Technical Support Document (TSD)
for the June Revisions to the Transport Rule
Docket ID No. EPA-HQ-OAR-2009-0491

Final June Revisions Rule Significant Contribution Assessment TSD

U.S. Environmental Protection Agency
Office of Air and Radiation
June 2012

This Technical Support Document (TSD) presents quantitative assessments of the relationship between the final February revisions to the Transport Rule, the final June revisions rule, and the original analysis conducted for the final Transport Rule informing the Rule's determination of emissions that significantly contribute to nonattainment or interfere with maintenance of the National Ambient Air Quality Standards (NAAQS) in downwind states. As conducted for the final Transport Rule, EPA re-iterated its analysis of the downwind air quality impacts resulting from the rule's projected SO_2 emission reductions using the Air Quality Assessment Tool (AQAT) and taking the final February revisions rule and the final June revisions rule into account. In this document, EPA also assesses the relationship between the NO_x emission inventories in each affected state and the finalized February revisions and final June revisions to annual NO_x and ozone-season NO_x budgets under the Transport Rule programs.

This technical support document uses results for the revisions described in the final February revisions rule[1],[2], as well as those revisions described in the final June revisions rule.[3] The final February revisions rule included increases to 2014 SO_2 budgets for Texas, New York, and Wisconsin. For the final June revisions rule, EPA has assessed the collective impact of all of the revisions being finalized. The final June revisions rule includes increases to 2014 SO_2 budgets for Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina. EPA has assessed the emission increases collectively, for the remedy scenario, the $500/ton cost threshold scenario, and the $2,300/ton cost threshold scenario.

For purposes of assessing the impact of state SO_2 budget increases under the final June revisions rule in AQAT (including the budget increases under the final February revisions rule), EPA assumed that the state SO_2 budget increases would result in an equivalent, ton for ton, increase in 2014 SO_2 emissions (beyond the level previously projected in the final Transport Rule). Therefore, this TSD refers to the "final emission increases" assumed to result from the final budget increases and analyzes the impact of these emission increases.

This TSD is organized as follows:

[1] See preamble to the "Revisions to Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone", 77 FR 10324.

[2] See the "Final Revisions Rule Significant Contribution Assessment Technical Support Document (TSD)" (EPA-HQ-OAR-2009-0491-4956).

[3] See preamble to the "Revisions to Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone", 77 FR 10350, where the June revisions were first proposed as well as the final preamble to the "Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone" where those revisions were finalized.

A. Summary of EPA's Analysis to Quantify Emissions that Significantly Contribute to Nonattainment or Interfere with Maintenance for the Final June Revisions Rule.

Sections V and VI of the final Transport Rule (TR) preamble (Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone and Correction of SIP Approvals, 76 FR 48208 (August 8, 2011)) describe EPA's approach to identify upwind states' emissions that significantly contribute to downwind nonattainment or interfere with downwind maintenance of the 1997 and 2006 fine particle ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS) and the 1997 ozone NAAQS. This is further described in the related Significant Contribution and State Emissions Budgets Final Rule TSD (EPA-HQ-OAR-2009-0491-4456). As described in the preamble for the final TR, the approach uses air quality modeling to identify monitoring sites with projected nonattainment and maintenance problems (receptors) for the $PM_{2.5}$ and ozone NAAQS as well as upwind states whose contributions to these receptors meet or exceed specified threshold amounts. See sections V.C and V.D in the TR preamble and the associated TR Air Quality Modeling Final Rule TSD (EPA-HQ-OAR-2009-0491-4140) for a detailed discussion of these air quality analyses.

As described in TR preamble section VI, after identifying upwind-to-downwind linkages, EPA uses a multi-step process to quantify each state's significant contribution to nonattainment and interference with maintenance. First, EPA identifies the power sector emissions projected to remain at ascending cost thresholds of emissions reductions for each state. See section B in the Significant Contribution and State Emissions Budgets Final Rule TSD for discussion of this analysis. Next, EPA uses an AQAT to estimate the air quality impact of the upwind emission reductions at each cost threshold on downwind receptors with problems attaining and maintaining the applicable NAAQS. See section C in the Significant Contribution and State Emissions Budgets Final Rule TSD for discussion of the development and use of AQAT.

The analysis in this TSD uses the annual PM2.5 and 24-hour PM2.5 AQAT to estimate the impacts of the final SO_2 emission increases on downwind air quality (including the emissions from the final February revisions rule) in the context of the air quality component of the determination of significant contribution in 2014; it also provides an estimate of the effect of these final SO_2 budget revisions on the "remedy" control scenario analyzed for the final Transport Rule in 2014. For the final June revisions rule, the final budget increases were investigated in a collective manner to show the estimated air quality impacts from all of the state's emissions following the finalization of the June revisions rule on the downwind monitors (inclusive of the final February revisions rule). Two assessments were performed:

- Significant Contribution Assessment: Following the methodology and using the emissions for the air quality assessment of significant contribution and interference with maintenance from the final TR and the final February revisions rule, we assess whether the SO_2 emission increases have the potential to change the patterns of attainment, nonattainment, and maintenance projected at the $500/ton and $2,300/ton cost threshold levels for annual PM2.5 and for 24-hour PM2.5 in 2014 (compared with the AQAT analysis from the final TR and the final February revisions rule). Specifically, we investigate if each state's significant contribution and interference with maintenance is resolved at $500/ton and/or $2,300/ton to the receptor(s) to which they are linked (as was concluded in the multi-factor assessment for the final TR). For each cost threshold level analyzed, on a receptor-by-receptor basis, the

emissions reductions for each upwind state are associated with one of two cost threshold levels (either the 2014 base case emissions level or the particular threshold cost level being analyzed) depending on whether the upwind state is "linked" to that receptor or if the receptor is located within the state. States that are contributing above the respective air quality threshold (i.e., greater than or equal to 1 percent contribution of total sulfate and nitrate for the annual and 24-hour PM2.5 to the monitor), as well as the state containing the monitor, make SO_2 emissions reductions available at the particular cost threshold level. The emissions for all other states are at the 2014 base case level.

