Technical Support Document (TSD)

for the Revisions to the Transport Rule

Docket ID No. EPA-HQ-OAR-2009-0491

Significant Contribution Assessment TSD

U.S. Environmental Protection Agency

Office of Air and Radiation

October 2011

This Technical Support Document (TSD) demonstrates EPA's analysis to quantify the SO_2 emissions that significantly contribute to nonattainment or interfere with maintenance of the National Ambient Air Quality Standards (NAAQS) in downwind states for the Revisions to the Transport Rule. The proposed increases in state SO_2 budgets for 2014 and thereafter, which could result in increased emissions in 2014, were investigated for Texas, New York, and Wisconsin. New Jersey was not investigated in this assessment because its proposed SO_2 budget would increase for 2012 through 2013 and not for 2014 and thereafter. For purposes of investigating the impact of the state budget increases, EPA assumed that the emissions in each state involved would equal the proposed amount of the increased state budget. Therefore, this TSD refers to the "proposed emission increases" assumed to result from the proposed budget increases and analyzes the impact of these emission increases. This TSD is organized as follows:

A. Background on EPA's Analysis to Quantify Emissions that Significantly Contribute to Nonattainment or Interfere with Maintenance

B. Analysis of Significant Contribution for SO_2 Emissions from Texas Using the Air Quality Assessment Tool (AQAT)

C. Analysis of Significant Contribution for SO_2 Emissions from New York Using the Air Quality Assessment Tool (AQAT)

D. Analysis of Significant Contribution for SO_2 Emissions from Wisconsin Using the Air Quality Assessment Tool (AQAT)

E. Presentation of Proposed Annual and Ozone-Season NO_x Emission Increases Relative to Annual and Ozone-Season Total NO_x Emissions

A. Background on EPA's Analysis to Quantify Emissions that Significantly Contribute to Nonattainment or Interfere with Maintenance

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 $PM_{2.5}$ 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 air quality assessment tool (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 on a case-by-case and state-by-state basis to estimate the impacts of the proposed SO_2 emission increases on downwind air quality in the context of the air quality portions of the determination of significant contribution in 2014 followed by an estimate of the net effect on the "remedy" control scenario in 2014. The proposed emission increases were investigated in a state-specific manner to show the estimated air quality impacts from that state's proposed emission increase on the downwind monitors to facilitate public comment on each emission increase. For example, this means that we examined the effects of the proposed emission increase for Texas, without simultaneously applying the proposed emission increases for New York and Wisconsin (and visa-versa). For each state, there were two assessments:

- 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, we assess whether the proposed SO_2 emission increases in Texas, New York, or Wisconsin 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 PM.25 (compared with the AQAT analysis from the final TR). Specifically, we investigate if their 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)? In this assessment, only states that are "linked" to a particular receptor make emission reductions, all other states are held at base case emission levels.
- "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 for the final TR (except for, on a case-by-case basis, emissions from Texas, New York, or Wisconsin, where their emissions are increased).

This analysis reaches the same conclusion as EPA's assessment of significant contribution to nonattainment and interference with maintenance from the final TR. There are no estimated changes in the patterns of attainment, nonattainment, and maintenance at the $500/ton cost threshold level for either Texas, New York, or Wisconsin. Therefore, Texas' significant contribution and interference with maintenance is the amount of emissions that can be removed at the $500/ton cost threshold. Furthermore, there are no estimated changes in the patterns of attainment, nonattainment, and maintenance at the $2,300/ton cost threshold level for either New York, or Wisconsin (relative to the analysis from the final TR). Thus, EPA concludes that for these three 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 proposed individual emission changes for Texas, New York, or Wisconsin.

In addition to the state-by-state and case-by-case analysis presented in this TSD, EPA also assessed the cumulative air quality impacts in the $500/ton cost threshold and $2300/ton cost threshold scenarios used in the significant contribution/interference with maintenance assessment as well as on the 2014 "remedy" control scenario. For these scenarios, we assumed that all three states (Texas, New York, and Wisconsin), simultaneously, were to make the proposed emission increases. As seen in the tables in Appendix B (Tables B-1 through B-4), while there were small changes in concentrations at some receptors, there were no changes in the patterns of attainment, nonattainment, and maintenance for either of the two cost threshold scenarios or for the 2014 "remedy" control scenario.

Based on the results of the analyses presented in this TSD (which showed small changes in concentrations at downwind receptors, no changes in the patterns of attainment, nonattainment, and maintenance at the two cost threshold levels, and no changes in the "remedy" control scenario) under any of the combinations assessed (either emission increases for each of the states individually or simultaneous emission increases for all three states), EPA concludes that the proposed SO_2 emission increases for each state, as well as collectively for all three states, would not substantially affect the air quality portion of the multifactor test and thus would not affect EPA's conclusions in the final TR identifying $500/ton and $2,300/ton as the appropriate SO_2 cost thresholds for "Group 1" and "Group 2" states..

B. Analysis of Significant Contribution for SO_2 Emissions from Texas Using the Air Quality Assessment Tool (AQAT)

Using the calibrated AQAT (as described in section C of the Significant Contribution and State Emissions Budgets Final Rule TSD), EPA examined the annual PM2.5 and 24-hour PM2.5 air quality impacts to receptors in 2014 using the 2014 base case and 2014 $500/ton cost threshold emission estimates. This analysis directly follows the analysis from the final TR cost threshold analysis. Appendix A of this document lists a number of the AQAT input and output workbooks from the TR that were used in this assessment as well as a number of additional AQAT input, intermediate, and output workbooks created specifically for this assessment.

To assess the impacts of emission increases under this revisions proposal to the $500/ton cost threshold, states whose contributions were greater than or equal to the 1% contribution threshold in the 2012 base case modeling had emissions at the $500/ton cost threshold level, while states whose contributions were below the threshold had emissions at the 2014 base case values. For Texas, emissions were assessed using the adjusted 2014 $500/ton cost threshold emissions level (with an additional 70,067 tons of additional SO_2) or the 2014 base case emission level, depending whether the contribution from Texas exceeded the 1% contribution threshold, or not, respectively. This was compared to the 2014 $500/ton cost threshold analysis from the final TR (where the additional tons were not added to Texas emissions).

To assess the impact of emissions increases under this revisions proposal to the final TR remedy, EPA estimated the air quality impacts of the additional SO_2 emissions for Texas (70,067 tons) in the 2014 “remedy” control scenario and compared this with the 2014 control scenario from the final TR. In these cases, all states, regardless of whether they were “linked”, or included in the TR, were assumed to make the SO_2 emission reductions or were assumed to experience the SO_2 emission increases as modeled in the final TR control scenario (except, of course, for Texas).

