212.312 [35 IAC 212.305].

7.13.4 Non-Applicability of Regulations of Concern

The landfill operated on the site is not subject to 35 IAC Part 220 for municipal waste landfills. The landfill serves only the needs for Permittee’s operations in accepting industrial waste generated on-site and no municipal or any off-site waste is accepted by this landfill.

7.13.5 Control Requirements and Work Practices

a. Pursuant to permit #95010001 [T1], the Permittee shall comply with the following on-site and off-site fugitive dust control requirements:

i. On-site fugitive dust control

A. The Permittee shall sweep or flush at least every day the paved access area below the BOF ESP where ESP dust collection bags (i.e., super-sacks, storage bags or other containers for ESP dust) are used, stored and transported.

B. The Permittee shall implement a housekeeping program for the non-roadway areas below and around the BOF ESP. This program shall, at a minimum, contain the following:

1. The ground and other accessible areas where dust may gather shall be swept or cleaned at least every day;

2. Cleaning shall be performed in such a manner as to minimize the escape of dust into the atmosphere;

3. Dust collection bags shall be inspected at least daily for rips, tears, or insecure connection to the discharge of the ESP hoppers;

4. Dust collection bags shall be inspected after removal from, and connection to, the discharge of the ESP hoppers;

5. Ripped or torn bags shall be taken out of service and transported in a covered truck.

C. Unpaved Roads. For unpaved roads that are part of normal traffic patterns (including roads B, C, E, N, F-F, and CS(2)) the Permittee shall apply a chemical dust suppressant at least three times a month, with the following exceptions:

1. Road segment G-G, which shall be sprayed at least quarterly;

2. Road segment L, which shall be sprayed at least 4 times per month.

3. All other unpaved roads shall be treated as necessary.

4. Applications of suppressant may be less frequent than specified above if weather conditions, i.e., precipitation or temperature, interfere with the schedule for spraying, provided each such instance shall be recorded in accordance with the

daily records for on-site fugitive dust control required by Condition 7.13.9(b).

D. Paved roadways and areas. Paved roadways and areas shall be maintained in good condition by the Permittee.

On paved roadways and other areas, the Permittee shall sweep or flush as follows:

1. Road segments D, K, M, F, G, J, R, and O shall be swept or flushed at least daily;

2. Road segments P, V, W, X, Z, D-D, E-E, and CS(1) shall be swept or flushed at least five days per week;

3. Road segments S and T shall be swept or flushed at least every other day;

4. Road segments A and H shall be swept or flushed at least once per month;

5. All gate areas leading from the steelworks area shall be swept or flushed at least daily;

6. All gate areas leading from the iron making area shall be swept or flushed at least five times per week.

7. The above on-site dust control measures shall be conducted to maximize their effectiveness by performing said measures when the roads or areas are not obstructed by parked vehicles and by preferentially using filter sweeping (e.g., Enviro-Whirl sweeper) for the gate areas, the roads and areas surrounding the BOPF shop and BOF ESP.

b. The fugitive dust control measures outlined above do not relieve the Permittee from complying with additional control measures identified in the PM_{10} contingency plan as required by Condition 5.3.3 of this permit [95010001, T1R].

c. The landfill operated by the Permittee shall not accept any off-site wastes, including municipal, hospital/medical or hazardous wastes [Section 39.5(7)(l) of the Act].

d. Pursuant to the Road Cleaning Program required by Permit #06070088, the Permittee shall comply with the following control requirements (for purposes of this condition

affected road segments are those identified in Condition 7.13.5(d)(iii):

i. Good air pollution control practices shall be implemented to minimize and reduce nuisance dust from the affected road segments.

ii. Cleaning of affected road segments shall be performed using vacuum cleaning equipment (such as Enviro-Whirl). Any dust laden air shall be vented through a filtering system on the vacuum cleaning equipment before discharge to atmosphere.

The handling of material collected by vacuum cleaning equipment during road cleaning shall be enclosed or shall utilize spraying, pelletizing, screw conveying or other equivalent methods to control PM emissions from transfer of material for disposal.

iii. Affected road segments shall be cleaned on the following frequency except during extended periods of inclement weather that act to prevent emissions of fugitive dust from the affected road segments:

A. Cleaning on a twice weekly basis:

Road Segment	Segment Boundaries
Madison Ave	16th & 20th Streets
Central 20th Street	Madison St. & USS Gate
East 20th Street	USS Gate & Rte 203
21st Street	Rte 203 and Monroe St.
North Edwardsville Rd	20th & Nameoki (Rte 203)

B. Cleaning on a twice monthly basis:

Road Segment	Segment Boundaries
Rock Road	Rte 3 & W. 20th St. (Overpass Approach)
West 20th St.	Rte 3 & Rock Road
Rock Road	W. 20th & Benton St. (Railroad Overpass)
Niedringhaus	Benton St. and 16th St.
16th Street	Niedringhaus & Madison St.
South Edwardsville Rd	20th & McCambridge Ave (Rte 203)
McCambridge Ave	Edwardsville Rd (Rte 203) & 2nd St.
Route 162	Nameoki Rd (Rte 203) & Railroad Tracks
Benton Street	Rock Rd. and Niedringhaus

7.13.6 <u>Production and Emission Limitations</u>

Total fugitive emission of PM/PM_{10} from the roadways at the source shall not exceed 27 tons/year. Compliance with the

annual limits shall be determined based on a calendar year pursuant to Permit 95010001 [T1].