- "Remedy" Control Scenario Assessment: In this case, we estimate the resulting air quality and patterns of attainment, nonattainment, and maintenance when the emissions from all states are at the level from the 2014 remedy control scenario (regardless of whether or not they are linked to a particular receptor). Emissions are at the level for the final TR remedy control scenario except for emissions from the states affected by the final February revisions rule or the final June revisions rule, where their emissions are increased by the amount of the related revisions.

For the final June revisions rule, this analysis reaches the same conclusion as EPA's assessment of significant contribution to nonattainment and interference with maintenance from the final TR and from the final February revisions rule. There are no estimated changes in the patterns of attainment, nonattainment, and maintenance at the $500/ton cost threshold level for any receptors linked to Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina. Furthermore, there are no estimated changes in the patterns of attainment, nonattainment, and maintenance at the $2,300/ton cost threshold level for any receptors linked to Indiana, New York, and Ohio (relative to the analysis from the final TR and the final February revisions rule).

EPA concludes that the SO_2 emission budget increases in the final June revisions rule (added incrementally to the final February revisions rule emissions) would not substantially affect the air quality component of the multifactor test and, thus, would not affect EPA's conclusions in the final TR identifying $2,300/ton and $500/ton as the appropriate SO_2 cost thresholds for "Group 1" and "Group 2" states, respectively.

Therefore, for Georgia, Kansas, Nebraska, and South Carolina, significant contribution and interference with maintenance is the amount of emissions that can be removed at the $500/ton cost threshold. For Indiana, New York, and Ohio, EPA concludes that for these states, their significant contribution and interference with maintenance is the amount of emissions that can be removed at the $2,300/ton cost threshold. In addition, there are no estimated changes in the patterns of attainment, nonattainment, and maintenance in the 2014 "remedy" control scenario for any of the final individual emission changes for Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina.

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B. Analysis of Significant Contribution and Interference with Maintenance for SO_2 Emissions from Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina Using AQAT for the Final June Revisions Rule.

EPA assessed the impacts of the SO_2 budget changes in the final June revisions rule, collectively. The total budget changes are presented in Table 1 (see the preamble of the final June revisions rule for details about the emission changes). The states that EPA investigated were Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina. The budget changes were assessed using the 2014 $500/ton and $2,300 cost threshold scenarios and the "remedy" control emissions scenario. All of these scenarios included the emission increases from the final February revisions rule. Note that the 2014 base case emissions were also used and that, for this case, EPA assumed no emission increases would be made to account for either of the final revisions rules.

As described in section A, EPA performed two assessments, a Significant Contribution Assessment and a "Remedy" Control Scenario Assessment. For each scenario for the two assessments, for comparison to see the affect of the emissions in the final June revisions rule, EPA also presents the results of the AQAT assessment from the final February revisions rule and from the final TR.

Collective Assessment: EPA used AQAT to estimate the air quality impacts in the significant contribution and remedy assessments when all states included in the final June revisions rule simultaneously increased their emissions. The specific receptors to which each of the states included in the final June revisions rule are "linked"are listed in the following paragraphs.

Georgia: Georgia was "linked" to the 24-hour PM2.5 receptors 10730023 and 10732003 in Jefferson County, Alabama and to the same receptors for annual PM2.5. There is also a receptor located in Georgia, identification number 131210039.

Indiana: Indiana contributed above the threshold to all 24-hour PM2.5 receptors with base case maximum design values greater than or equal to 35.5 $\mu g/m^3$ (except for receptor 420710007 in Lancaster County, Pennsylvania). Indiana also contributed at or above the threshold to all of the annual PM2.5 receptors with 2012 base case design values greater than or equal to 15.05 $\mu g/m^3$.

Kansas: Kansas was "linked" to the 24-hour PM2.5 receptors identification numbers 550790010, 550790026, 171191007, 170316005, and 170310052 in Wisconsin and Illinois. Kansas did not contribute to any of the annual PM2.5 receptors with 2012 base case design values greater than or equal to 15.05 $\mu g/m^3$.

Nebraska: Nebraska was "linked" to the 24-hour PM2.5 receptors 550790010 and 550790026 in Wisconsin. Nebraska did not contribute to any of the annual PM2.5 receptors with 2012 base case design values greater than or equal to 15.05 $\mu g/m^3$.

New York: The monitors for 24-hour PM2.5 to which New York was linked in the TR were: 261470005; 261610008; 261630016; 261630019; 261630033; 390350045; 390350060; 390350065; 420710007; and 421330008. The monitors for annual PM2.5 to which New York was linked in the TR were: 390350038; 390350045; 390350060; 390350065; and 420030064.

Ohio: Ohio contributed above the threshold to all 24-hour PM2.5 receptors with base case maximum design values greater than or equal to 35.5 $\mu g/m^3$. Ohio also contributed at or above the threshold to all of the annual PM2.5 receptors with 2012 base case design values greater than or equal to 15.05 $\mu g/m^3$.

South Carolina: South Carolina did not contribute above the threshold to any of the 24-hour PM2.5 receptors identified in the TR (i.e., it was not "linked"). For annual PM2.5, South Carolina was "linked" to receptor 131210039 in Fulton County, Georgia.

As seen in Tables 2 and 3 for annual PM2.5 average and maximum design values and for Tables 4 and 5 for 24-hour PM2.5 average and maximum design values, the resulting change in concentration at each of the TR receptors was not sufficient to alter the conclusions about its status (i.e., estimated to be in attainment, maintenance, or nonattainment) at the $500/ton or $2,300/ton cost threshold levels in 2014. EPA concludes that assessment of alternative cost threshold levels were unnecessary. EPA also concludes that each state appropriately maintains its classification as "Group 1" or "Group 2" from the final TR.