The all fossil and biomass SO_2 emissions for each state modeled in the 2012 base case CAMx source-apportionment air quality modeling are shown in Table 1 for each of the cases involving Texas that were investigated using AQAT. Note that the emissions for each of the states is constant for the two general scenarios $500/ton and control scenario (with the exception of Texas) which had emissions of 0 tons or 70,067 tons added to the values used in the final TR assessment. Note that the “0 ton” case for Texas is identical to the values used in the final TR assessment. For the $500/ton cost threshold assessment, the 2014 base case emissions were used for states that were “not linked” (Table 1).

Only a single cost threshold level ($500/ton) was investigated in this assessment, the appropriate cost threshold for “Group 2” states, as determined in the final TR. Following the analysis of this cost threshold level with the adjustment in SO_2 emissions made for Texas, no additional nonattainment/maintenance areas were present beyond those areas identified at $500/ton in the final TR AQAT assessment (see the Significant Contribution and State Emissions Budgets Final Rule TSD for discussion of this analysis). Since Texas is not “linked” to any of the receptors with residual nonattainment or maintenance problems at the 2014 $500/ton level in the TR AQAT assessment, Texas’s emissions were assessed at the 2014 base case level for these receptors, and, thus, no changes in estimated air quality were present at these receptors in this assessment relative to the TR assessment. Changes in estimated concentrations were seen at the Madison County receptor (ID #171191007) to which Texas was “linked”. However, the resulting change in concentration was not sufficient to alter the conclusion that this receptor would likely be in attainment and would not be a maintenance receptor at the $500/ton cost threshold level in 2014. Thus, EPA concludes that assessment of alternative cost threshold levels (for example, the Group 1 cost threshold level of $2,300/ton) were unnecessary. The estimates of average and maximum design values (DV) for the $500/ton assessment for the two scenarios (incremental emissions of 0 tons or 70,067 tons to Texas) for annual and 24-hour PM2.5 can be found in Tables 2,3,4, and 5.

As described previously, using AQAT, EPA also assessed how the SO_2 emission levels for Texas impact the patterns of attainment, nonattainment, and maintenance areas for the 2014 TR "remedy" control scenario, EPA found that, while there were small changes in average and maximum design values, the patterns were not likely to change. Areas were projected to retain the same status as estimated in the TR using AQAT.

C. Analysis of Significant Contribution for SO_2 Emissions from New York Using the Air Quality Assessment Tool (AQAT)

Using the calibrated annual PM2.5 and 24-hour PM2.5 versions of AQAT (as described in section C of the Significant Contribution and State Emissions Budgets Final Rule TSD), EPA examined the air quality impacts to receptors in 2014 using the 2014 base case and 2014 $500/ton and $2,300/ton cost threshold emission estimates. As was the case for the assessment of Texas emissions, this analysis directly follows the analysis from the final TR cost threshold analysis. As stated in section B of this TSD, Appendix A of this document lists a number of the AQAT input and output workbooks from the TR that were used in this assessment.

To assess the impacts of emission increases under this revisions proposal to the $500/ton and $2,300/ton cost thresholds, states whose contributions were greater than or equal to the 1% contribution threshold in the 2012 base case modeling were assessed at the $500/ton or $2,300/ton cost threshold levels (depending on the assessment), while states whose contributions were below the threshold had emissions at the 2014 base case values. For New York, emissions were assessed at the adjusted 2014 $500/ton or $2,300/ton cost threshold emissions levels to account for the increase in SO_2 emissions from this corrections proposal (with either 0 tons or 3,527 tons of additional SO_2) or the 2014 base case level, depending whether the contribution from New York exceeded the 1% contribution threshold, or not, respectively.

To assess the impact of emissions increases under this corrections proposal to the final TR remedy control scenario, EPA estimated the air quality impacts of the additional SO_2 emission levels for New York (0 tons or 3,527 tons) in the 2014 control scenario. In these cases, all states, regardless of whether they were "linked", or included in the TR, were assumed to make the SO_2 emission reductions or were assumed to experience the SO_2 emission increases as modeled in the final TR control scenario (except for New York).

The 2014 all fossil and biomass SO_2 emissions for each state modeled in the 2012 base case CAMx source-apportionment air quality modeling are shown in Table 6 for each of the cases involving New York investigated using AQAT. Note that the emissions for each of the states is constant for the three general scenarios $500/ton, $2,300/ton, and control scenario (with the exception of New York) which had emissions of 0 tons or 3,527 tons added to the values used in the final TR assessment. Notably, for the New York assessment, emissions from Texas, and Wisconsin were not simultaneously adjusted (i.e., the proposed adjustment was not added to the relevant emissions for these states). For the $500/ton and $2,300/ton cost threshold assessments, the 2014 base case emissions were used for states that were "not linked" (Table 6).

Two cost threshold levels ($500/ton and $2,300/ton) were investigated in this assessment, the appropriate cost threshold for "Group 2" states and the cost threshold for "Group 1" states as determined in the final TR. Following the analysis of this cost threshold level with the adjustment in SO_2 emissions made for New York, no additional nonattainment/maintenance areas were present beyond those areas identified at $500/ton and $2,300/ton in the final TR AQAT assessments (see the Significant Contribution and State Emissions Budgets Final Rule TSD for discussion of this analysis). Since New York is "linked" to at least one of the 24-hour PM2.5 receptors with residual nonattainment or maintenance problems at the 2014 $500/ton level in the TR AQAT assessment that remains in nonattainment and/or maintenance at $2,300/ton, New York is classified as a "Group 1" state. Minor changes in estimated concentrations were seen at the receptors to which New York was "linked" (see the preamble for the final TR). 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.

However, the resulting change in concentration at these receptors was not sufficient to alter the conclusions about the status of these receptors at the $500/ton or $2,300/ton cost threshold levels in 2014. Thus, EPA concludes that assessment of alternative cost threshold levels were unnecessary. The estimates of average and maximum design values for the $500/ton and $2,300/ton assessments for the three scenarios (incremental emissions of 0 tons or 3,527 tons to New York) for annual and 24-hour PM2.5 can be found in Tables 7,8,9, and 10.

As described previously, using AQAT, EPA also assessed how the SO_2 emission levels for New York impact the patterns of attainment, nonattainment, and maintenance areas for the 2014 TR "remedy" control scenario, EPA found that, while there were modest changes in average and maximum design values, the patterns were not likely to change. Areas were projected to retain the same status as estimated in the TR using AQAT.

D. Analysis of Significant Contribution for SO_2 Emissions from Wisconsin Using the Air Quality Assessment Tool (AQAT)

For the assessment of the SO2 emissions from Wisconsin, EPA, EPA followed the same methodology as for New York (in section C of this TSD), examining the impacts of emission increases under this revisions proposal to the $500/ton and $2,300/ton cost thresholds. Wisconsin emissions were assessed at the adjusted 2014 $500/ton or $2,300/ton cost threshold emissions levels (7,757 tons of additional SO_2) when the state was contributing to a receptor at or above the 1% contribution threshold. The results are compared with the estimates from the TR cost threshold analysis. EPA also estimated the air quality impacts of the additional SO_2 emission level for Wisconsin (7,757 tons) in the 2014 control scenario.