7.13.7 Testing Requirements

a. Opacity observations shall be conducted by a qualified observer in accordance with procedures published in 40 CFR Part 60, Appendix A, Method 9, except as specified below.

   i. Opacity readings on each roadway or parking area shall be conducted at least annually. On unpaved roadways or parking areas, the reading shall not be conducted within three days of the application of any dust suppressants.

   ii. The Permittee shall observe, one day per calendar month, the opacity of emissions from each active coal storage pile and areas travelled by equipment hauling coal from these coal storage piles to coal processing operations unless prolonged weather conditions preclude scheduled observations. In addition, the observer shall remain in the area for at least 3 hours to perform opacity readings on other coal piles which become active during this 3 hour period.

   iii. All opacity readings conducted on visible emissions generated by vehicular traffic on roadways, parking areas and heavy equipment traffic associated with storage piles, shall be in accordance with the procedures specified in 35 IAC 212.109.

   iv. All opacity readings on storage piles shall be measured four feet above the pile surface. The duration of opacity observations for each test shall be at least 30 minutes (five 6-minute averages) or 12 minutes without visible emissions.

b. Upon written request by the Illinois EPA, such testing shall be conducted for specific affected operations(s) within 45 calendar days of the request or on the date agreed upon by the Illinois EPA, whichever is later. As least 30 days prior to the scheduled test date, the Permittee shall submit a detailed test plan to the Illinois EPA, describing the manner of operations of the affected activity and all control measures that will be implemented during the testing. The results of the testing will be submitted within thirty calendar days of the completion of the tests.

c. The testing conditions from above are established in accordance with requirements of 39.5(7)(p) of the Act.

d. Pursuant to Permit 06070088, the Permittee shall conduct silt loading measurements as follows [T1] (for purposes of

this condition affected road segments are those identified in Condition 7.13.5(d)(iii)):

i. The Permittee shall conduct measurements of the silt loading on the affected road segments, with sampling and analysis conducted using the "Procedures for Sampling Surface/Bulk Dust Loading," Appendix C.1 in Compilation of Air Pollutant Emission Factors, USEPA, AP-42. A series of samples shall be taken to determine the average silt loading on each affected road segment and address the change in silt loadings as related to the amount and nature of vehicle traffic.

ii. Measurements for "controlled" silt loading shall be repeated at least every three years pursuant to the Road Cleaning Program of Condition 7.13.5(d).

iii. Measurements for "controlled" silt loadings shall be conducted upon written request by the Illinois EPA, as specified in the request, which shall be completed within 75 days of the Illinois EPA's request.

7.13.8 Monitoring Requirements

a. Except as provided in Condition 7.13.8(b), the Permittee shall perform inspections of the affected activities on at least a quarterly basis, including associated control measures, while the affected activities are in use, to confirm compliance with the requirements of Condition 7.13.3. Control measures may include material characteristics. These quarterly inspections may be scheduled so that only a number of affected activities are reviewed during each inspection, provided however, that all affected activities shall be inspected at least once during each calendar year. For the purpose of this condition, all affected activities means each type of material handled. (Sections 39.5(7)(a) and (d) of the Act).

b. The Permittee shall perform inspections, on a once per calendar month basis, during receipt of the truck unloading each contracted supply of coal.

c. As part of the inspections required by 7.13.8(a), the Permittee shall perform observations for visible emissions by Method 22. These observations shall be conducted during the operation of each activity for a minimum of 18 minutes, or for activities that operate on a batch basis, for a minimum of six consecutive batches. If visible emissions are observed, the Permittee shall take corrective action within 2 hours to return the status of the operation to no visible emissions or observations of opacity by Method 9 shall be conducted. For the purpose of this condition, returning the status of operations to no visible emissions

does not include, for any activity, temporary idling of lack of operation between batches.

d. The requirements from above are established pursuant to Sections 39.5(7)(a) and (d) of the Act.

7.13.9 Recordkeeping Requirements

The Permittee shall maintain records of the following items for the affected areas of fugitive emissions, pursuant to Sections 39.5(7)(a) and (e) of the Act:

a. Records required by 35 IAC 212.316(g):

i. The owner or operator of any fugitive particulate matter emission unit subject to 35 IAC 212.316 shall keep written records of the application of control measures for compliance with the opacity limitations of 212.316 and shall submit to the Illinois EPA an annual report containing a summary of such information.

ii. The records shall include at least the following:

A. The name and address of the source;

B. The name and address of the owner and/or operator of the source;

C. A map or diagram showing the location of all emission units controlled, including the location, identification, length, and width of roadways;

D. For each application of water or chemical solution to roadways by truck: the name and location of the roadway controlled, application rate of each truck, frequency of each application, width of each application, identification of each truck used, total quantity of water or chemical used for each application and, for each application of chemical solution, the concentration and identity of the chemical;

E. For application of physical or chemical control agents: the name of the agent, application rate and frequency, and total quantity of agent, and, if diluted, percent of concentration, used each day; and

F. A log recording incidents when control measures were not used and a statement of explanation.

iii. Copies of all records required by 35 IAC 212.316 shall be submitted to the Illinois EPA within ten (10) working days after a written request by the Illinois EPA and shall be transmitted to the Illinois EPA by a company-designated person with authority to release such records.

iv. The records required under 35 IAC 212.316 shall be kept and maintained for at least five (5) years at the source and be available for inspection and copying by Illinois EPA representatives during working hours.

b. i. The Permittee shall maintain daily records relative to the on-site fugitive dust control program which includes the following information at a minimum, pursuant to the Permit 95010001:

A. The date (and time for the gate areas) each road or area was treated;

B. The manner in which the road or area was treated (i.e., filter sweep, conventional sweep, suppressant spray or flush);

C. Detailed information for use of dust suppressant, including but not limited to the application rate, dilution ratio, type of suppressant used, and the number of gallons of suppressant applied;

D. Observations, if any, concerning the condition of the roadway, e.g., presence of parked vehicles, detection of potholes;

E. The amount of precipitation and temperature recorded for each day, and if determination was made to suspend application of suppressant, include name and title of person who made determination to suspend application and explanation; and

F. Any and all suspensions or deviations from the work practices and control procedures of Condition 7.13.5, with a date, description, and explanation for suspension of application.

ii. The Permittee shall keep a record containing calculations and analysis for the emissions from roadways at the source with emissions calculation performed in accordance with the methodology set forth in Section 13.2.1 of AP-42, to verify compliance with Condition 7.13.6. A copy of this record shall be submitted to the Illinois EPA each time it is prepared, with submittal made within 15

days of the date that the Permittee completes the preparation of new or revised calculations and analysis.

c. The Permittee shall maintain the most current versions of the PM_{10} contingency plan and the fugitive particulate matter control program.

d. The Permittee shall keep records of the silt measurements conducted pursuant to Condition 7.13.7(d), including records for the sampling and analysis activities and results.

e. Recordkeeping requirements for the Road Cleaning Program (for purposes of this condition affected road segments are those identified in Condition 7.13.5(d)(iii):

i. A. The Permittee shall keep a record describing the Road Cleaning Program that at a minimum: identify any contractors implementing the program for the Permittee and their duties for implementing the Program under the contract; the equipment used by the Permittee or its contractor for cleaning roads, including for each item of equipment, a description of and the manufacturer's specifications for collection of silt from roadways and control of dust emissions from the cleaning process; and the standards practices that are used to clean roads under the Program, such as type of equipment, and speed of travel.