Similarly, As seen in Tables 2, 3, 4, and 5 under the remedy assessment, the estimated patterns of attainment, maintenance, and nonattainment were unchanged relative to the final TR assessment (including the final February revisions rule).

C. Presentation of Annual and Ozone-Season NO_x Emission Increases Relative to Annual and Ozone-Season Total NO_x Emissions for the Final June Revisions Rule.

The final June revisions rule revises the state budgets for annual and ozone-season NO_x. These changes represent very limited shares of the total NO_x emissions from all source-sectors in each affected state, as modeled in the air quality projections under the final Transport Rule "remedy" control scenario analysis in 2014, and very limited shares of the total NO_x emissions from all source-sectors in each affected state (when the final February revisions rule is also considered). See the excel workbook "EmissionsSummaries_TR_remedyNOx_OS.xlsx" for the ozone-season emission summary for the 2014 remedy control scenario for NOx. See the excel workbook "TransportRuleFinal_EmissionsSummaries", EPA-HQ-OAR-2009-0491-4206, for the 2014 remedy control scenario for annual NOx. See the Emissions Inventory Final Rule Technical Support Document (TSD), EPA-HQ-OAR-2009-0491-4522, for additional details about the emissions inventories.

Tables 6 and 7 illustrate the relationship of the final June revisions rule state budget revisions to each state's total emissions (from all sources) for annual NO_x and ozone-season NO_x respectively. The total emissions include the NO_x from the final February revisions rule (assuming that there is a one-to-one correlation between the budget increase and an increase in emissions). The state budget revisions in the final June revisions rule represent small percentages of each state's total emissions; therefore, EPA believes that the impact of these revisions would be limited to comparatively small changes to the 2014 ozone design values projected in the final Transport Rule air quality analysis.

Table 1. SO_2 EGU Emissions From Fossil and Biomass Units* Used in AQAT (tons of SO_2) in 2014 in the Final TR Including the Emissions in the Final February Revisions Rule as well as the Additional Emission Increases in the Final June Revisions Rule.

	2014 Base Case	$500/ton Cost Threshold	$2,300/ton Cost Threshold	"Remedy" Control Scenario	Emission Increase Examined in AQAT
State					
Alabama	417,340	200,905	213,593	173,566	
Arkansas	99,411	103,431	103,431	106,685	
Connecticut	3,774	3,883	3,883	3,883	
Delaware	2,172	2,088	2,088	2,172	
District of Columbia	0	0	0	0	
Florida	143,601	137,705	136,825	148,069	
Georgia	**170,288**	**94,691**	**95,834**	**93,208**	**40,334**
Illinois	141,606	138,815	128,997	132,647	
Indiana	**727,786**	**262,386**	**179,539**	**195,045**	**5,338**
Iowa	133,083	117,830	81,137	83,827	
Kansas	**69,819**	**55,308**	**60,870**	**45,740**	**452**
Kentucky	488,006	160,582	106,299	116,927	
Louisiana	118,231	135,803	139,204	139,204	
Maine	2,355	2,355	2,355	2,355	
Maryland	42,926	32,187	28,203	30,368	
Massachusetts	13,365	13,364	13,363	13,363	
Michigan	269,434	210,163	148,232	162,632	
Minnesota	70,937	47,720	50,213	49,622	
Mississippi	30,972	32,454	32,455	32,109	
Missouri	390,287	221,689	175,480	186,898	
Nebraska	**73,073**	**69,466**	**71,475**	**71,340**	**3,110**
New Hampshire	6,453	7,100	7,199	6,742	
New Jersey	38,857	7,069	6,611	6,243	
New York**	**42,887**	**26,708**	**17,931**	**18,687**	**5,444**
North Carolina	126,048	109,612	63,577	69,377	
North Dakota	103,633	102,816	103,633	103,624	
Ohio	**851,199**	**313,193**	**166,691**	**178,975**	**5,163**
Oklahoma	137,981	137,981	138,072	138,072	
Pennsylvania	509,650	296,596	114,431	125,545	
Rhode Island	0	0	0	0	
South Carolina	**213,281**	**96,504**	**107,114**	**100,787**	**8,013**
South Dakota	29,711	29,711	29,711	29,711	
Tennessee	284,468	82,159	58,838	64,721	
Texas**	453,332	331,815	334,649	317,165	
Vermont	263	263	263	263	
Virginia	77,256	71,505	47,639	51,144	
West Virginia	498,507	158,445	76,778	84,344	
Wisconsin**	130,538	65,175	53,962	57,893	

*Source: Integrated Planning Model run by EPA, 2011. See Appendix A in the TR Significant Contribution and State Emissions Budgets Final Rule TSD (EPA-HQ-OAR-2009-0491-4456) for list and description of the IPM $500/ton and $2,300/ton cost threshold and control scenario IPM runs. Emissions are shown for all fossil and biomass units. These "final cost curve" runs have NO_x and ozone season NO_x cost thresholds at $500/ton (all years), SO_2 Group 2 at $500/ton (all years), and SO_2 Group 1 (2012-2013) at $500/ton.

** Emission estimates at the $500/ton cost threshold, $2,300/ton cost threshold, and "remedy" control scenario include emissions from the Final February Revisions Rule.