In particular, EPA examined the average and maximum DV estimates in the adjusted scenarios for Milwaukee, Wisconsin, since these would likely see the largest changes in value.

The 2014 all fossil and biomass SO_2 emissions for each state for the two cost thresholds ($500/ton and $2,300/ton) as well as the "remedy" control scenario from the TR analysis are shown in Table 6 along with the proposed upward revision of 7,757 tons for Wisconsin. Note that in the assessment of the effects of the proposed revision for Wisconsin, none of the proposed emission revisions for other states were simultaneously investigated.

For both cost threshold levels where Wisconsin emissions were adjusted, no additional nonattainment/maintenance areas were present beyond those areas identified at \$500/ton and \$2,300/ton in the final TR AQAT assessments for both annual PM2.5 and 24-hour PM2.5 (including the Milwaukee receptors). Minor changes in estimated concentrations were seen at the receptors to which Wisconsin was "linked" (see the preamble for the final TR). We have included receptors located in Wisconsin in the following lists. The receptors for 24-hour PM2.5 to which Wisconsin was linked in the TR were: 170311016, 180890022, 261630016, 261630033, 390350038, 390350045, 390350060, 390811001, 420030064, 420030093, 420710007, and 540090011. The receptors for annual PM2.5 to which Wisconsin was linked in the TR were: 171191007, 180970081, 180970083, 261630033, 390350038, 390350045, 390350060, 390350065, 390610014, 390617001, and 390618001.

However, the resulting change in concentration at these receptors was not sufficient to alter the conclusions about the status of these receptors at the \$500/ton or \$2,300/ton cost threshold levels in 2014. Thus, EPA concludes that assessment of alternative cost threshold levels were unnecessary, and Wisconsin maintains its classification as a "Group 1" state. The estimates of average and maximum design values for the \$500/ton and \$2,300/ton assessments for the scenarios (incremental emissions of 0 tons or 7,757 tons) for annual and 24-hour PM2.5 can be found in Tables 11,12,13, and 14.

As described previously for New York, and Texas, using AQAT, EPA also assessed how the adjusted SO_2 emission levels for Wisconsin impact the patterns of attainment, nonattainment, and maintenance areas for the 2014 TR "remedy" control scenario, EPA found that, while there were modest changes in average and maximum design values, the patterns were not likely to change. Areas were projected to retain the same status as estimated in the TR.

E. Presentation of Proposed Annual and Ozone-Season NO_x Emission Increases Relative to Annual and Ozone-Season Total NO_x Emissions .

The proposed revisions to state budgets for annual and ozone-season NO_x 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. Tables 15 and 16 illustrate the relationship of the proposed state budget revisions to each state's total emissions (from all sources) for annual NO_x and ozone-season NO_X, respectively. The proposed state budget revisions 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 – Considering Additional Texas Emissions.

	Base Case	$500/ton Cost Threshold	$500/ton Cost Threshold (With Additional Emissions from Texas)	"Remedy" Control Scenario	"Remedy" Control Scenario (With Additional Emissions from Texas)
Additional Emissions Added to Texas (tons)	**0**	**0**	**70,067**	**0**	**70,067**
State					
Alabama	417,340	200,905	200,905	173,566	173,566
Arkansas	99,411	103,431	103,431	106,685	106,685
Connecticut	3,774	3,883	3,883	3,883	3,883
Delaware	2,172	2,088	2,088	2,172	2,172
District of Columbia	0	0	0	0	0
Florida	143,601	137,705	137,705	148,069	148,069
Georgia	170,288	94,691	94,691	93,208	93,208
Illinois	141,606	138,815	138,815	132,647	132,647
Indiana	727,786	262,386	262,386	195,045	195,045
Iowa	133,083	117,830	117,830	83,827	83,827
Kansas	69,819	55,308	55,308	45,740	45,740
Kentucky	488,006	160,582	160,582	116,927	116,927
Louisiana	118,231	135,803	135,803	139,204	139,204
Maine	2,355	2,355	2,355	2,355	2,355
Maryland	42,926	32,187	32,187	30,368	30,368
Massachusetts	13,365	13,364	13,364	13,363	13,363
Michigan	269,434	210,163	210,163	162,632	162,632
Minnesota	70,937	47,720	47,720	49,622	49,622
Mississippi	30,972	32,454	32,454	32,109	32,109
Missouri	390,287	221,689	221,689	186,898	186,898
Nebraska	73,073	69,466	69,466	71,340	71,340
New Hampshire	6,453	7,100	7,100	6,742	6,742
New Jersey	38,857	7,069	7,069	6,243	6,243
New York	42,887	23,181	23,181	15,160	15,160
North Carolina	126,048	109,612	109,612	69,377	69,377
North Dakota	103,633	102,816	102,816	103,624	103,624
Ohio	851,199	313,193	313,193	178,975	178,975
Oklahoma	137,981	137,981	137,981	138,072	138,072
Pennsylvania	509,650	296,596	296,596	125,545	125,545
Rhode Island	0	0	0	0	0
South Carolina	213,281	96,504	96,504	100,787	100,787
South Dakota	29,711	29,711	29,711	29,711	29,711
Tennessee	284,468	82,159	82,159	64,721	64,721
Texas	**453,332**	**281,298**	**351,365**	**266,648**	**336,715**
Vermont	263	263	263	263	263
Virginia	77,256	71,505	71,505	51,144	51,144
West Virginia	498,507	158,445	158,445	84,344	84,344
Wisconsin	130,538	57,418	57,418	50,136	50,136

*Source: Integrated Planning Model run by EPA, 2011. See Appendix A in the TR Significant Contribution and State Emissions Budgets Final Rule TSD for list and description of the IPM $500/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.

Table 2. Average Annual $PM_{2.5}$ Design Values (DV) ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Texas Emissions.