B. The Permittee shall keep records for implementation of the Road Cleaning Program that at a minimum: Identify each time that an affected road segment was cleaned, with a description of any circumstances that may have affected the extent or nature of cleaning; and identify each time that scheduled cleaning was not performed, with detailed explanation.

C. The Permittee shall keep records documenting maintenance and repair of road cleaning equipment.

ii. The Permittee shall keep a record containing calculations and analysis for the annual reduction in emissions that is achieved by the Road Cleaning Program, with emissions calculation performed in accordance with the methodology set forth in Section 13.2.1 of AP-42, to verify that the Road Cleaning Program is achieving 236.03 tons/yr reduction, total, of particulate matter determined as PM_{10} from baseline emission levels of 656.87 tons/year from the affected road segments. This record shall be prepared in

conjunction with the measurements of “controlled” silt loadings required by Condition 7.13.7(d). A copy of this record shall be submitted to the Illinois EPA each time it is prepared, with submittal made to the Illinois EPA within 15 days of the date that the Permittee completes the preparation of new or revised calculations and analysis.

7.13.10 Reporting Requirements

The Permittee shall promptly notify the Illinois EPA, Air Compliance Section, of deviations of the affected area of fugitive emissions with the permit requirements, pursuant to Section 39.5(7)(f)(ii) of the Act. Reports submitted by the Permittee shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken.

a. i. Pursuant 35 IAC 212.316(g)(5), the Permittee shall submit a quarterly report to the Illinois EPA stating the following: the dates any necessary control measures were not implemented, a listing of those control measures, the reasons that the control measures were not implemented, and any corrective actions taken. This information includes, but is not limited to, those dates when controls were not applied based on a belief that application of such control measures would have been unreasonable given prevailing atmospheric conditions, which shall constitute a defense to the requirements of 35 IAC 212.316. This report shall be submitted to the Agency thirty (30) calendar days from the end of a quarter. Quarters end March 31, June 30, September 30, and December 31.

ii. Pursuant to permit 06070088, the Permittee shall submit a quarterly report to the Illinois EPA describing the implementation of the Road Cleaning Program during the previous quarter. This report shall at a minimum provide: the number of times each road segment was cleaned; the number of times that cleaning was not performed, with explanation; a description of any significant changes in road cleaning equipment or cleaning practices, with explanation; and a description of other changes to the Road Cleaning Program, including changes in contractors.

b. i. Pursuant to Section 39.5(7)(f)(ii) of the Act, the Permittee shall promptly notify the Illinois EPA, Air Compliance Section, within 30 days of deviations in the affected areas of fugitive emissions, as follows:

A. Requirements in Condition 7.13.3(b) through (e).

B. Requirements in Condition 7.13.5.

C. Requirements in Condition 7.13.6.

ii. All such deviations shall be summarized and reported as part of the semiannual monitoring report required by Condition 8.6.1.

c. The Permittee shall notify the Illinois EPA, Air Compliance Section, of all other deviations as part of the semiannual monitoring reports required by Condition 8.6.1.

d. Deviation reports described in Condition 7.13.10(b) and (c) above shall contain the following:

i. Date, time and duration of the deviation;

ii. Description of the deviation;

iii. Probable cause of the deviation; and

iv. Any corrective action or preventive measures taken.

7.13.11 Operational Flexibility/Anticipated Operating Scenarios

a. Beaching

The following requirements established by Permits 72080034 and 72080036 shall be implemented:

i. Under the following circumstances beaching of iron may occur:

A. In the event that Blast Furnace A or Blast Furnace B must be shut down in order to cast the furnace dry.

B. In the event that an interruption in the BOF steelmaking and/or casting operations will result in a temporary surplus of iron, beyond the capacity of the system to hold, necessitating beaching in order to cast the furnace dry and provide the ability to safely shut down.

C. In the event that the blast furnace produces unusable iron such as high silica or low temperature iron. High silica iron shall be blended and used to the extent possible at the BOF in order to reduce beaching. Low temperature iron shall be used at the BOF to the extent possible until solidification in the car becomes imminent. In other cases of

unusable iron, such iron shall be used when possible to minimize the quantity beached.

ii. In the event that the beaching of iron occurs the Permittee shall beach the iron as follows:

A. Beaching shall be allowed only in the event that alternate receptacles are not available;

B. Beaching shall be allowed only if all reasonable measures are taken to minimize the quantity of liquid metal beached, the frequency of a malfunction or breakdown that necessitates beaching, the duration beaching occurs, and the emissions resulting from beaching; and

C. Beaching shall be allowed at a controlled pour rate not to exceed 20 tons per minute.

b. Prior to material in the beaching pit being dug and transferred to vehicles for recycling to the blast furnaces, it shall be watered or treated with other equivalent techniques to minimize particulate matter emissions during such material handling, unless such measures would cause a hazard or safety issue to employees.

7.13.12 Compliance Procedures

a. Compliance with Condition 7.13.3(b) is addressed by the monitoring requirements in Condition 7.13.8(b) and the records in Condition 7.13.9.

b. Compliance with Condition 7.13.3(c), (d), 7.13.5(a), (d), and 7.13.6 is addressed by the testing in Condition 7.13.7, monitoring requirements in Condition 7.13.8(a) and the records in Condition 7.13.9.

c. Compliance with Condition 7.13.3(e) is addressed by the testing requirements Condition 7.13.7, monitoring in Condition 7.13.8(c) and the records in Condition 7.13.9.

d. Compliance with Condition 7.13.5(c) is addressed by the records in Condition 7.13.9.

7.13.13 State-Only Conditions

State-only conditions are not being established.

8.0 GENERAL PERMIT CONDITIONS

8.1 Permit Shield

Pursuant to Section 39.5(7)(j) of the Act, the Permittee has requested and has been granted a permit shield. This permit shield provides that compliance with the conditions of this permit shall be deemed compliance with applicable requirements which were applicable as of the date the proposed permit for this source was issued, provided that either the applicable requirements are specifically identified within this permit, or the Illinois EPA, in acting on this permit application, has determined that other requirements specifically identified are not applicable to this source and this determination (or a concise summary thereof) is included in this permit.