Table 2. Average Annual $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT **

Monitor Identification Number*	State	County	CAMx 2012 Base Case ($\mu g/m^3$)	AQAT 2014 Average Annual PM2.5 Design Values ($\mu g/m^3$).								
				$500/ton Final July TR	$500/ton With Feb. Revisions	$500/ton With Feb. and June Revisions	$2,300/ton Final July TR	$2,300/ton With Feb. Revisions	$2300/ton With Feb. and June Revisions	Control Scenario Final July TR	Control Scenario With Feb. Revisions	Control Scenario With Feb. and June Revisions
420030064	Pennsylvania	Allegheny	17.94	15.78	15.78	15.79	15.03	15.03	15.04	14.86	14.87	14.88
390350038	Ohio	Cuyahoga	15.99	14.10	14.10	14.12	13.60	13.60	13.62	13.51	13.52	13.53
10730023	Alabama	Jefferson	16.15	14.33	14.33	14.36	14.31	14.31	14.34	13.89	13.90	13.93
390618001	Ohio	Hamilton	16.01	13.54	13.55	13.56	13.01	13.01	13.02	12.96	12.97	12.99
261630033	Michigan	Wayne	15.73	14.35	14.36	14.36	13.87	13.87	13.88	13.77	13.78	13.79
390350060	Ohio	Cuyahoga	15.67	13.75	13.76	13.77	13.25	13.25	13.27	13.16	13.16	13.18
390610014	Ohio	Hamilton	15.76	13.29	13.29	13.31	12.75	12.75	12.76	12.70	12.71	12.74
390610042	Ohio	Hamilton	15.40	12.97	12.97	12.99	12.44	12.44	12.46	12.36	12.37	12.39
171191007	Illinois	Madison	15.46	13.83	13.85	13.85	13.56	13.57	13.58	13.39	13.40	13.41
10732003	Alabama	Jefferson	15.16	13.55	13.55	13.58	13.52	13.52	13.55	13.13	13.13	13.16
390350045	Ohio	Cuyahoga	15.14	13.23	13.24	13.25	12.73	12.73	12.75	12.64	12.65	12.66
180970081	Indiana	Marion	14.86	12.68	12.69	12.70	12.26	12.27	12.28	12.24	12.25	12.27
131210039	Georgia	Fulton	15.07	13.35	13.35	13.43	13.20	13.20	13.28	13.07	13.08	13.16
390617001	Ohio	Hamilton	14.74	12.30	12.30	12.31	11.76	11.76	11.77	11.71	11.72	11.74
390350065	Ohio	Cuyahoga	14.67	12.79	12.79	12.80	12.28	12.28	12.30	12.19	12.20	12.21
180970083	Indiana	Marion	14.71	12.53	12.54	12.55	12.11	12.12	12.13	12.09	12.10	12.12

*Monitors are in order of decreasing 2012 base case Maximum DV.

**Including the Additional Texas, New York, and Wisconsin Emissions from the Final February Revisions Rule and the Additional Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina Emissions from the Final June Revisions Rule.

Table 3. Maximum Annual $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT**.

Monitor Identification Number*	State	County	CAMx 2012 Base Case ($\mu g/m^3$)	AQAT 2014 Maximum Annual PM2.5 Design Values ($\mu g/m^3$).								
				$500/ton Final July TR	$500/ton With Feb. Revisions	$500/ton With Feb. and June Revisions	$2,300/ton Final July TR	$2,300/ton With Feb. Revisions	$2300/ton With Feb. and June Revisions	Control Scenario Final July TR	Control Scenario With Feb. Revisions	Control Scenario With Feb. and June Revisions
420030064	Pennsylvania	Allegheny	18.33	16.17	16.17	16.18	15.42	15.42	15.43	15.25	15.26	15.27
390350038	Ohio	Cuyahoga	16.66	14.77	14.77	14.79	14.27	14.27	14.29	14.18	14.19	14.20
10730023	Alabama	Jefferson	16.46	14.64	14.64	14.67	14.62	14.62	14.65	14.20	14.21	14.24
390618001	Ohio	Hamilton	16.33	13.86	13.87	13.88	13.33	13.33	13.34	13.28	13.29	13.31
261630033	Michigan	Wayne	16.32	14.94	14.95	14.95	14.46	14.46	14.47	14.36	14.37	14.38
390350060	Ohio	Cuyahoga	16.18	14.26	14.27	14.28	13.76	13.76	13.78	13.67	13.67	13.69
390610014	Ohio	Hamilton	15.98	13.51	13.51	13.53	12.97	12.97	12.98	12.92	12.93	12.96
390610042	Ohio	Hamilton	15.77	13.34	13.34	13.36	12.81	12.81	12.83	12.73	12.74	12.76
171191007	Illinois	Madison	15.73	14.10	14.12	14.12	13.83	13.84	13.85	13.66	13.67	13.68
10732003	Alabama	Jefferson	15.64	14.03	14.03	14.06	14.00	14.00	14.03	13.61	13.61	13.64
390350045	Ohio	Cuyahoga	15.61	13.70	13.71	13.72	13.20	13.20	13.22	13.11	13.12	13.13
180970081	Indiana	Marion	15.16	12.98	12.99	13.00	12.56	12.57	12.58	12.54	12.55	12.57
131210039	Georgia	Fulton	15.10	13.38	13.38	13.46	13.23	13.23	13.31	13.10	13.11	13.19
390617001	Ohio	Hamilton	15.10	12.66	12.66	12.67	12.12	12.12	12.13	12.07	12.08	12.10
390350065	Ohio	Cuyahoga	15.10	13.22	13.22	13.23	12.71	12.71	12.73	12.62	12.63	12.64
180970083	Indiana	Marion	15.06	12.88	12.89	12.90	12.46	12.47	12.48	12.44	12.45	12.47

*Monitors are in order of decreasing 2012 base case Maximum DV.

**Including the Additional Texas, New York, and Wisconsin Emissions from the Final February Revisions Rule and the Additional Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina Emissions from the Final June Revisions Rule.

Table 4. Average 24-hour $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT ***.