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 Without Texas Budget Increase	$500/ton With Texas Budget Increase	Control Scenario Without Texas Budget Increase	Control Scenario With Texas Budget Increase
Additional Emissions Added to Texas (tons)				0	70,067	0	70,067
420030064	Pennsylvania	Allegheny	17.94	15.78	15.78	14.86	14.86
390350038	Ohio	Cuyahoga	15.99	14.10	14.10	13.51	13.51
10730023	Alabama	Jefferson	16.15	14.33	14.33	13.89	13.90
390618001	Ohio	Hamilton	16.01	13.54	13.54	12.96	12.97
261630033	Michigan	Wayne	15.73	14.35	14.35	13.77	13.78
390350060	Ohio	Cuyahoga	15.67	13.75	13.75	13.16	13.16
390610014	Ohio	Hamilton	15.76	13.29	13.29	12.70	12.71
390610042	Ohio	Hamilton	15.40	12.97	12.97	12.36	12.37
171191007	Illinois	Madison	15.46	13.83	13.85	13.39	13.40
10732003	Alabama	Jefferson	15.16	13.55	13.55	13.13	13.13
390350045	Ohio	Cuyahoga	15.14	13.23	13.23	12.64	12.64
180970081	Indiana	Marion	14.86	12.68	12.68	12.24	12.24
131210039	Georgia	Fulton	15.07	13.35	13.35	13.07	13.08
390617001	Ohio	Hamilton	14.74	12.30	12.30	11.71	11.72
390350065	Ohio	Cuyahoga	14.67	12.79	12.79	12.19	12.19
180970083	Indiana	Marion	14.71	12.53	12.53	12.09	12.09

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

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

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 Without Texas Budget Increase	$500/ton With Texas Budget Increase	Control Scenario Without Texas Budget Increase	Control Scenario With Texas Budget Increase
Additional Emissions Added to Texas (tons)				0	70,067	0	70,067
420030064	Pennsylvania	Allegheny	18.33	16.17	16.17	15.25	15.25
390350038	Ohio	Cuyahoga	16.66	14.77	14.77	14.18	14.18
10730023	Alabama	Jefferson	16.46	14.64	14.64	14.20	14.21
390618001	Ohio	Hamilton	16.33	13.86	13.86	13.28	13.29
261630033	Michigan	Wayne	16.32	14.94	14.94	14.36	14.37
390350060	Ohio	Cuyahoga	16.18	14.26	14.26	13.67	13.67
390610014	Ohio	Hamilton	15.98	13.51	13.51	12.92	12.93
390610042	Ohio	Hamilton	15.77	13.34	13.34	12.73	12.74
171191007	Illinois	Madison	15.73	14.10	14.12	13.66	13.67
10732003	Alabama	Jefferson	15.64	14.03	14.03	13.61	13.61
390350045	Ohio	Cuyahoga	15.61	13.70	13.70	13.11	13.11
180970081	Indiana	Marion	15.16	12.98	12.98	12.54	12.54
131210039	Georgia	Fulton	15.10	13.38	13.38	13.10	13.11
390617001	Ohio	Hamilton	15.10	12.66	12.66	12.07	12.08
390350065	Ohio	Cuyahoga	15.10	13.22	13.22	12.62	12.62
180970083	Indiana	Marion	15.06	12.88	12.88	12.44	12.44

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

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

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 Without Texas Budget Increase	$500/ton With Texas Budget Increase	Control Scenario Without Texas Budget Increase	Control Scenario With Texas Budget Increase
Additional Emissions Added to Texas (tons)				0	70,067	0	70,067
420030064**	Pennsylvania	Allegheny	56.71	47.57	47.57	45.45	45.45
420030093**	Pennsylvania	Allegheny	39.11	32.19	32.19	29.88	29.88
390350038**	Ohio	Cuyahoga	39.46	34.18	34.18	33.46	33.46
261630016**	Michigan	Wayne	38.99	34.42	34.42	33.88	33.88
390350060	Ohio	Cuyahoga	37.78	31.50	31.50	30.51	30.51
170311016**	Illinois	Cook	37.58	34.13	34.13	32.95	32.96
261630033**	Michigan	Wayne	39.48	36.31	36.31	34.74	34.75
180890022**	Indiana	Lake	34.94	32.79	32.79	32.31	32.31
540090011	West Virginia	Brooke	37.57	30.60	30.60	28.83	28.83
420710007**	Pennsylvania	Lancaster	35.98	35.19	35.19	34.87	34.87
390350045	Ohio	Cuyahoga	34.80	27.69	27.69	26.23	26.23
390811001	Ohio	Jefferson	34.56	27.64	27.64	25.57	25.57
261630019**	Michigan	Wayne	37.34	35.27	35.27	34.87	34.88
390350065	Ohio	Cuyahoga	34.91	27.65	27.65	25.95	25.96
170313301	Illinois	Cook	34.97	31.11	31.11	30.35	30.36
420070014	Pennsylvania	Beaver	36.21	29.28	29.28	27.39	27.39
420033007	Pennsylvania	Allegheny	32.40	26.27	26.27	24.78	24.78
010730023	Alabama	Jefferson	36.96	31.93	31.93	31.10	31.11
550790026	Wisconsin	Milwaukee	33.62	30.48	30.48	30.08	30.08
180970043	Indiana	Marion	35.76	28.64	28.64	27.13	27.13
261470005	Michigan	St Clair	36.23	33.35	33.35	32.67	32.68
550790043	Wisconsin	Milwaukee	36.21	32.49	32.49	31.80	31.81
180890026	Indiana	Lake	34.08	30.91	30.91	30.49	30.49
180970081	Indiana	Marion	35.85	28.44	28.44	27.30	27.30
180970066	Indiana	Marion	35.73	29.22	29.22	28.10	28.10
171191007	Illinois	Madison	36.59	29.92	29.94	29.32	29.34
550790010	Wisconsin	Milwaukee	35.47	31.50	31.50	30.83	30.83
390170003	Ohio	Butler	34.40	28.07	28.07	26.47	26.48
170316005	Illinois	Cook	34.12	32.72	32.72	32.02	32.04
420031008	Pennsylvania	Allegheny	35.04	26.95	26.95	24.47	24.48
261610008	Michigan	Washtenaw	35.05	29.40	29.40	28.47	28.47
170312001	Illinois	Cook	33.62	29.84	29.84	29.50	29.51
170310052	Illinois	Cook	34.94	30.11	30.11	29.69	29.69
421330008	Pennsylvania	York	33.38	31.60	31.60	30.92	30.92
261630015	Michigan	Wayne	35.55	32.23	32.23	31.02	31.02
010732003	Alabama	Jefferson	35.31	31.42	31.42	30.62	30.63
390618001	Ohio	Hamilton	35.29	27.63	27.63	25.96	25.96
171190023	Illinois	Madison	35.11	29.23	29.23	28.41	28.43
420031301	Pennsylvania	Allegheny	33.95	27.16	27.16	24.96	24.96
391130032	Ohio	Montgomery	33.68	24.40	24.40	23.09	23.09
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	26.13	26.14

*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).

