

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 Parkersburg-Marietta 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 emission inventories utilized in the redesignation and maintenance plan for the Parkersburg-Marietta annual PM_{2.5} nonattainment area were prepared for county level emissions.

Mobile emissions inventories and projections for all counties were prepared by the Ohio Department of Transportation (ODOT) and the Wood-Washington-Wirt Interstate Planning Commission (WWW), with data provided by the ODOT, Ohio EPA, West Virginia Department of Transportation (WVDOT), and West Virginia Department of Environmental Protection (WVDEP). The mobile emission inventories 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

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

² VOC and NH₃ are not addressed.

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-EGU, 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). 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.

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 and 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
Pleasants County, WV	7,514	
Grant Tax District	1,675	22.29%

Sources:

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

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

The designation of a partial area as nonattainment for the annual PM2.5 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. EGU sources include those sources that are identified by point locations, typically because they are regulated and their locations are available in regulatory reports.

Table 2 to Table 4³ 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 emission sources (except EGUs and mobile sources since they are already only representing partial nonattainment areas). Please note the Table 2 to Table 4 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 13, Table 17, and Table 21.

PM_{2.5}

Table 2 - Pleasants County, West Virginia PM_{2.5} Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Inventory Totals for Base Year 2005, Estimated 2008, and Projected 2015 and 2022 (tpy) – With CSAPR

Sector	2005 Base	2008 Attainment	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only	Safety Margin
EGU Point	1,360.23	1,287.83	1,330.92	1,330.92	1,286.59	1,286.59	1.24
Non-EGU	198.72	159.57	143.78	32.05	141.49	31.54	18.08
Non-road	8.32	8.19	5.96	1.33	3.73	0.83	4.46
Area	143.43	121.73	116.47	25.96	113.48	25.30	8.25
MAR	28.83	12.30	12.38	2.76	12.45	2.78	-0.15
On-road	1.61	1.20	0.55	0.55	0.37	0.37	0.83
TOTAL	1,741.14	1,590.82	1,610.06	1,393.57	1,558.11	1,347.41	32.71

³ Tables 2 to Table 4 are similar to Table 13, Table 17, and Table 21 of the Redesignation and Maintenance document.

NO_x

Table 3 - Pleasants County, West Virginia NO_x Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Inventory Totals for Base Year 2005, Estimated 2008, and Projected 2015 and 2022 (tpy) – With CSAPR

Sector	2005 Base	2008 Attainment	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only	Safety Margin
EGU Point	12,318.14	8,251.74	3,733.99	3,733.99	3,798.80	3,798.80	4,452.94
Non-EGU	639.94	156.90	22.73	5.07	21.64	4.82	135.26
Non-road	38.49	37.72	31.31	6.98	26.65	5.94	11.07
Area	174.42	43.54	42.80	9.54	42.07	9.38	1.47
MAR	799.88	362.14	364.42	81.24	366.7	81.74	-4.56
On-road	54.17	42.41	19.05	19.05	9.96	9.96	32.45
TOTAL	14,025.04	8,894.45	4,214.30	3,855.87	4,265.82	3,910.64	4,628.63

SO₂

Table 4 - Pleasants County, West Virginia SO₂ Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Inventory Totals for Base Year 2005, Estimated 2008, and Projected 2015 and 2022 (tpy) – With CSAPR

Sector	2005 Base	2008 Attainment	2015 Interim	2015 Partial Only	2022 Maintenance	2022 Partial Only	Safety Margin
EGU Point	52,295.78	15,803.98	6,090.44	6,090.44	7,687.48	7,687.48	8,116.50
Non-EGU	5,623.32	1,175.69	1.11	0.25	1.08	0.24	1,174.61
Non-road	2.42	0.47	0.12	0.03	0.13	0.03	0.34
Area	97.76	55.40	52.50	11.70	49.60	11.06	5.80
MAR	38.47	19.29	19.41	4.33	19.53	4.35	-0.24
On-road	0.69	0.22	0.18	0.18	0.15	0.15	0.07
TOTAL	58,058.44	17,055.05	6,163.76	6,106.93	7,757.97	7,703.31	9,297.08

Table 5 to Table 7 show a summary comparison between entire counties (without apportionment, see columns D and F) and only nonattainment areas (with apportionment, see columns E and G). The comparison shows the apportionment results in a decrease of at least 5.77% for all 2015 PM_{2.5} emissions and 5.76% for all 2022 PM_{2.5} emissions, 1.90% for all 2015 NO_x emissions and 2.67% for all 2022 NO_x emissions, and 0.07% for all 2015 SO₂ emissions and 0.11% for all 2022 SO₂ emissions. Recall, as mentioned above, detailed emissions by each sector for full counties included in the determination of insignificance and identified below can be found in the full document.