Monitor Identification Number*	State	County	CAMx 2012 Base Case ($\mu g/m^3$)	AQAT 2014 Average 24-hour PM2.5 Design Values ($\mu g/m^3$).								
				$500/ton Final July TR	$500/ton With Feb. Revisions	$500/ton With Feb. and June Revisions	$2,300/ton Final July TR	$2,300/ton With Feb. Revisions	$2300/ton With Feb. and June Revisions	Control Scenario Final July TR	Control Scenario With Feb. Revisions	Control Scenario With Feb. and June Revisions
420030064**	Pennsylvania	Allegheny	56.71	47.57	47.57	47.59	45.54	45.54	45.56	45.45	45.46	45.49
420030093**	Pennsylvania	Allegheny	39.11	32.19	32.19	32.21	30.25	30.25	30.27	29.88	29.88	29.92
390350038**	Ohio	Cuyahoga	39.46	34.18	34.18	34.19	33.51	33.51	33.53	33.46	33.47	33.49
261630016**	Michigan	Wayne	38.99	34.42	34.42	34.42	33.93	33.93	33.94	33.88	33.88	33.90
390350060	Ohio	Cuyahoga	37.78	31.50	31.50	31.53	30.60	30.61	30.64	30.51	30.51	30.53
170311016**	Illinois	Cook	37.58	34.13	34.14	34.16	33.13	33.14	33.16	32.95	32.97	33.02
261630033**	Michigan	Wayne	39.48	36.31	36.32	36.34	35.00	35.01	35.03	34.74	34.76	34.80
180890022**	Indiana	Lake	34.94	32.79	32.80	32.82	32.38	32.39	32.40	32.31	32.31	32.34
540090011	West Virginia	Brooke	37.57	30.60	30.60	30.62	29.07	29.07	29.10	28.83	28.84	28.87
420710007**	Pennsylvania	Lancaster	35.98	35.19	35.19	35.19	34.95	34.95	34.95	34.87	34.87	34.87
390350045	Ohio	Cuyahoga	34.80	27.69	27.69	27.73	26.30	26.30	26.32	26.23	26.24	26.26
390811001	Ohio	Jefferson	34.56	27.64	27.64	27.67	25.79	25.79	25.82	25.57	25.57	25.61
261630019**	Michigan	Wayne	37.34	35.27	35.28	35.29	34.93	34.93	34.94	34.87	34.88	34.89
390350065	Ohio	Cuyahoga	34.91	27.65	27.66	27.69	26.11	26.11	26.15	25.95	25.96	26.01
170313301	Illinois	Cook	34.97	31.11	31.11	31.13	30.54	30.54	30.55	30.35	30.36	30.39
420070014	Pennsylvania	Beaver	36.21	29.28	29.28	29.30	27.59	27.59	27.60	27.39	27.40	27.42
420033007	Pennsylvania	Allegheny	32.40	26.27	26.27	26.29	24.88	24.88	24.90	24.78	24.78	24.80
010730023	Alabama	Jefferson	36.96	31.93	31.93	31.99	31.61	31.61	31.67	31.10	31.11	31.17
550790026	Wisconsin	Milwaukee	33.62	30.48	30.51	30.52	30.15	30.18	30.19	30.08	30.11	30.12
180970043	Indiana	Marion	35.76	28.64	28.64	28.69	27.16	27.16	27.21	27.13	27.14	27.20
261470005	Michigan	St Clair	36.23	33.35	33.35	33.37	32.78	32.78	32.80	32.67	32.68	32.71
550790043	Wisconsin	Milwaukee	36.21	32.49	32.53	32.54	31.85	31.89	31.90	31.80	31.84	31.87
180890026	Indiana	Lake	34.08	30.91	30.91	30.92	30.52	30.52	30.53	30.49	30.49	30.50
180970081	Indiana	Marion	35.85	28.44	28.44	28.47	27.35	27.35	27.39	27.30	27.30	27.35
180970066	Indiana	Marion	35.73	29.22	29.22	29.26	28.13	28.13	28.17	28.10	28.10	28.15
171191007	Illinois	Madison	36.59	29.92	29.94	29.95	29.32	29.34	29.35	29.32	29.34	29.35
550790010	Wisconsin	Milwaukee	35.47	31.50	31.54	31.55	30.82	30.86	30.87	30.83	30.86	30.87
390170003	Ohio	Butler	34.40	28.07	28.07	28.11	26.49	26.49	26.52	26.47	26.48	26.53
170316005	Illinois	Cook	34.12	32.72	32.72	32.73	32.41	32.41	32.42	32.02	32.04	32.06
420031008	Pennsylvania	Allegheny	35.04	26.95	26.95	26.98	24.69	24.69	24.72	24.47	24.49	24.52
261610008	Michigan	Washtenaw	35.05	29.40	29.40	29.44	28.54	28.55	28.56	28.47	28.47	28.50
170312001	Illinois	Cook	33.62	29.84	29.85	29.85	29.58	29.58	29.59	29.50	29.51	29.53
170310052	Illinois	Cook	34.94	30.11	30.12	30.12	29.78	29.79	29.79	29.69	29.70	29.71
421330008	Pennsylvania	York	33.38	31.60	31.60	31.61	31.03	31.03	31.04	30.92	30.93	30.94
261630015	Michigan	Wayne	35.55	32.23	32.23	32.25	31.10	31.10	31.11	31.02	31.02	31.05
010732003	Alabama	Jefferson	35.31	31.42	31.42	31.47	31.10	31.10	31.16	30.62	30.63	30.70
390618001	Ohio	Hamilton	35.29	27.63	27.63	27.67	26.11	26.11	26.14	25.96	25.97	26.03
171190023	Illinois	Madison	35.11	29.23	29.23	29.25	28.49	28.49	28.50	28.41	28.43	28.44
420031301	Pennsylvania	Allegheny	33.95	27.16	27.16	27.19	25.21	25.21	25.24	24.96	24.97	25.00
391130032	Ohio	Montgomery	33.68	24.40	24.40	24.44	23.15	23.15	23.17	23.09	23.10	23.14
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	28.00	26.34	26.34	26.36	26.13	26.14	26.17

*Monitors are in order of decreasing 2012 base case Maximum DV.
** Identify receptors that have maximum design values greater than or equal to 35.5 $\mu g/m^3$ at the $500 cost threshold in 2014 (as modeled in AQAT in the TR).
***Including the Additional Texas, New York, and Wisconsin Emissions from the Final February Revisions Rule and the Additional Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina Emissions from the Final June Revisions Rule.