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

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 Without Texas Budget Increase	$500/ton With Texas Budget Increase	Control Scenario Without Texas Budget Increase	Control Scenario With Texas Budget Increase
Additional Emissions Added to Texas (tons)				0	70,067	0	70,067
420030064**	Pennsylvania	Allegheny	59.93	50.72	50.72	48.52	48.53
420030093**	Pennsylvania	Allegheny	44.40	36.85	36.85	34.28	34.29
390350038**	Ohio	Cuyahoga	41.84	35.93	35.93	35.39	35.39
261630016**	Michigan	Wayne	41.28	36.20	36.20	35.61	35.61
390350060	Ohio	Cuyahoga	40.85	33.69	33.69	32.94	32.94
170311016**	Illinois	Cook	40.44	37.40	37.40	36.40	36.41
261630033**	Michigan	Wayne	39.81	36.59	36.59	34.95	34.96
180890022**	Indiana	Lake	39.58	37.00	37.00	36.30	36.31
540090011	West Virginia	Brooke	38.39	32.23	32.23	29.63	29.64
420710007**	Pennsylvania	Lancaster	38.37	37.43	37.43	37.08	37.08
390350045	Ohio	Cuyahoga	38.13	29.48	29.48	27.43	27.43
390811001	Ohio	Jefferson	37.88	30.27	30.27	27.76	27.76
261630019**	Michigan	Wayne	37.83	36.20	36.20	35.74	35.75
390350065	Ohio	Cuyahoga	37.67	28.79	28.79	26.81	26.82
170313301	Illinois	Cook	37.67	33.36	33.36	32.70	32.70
420070014	Pennsylvania	Beaver	37.42	30.46	30.46	28.49	28.50
420033007	Pennsylvania	Allegheny	37.40	30.73	30.73	28.63	28.64
010730023	Alabama	Jefferson	37.33	32.50	32.50	31.57	31.58
550790026	Wisconsin	Milwaukee	37.24	33.54	33.54	33.10	33.11
180970043	Indiana	Marion	37.20	29.00	29.00	27.76	27.77
261470005	Michigan	St Clair	37.14	34.16	34.16	33.29	33.30
550790043	Wisconsin	Milwaukee	37.10	34.22	34.22	33.92	33.92
180890026	Indiana	Lake	37.06	33.67	33.67	33.39	33.39
180970081	Indiana	Marion	36.96	28.83	28.83	27.54	27.54
180970066	Indiana	Marion	36.92	30.40	30.40	29.11	29.11
171191007	Illinois	Madison	36.83	31.19	31.21	30.64	30.67
550790010	Wisconsin	Milwaukee	36.71	33.47	33.47	33.13	33.14
390170003	Ohio	Butler	36.59	28.71	28.71	27.29	27.29
170316005	Illinois	Cook	36.42	35.09	35.09	34.45	34.46
420031008	Pennsylvania	Allegheny	36.35	28.15	28.15	25.38	25.39
261610008	Michigan	Washtenaw	36.32	30.20	30.20	29.26	29.27
170312001	Illinois	Cook	36.12	32.71	32.71	32.21	32.22
170310052	Illinois	Cook	36.07	30.62	30.62	30.20	30.20
421330008	Pennsylvania	York	36.06	34.55	34.55	33.79	33.80
261630015	Michigan	Wayne	36.00	33.04	33.04	31.91	31.91
010732003	Alabama	Jefferson	35.94	32.23	32.23	31.46	31.46
390618001	Ohio	Hamilton	35.85	28.23	28.23	26.64	26.64
171190023	Illinois	Madison	35.81	30.23	30.23	29.41	29.44
420031301	Pennsylvania	Allegheny	35.65	28.05	28.05	25.85	25.85
391130032	Ohio	Montgomery	35.61	25.99	25.99	24.54	24.54
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	26.13	26.14

*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).

Table 6. SO_2 EGU Emissions From Fossil and Biomass Units* Used in AQAT (tons of SO_2) in 2014 in the Final TR as well as the Additional Emission Increases Examined in the Revisions Proposal.

State	2014 Base Case	\$500/ton Cost Threshold	\$2,300/ton Cost Threshold	"Remedy" Control Scenario	Emission Increase Examined in AQAT
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	
Illinois	141,606	138,815	128,997	132,647	
Indiana	727,786	262,386	179,539	195,045	
Iowa	133,083	117,830	81,137	83,827	
Kansas	69,819	55,308	60,870	45,740	
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	
New Hampshire	6,453	7,100	7,199	6,742	
New Jersey	38,857	7,069	6,611	6,243	
New York	**42,887**	**23,181**	**14,404**	**15,160**	**3,527**
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	
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	
South Dakota	29,711	29,711	29,711	29,711	
Tennessee	284,468	82,159	58,838	64,721	
Texas	**453,332**	**281,298**	**284,132**	**266,648**	**70,067**
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**	**57,418**	**46,205**	**50,136**	**7,757**

*Source: Integrated Planning Model run by EPA, 2011. See Appendix A in the TR Significant Contribution and State Emissions Budgets Final Rule TSD 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.

Table 7. Average Annual $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional New York Emissions.

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 Without New York Budget Increase	$500/ton With New York Budget Increase	$2,300/ton Without New York Budget Increase	$2,300/ton With New York Budget Increase	Control Scenario Without New York Budget Increase	Control Scenario With New York Budget Increase
Additional Emissions Added to New York (tons)				0	3,527	0	3,527	0	3,527
420030064	Pennsylvania	Allegheny	17.94	15.78	15.78	15.03	15.03	14.86	14.86
390350038	Ohio	Cuyahoga	15.99	14.10	14.10	13.60	13.60	13.51	13.51
10730023	Alabama	Jefferson	16.15	14.33	14.33	14.31	14.31	13.89	13.89
390618001	Ohio	Hamilton	16.01	13.54	13.54	13.01	13.01	12.96	12.96
261630033	Michigan	Wayne	15.73	14.35	14.35	13.87	13.87	13.77	13.77
390350060	Ohio	Cuyahoga	15.67	13.75	13.75	13.25	13.25	13.16	13.16
390610014	Ohio	Hamilton	15.76	13.29	13.29	12.75	12.75	12.70	12.70
390610042	Ohio	Hamilton	15.40	12.97	12.97	12.44	12.44	12.36	12.36
171191007	Illinois	Madison	15.46	13.83	13.83	13.56	13.56	13.39	13.39
10732003	Alabama	Jefferson	15.16	13.55	13.55	13.52	13.52	13.13	13.13
390350045	Ohio	Cuyahoga	15.14	13.23	13.24	12.73	12.73	12.64	12.64
180970081	Indiana	Marion	14.86	12.68	12.68	12.26	12.26	12.24	12.24
131210039	Georgia	Fulton	15.07	13.35	13.35	13.20	13.20	13.07	13.07
390617001	Ohio	Hamilton	14.74	12.30	12.30	11.76	11.76	11.71	11.71
390350065	Ohio	Cuyahoga	14.67	12.79	12.79	12.28	12.28	12.19	12.19
180970083	Indiana	Marion	14.71	12.53	12.53	12.11	12.11	12.09	12.09

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

Table 8. Maximum Annual $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional New York Emissions.

