

Analysis of Insignificance of Mobile Emissions

In Ohio's July 16, 2008 PM_{2.5} Attainment Demonstration SIP¹, Ohio found that the regional highway emissions of PM_{2.5}, NO_x, and SO₂ were insignificant contributors to the nonattainment problems and, therefore, none of the three pollutants necessitated emissions inventory analysis or required the establishment of mobile emission budgets. As documented in Ohio EPA's attainment demonstration SIP, Ohio EPA in consultation with U.S. EPA determined that the Huntington-Ashland nonattainment area is not significantly impacted by on-road mobile emissions as compared to other source emissions; in addition, mobile source emissions in the area were expected to decrease. Based on the results of mobile source emission projections prepared as a part of this redesignation and maintenance plan, Ohio EPA is again making a finding that the regional highway emissions of PM_{2.5}, NO_x, and SO₂ continue to be insignificant contributors to the nonattainment problems in this area, as discussed below.

U.S. EPA's redesignation guidance requires the submittal of a comprehensive inventory of PM_{2.5} precursor emissions (primary particles (organic carbon, crustal matter, and elemental carbon), SO₂ and NO_x²) representative of the year when the area achieves attainment of the annual PM_{2.5} air quality standard. Ohio also must demonstrate that the improvement in air quality between the year that violations occurred and the year that attainment was achieved is based on permanent and enforceable emission reductions. Other emission inventory related requirements include a projection of the emission inventory to a year at least 10 years following redesignation; a demonstration that the projected level of emissions is sufficient to maintain the annual PM_{2.5} standard; and a commitment to provide future updates of the inventory to enable tracking of emission levels during the 10-year maintenance period.

The emissions inventory development process addresses emissions from several types of sources or sectors: point (EGU or non-EGU); non-point or area; marine, air, rail (MAR); non-road, and on-road or mobile. The inventories, with the exception of the mobile (on-road) , used in this submittal are developed by the Lake Michigan Area Directors Consortium (LADCO) as discussed in greater detail elsewhere in the documents associated with this submittal.. All LADCO's emission inventories utilized in the redesignation and maintenance plan for the Huntington-Ashland annual PM_{2.5} nonattainment area were prepared for county level emission.

Mobile emissions inventories and projections for all counties were prepared by Kimley-Horn and Associates Inc., with data provided by the Kentucky-Ohio-West Virginia Interstate Planning Commission (KYOVA), Ohio Department of Transportation (ODOT), Ohio EPA, West Virginia Department of Transportation (WVDOT), West Virginia Department of Environmental Protection (WVDEP), Kentucky Transportation Cabinet (KYTC), and Kentucky Division of Air Quality (KDAQ). The mobile emission inventories

¹ http://www.epa.ohio.gov/portals/27/SIP/Attain/PM2_5/PM25Doc.pdf

² VOC and NH₃ are not addressed.

are only generated for the annual PM_{2.5} nonattainment areas, meaning that if an area was designated partial nonattainment, that was the only area that was modeled for inventory development (as opposed to the entire county that the partial nonattainment area is included within).

Since the mobile emissions inventories only address nonattainment areas (county level or only partial areas determined as nonattainment) and the remainder of the source sector inventories (non-electric generating unit (EGU), EGU, area, non-road, and MAR) address complete counties (which are not necessarily entirely classified as nonattainment), Ohio EPA and U.S. EPA agreed that an apportioning analysis approach would most accurately provide for a determination of mobile emissions insignificance. The analysis incorporates apportioning non-road, MAR, and area emission sources from the entire county level inventory to the partial nonattainment portion of the county based on the percentages of population in the county versus the partial area (based on the 2000 Census. This type of apportioning may not be as appropriate for the EGU and non-EGU sectors. However, for all partial nonattainment counties within this nonattainment area all EGU emissions within the county level inventory reside solely within the partial area. As such, Ohio EPA has apportioned all EGU emissions into the partial area. Apportioning county level non-EGU emissions into the partial area for all the years of interest would be more challenging. Because of these challenges and also due to time/recourse constraints, Ohio EPA has elected to remove non-EGUs from this insignificance analysis ONLY in the partial nonattainment counties. This is justified as omitting non-EGUs will provide for more conservative results (i.e., the percentage of mobile emissions will be larger). Therefore, if the insignificance analysis with the omission of non-EGUs determines mobile emissions are insignificant, performing the analysis with non-EGU's apportioned will show even greater insignificance.