Table 5. Maximum 24-hour $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT ***.

Monitor Identification Number*	State	County	CAMx 2012 Base Case ($\mu g/m^3$)	AQAT 2014 Maximum 24-hour PM2.5 Design Values ($\mu g/m^3$).								
				$500/ton Final July TR	$500/ton With Feb. Revisions	$500/ton With Feb. and June Revisions	$2,300/ton Final July TR	$2,300/ton With Feb. Revisions	$2300/ton With Feb. and June Revisions	Control Scenario Final July TR	Control Scenario With Feb. Revisions	Control Scenario With Feb. and June Revisions
420030064**	Pennsylvania	Allegheny	59.93	50.72	50.72	50.74	48.63	48.63	48.65	48.52	48.53	48.56
420030093**	Pennsylvania	Allegheny	44.40	36.85	36.85	36.88	34.80	34.80	34.83	34.28	34.29	34.34
390350038**	Ohio	Cuyahoga	41.84	35.93	35.93	35.94	35.41	35.41	35.42	35.39	35.39	35.42
261630016**	Michigan	Wayne	41.28	36.20	36.20	36.20	35.65	35.66	35.66	35.61	35.61	35.62
390350060	Ohio	Cuyahoga	40.85	33.69	33.70	33.72	33.04	33.04	33.07	32.94	32.95	32.97
170311016**	Illinois	Cook	40.44	37.40	37.41	37.43	36.54	36.55	36.56	36.40	36.41	36.46
261630033**	Michigan	Wayne	39.81	36.59	36.59	36.62	35.23	35.23	35.26	34.95	34.97	35.01
180890022**	Indiana	Lake	39.58	37.00	37.01	37.03	36.51	36.51	36.54	36.30	36.31	36.35
540090011	West Virginia	Brooke	38.39	32.23	32.23	32.27	30.02	30.02	30.06	29.63	29.64	29.69
420710007**	Pennsylvania	Lancaster	38.37	37.43	37.43	37.43	37.18	37.18	37.18	37.08	37.08	37.08
390350045	Ohio	Cuyahoga	38.13	29.48	29.49	29.53	27.60	27.60	27.63	27.43	27.44	27.46
390811001	Ohio	Jefferson	37.88	30.27	30.27	30.31	28.03	28.03	28.06	27.76	27.76	27.81
261630019**	Michigan	Wayne	37.83	36.20	36.21	36.22	35.83	35.83	35.84	35.74	35.75	35.76
390350065	Ohio	Cuyahoga	37.67	28.79	28.80	28.84	27.00	27.00	27.04	26.81	26.82	26.88
170313301	Illinois	Cook	37.67	33.36	33.36	33.37	32.84	32.85	32.86	32.70	32.71	32.73
420070014	Pennsylvania	Beaver	37.42	30.46	30.46	30.49	28.70	28.70	28.72	28.49	28.50	28.53
420033007	Pennsylvania	Allegheny	37.40	30.73	30.73	30.75	28.81	28.81	28.83	28.63	28.64	28.67
010730023	Alabama	Jefferson	37.33	32.50	32.50	32.58	32.12	32.12	32.19	31.57	31.57	31.64
550790026	Wisconsin	Milwaukee	37.24	33.54	33.57	33.58	33.21	33.24	33.25	33.10	33.14	33.15
180970043	Indiana	Marion	37.20	29.00	29.00	29.05	27.82	27.82	27.85	27.76	27.77	27.81
261470005	Michigan	St Clair	37.14	34.16	34.16	34.19	33.38	33.38	33.39	33.29	33.30	33.32
550790043	Wisconsin	Milwaukee	37.10	34.22	34.26	34.27	33.92	33.96	33.96	33.92	33.95	33.96
180890026	Indiana	Lake	37.06	33.67	33.67	33.68	33.37	33.37	33.38	33.39	33.39	33.40
180970081	Indiana	Marion	36.96	28.83	28.83	28.87	27.59	27.59	27.63	27.54	27.55	27.61
180970066	Indiana	Marion	36.92	30.40	30.40	30.45	29.13	29.13	29.18	29.11	29.11	29.18
171191007	Illinois	Madison	36.83	31.19	31.20	31.21	30.66	30.68	30.70	30.64	30.67	30.68
550790010	Wisconsin	Milwaukee	36.71	33.47	33.50	33.51	33.13	33.16	33.17	33.13	33.17	33.18
390170003	Ohio	Butler	36.59	28.71	28.71	28.73	27.33	27.33	27.35	27.29	27.30	27.35
170316005	Illinois	Cook	36.42	35.09	35.10	35.10	34.82	34.82	34.83	34.45	34.47	34.49
420031008	Pennsylvania	Allegheny	36.35	28.15	28.15	28.19	25.62	25.62	25.66	25.38	25.40	25.45
261610008	Michigan	Washtenaw	36.32	30.20	30.20	30.23	29.33	29.33	29.34	29.26	29.27	29.29
170312001	Illinois	Cook	36.12	32.71	32.71	32.72	32.33	32.34	32.35	32.21	32.22	32.24
170310052	Illinois	Cook	36.07	30.62	30.62	30.63	30.31	30.32	30.33	30.20	30.21	30.22
421330008	Pennsylvania	York	36.06	34.55	34.56	34.56	33.91	33.92	33.92	33.79	33.80	33.82
261630015	Michigan	Wayne	36.00	33.04	33.04	33.06	31.99	31.99	32.00	31.91	31.92	31.94
010732003	Alabama	Jefferson	35.94	32.23	32.23	32.28	31.91	31.91	31.97	31.46	31.46	31.53
390618001	Ohio	Hamilton	35.85	28.23	28.23	28.27	26.73	26.73	26.75	26.64	26.65	26.68
171190023	Illinois	Madison	35.81	30.23	30.23	30.25	29.50	29.50	29.51	29.41	29.43	29.45
420031301	Pennsylvania	Allegheny	35.65	28.05	28.05	28.08	26.15	26.15	26.17	25.85	25.86	25.89
391130032	Ohio	Montgomery	35.61	25.99	25.99	26.02	24.62	24.62	24.64	24.54	24.54	24.60
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	28.00	26.34	26.34	26.36	26.13	26.14	26.17