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 Without New York Budget Increase	$500/ton With New York Budget Increase	$2,300/ton Without New York Budget Increase	$2,300/ton With New York Budget Increase	Control Scenario Without New York Budget Increase	Control Scenario With New York Budget Increase
Additional Emissions Added to New York (tons)				0	3,527	0	3,527	0	3,527
420030064	Pennsylvania	Allegheny	18.33	16.17	16.17	15.42	15.42	15.25	15.25
390350038	Ohio	Cuyahoga	16.66	14.77	14.77	14.27	14.27	14.18	14.18
10730023	Alabama	Jefferson	16.46	14.64	14.64	14.62	14.62	14.20	14.20
390618001	Ohio	Hamilton	16.33	13.86	13.86	13.33	13.33	13.28	13.28
261630033	Michigan	Wayne	16.32	14.94	14.94	14.46	14.46	14.36	14.36
390350060	Ohio	Cuyahoga	16.18	14.26	14.26	13.76	13.76	13.67	13.67
390610014	Ohio	Hamilton	15.98	13.51	13.51	12.97	12.97	12.92	12.92
390610042	Ohio	Hamilton	15.77	13.34	13.34	12.81	12.81	12.73	12.73
171191007	Illinois	Madison	15.73	14.10	14.10	13.83	13.83	13.66	13.66
10732003	Alabama	Jefferson	15.64	14.03	14.03	14.00	14.00	13.61	13.61
390350045	Ohio	Cuyahoga	15.61	13.70	13.71	13.20	13.20	13.11	13.11
180970081	Indiana	Marion	15.16	12.98	12.98	12.56	12.56	12.54	12.54
131210039	Georgia	Fulton	15.10	13.38	13.38	13.23	13.23	13.10	13.10
390617001	Ohio	Hamilton	15.10	12.66	12.66	12.12	12.12	12.07	12.07
390350065	Ohio	Cuyahoga	15.10	13.22	13.22	12.71	12.71	12.62	12.62
180970083	Indiana	Marion	15.06	12.88	12.88	12.46	12.46	12.44	12.44

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

Table 9. Average 24-hour $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional New York Emissions.

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 Without New York Budget Increase	$500/ton With New York Budget Increase	$2,300/ton Without New York Budget Increase	$2,300/ton With New York Budget Increase	Control Scenario Without New York Budget Increase	Control Scenario With New York Budget Increase
Additional Emissions Added to New York (tons)				0	3,527	0	3,527	0	3,527
420030064**	Pennsylvania	Allegheny	56.71	47.57	47.57	45.54	45.54	45.45	45.45
420030093**	Pennsylvania	Allegheny	39.11	32.19	32.19	30.25	30.25	29.88	29.88
390350038**	Ohio	Cuyahoga	39.46	34.18	34.18	33.51	33.51	33.46	33.46
261630016**	Michigan	Wayne	38.99	34.42	34.42	33.93	33.93	33.88	33.88
390350060	Ohio	Cuyahoga	37.78	31.50	31.50	30.60	30.61	30.51	30.51
170311016**	Illinois	Cook	37.58	34.13	34.13	33.13	33.13	32.95	32.95
261630033**	Michigan	Wayne	39.48	36.31	36.31	35.00	35.00	34.74	34.75
180890022**	Indiana	Lake	34.94	32.79	32.79	32.38	32.38	32.31	32.31
540090011	West Virginia	Brooke	37.57	30.60	30.60	29.07	29.07	28.83	28.83
420710007**	Pennsylvania	Lancaster	35.98	35.19	35.19	34.95	34.95	34.87	34.87
390350045	Ohio	Cuyahoga	34.80	27.69	27.69	26.30	26.30	26.23	26.24
390811001	Ohio	Jefferson	34.56	27.64	27.64	25.79	25.79	25.57	25.57
261630019**	Michigan	Wayne	37.34	35.27	35.28	34.93	34.93	34.87	34.88
390350065	Ohio	Cuyahoga	34.91	27.65	27.66	26.11	26.11	25.95	25.96
170313301	Illinois	Cook	34.97	31.11	31.11	30.54	30.54	30.35	30.35
420070014	Pennsylvania	Beaver	36.21	29.28	29.28	27.59	27.59	27.39	27.39
420033007	Pennsylvania	Allegheny	32.40	26.27	26.27	24.88	24.88	24.78	24.78
010730023	Alabama	Jefferson	36.96	31.93	31.93	31.61	31.61	31.10	31.10
550790026	Wisconsin	Milwaukee	33.62	30.48	30.48	30.15	30.15	30.08	30.08
180970043	Indiana	Marion	35.76	28.64	28.64	27.16	27.16	27.13	27.13
261470005	Michigan	St Clair	36.23	33.35	33.35	32.78	32.78	32.67	32.67
550790043	Wisconsin	Milwaukee	36.21	32.49	32.49	31.85	31.85	31.80	31.80
180890026	Indiana	Lake	34.08	30.91	30.91	30.52	30.52	30.49	30.49
180970081	Indiana	Marion	35.85	28.44	28.44	27.35	27.35	27.30	27.30
180970066	Indiana	Marion	35.73	29.22	29.22	28.13	28.13	28.10	28.10
171191007	Illinois	Madison	36.59	29.92	29.92	29.32	29.32	29.32	29.32
550790010	Wisconsin	Milwaukee	35.47	31.50	31.50	30.82	30.82	30.83	30.83
390170003	Ohio	Butler	34.40	28.07	28.07	26.49	26.49	26.47	26.48
170316005	Illinois	Cook	34.12	32.72	32.72	32.41	32.41	32.02	32.02
420031008	Pennsylvania	Allegheny	35.04	26.95	26.95	24.69	24.69	24.47	24.48
261610008	Michigan	Washtenaw	35.05	29.40	29.40	28.54	28.55	28.47	28.47
170312001	Illinois	Cook	33.62	29.84	29.84	29.58	29.58	29.50	29.50
170310052	Illinois	Cook	34.94	30.11	30.11	29.78	29.78	29.69	29.69
421330008	Pennsylvania	York	33.38	31.60	31.60	31.03	31.03	30.92	30.92
261630015	Michigan	Wayne	35.55	32.23	32.23	31.10	31.10	31.02	31.02
010732003	Alabama	Jefferson	35.31	31.42	31.42	31.10	31.10	30.62	30.62
390618001	Ohio	Hamilton	35.29	27.63	27.63	26.11	26.11	25.96	25.96
171190023	Illinois	Madison	35.11	29.23	29.23	28.49	28.49	28.41	28.41
420031301	Pennsylvania	Allegheny	33.95	27.16	27.16	25.21	25.21	24.96	24.96
391130032	Ohio	Montgomery	33.68	24.40	24.40	23.15	23.15	23.09	23.09
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	26.34	26.34	26.13	26.13

*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).

Table 10. Maximum 24-hour $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional New York Emissions.