Table 1 shows the total population in each county that contains one or more partial nonattainment areas, the total population in each partial nonattainment area, and the population percentage in each partial nonattainment area relative to the county population. This data is based on the 2000 Census data. The population percentages will be used to apportion all existing county level emissions (except mobile, EGU and non-EGU emissions) to the partial nonattainment area.

Table 1. Total County Population, Partial Nonattainment Area Population, and Percentage of County Population within the Partial Nonattainment Area.

	Population	
	Total	% of County
Adams County, OH	27,330	
Sprigg Township	1,639	6.00%
Monroe Township	735	2.69%
Gallia County, OH	31,069	
Cheshire Township	1,259	4.05%
Mason County, WV	25,957	
Graham Tax District	2,774	10.69%
Lawrence County, KY	15,569	
The area described by US Census 2000 block group identifier 21-127-9901-6	1,050	6.74%

Sources:

2000 Census: <http://censtats.census.gov/pub/Profiles.shtml>

West Virginia 2000 partial information:

<http://www.epa.gov/oaqps001/greenbk/qnay.html>

Kentucky 2000 partial information:

http://www.census.gov/geo/www/cenpop/blkgrp/bg_21_ky.txt

The designation of a partial area as nonattainment for the annual PM_{2.5} standard, is primarily attributed to the existence of EGUs (power plants) within the area encompassing the partial nonattainment area. As mentioned previously, all EGU emissions within each partial area presented in this redesignation and maintenance plan, reside only within the partial nonattainment area. Hence, all county level EGU emission sources are apportioned to the partial area since these emissions are only present in the partial area.

Non-EGU and EGU sources include those sources that are identified by point locations, typically because they are regulated and their locations are available in regulatory reports. As mentioned above EGU sources will be included in the insignificance analysis apportioned to the partial area.

Because non-EGU sources include an infinite amount of facilities and processes, and because the recourses that would be needed to estimate non-EGU emissions within a partial area, based on county level emissions (for the apportionment analysis), it was agreed that Ohio EPA would omit these emissions in the partial areas from the insignificance analysis for the partial nonattainment counties. Moreover, omitting these emissions will provide a more conservative finding of mobile emissions insignificance as discussed above.

Table 2 to Table 13³ show partial nonattainment areas apportioning results and entire county level emissions. The emission reductions from the apportioning approach compared to the entire county level emissions, show further reductions across all

³ Table 2 to Table 13 are similar to Table 18 to Table 47 of the Redesignation and Maintenance document, without Non-EGU sources

emission sources (except EGUs and mobile sources since they are already only representing partial nonattainment areas). Please note the Table 2 to Table 13 below only reflects emissions as a part of the apportioning analysis for the partial nonattainment areas. The remaining emissions for full nonattainment counties included in the determination of insignificance can be found in redesignation and maintenance document from Table 18 to Table 47.

PM_{2.5}

Table 2 - Adams County, Ohio PM_{2.5} Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – Without CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	3569.95	3569.95	3544.65	3544.65
Non-road	8.70	0.76	4.04	0.35
Area	285.55	24.80	282.69	24.56
MAR	4.21	0.37	1.74	0.15
On-road	2.17	2.17	1.39	1.39
TOTAL	3870.58	3598.05	3834.51	3571.10

Table 3 - Gallia County, Ohio PM_{2.5} Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – Without CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	1,073.20	1,073.20	1,100.12	1,100.12
Non-road	7.22	0.29	4.07	0.16
Area	181.29	7.35	182.52	7.40
MAR	4.32	0.18	1.84	0.07
On-road	1.06	1.06	0.68	0.68
TOTAL	1,267.09	1,082.08	1,289.23	1,108.43

Table 4 - Lawrence County, Kentucky PM_{2.5} Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – Without CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	422.88	422.88	433.23	433.23
Non-road	7.21	0.49	4.91	0.33
Area	91.70	6.18	92.09	6.21
MAR	13.33	0.90	9.05	0.61
On-road	3.12	3.12	1.69	1.69
TOTAL	538.24	433.57	540.97	442.07

Table 5 - Mason County, West Virginia PM_{2.5} Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – Without CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	259.80	259.80	266.33	266.33
Non-road	9.38	1.00	4.70	0.50
Area	139.42	14.90	141.99	15.17
MAR	35.53	3.80	25.66	2.74
On-road	0.64	0.64	0.38	0.38
TOTAL	444.77	280.14	439.06	285.12