*Monitors are in order of decreasing 2012 base case Maximum DV.
** Identify receptors that have maximum design values greater than or equal to 35.5 $\mu g/m^3$ at the $500 cost threshold in 2014 (as modeled in AQAT in the TR).
***Including the Additional Texas, New York, and Wisconsin Emissions from the Final February Revisions Rule and the Additional Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina Emissions from the Final June Revisions Rule.

Table 6. The Percentage of the Final June Revisions Rule Annual NO_x Emission Increase (tons) as a Function of Total Annual NO_x Emissions from all Source Sectors (tons) (Including the Final February Revisions Rule).[4]

State	2014 "Remedy" Control Scenario Total Annual NO_x Emissions	Final June Revisions Rule Annual NO_x Budget Increase	Final June Revisions Rule Annual NO_x Budget Increase as a Percentage of 2014 "Remedy" Total Emissions
Alabama	315,155		
Arkansas	194,964		
Connecticut	80,793		
Delaware	31,744		
District of Columbia	9,773		
Florida	616,154		
Georgia	395,764	13,198	3.3%
Illinois	540,361		
Indiana	424,250		
Iowa	217,221		
Kansas	240,384	5,794	2.4%
Kentucky	286,806		
Louisiana	466,098		
Maine	61,657		
Maryland	181,533		
Massachusetts	175,316		
Michigan	447,772		
Minnesota	338,438		
Mississippi	216,224		
Missouri	352,631	26	0.0%
Nebraska	173,170		
New Hampshire	47,482		
New Jersey	210,520		
New York	461,412	694	0.2%
North Carolina	317,230		
North Dakota	127,127		
Ohio	508,054	2,765	0.5%
Oklahoma	305,859		
Pennsylvania	514,563		
Rhode Island	18,808		
South Carolina	202,118		
South Dakota	65,500		
Tennessee	293,339		
Texas	1,369,987	2,731	0.2%
Vermont	22,824		
Virginia	333,985		
West Virginia	155,245		
Wisconsin	257,462		

[4] For additional details about emission budgets and unit-level allocations see the Final June Revisions Rule State Budgets and New Unit Set-Asides TSD and the Final June Revisions Rule Unit-Level Allocations under the FIPs in the docket to this rulemaking.

Table 7. The Percentage of the Final June Revisions Rule Ozone-Season NO_x Emission Increase (tons) as a Function of Total Ozone-Season NO_x Emissions from all Source Sectors (tons) (Including the Final February Revisions Rule).[5]

State	2014 "Remedy" Control Scenario Total Ozone-Season NO_x Emissions	Final June Revisions Rule Ozone-Season NO_x Budget Increase	Final June Revisions Rule Ozone-Season NO_x Budget Increase as a Percentage of 2014 "Remedy" Total Emissions
Alabama	126,382		
Arkansas	87,920	73	0.1%
Connecticut	31,133		
Delaware	13,693		
District of Columbia	3,805		
Florida	261,497		
Georgia	161,301	5,762	3.6%
Illinois	221,011		
Indiana	176,143		
Iowa	97,478		
Kansas	97,635		
Kentucky	117,179		
Louisiana	199,940	89	0.0%
Maine	24,427		
Maryland	74,401		
Massachusetts	68,324		
Michigan	180,549		
Minnesota	144,960		
Mississippi	91,480	115	0.1%
Missouri	149,213	26	0.0%
Nebraska	74,095		
New Hampshire	18,785		
New Jersey	84,110		
New York	184,723	127	0.1%
North Carolina	130,132		
North Dakota	59,336		
Ohio	208,281	1,221	0.6%
Oklahoma	125,457	859	0.7%
Pennsylvania	208,800		
Rhode Island	7,251		
South Carolina	83,215		
South Dakota	31,739		
Tennessee	119,966		
Texas	578,301	1,142	0.2%
Vermont	8,796		
Virginia	136,976		
West Virginia	63,770		
Wisconsin	104,890		

[5] For additional details about emission budgets and unit-level allocations see the Final Revisions Rule State Budgets and New Unit Set-Asides TSD and the Final Revisions Rule Unit-Level Allocations under the FIPs in the docket to this rulemaking.

Appendix A.

Documents, worksheets, and workbooks used in this analysis (with documents from the final TR that were used listed with their relevant document identification number). In addition, a list of abbreviations along with brief descriptions of the various AQAT simulations used in this assessment is included at the end of this appendix.

Annual and Quarterly Emissions for all AQAT Simulations. EPA-HQ-OAR-2009-0491-4530

AQAT_emissions_final_June_revrule.xlsx
contains the emissions and fraction of emissions for each scenario in the final february revisions rule and the final june revisions rule relative to the total emissions in the 2012 base case from the final TR.