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 Without New York Budget Increase	$500/ton With New York Budget Increase	$2,300/ton Without New York Budget Increase	$2,300/ton With New York Budget Increase	Control Scenario Without New York Budget Increase	Control Scenario With New York Budget Increase
Additional Emissions Added to New York (tons)				0	3,527	0	3,527	0	3,527
420030064**	Pennsylvania	Allegheny	59.93	50.72	50.72	48.63	48.63	48.52	48.53
420030093**	Pennsylvania	Allegheny	44.40	36.85	36.85	34.80	34.80	34.28	34.29
390350038**	Ohio	Cuyahoga	41.84	35.93	35.93	35.41	35.41	35.39	35.39
261630016**	Michigan	Wayne	41.28	36.20	36.20	35.65	35.66	35.61	35.61
390350060	Ohio	Cuyahoga	40.85	33.69	33.70	33.04	33.04	32.94	32.94
170311016**	Illinois	Cook	40.44	37.40	37.40	36.54	36.54	36.40	36.40
261630033**	Michigan	Wayne	39.81	36.59	36.59	35.23	35.23	34.95	34.96
180890022**	Indiana	Lake	39.58	37.00	37.00	36.51	36.51	36.30	36.30
540090011	West Virginia	Brooke	38.39	32.23	32.23	30.02	30.02	29.63	29.63
420710007**	Pennsylvania	Lancaster	38.37	37.43	37.43	37.18	37.18	37.08	37.08
390350045	Ohio	Cuyahoga	38.13	29.48	29.49	27.60	27.60	27.43	27.43
390811001	Ohio	Jefferson	37.88	30.27	30.27	28.03	28.03	27.76	27.76
261630019**	Michigan	Wayne	37.83	36.20	36.21	35.83	35.83	35.74	35.74
390350065	Ohio	Cuyahoga	37.67	28.79	28.80	27.00	27.00	26.81	26.82
170313301	Illinois	Cook	37.67	33.36	33.36	32.84	32.84	32.70	32.70
420070014	Pennsylvania	Beaver	37.42	30.46	30.46	28.70	28.70	28.49	28.49
420033007	Pennsylvania	Allegheny	37.40	30.73	30.73	28.81	28.81	28.63	28.63
010730023	Alabama	Jefferson	37.33	32.50	32.50	32.12	32.12	31.57	31.57
550790026	Wisconsin	Milwaukee	37.24	33.54	33.54	33.21	33.21	33.10	33.11
180970043	Indiana	Marion	37.20	29.00	29.00	27.82	27.82	27.76	27.76
261470005	Michigan	St Clair	37.14	34.16	34.16	33.38	33.38	33.29	33.29
550790043	Wisconsin	Milwaukee	37.10	34.22	34.22	33.92	33.92	33.92	33.92
180890026	Indiana	Lake	37.06	33.67	33.67	33.37	33.37	33.39	33.39
180970081	Indiana	Marion	36.96	28.83	28.83	27.59	27.59	27.54	27.54
180970066	Indiana	Marion	36.92	30.40	30.40	29.13	29.13	29.11	29.11
171191007	Illinois	Madison	36.83	31.19	31.19	30.66	30.66	30.64	30.64
550790010	Wisconsin	Milwaukee	36.71	33.47	33.47	33.13	33.13	33.13	33.13
390170003	Ohio	Butler	36.59	28.71	28.71	27.33	27.33	27.29	27.29
170316005	Illinois	Cook	36.42	35.09	35.09	34.82	34.82	34.45	34.45
420031008	Pennsylvania	Allegheny	36.35	28.15	28.15	25.62	25.62	25.38	25.39
261610008	Michigan	Washtenaw	36.32	30.20	30.20	29.33	29.33	29.26	29.26
170312001	Illinois	Cook	36.12	32.71	32.71	32.33	32.33	32.21	32.21
170310052	Illinois	Cook	36.07	30.62	30.62	30.31	30.31	30.20	30.20
421330008	Pennsylvania	York	36.06	34.55	34.56	33.91	33.92	33.79	33.80
261630015	Michigan	Wayne	36.00	33.04	33.04	31.99	31.99	31.91	31.91
010732003	Alabama	Jefferson	35.94	32.23	32.23	31.91	31.91	31.46	31.46
390618001	Ohio	Hamilton	35.85	28.23	28.23	26.73	26.73	26.64	26.64
171190023	Illinois	Madison	35.81	30.23	30.23	29.50	29.50	29.41	29.41
420031301	Pennsylvania	Allegheny	35.65	28.05	28.05	26.15	26.15	25.85	25.85
391130032	Ohio	Montgomery	35.61	25.99	25.99	24.62	24.62	24.54	24.54
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	26.34	26.34	26.13	26.13

*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).

Table 11. Average Annual $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Wisconsin Emissions.

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 Without Wisconsin Budget Increase	$500/ton With Wisconsin Budget Increase	$2,300/ton Without Wisconsin Budget Increase	$2,300/ton With Wisconsin Budget Increase	Control Scenario Without Wisconsin Budget Increase	Control Scenario With Wisconsin Budget Increase
Additional Emissions Added to Wisconsin (tons)				0	7,757	0	7,757	0	7,757
420030064	Pennsylvania	Allegheny	17.94	15.78	15.78	15.03	15.03	14.86	14.86
390350038	Ohio	Cuyahoga	15.99	14.10	14.10	13.60	13.60	13.51	13.51
10730023	Alabama	Jefferson	16.15	14.33	14.33	14.31	14.31	13.89	13.89
390618001	Ohio	Hamilton	16.01	13.54	13.55	13.01	13.01	12.96	12.96
261630033	Michigan	Wayne	15.73	14.35	14.36	13.87	13.87	13.77	13.78
390350060	Ohio	Cuyahoga	15.67	13.75	13.76	13.25	13.25	13.16	13.16
390610014	Ohio	Hamilton	15.76	13.29	13.29	12.75	12.75	12.70	12.71
390610042	Ohio	Hamilton	15.40	12.97	12.97	12.44	12.44	12.36	12.36
171191007	Illinois	Madison	15.46	13.83	13.84	13.56	13.57	13.39	13.39
10732003	Alabama	Jefferson	15.16	13.55	13.55	13.52	13.52	13.13	13.13
390350045	Ohio	Cuyahoga	15.14	13.23	13.24	12.73	12.73	12.64	12.64
180970081	Indiana	Marion	14.86	12.68	12.69	12.26	12.27	12.24	12.24
131210039	Georgia	Fulton	15.07	13.35	13.35	13.20	13.20	13.07	13.07
390617001	Ohio	Hamilton	14.74	12.30	12.30	11.76	11.76	11.71	11.72
390350065	Ohio	Cuyahoga	14.67	12.79	12.79	12.28	12.28	12.19	12.19
180970083	Indiana	Marion	14.71	12.53	12.54	12.11	12.12	12.09	12.09

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

Table 12. Maximum Annual $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Wisconsin Emissions.