NO_x

Table 6 - Adams County, Ohio NO_x Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	25,671.39	25,671.39	23,276.73	23,276.73
Non-road	92.82	8.06	57.47	4.99
Area	134.84	11.71	137.93	11.98
MAR	199.67	17.34	97.77	8.49
On-road	54.82	54.82	26.21	26.21
TOTAL	26,153.54	25,763.32	23,596.11	23,328.40

Table 7 - Gallia County, Ohio NO_x Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	24,476.65	24476.65	9,385.96	9385.96
Non-road	67.88	2.75	38.85	1.57
Area	131.45	5.33	135.53	5.49
MAR	194.41	7.88	95.18	3.86
On-road	26.89	26.89	12.94	12.94
TOTAL	24,897.28	24,519.50	9,668.46	9,409.82

Table 8 - Lawrence County, Kentucky NO_x Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	2,997.63	2997.63	2,252.78	2252.78
Non-road	41.05	2.77	28.16	1.90
Area	92.45	6.23	96.64	6.52
MAR	444.15	29.95	286.03	19.29
On-road	70.54	70.54	37.96	37.96
TOTAL	3,645.82	3,107.12	2,701.57	2,318.45

Table 9 - Mason County, West Virginia NO_x Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	11,957.32	11957.32	11,300.37	11300.37
Non-road	124.24	13.28	96.26	10.29
Area	391.32	41.82	414.58	44.31
MAR	971.05	103.78	663.19	70.87
On-road	15.33	15.33	8.72	8.72
TOTAL	13,459.26	12,131.53	12,483.12	11,434.56

SO₂

Table 10 - Adams County, Ohio SO₂ Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	27,077.57	27,077.57	23,276.73	23,276.73
Non-road	0.91	0.08	0.14	0.01
Area	31.73	2.76	30.08	2.61
MAR	6.61	0.57	1.79	0.16
On-road	0.32	0.32	0.32	0.32
TOTAL	27,117.14	27,081.30	23,309.06	23,279.83

Table 11 - Gallia County, Ohio SO₂ Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	41,924.16	41924.16	20,510.45	20510.45
Non-road	0.67	0.03	0.15	0.01
Area	15.91	0.65	15.35	0.62
MAR	6.9	0.28	2.26	0.09
On-road	0.16	0.16	0.16	0.16
TOTAL	41,947.80	41,925.28	20,528.37	20,511.33

Table 12 - Lawrence County, Kentucky SO₂ Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	20,475.34	20475.34	11,800.13	11800.13
Non-road	0.41	0.03	0.12	0.01
Area	98.36	6.63	98.02	6.61
MAR	38.28	2.58	21.04	1.42
On-road	0.73	0.73	0.71	0.71
TOTAL	20,613.12	20,485.31	11,920.02	11,808.88

Table 13 - Mason County, West Virginia SO₂ Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

Sector	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only
EGU Point	44,094.05	44094.05	41,340.89	41340.89
Non-road	1.03	0.11	0.25	0.03
Area	123.14	13.16	125.6	13.42
MAR	4.38	0.47	1.06	0.11
On-road	0.07	0.07	0.08	0.08
TOTAL	44,222.67	44,107.86	41,467.88	41,354.53

Table 14 to Table 16 show a summary comparison between entire counties (without apportionment and with non-EGU emissions, see columns D and F) and only nonattainment areas (with apportionment and excluding Non-EGU emissions in the partial areas, see columns E and G). The comparison shows the apportionment results in a decrease of at least 7.23% for 2015 emissions and 7.05% for 2022 of PM_{2.5} emissions, 2.81% for 2015 emissions and 2.84% for 2022 emissions of NO_x emissions

and 0.20% for 2015 emissions and 0.24% for 2022 emissions of SO₂ emission. Recall, as mentioned above, detailed emissions by each sector for full nonattainment counties included in the determination of insignificance and identified below can be found in the full document.

Table 14 - Huntington-Ashland Area PM_{2.5} Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

A	D	E	F	G
PM _{2.5}	2015 Interim	2015 Interim with Apportionment and Non-EGU in Partial Areas Only	2022 Maintenance	2022 Interim with Apportionment and Non-EGU in Partial Areas Only
Adams, OH	3870.58	3598.05	3834.51	3571.10
Gallia, OH	1,267.09	1,082.08	1,289.23	1,108.43
Lawrence, OH	181.56	181.56	158.79	158.79
Scioto, OH	517.46	517.46	475.21	475.21
Boyd, KY	1,977.20	1,977.20	1,941.71	1,941.71
Lawrence, KY	538.24	433.57	540.97	442.07
Cabell, WV	900.25	900.25	881.53	881.53
Mason, WV	444.77	280.14	439.06	285.12
Wayne, WV	358.66	358.66	319.69	319.69
COMBINED PM _{2.5} TOTAL	10,055.81	9,328.97	9,880.70	9,183.65