These files contain the 24-hour PM2.5 2012 base case and 2014 AQAT Calibration Scenario contributions.
QTR1_base_and_AQAT_calibration_scenario_contributions.xlsx EPA-HQ-OAR-2009-0491-4531
QTR2_base_and_AQAT_calibration_scenario_contributions.xlsx EPA-HQ-OAR-2009-0491-4532
QTR3_base_and_AQAT_calibration_scenario_contributions.xlsx EPA-HQ-OAR-2009-0491-4533
QTR4_base_and_AQAT_calibration_scenario_contributions.xlsx EPA-HQ-OAR-2009-0491-4534

The annual PM2.5 and 24-hour PM2.5 calibration factors can be found in the respective files in the TR docket. The annual PM2.5 calibration factors are also included in the AnnualPM2.5 AQAT workbook.
Annual PM Calibration Factors.xlsx EPA-HQ-OAR-2009-0491-4535
Daily PM Calibration Factors.xlsx EPA-HQ-OAR-2009-0491-4464

These files contain the quarterly contributions and calibrated Relative Response Factors (RRFs) for the 24-hour PM2.5 simulations (CT refers to cost threshold). The files from the final TR are listed here (along with their docket identification numbers), as well as the additional files that have been created and used for this assessment. The file name identifies whether the file is a cost threshold (CT) or a "remedy" control scenario (rem).
dailyPM_adjusted sulfate contributions and RRF_2014_500CT.xlsx EPA-HQ-OAR-2009-0491-4492
dailyPM_adjusted sulfate contributions and RRF_2014_2300CT.xlsx EPA-HQ-OAR-2009-0491-4488
dailyPM_adjusted sulfate contributions and RRF_2014_2300_remedy.xlsx EPA-HQ-OAR-2009-0491-4487
dailyPM_adjusted sulfate contributions and RRF_2014_2300rem_febrev. xlsx (recreating the final February revisions rule rule)
dailyPM_adjusted sulfate contributions and RRF_2014_2300rem_Junerev. xlsx

dailyPM_adjusted sulfate contributions and RRF_2014_2300rem. xlsx (recreating the final TR file)
dailyPM_adjusted sulfate contributions and RRF_2014_2300CT_febrev. xlsx (recreating the final February revisions rule rule)
dailyPM_adjusted sulfate contributions and RRF_2014_2300CT_Junerev. xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_2300CT. xlsx (recreating the final TR file)
dailyPM_adjusted sulfate contributions and RRF_2014_500CT_febrev. xlsx (recreating the final February revisions rule rule)
dailyPM_adjusted sulfate contributions and RRF_2014_500CT_Junerev. xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_500CT. xlsx (recreating the final TR file)

dailyPM_allyears_high_quarters_Junerev.xlsx. This file contains a summary of the estimated 98th percentile values and resulting average and maximum design values for all 24-hour PM2.5 AQAT cost threshold level and remedy simulations. It also contains a summary worksheet, where the design values are sorted in order of decreasing maximum 2012 base case design value (the same key as used in the tables in this TSD).

The following files apply the RRFs to each of the 32 days per year for each of the 5 years of available receptor estimates. The result is the estimated 24-hour PM2.5 concentration for that day. The 98th percentile day is also identified in these files. They are in 2014.

dailyPM_all_years_all_quarters_base_500CT.xlsx EPA-HQ-OAR-2009-0491-4540
dailyPM_all_years_all_quarters_base_2300CT.xlsx EPA-HQ-OAR-2009-0491-4505
dailyPM_all_years_all_quarters_2300_remedy.xlsx EPA-HQ-OAR-2009-0491-4569
The additional files in this assessment are:
dailyPM_all_years_all_quarters_2300_rem_febrev. xlsx (recreating the final February revisions rule rule)
dailyPM_all_years_all_quarters_2300_rem_junerev. xlsx
dailyPM_all_years_all_quarters_2300_rem. xlsx (recreating the final TR file)
dailyPM_all_years_all_quarters_2300_CT_febrev. xlsx (recreating the final February revisions rule rule)
dailyPM_all_years_all_quarters_2300_CT_junerev.xlsx
dailyPM_all_years_all_quarters_2300_CT. xlsx (recreating the final TR file)
dailyPM_all_years_all_quarters_500_CT_febrev. xlsx (recreating the final February revisions rule rule)
dailyPM_all_years_all_quarters_500_CT_junerev.xlsx
dailyPM_all_years_all_quarters_500_CT. xlsx (recreating the final TR file)

The file annualPM25 AQAT.xlsx file EPA-HQ-OAR-2009-0491-4458
contains the base contributions, AQAT calibration scenario contributions, calibrated contributions, and estimated design values for all annual PM2.5 AQAT simulations for the final TR.

A new file, containing the annual AQAT estimates for this assessment (including the final February revisions rule and final June revisions rule) is called “annualPM25 AQAT_June_rev.xlsx”

A list of the abbreviations, used throughout the excel workbooks, which identify specific AQAT simulations used in this assessment:

2300 rem Feb rev. This is a simulation of the 2014 "remedy" control scenario with the final Febrauary emission revisions made for Texas, New York, and Wisconsin.
2300 rem June rev. This is a simulation of the 2014 "remedy" control scenario with the emission revisions in the final June revisions rule made for Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina as well as the emission changes for Texas, New York, and Wisconsin included in the final February revisions rule.
2300 rem. This is a simulation of the 2014 "remedy" control scenario with emissions from the final Transport Rule.
2300 CT Feb rev. This is a simulation of the 2014 $2,300/ton cost threshold scenario with the final Febrauary emission revisions made for Texas, New York, and Wisconsin.
2300 CT June rev. This is a simulation of the 2014 $2,300/ton cost threshold scenario with the emission revisions in the final June revisions rule made for Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina as well as the emission changes for Texas, New York, and Wisconsin included in the final February revisions rule.
2300 CT. This is a simulation of the 2014 $2,300/ton cost threshold scenario with emissions from the final Transport Rule.
500 CT Feb rev. This is a simulation of the 2014 $500/ton cost threshold scenario with the final emission Febrauary revisions made for Texas, New York, and Wisconsin.
500 CT June rev. This is a simulation of the 2014 $500/ton cost threshold scenario with the emission revisions in the final June revisions rule made for Georgia, Indiana, Kansas, Nebraska, New York, Ohio, and South Carolina as well as the emission changes for Texas, New York, and Wisconsin included in the final February revisions rule.
500 CT. This is a simulation of the 2014 $500/ton cost threshold scenario with emissions from the final Transport Rule.