This permit shield does not extend to applicable requirements which are promulgated after May 2, 2011, unless this permit has been modified to reflect such new requirements.

8.2 Applicability of Title IV Requirements (Acid Deposition Control)

This source is not an affected source under Title IV of the CAA and is not subject to requirements pursuant to Title IV of the CAA.

8.3 Emissions Trading Programs

No permit revision shall be required for increases in emissions allowed under any USEPA approved economic incentives, marketable permits, emissions trading, and other similar programs or processes for changes that are provided for elsewhere in this permit and that are authorized by the applicable requirement [Section 39.5(7)(o)(vii) of the Act].

8.4 Operational Flexibility/Anticipated Operating Scenarios

8.4.1 Changes Specifically Addressed by Permit

Physical or operational changes specifically addressed by the conditions of this permit that have been identified as not requiring Illinois EPA notification may be implemented without prior notice to the Illinois EPA.

8.4.2 Changes Requiring Prior Notification

The Permittee is authorized to make physical or operational changes that contravene express permit terms without applying for or obtaining an amendment to this permit, provided that [Section 39.5(12)(a)(i) of the Act]:

a. The changes do not violate applicable requirements;

b. The changes do not contravene federally enforceable permit terms or conditions that are monitoring (including test methods), recordkeeping, reporting, or compliance certification requirements;

c. The changes do not constitute a modification under Title I of the CAA;

d. Emissions will not exceed the emissions allowed under this permit following implementation of the physical or operational change; and

e. The Permittee provides written notice to the Illinois EPA, Division of Air Pollution Control, Permit Section, at least 7 days before commencement of the change. This notice shall:

i. Describe the physical or operational change;

ii. Identify the schedule for implementing the physical or operational change;

iii. Provide a statement of whether or not any New Source Performance Standard (NSPS) is applicable to the physical or operational change and the reason why the NSPS does or does not apply;

iv. Provide emission calculations which demonstrate that the physical or operational change will not result in a modification; and

v. Provide a certification that the physical or operational change will not result in emissions greater than authorized under the conditions of this permit.

8.5 Testing Procedures

Tests conducted to measure composition of materials, efficiency of pollution control devices, emissions from process or control equipment, or other parameters shall be conducted using standard test methods if applicable test methods are not specified by the applicable regulations or otherwise identified in the conditions of this permit. Documentation of the test date, conditions, methodologies, calculations, and test results shall be retained pursuant to the recordkeeping procedures of this permit. Reports of any tests conducted as required by this permit or as the result of a request by the Illinois EPA shall be submitted as specified in Conditions 8.6.3 and 8.6.4.

8.6 Reporting Requirements

8.6.1 Monitoring Reports

Semiannual reports, including monitoring reports summarizing required monitoring as specified in the conditions of this permit shall be submitted to the Illinois EPA, unless more frequent submittal of such reports is required in Sections 5 or 7 of this permit [Section 39.5(7)(f) of the Act]:

Monitoring Period	Report Due Date
January - June	July 31
July - December	January 31

All instances of deviations from permit requirements must be clearly identified in such reports. All such reports shall be certified in accordance with Condition 9.9.

8.6.2 Test Notifications

Unless otherwise specified elsewhere in this permit, a written test plan for any test required by this permit shall be submitted to the Illinois EPA for review at least 60 days prior to the testing pursuant to Section 39.5(7)(a) of the Act. The notification shall include at a minimum:

a. The name and identification of the affected unit(s);

b. The person(s) who will be performing sampling and analysis and their experience with similar tests;

c. The specific conditions under which testing will be performed, including a discussion of why these conditions will be representative of maximum emissions and the means by which the specified operating parameters, as defined in Section 7 for each emission unit and any control equipment, will be determined;

d. The specific determinations of emissions and operation that are intended to be made, including sampling and monitoring locations;

e. The test method(s) that will be used, with the specific analysis method, if the method can be used with different analysis methods;

f. Any minor changes in standard methodology proposed to accommodate the specific circumstances of testing, with justification; and

g. Any proposed use of an alternative test method, with detailed justification.

8.6.3 Test Reports

Unless otherwise specified elsewhere in this permit, the results of any test required by this permit shall be submitted to the Illinois EPA within 60 days of completion of the testing. The test report shall include at a minimum [Section 39.5(7)(e)(i) of the Act]:

a. The name and identification of the affected unit(s);

b. The date and time of the sampling or measurements;

c. The date any analyses were performed;

d. The name of the company that performed the tests and/or analyses;

e. The test and analytical methodologies used;

f. The results of the tests including raw data, and/or analyses including sample calculations;

g. The operating conditions at the time of the sampling or measurements; and

h. The name of any relevant observers present including the testing company's representatives, any Illinois EPA or USEPA representatives, and the representatives of the source.

8.6.4 Reporting Addresses

a. Unless otherwise specified in the particular provision of this permit or in the written instructions distributed by the Illinois EPA for particular reports, reports and notifications shall be sent to the Illinois EPA - Air Compliance Unit with a copy sent to the Illinois EPA - Air Regional Field Office.

b. All test protocols, test notifications and test reports shall be sent to the Illinois EPA - Air Compliance Unit with a copy sent to the Illinois EPA - Air Regional Field Office and to the Illinois EPA – Stack Test Specialist.

c. As of the date of issuance of this permit, the addresses of the offices that should generally be utilized for the submittal of reports and notifications are as follows:

i. Illinois EPA - Air Compliance Unit

Illinois Environmental Protection Agency
Bureau of Air
Compliance & Enforcement Section (MC 40)
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

ii. Illinois EPA – Stack Test Specialist

Illinois Environmental Protection Agency
Division of Air Pollution Control
9511 West Harrison
Des Plaines, Illinois 60016

iii. Illinois EPA - Air Quality Planning Section

Illinois Environmental Protection Agency
Bureau of Air

Air Quality Planning Section (MC 39)
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

iv. Illinois EPA - Air Regional Field Office

Illinois Environmental Protection Agency
Division of Air Pollution Control
2009 Mall Street
Collinsville, Illinois 62234

v. USEPA Region 5 - Air Branch

USEPA (AR - 17J)
Air & Radiation Division
77 West Jackson Boulevard
Chicago, Illinois 60604

d. Permit applications should be addressed to the Air Permit Section. As of the date of issuance of this permit, the address of the Air Permit Section is as follows:

Illinois Environmental Protection Agency
Division of Air Pollution Control
Permit Section (MC 11)
1021 North Grand Avenue East
P.O. Box 19506
Springfield, Illinois 62794-9506

8.7 Title I Conditions

Notwithstanding the expiration date on the first page of this CAAPP permit, Title I conditions in this permit, which are identified by a T1, T1N, or T1R designation, remain in effect until such time as the Illinois EPA takes action to revise or terminate them in accordance with applicable procedures for action on Title I conditions. This is because these conditions either: (a) incorporate conditions of earlier permits that were issued by the Illinois EPA pursuant to authority that includes authority found in Title I of the CAA (T1 conditions), (b) were newly established in this CAAPP permit pursuant to authority that includes such Title I authority (T1N conditions), or (c) reflect a revision or combination of conditions established in this CAAPP permit (T1R conditions). (See also Condition 1.5.)

9.0 STANDARD PERMIT CONDITIONS

9.1 Effect of Permit

9.1.1 The issuance of this permit does not release the Permittee from compliance with State and Federal regulations which are part of the Illinois State Implementation Plan, as well as with other applicable statutes and regulations of the United States or the State of Illinois or applicable ordinances, except as specifically stated in this permit and as allowed by law and rule.

9.1.2 In particular, this permit does not alter or affect the following [Section 39.5(7)(j)(iv) of the Act]:

a. The provisions of Section 303 (emergency powers) of the CAA, including USEPA's authority under that Section;

b. The liability of an owner or operator of a source for any violation of applicable requirements prior to or at the time of permit issuance;

c. The applicable requirements of the acid rain program consistent with Section 408(a) of the CAA; and

d. The ability of USEPA to obtain information from a source pursuant to Section 114 (inspections, monitoring, and entry) of the CAA.

9.1.3 This permit and the terms and conditions herein do not affect the Permittee's past and/or continuing obligation with respect to statutory or regulatory requirements governing major source construction or modification under Title I of the CAA. Further, neither the issuance of this permit nor any of the terms or conditions of the permit shall alter or affect the liability of the Permittee for any violation of applicable requirements prior to or at the time of permit issuance.

9.1.4 Except as provided by applicable law, the issuance of this permit by the Illinois EPA does not and shall not be construed as barring, diminishing, adjudicating or in any way affecting any currently pending or future legal, administrative or equitable rights or claims, actions, suits, causes of action or demands whatsoever that the Illinois EPA or the USEPA may have against the applicant including, but not limited to, any enforcement action authorized pursuant to the provision of applicable federal and state law.

9.1.5 Notwithstanding the conditions of this permit specifying compliance practices for applicable requirements, pursuant to Section 39.5(7)(j) and (p) of the Act, any person (including the Permittee) may also use other credible evidence to establish compliance or noncompliance with applicable requirements.

9.1.6 In the event of an action to enforce the terms or conditions of this permit, this permit does not prohibit a Permittee from invoking any affirmative defense that is provided by the applicable law or rule.

9.2 General Obligations of Permittee

9.2.1 Duty to Comply

The Permittee must comply with all terms and conditions of this permit. Any permit noncompliance constitutes a violation of the CAA and the Act, and is grounds for any or all of the following: enforcement action; permit termination, revocation and reissuance, or modification; or denial of a permit renewal application [Section 39.5(7)(o)(i) of the Act].

The Permittee shall meet applicable requirements that become effective during the permit term in a timely manner unless an alternate schedule for compliance with the applicable requirement is established.

9.2.2 Duty to Maintain Equipment

The Permittee shall maintain all equipment covered under this permit in such a manner that the performance or operation of such equipment shall not cause a violation of applicable requirements.

9.2.3 Duty to Cease Operation

No person shall cause, threaten or allow the continued operation of any emission unit during malfunction or breakdown of the emission unit or related air pollution control equipment if such operation would cause a violation of an applicable emission standard, regulatory requirement, ambient air quality standard or permit limitation unless this permit provides for such continued operation consistent with the Act and applicable Illinois Pollution Control Board regulations [Section 39.5(6)(c) of the Act].

9.2.4 Disposal Operations

The source shall be operated in such a manner that the disposal of air contaminants collected by the equipment operations, or activities shall not cause a violation of the Act or regulations promulgated there under.

9.2.5 Duty to Pay Fees

The Permittee must pay fees to the Illinois EPA consistent with the fee schedule approved pursuant to Section 39.5(18) of the Act, and submit any information relevant thereto [Section 39.5(7)(o)(vi) of the Act]. The check should be payable to “Treasurer, State of Illinois” and sent to: Fiscal Services

Section, Illinois Environmental Protection Agency, P.O. Box 19276, Springfield, Illinois, 62794-9276.

9.3 Obligation to Allow Illinois EPA Surveillance

Upon presentation of proper credentials and other documents as may be required by law and in accordance with constitutional limitations, the Permittee shall allow the Illinois EPA, or an authorized representative to perform the following [Sections 4 and 39.5(7)(a) and (p)(ii) of the Act]:

a. Enter upon the Permittee's premises where an actual or potential emission unit is located; where any regulated equipment, operation, or activity is located or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect during hours of operation any sources, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under this permit;

d. Sample or monitor any substances or parameters at any location:

   i. At reasonable times, for the purposes of assuring permit compliance or applicable requirements; or

   ii. As otherwise authorized by the CAA, or the Act.

e. Obtain and remove samples of any discharge or emission of pollutants authorized by this permit; and

f. Enter and utilize any photographic, recording, testing, monitoring, or other equipment for the purposes of preserving, testing, monitoring, or recording any activity, discharge or emission at the source authorized by this permit.

9.4 Obligation to Comply with Other Requirements

The issuance of this permit does not release the Permittee from applicable State and Federal laws and regulations, and applicable local ordinances addressing subjects other than air pollution control.

9.5 Liability

9.5.1 Title

This permit shall not be considered as in any manner affecting the title of the premises upon which the permitted source is located.