Table 5 - Parkersburg-Marietta Area PM_{2.5} Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Inventory Totals for Base Year 2005, Estimated 2008, and Projected 2015 and 2022 (tpy) – Without CAIR (Ohio) and With CSAPR (West Virginia)

A	B	C	D	E	F	G
PM _{2.5}	2005 Base	2008 Attainment	2015 Interim	2015 Interim with Apportionment	2022 Maintenance	2022 Interim with Apportionment
Pleasants, WV	1,741.14	1,590.82	1,610.06	1,393.57	1,558.11	1,347.40
Wood, WV	1,262.25	1,002.42	944.57	944.57	918.15	918.15
Washington, OH	1,143.35	1,203.35	1,198.61	1,198.61	1,181.01	1,181.01
COMBINED PM _{2.5} TOTAL	4,146.74	3,796.59	3,753.24	3,536.75	3,657.27	3,446.56

Table 6 - Parkersburg-Marietta Area NO_x Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Inventory Totals for Base Year 2005, Estimated 2008, and Projected 2015 and 2022 (tpy) – With CAIR (Ohio) and With CSAPR (West Virginia)

A	B	C	D	E	F	G
NO _x	2005 Base	2008 Attainment	2015 Interim	2015 Interim with Apportionment	2022 Maintenance	2022 Interim with Apportionment
Pleasants, WV	14,025.04	8,894.45	4,214.30	3,855.87	4,265.82	3,910.64
Wood, WV	5,760.06	4,495.90	3,195.98	3,195.98	2,640.34	2,640.34
Washington, OH	21,668.23	22,365.96	11,439.41	11,439.41	6,417.53	6,417.53
COMBINED NO _x TOTAL	41,453.33	35,756.31	18,849.69	18,491.26	13,323.69	12,968.52

Table 7 - Parkersburg-Marietta Area SO₂ Partial Nonattainment Areas Apportioning Results and Entire County Level Emissions: Emission Inventory Totals for Base Year 2005, Estimated 2008, and Projected 2015 and 2022 (tpy) – With CAIR (Ohio) and With CSAPR (West Virginia)

A	B	C	D	E	F	G
SO ₂	2005 Base	2008 Attainment	2015 Interim	2015 Interim with Apportionment	2022 Maintenance	2022 Interim with Apportionment
Pleasants, WV	58,058.44	17,055.05	6,163.76	6,106.93	7,757.97	7,703.31
Wood, WV	6,068.44	3,751.88	3,560.54	3,560.54	3,384.15	3,384.15
Washington, OH	146,280.18	138,786.24	67,625.84	67,625.84	37,351.17	37,351.17
COMBINED SO ₂ TOTAL	210,407.06	159,593.17	77,350.14	77,293.31	48,493.29	48,438.63

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 8 – Percent of Mobile Emissions for the Parkersburg-Marietta Area in 2015 and 2022 – With Apportionment Analysis for partial nonattainment areas

		NOx		SO2		PM2.5	
		2015	2022	2015	2022	2015	2022
Parkersburg-Marietta Area	Total (tpy)	18,491.26	12,968.52	77,293.31	48,438.63	3,536.75	3,446.56
	Mobile (tpy)	2,212.19	1,120.80	14.52	14.16	75.85	49.75
	% Mobile	11.96%	8.64%	0.02%	0.03%	2.14%	1.44%
Ohio Portion	Total (tpy)	11,439.41	6,417.53	67,625.84	37,351.17	1,198.61	1,181.01
	Mobile (tpy)	1,200.52	572.25	6.46	6.31	41.68	25.22
	% Mobile	10.49%	8.92%	0.01%	0.02%	3.48%	2.14%

NO_x on-road emissions are just under twelve percent (11.96%) of the area's total NO_x emissions in the 2015 horizon year and just over eight percent (8.64%) in the 2022 horizon year. PM_{2.5} on-road emissions constitute just over two percent (2.14%) of the area's total PM_{2.5} emissions in the 2015 and just over one percent (1.44%) in the 2022 horizon years. SO₂ on-road emissions constitute less than one percent (0.02% for 2015 and 0.03% for 2022) of the area's total SO₂ emissions in both the 2015 and 2022 horizon years.

Based on the results from Table 8 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 Parkersburg-Marietta area, as agreed upon as a part of the interagency consultation process. Because of this finding it is not necessary to establish mobile emission budgets for this area in the 2015 and 2022 horizon years.

Moreover, the nonattainment area meets the 40 CFR 93.109(m) criteria for PM_{2.5}, NO_x, and SO₂. As shown, throughout the "Redesignation Request and Maintenance Plan for the Ohio Portion of the Parkersburg-Marietta, OH-WV Annual PM_{2.5} Nonattainment Area" document, it would be unreasonable to expect that the Parkersburg-Marietta area would experience enough motor vehicle emissions growth in PM_{2.5}, NO_x, and SO₂ for a PM_{2.5} NAAQS violation to occur. Ohio EPA demonstrates that the percentage of motor vehicle emissions in the context of the total SIP inventory, the current state of air quality as determined by monitoring data, the absence of SIP motor vehicle control measures, and historical trends and future projections of the growth of motor vehicle emissions, are evidence enough to consider mobile source PM_{2.5}, NO_x, and SO₂ insignificant contributors to fine particles.