Table 15 - Huntington-Ashland Area NO_x Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

A	D	E	F	G
NO _x	2015 Interim	2015 Interim with Apportionment and Non-EGU in Partial Areas Only	2022 Maintenance	2022 Interim with Apportionment and Non-EGU in Partial Areas Only
Adams, OH	26,153.54	25,763.32	23,596.11	23,328.40
Gallia, OH	24,897.28	24,519.50	9,668.46	9,409.82
Lawrence, OH	1,771.48	1,771.48	1,179.13	1,179.13
Scioto, OH	2,750.01	2,750.01	1,643.98	1,643.98
Boyd, KY	10,974.99	10,974.99	10,073.03	10,073.03
Lawrence, KY	3,645.82	3,107.12	2,701.57	2,318.45
Cabell, WV	4,146.09	4,146.09	2,980.41	2,971.41
Mason, WV	13,459.26	12,131.53	12,483.12	11,434.56
Wayne, WV	5,979.24	5,979.24	4,900.76	4,900.76
COMBINED NO _x TOTAL	93,777.71	91,143.28	69,226.57	67,259.54

Table 16 - Huntington-Ashland Area SO₂ Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Totals for Projected 2015 and 2022 (tpy) – With CAIR

A	D	E	F	G
SO ₂	2015 Interim	2015 Interim with Apportionment and Non-EGU in Partial Areas Only	2022 Maintenance	2022 Interim with Apportionment and Non-EGU in Partial Areas Only
Adams, OH	27,117.14	27,081.30	23,309.06	23,279.83
Gallia, OH	41,947.80	41,925.28	20,528.37	20,511.33
Lawrence, OH	64.67	64.67	38.19	38.19
Scioto, OH	1,103.30	1,103.30	796.00	796.00
Boyd, KY	11,964.29	11,964.29	12,840.55	12,840.55
Lawrence, KY	20,613.12	20,485.31	11,920.02	11,808.88
Cabell, WV	1,756.37	1,756.37	1,865.27	1,865.27
Mason, WV	44,222.67	44,107.86	41,467.88	41,354.53
Wayne, WV	846.29	846.29	874.07	874.07
COMBINED SO ₂ TOTAL	149,635.65	149,334.67	113,639.41	113,368.65

The following table shows the percentage of the mobile portion of all emissions, for each pollutant in the entire nonattainment area, apportioned per the above, for 2015 and 2022.

Table 17 – Percent of Mobile Emissions for the Huntington-Ashland Area in 2015 and 2022 – With Apportionment Analysis for partial nonattainment areas

		NO _x		SO ₂		PM _{2.5}	
		2015	2022	2015	2022	2015	2022
Huntington-Ashland Area	Total (tpy)	91,143.28	67,259.54	149,334.67	113,368.65	9,328.97	9,183.65
	Mobile (tpy)	5,444.35	2,852.96	35.85	36.73	236.36	141.31
	% Mobile	5.97%	4.24%	0.02%	0.03%	2.53%	1.54%
Ohio Portion	Total (tpy)	54,804.31	35,561.33	70,174.55	44,625.35	5,379.15	5,313.53
	Mobile (tpy)	1,824.62	924.08	10.01	10.43	69.34	46.71
	% Mobile	3.33%	2.60%	0.01%	0.02%	1.29%	0.88%

NO_x constitutes less than six percent (<6%) of the area's total NO_x emissions in the 2015 and 2022 horizon years. PM_{2.5} constitutes less than three percent (<3%) of the area's total PM_{2.5} emissions in the 2015 and 2022 horizon years. SO₂ constitutes less than one percent (<1%) of the area's total SO₂ emissions in the 2015 and 2022 horizon years.

Therefore, the Ohio EPA is herein making a finding that the area's highway emissions for PM_{2.5}, NO_x, and SO₂ continue to be insignificant contributors to the nonattainment problem of the Huntington-Ashland area, as agreed upon as a part of the interagency consultation process. Moreover, the results from Table 17 show emissions adjusted for partial nonattainment areas and does not include Non-EGU emission sources in partial areas, providing higher percentages of mobile emissions (for all three pollutants) and showing a conservative (overestimated) percentage of mobile emissions. Because of this finding it is not necessary to establish mobile emission budgets for this area in the 2015 and 2022 horizon years.