9.5.2 Liability of Permittee

This permit does not release the Permittee from any liability for damage to person or property caused by or resulting from the construction, maintenance, or operation of the sources.

9.5.3 Structural Stability

This permit does not take into consideration or attest to the structural stability of any unit or part of the source.

9.5.4 Illinois EPA Liability

This permit in no manner implies or suggests that the Illinois EPA (or its officers, agents or employees) assumes any liability, directly or indirectly, for any loss due to damage, installation, maintenance, or operation of the source.

9.5.5 Property Rights

This permit does not convey any property rights of any sort, or any exclusive privilege [Section 39.5(7)(o)(iv) of the Act].

9.6 Recordkeeping

9.6.1 Control Equipment Maintenance Records

A maintenance record shall be kept on the premises for each item of air pollution control equipment. At a minimum, this record shall show the dates of performance and nature of preventative maintenance activities.

9.6.2 Records of Changes in Operation

A record shall be kept describing changes made at the source that result in emissions of a regulated air pollutant subject to an applicable Clean Air Act requirement, but not otherwise regulated under this permit, and the emissions resulting from those changes [Section 39.5(12)(b)(iv) of the Act].

9.6.3 Retention of Records

a. Records of all monitoring data and support information shall be retained for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. Support information includes all calibration and maintenance records, original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit [Section 39.5(7)(e)(ii) of the Act].

b. Other records required by this permit including any logs, plans, procedures, or instructions required to be kept by this permit shall be retained for a period of at least 5

years from the date of entry unless a longer period is specified by a particular permit provision.

9.7 Annual Emissions Report

The Permittee shall submit an annual emissions report to the Illinois EPA, Air Quality Planning Section no later than May 1 of the following year, as required by 35 IAC Part 254.

9.8 Requirements for Compliance Certification

Pursuant to Section 39.5(7)(p)(v) of the Act, the Permittee shall submit annual compliance certifications. The compliance certifications shall be submitted no later than May 1 or more frequently as specified in the applicable requirements or by permit condition. The compliance certifications shall be submitted to the Air Compliance Unit, Air Regional Field Office, and USEPA Region 5 – Air Branch. The addresses for the submittal of the compliance certifications are provided in Condition 8.6.4 of this permit.

a. The certification shall include the identification of each term or condition of this permit that is the basis of the certification; the compliance status; whether compliance was continuous or intermittent; the method(s) used for determining the compliance status of the source, both currently and over the reporting period consistent with the conditions of this permit.

b. All compliance certifications shall be submitted to USEPA Region 5 in Chicago as well as to the Illinois EPA.

c. All compliance reports required to be submitted shall include a certification in accordance with Condition 9.9.

9.9 Certification

Any document (including reports) required to be submitted by this permit shall contain a certification by a responsible official of the Permittee that meets the requirements of Section 39.5(5) of the Act and applicable regulations [Section 39.5(7)(p)(i) of the Act]. An example Certification by a Responsible Official is included as Attachment 1 to this permit.

9.10 Defense to Enforcement Actions

9.10.1 Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit [Section 39.5(7)(o)(ii) of the Act].

9.10.2 Emergency Provision

a. An emergency shall be an affirmative defense to an action brought for noncompliance with the technology-based emission limitations under this permit if the following conditions are met through properly signed, contemporaneous operating logs, or other relevant evidence [Section 39.5(7)(k) of the Act]:

i. An emergency occurred as provided in Section 39.5(7)(k) of the Act and the Permittee can identify the cause(s) of the emergency.

Note: For this purpose, emergency means a situation arising from sudden and reasonably unforeseeable events beyond the control of the source, as further defined by Section 39.5(7)(k)(iv) of the Act.

ii. The permitted source was at the time being properly operated;

iii. The Permittee submitted notice of the emergency to the Illinois EPA within two working days of the time when emission limitations were exceeded due to the emergency. This notice must contain a detailed description of the emergency, any steps taken to mitigate emissions, and corrective actions taken; and

iv. During the period of the emergency the Permittee took all reasonable steps to minimize levels of emissions that exceeded the emission limitations, standards, or regulations in this permit.

b. This provision is in addition to any emergency or upset provision contained in any applicable requirement. This provision does not relieve a Permittee of any reporting obligations under existing federal or state laws or regulations [Section 39.5(7)(k)(iv) of the Act].

9.11 Permanent Shutdown

This permit only covers emission units and control equipment while physically present at the indicated source location(s). Unless this permit specifically provides for equipment relocation, this permit is void for the operation or activity of any item of equipment on the date it is removed from the permitted location(s) or permanently shut down. This permit expires if all equipment is removed from the permitted location(s), notwithstanding the expiration date specified on this permit.

9.12 Reopening and Reissuing Permit for Cause

9.12.1 Permit Actions

This permit may be modified, revoked, reopened and reissued, or terminated for cause in accordance with applicable provisions of Section 39.5 of the Act. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition [Section 39.5(7)(o)(iii) of the Act].

9.12.2 Reopening and Revision

This permit must be reopened and revised if any of the following occur [Section 39.5(15)(a) of the Act]:

a. Additional requirements become applicable to the equipment covered by this permit and three or more years remain before expiration of this permit.

b. Additional requirements become applicable to an affected source for acid deposition under the acid rain program.

c. The Illinois EPA or USEPA determines that this permit contains a material mistake or that inaccurate statement were made in establishing the emission standards or limitations, or other terms or conditions of this permit.

d. The Illinois EPA or USEPA determines that this permit must be revised or revoked to ensure compliance with the applicable requirements.

9.12.3 Inaccurate Application

The Illinois EPA has issued this permit based upon the information submitted by the Permittee in the permit application. Any misinformation, false statement or misrepresentation in the application shall be grounds for revocation and reissuance under Section 39.5(15) of the Act, pursuant to Sections 39.5(5)(e) and (i) of the Act.

9.12.4 Duty to Provide Information

The Permittee shall furnish to the Illinois EPA, within a reasonable time specified by the Illinois EPA any information that the Illinois EPA may request in writing to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. Upon request, the Permittee shall also furnish to the Illinois EPA copies of records required to be kept by this permit, or for information claimed to be confidential, the Permittee may furnish such records directly to USEPA along with a claim of confidentiality [Section 39.5(7)(o)(v) of the Act].

9.13 Severability Clause

The provisions of this permit are severable. In the event of a challenge to any portion of the permit, other portions of the permit may continue to be in effect. Should any portion of this permit be determined to be illegal or unenforceable, the validity of the other provisions shall not be affected and the rights and obligations of the Permittee shall be construed and enforced as if this permit did not contain the particular provisions held to be invalid and the applicable requirements underlying these provisions shall remain in force [Section 39.5(7)(i) of the Act].

9.14 Permit Expiration and Renewal

Upon the expiration of this permit, if the source is operated, it shall be deemed to be operating without a permit unless a timely and complete CAAPP application has been submitted for renewal of this permit. However, if a timely and complete application to renew this CAAPP permit has been submitted, the terms and all conditions of this CAAPP permit will remain in effect until the issuance of a renewal permit [Section 39.5(5)(l) and (o) of the Act].

Note: Pursuant to Sections 39.5(5)(h) and (n) of the Act, upon submittal of a timely and complete renewal application, the permitted source may continue to operate until final action is taken by the Illinois EPA on the renewal application, provided, however, that this protection shall cease if the applicant fails to submit any additional information necessary to evaluate or take final action on the renewal application as requested by the Illinois EPA in writing. For a renewal application to be timely, it must be submitted no later than 9 months prior to the date of permit expiration.

9.15 General Authority for the Terms and Conditions of this Permit

The authority for terms and conditions of this permit that do not include a citation for their authority is Section 39.5(7)(a) of the Act, which provides that the Illinois EPA shall include such provisions in a CAAPP permit as are necessary to accomplish the purposes of the Act and to assure compliance with all applicable requirements. Section 39.5(7)(a) of the Act is also another basis of authority for terms and conditions of this permit that do include a specific citation for their authority.

Note: This condition is included in this permit pursuant to Section 39.5(7)(n) of the Act.

10.0 ATTACHMENTS

Attachment 1 Example Certification by a Responsible Official

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: _____

Name: _____

Official Title: _____

Telephone No.: _____

Date Signed: _____

Attachment 2 Emissions of Particulate Matter from Process Emission Units

10.2.1. Process Emission Units for Which Construction or Modification Commenced On or After April 14, 1972

a. New Process Emission Units for Which Construction or Modification Commenced On or After April 14, 1972 [35 IAC 212.321].

b. No person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any new process emission unit, either alone or in combination with the emission of particulate matter from all other similar process emission units for which construction or modification commenced on or after April 14, 1972, at a source or premises, exceeds the allowable emission rates specified in subsection (c) of 35 IAC 212.321 [35 IAC 212.321(a)].

i. The emissions of particulate matter into the atmosphere in any one hour period from the affected coating lines shall not exceed the allowable emission rates specified in the following equation:

$$E = A\ (P)^B$$

Where:

P = Process weight rate

E = Allowable emission rate

ii. For process weight rates of 408 Mg/hr (450 T/hr):

	Metric	English
P	Mg/hr	T/hr
E	kg/hr	lbs/hr
A	1.214	2.54
B	0.534	0.534

iii. For process weight rates in excess of 408 Mg/hr (450 T/hr):

	Metric	English
P	Mg/hr	T/hr
E	kg/hr	lbs/hr
A	11.42	24.8
B	0.16	0.16

c. Limits for Process Emission Units for which Construction or Modification Commenced On or After April 14, 1972 [35 IAC 212.321(c)]:

Metric		English	
P	E	P	E
Mg/hr	kg/hr	T/hr	lb/hr
0.05	0.25	0.05	0.55
0.1	0.29	0.10	0.77
0.2	0.42	0.2	1.10
0.3	0.64	0.30	1.35
0.4	0.74	0.40	1.58
0.5	0.84	0.50	1.75
0.7	1.00	0.75	2.40
0.9	1.15	1.00	2.60
1.8	1.66	2.00	3.70
2.7	2.1	3.00	4.60
3.6	2.4	4.00	5.35
4.5	2.7	5.00	6.00
9.0	3.9	10.00	8.70
13.0	4.8	15.00	10.80
18.0	5.7	20.00	12.50
23.0	6.5	25.00	14.00
27.0	7.1	30.00	15.60
32.0	7.7	35.00	17.00
36.0	8.2	40.00	18.20
41.0	8.8	45.00	19.20
45.0	9.3	50.00	20.50
90.0	13.4	100.00	29.50
140.0	17.0	150.00	37.00
180.0	19.4	200.00	43.00
230.0	22.0	250.00	48.50
270.0	24.0	300.00	53.00
320.0	26.0	350.00	58.00
360.0	28.0	400.00	62.00
408.0	30.1	450.00	66.00
454.0	30.4	500.00	67.00

10.2.2 Process Emission Units for Which Construction or Modification Commenced Prior to April 14, 1972

a. No person shall cause or allow the emission of particulate matter into the atmosphere in any one hour period from any new process emission unit, either alone or in combination with the emission of particulate matter from all other similar process emission units for which construction or modification commenced prior to April 14, 1972, at a source or premises, exceeds the allowable emission rates specified in subsection (c) of 35 IAC 212.322 [35 IAC 212.322(a)].

b. The emissions of particulate matter into the atmosphere in any one hour period from the affected unit shall not exceed the allowable emission rates specified in the following equation:

$$E = C + A\,(P)^{B}$$

Where:

P = Process weight rate

E = Allowable emission rate

i. For process weight rates up to 27.2 Mg/hr (30 T/hr):

	Metric	English
P	Mg/hr	T/hr
E	kg/hr	lbs/hr
A	1.985	4.10
B	0.67	0.67
C	0	0

ii. For process weight rates in excess of 27.2 Mg/hr (30 T/hr):

	Metric	English
P	Mg/hr	T/hr
E	kg/hr	lbs/hr
A	25.21	55.0
B	0.11	0.11
C	-18.4	-40.0

c. Limits for Process Emission Units for which Construction or Modification Commenced Prior to April 14, 1972 [35 IAC 212.322(c)]:

Metric		English	
P	E	P	E
Mg/hr	kg/hr	T/hr	lb/hr
0.05	0.27	0.05	0.55
0.1	0.42	0.10	0.87
0.2	0.68	0.20	1.40
0.3	0.89	0.30	1.83
0.4	1.07	0.40	2.22
0.5	1.25	0.50	2.58
0.7	1.56	0.75	3.38
0.9	1.85	1.00	4.10
1.8	2.9	2.00	6.52
2.7	3.9	3.00	8.56
3.6	4.7	4.00	10.40
4.5	5.4	5.00	12.00
9.0	8.7	10.00	19.20
13.0	11.1	15.00	25.20
18.0	13.8	20.00	30.50
23.0	16.2	25.00	35.40
27.2	18.15	30.00	40.00
32.0	18.8	35.00	41.30
36.0	19.3	40.00	42.50
41.0	19.8	45.00	43.60
45.0	20.2	50.00	44.60
90.0	23.2	100.00	51.20
140.0	25.3	150.00	55.40
180.0	26.5	200.00	58.60
230.0	27.7	250.00	61.00
270.0	28.5	300.00	63.10
320.0	29.4	350.00	64.90
360.0	30.0	400.00	66.20
400.0	30.6	450.00	67.70
454.0	31.3	500.00	69.00

Attachment 3 Current Emission Factors for Certain Emission Limits

This attachment provides information, based on information provided by the Permittee as of the date of issuance of this revised permit, on the emission factors used by the Permittee to demonstrate compliance with certain emission limits for Material Handling Operations (Section 7.1), Blast Furnace Operations (Section 7.4), Basic Oxygen Process Operations (Section 7.5) and Continuous Casting Activities (Section 7.6), which limits have been carried over from Construction Permit/PSD Approval 95010001. (See also Condition 5.13.)

Operation (Permit Condition)	Pollutant	Emission Factor	Basis
Material Handling Operations (Section 7.1)			
Ladle Metallurgy Material Handling (7.1.6(b)(i))	PM	0.00355 lb/ton	steel
	PM10	0.00355 lb/ton	steel
BOF Additive System (7.1.6(b)(ii))	PM	0.00032 lb/ton	steel
	PM10	0.00032 lb/ton	steel
Flux conveyor Operations (7.1.6(b)(iii))	PM	0.0016 lb/ton	steel
	PM10	0.0016 lb/ton	steel
Iron Pellet Screening (7.1.6(b)(iv))	PM	0.00279 lb/ton	iron pellets
	PM10	0.00279 lb/ton	iron pellets
Blast Furnace Operations (Section 7.4)			
Casthouse (7.4.6(b))	PM	0.0703 lb/ton	iron
	PM_{10}	0.0703 lb/ton	iron
	SO_2	0.2006 lb/ton	iron
	NO_x	0.0144 lb/ton	iron
	VOM	0.0946 lb/ton	iron
Blast Furnace Uncaptured Emissions (7.4.6(c))	PM	0.031 lb/ton	iron
	PM_{10}	0.0155 lb/ton	iron
	SO_2	0.0104 lb/ton	iron
	NO_x	0.0007 lb/ton	iron
	VOM	0.0047 lb/ton	iron
Blast Furnace Charging (7.4.6(d))	PM	0.0024 lb/ton	iron pellets
	PM_{10}	0.0024 lb/ton	iron pellets
Slag Pits (7.4.6(e))	PM	0.00417 lb/ton	iron
	PM_{10}	0.00417 lb/ton	iron
	SO_2	0.01 lb/ton	iron
Iron Spout (7.4.6(f))	PM	0.02548 lb/ton	iron
	PM_{10}	0.02548 lb/ton	iron
	SO_2	0.0073 lb/ton	iron

Operation (Permit Condition)	Pollutant	Emission Factor	Basis
Basic Oxygen Process Operations (Section 7.5)			
BOF Electrostatic Precipitator (7.5.6(c))	PM	0.16 lb/ton	steel
	PM_{10}	0.16 lb/ton	steel
	NO_x	0.0389 lb/ton*	steel
	VOM	0.006 lb/ton**	steel
	CO	8.993 lb/ton	steel
	Lead	0.1934 lb/hr	-
BOF Roof Monitor (7.5.6(d))	PM	0.0987 lb/ton	steel
	PM_{10}	0.066145 lb/ton	steel
	Lead	0.0129 lb/hour	-
Desulfurization and Hot Metal Transfer (7.5.6(e))	PM	0.03721 lb/ton	iron
	PM_{10}	0.03721 lb/ton	iron
	VOM	0.001 lb/ton	iron
	Lead	0.0133 lb/hr	-
Slag Skimming (7.5.6(f))	PM	0.005 lb/ton	iron
	PM_{10}	0.005 lb/ton	iron
Argon Stirring and Material Handling (7.5.6(g))	PM	0.00715 lb/ton	steel
	PM_{10}	0.00715 lb/ton	steel
Continuous Casting Activities (Section 7.6)			
Baghouse #1 (7.6.6(a))	PM	0.00355 lb/ton	steel
	PM_{10}	0.00355 lb/ton	steel
Continuous Caster Molds (7.6.6(b))	PM	0.006 lb/ton	steel
	PM_{10}	0.006 lb/ton	steel
	NO_x	0.05 lb/ton	steel
Cont. Caster Spray Chambers (7.6.6(c))	PM	0.00852 lb/ton	steel
	PM_{10}	0.00852 lb/ton	steel
Slab Cutoff (7.6.6(d))	PM	0.0071 lb/ton	steel
	PM_{10}	0.0071 lb/ton	steel
Slab Ripping (7.6.6(e))	PM	0.00722 lb/ton	steel
	PM_{10}	0.00722 lb/ton	steel

* As of the date of issuance of this permit, the Permittee had not notified the Illinois EPA of the updated NOx emission factor that it will be using for the BOF ESP as a consequence of the results of recent testing that indicated that a factor of 0.0389 pounds/ton would understate actual emissions. The NOx emission rates measured during such testing, in April 2012 and July 2012, were, respectively, 0.1273 and 0.1535 pounds per ton of steel.

** As of the date of issuance of this permit, the Permittee had not notified the Illinois EPA of the updated VOM emission factor that it will be using for the BOF ESP as a consequence of the results of recent testing that indicated that a factor of 0.006 pounds/ton would understate actual emissions. The VOM emission rates measured during such testing in April 2012 and July 2012, respectively, were 0.023 and 0.0153 pounds per ton of steel.