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 Without Wisconsin Budget Increase	$500/ton With Wisconsin Budget Increase	$2,300/ton Without Wisconsin Budget Increase	$2,300/ton With Wisconsin Budget Increase	Control Scenario Without Wisconsin Budget Increase	Control Scenario With Wisconsin Budget Increase
Additional Emissions Added to Wisconsin (tons)				0	7,757	0	7,757	0	7,757
420030064	Pennsylvania	Allegheny	18.33	16.17	16.17	15.42	15.42	15.25	15.25
390350038	Ohio	Cuyahoga	16.66	14.77	14.77	14.27	14.27	14.18	14.18
10730023	Alabama	Jefferson	16.46	14.64	14.64	14.62	14.62	14.20	14.20
390618001	Ohio	Hamilton	16.33	13.86	13.87	13.33	13.33	13.28	13.28
261630033	Michigan	Wayne	16.32	14.94	14.95	14.46	14.46	14.36	14.37
390350060	Ohio	Cuyahoga	16.18	14.26	14.27	13.76	13.76	13.67	13.67
390610014	Ohio	Hamilton	15.98	13.51	13.51	12.97	12.97	12.92	12.93
390610042	Ohio	Hamilton	15.77	13.34	13.34	12.81	12.81	12.73	12.73
171191007	Illinois	Madison	15.73	14.10	14.11	13.83	13.84	13.66	13.66
10732003	Alabama	Jefferson	15.64	14.03	14.03	14.00	14.00	13.61	13.61
390350045	Ohio	Cuyahoga	15.61	13.70	13.71	13.20	13.20	13.11	13.11
180970081	Indiana	Marion	15.16	12.98	12.99	12.56	12.57	12.54	12.54
131210039	Georgia	Fulton	15.10	13.38	13.38	13.23	13.23	13.10	13.10
390617001	Ohio	Hamilton	15.10	12.66	12.66	12.12	12.12	12.07	12.08
390350065	Ohio	Cuyahoga	15.10	13.22	13.22	12.71	12.71	12.62	12.62
180970083	Indiana	Marion	15.06	12.88	12.89	12.46	12.47	12.44	12.44

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

Table 13. Average 24-hour $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Wisconsin Emissions.

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 Without Wisconsin Budget Increase	$500/ton With Wisconsin Budget Increase	$2,300/ton Without Wisconsin Budget Increase	$2,300/ton With Wisconsin Budget Increase	Control Scenario Without Wisconsin Budget Increase	Control Scenario With Wisconsin Budget Increase
Additional Emissions Added to Wisconsin (tons)				0	7,757	0	7,757	0	7,757
420030064**	Pennsylvania	Allegheny	56.71	47.57	47.57	45.54	45.54	45.45	45.45
420030093**	Pennsylvania	Allegheny	39.11	32.19	32.19	30.25	30.25	29.88	29.88
390350038**	Ohio	Cuyahoga	39.46	34.18	34.18	33.51	33.51	33.46	33.46
261630016**	Michigan	Wayne	38.99	34.42	34.42	33.93	33.93	33.88	33.88
390350060	Ohio	Cuyahoga	37.78	31.50	31.50	30.60	30.60	30.51	30.51
170311016**	Illinois	Cook	37.58	34.13	34.14	33.13	33.14	32.95	32.96
261630033**	Michigan	Wayne	39.48	36.31	36.31	35.00	35.00	34.74	34.75
180890022**	Indiana	Lake	34.94	32.79	32.80	32.38	32.39	32.31	32.31
540090011	West Virginia	Brooke	37.57	30.60	30.60	29.07	29.07	28.83	28.83
420710007**	Pennsylvania	Lancaster	35.98	35.19	35.19	34.95	34.95	34.87	34.87
390350045	Ohio	Cuyahoga	34.80	27.69	27.69	26.30	26.30	26.23	26.24
390811001	Ohio	Jefferson	34.56	27.64	27.64	25.79	25.79	25.57	25.57
261630019**	Michigan	Wayne	37.34	35.27	35.28	34.93	34.93	34.87	34.88
390350065	Ohio	Cuyahoga	34.91	27.65	27.65	26.11	26.11	25.95	25.96
170313301	Illinois	Cook	34.97	31.11	31.11	30.54	30.54	30.35	30.35
420070014	Pennsylvania	Beaver	36.21	29.28	29.28	27.59	27.59	27.39	27.39
420033007	Pennsylvania	Allegheny	32.40	26.27	26.27	24.88	24.88	24.78	24.78
010730023	Alabama	Jefferson	36.96	31.93	31.93	31.61	31.61	31.10	31.10
550790026	Wisconsin	Milwaukee	33.62	30.48	30.51	30.15	30.18	30.08	30.11
180970043	Indiana	Marion	35.76	28.64	28.64	27.16	27.16	27.13	27.13
261470005	Michigan	St Clair	36.23	33.35	33.35	32.78	32.78	32.67	32.67
550790043	Wisconsin	Milwaukee	36.21	32.49	32.53	31.85	31.89	31.80	31.84
180890026	Indiana	Lake	34.08	30.91	30.91	30.52	30.52	30.49	30.49
180970081	Indiana	Marion	35.85	28.44	28.44	27.35	27.35	27.30	27.30
180970066	Indiana	Marion	35.73	29.22	29.22	28.13	28.13	28.10	28.10
171191007	Illinois	Madison	36.59	29.92	29.92	29.32	29.32	29.32	29.32
550790010	Wisconsin	Milwaukee	35.47	31.50	31.54	30.82	30.86	30.83	30.86
390170003	Ohio	Butler	34.40	28.07	28.07	26.49	26.49	26.47	26.48
170316005	Illinois	Cook	34.12	32.72	32.72	32.41	32.41	32.02	32.03
420031008	Pennsylvania	Allegheny	35.04	26.95	26.95	24.69	24.69	24.47	24.48
261610008	Michigan	Washtenaw	35.05	29.40	29.40	28.54	28.54	28.47	28.47
170312001	Illinois	Cook	33.62	29.84	29.85	29.58	29.58	29.50	29.51
170310052	Illinois	Cook	34.94	30.11	30.12	29.78	29.79	29.69	29.69
421330008	Pennsylvania	York	33.38	31.60	31.60	31.03	31.03	30.92	30.92
261630015	Michigan	Wayne	35.55	32.23	32.23	31.10	31.10	31.02	31.02
010732003	Alabama	Jefferson	35.31	31.42	31.42	31.10	31.10	30.62	30.62
390618001	Ohio	Hamilton	35.29	27.63	27.63	26.11	26.11	25.96	25.96
171190023	Illinois	Madison	35.11	29.23	29.23	28.49	28.49	28.41	28.41
420031301	Pennsylvania	Allegheny	33.95	27.16	27.16	25.21	25.21	24.96	24.96
391130032	Ohio	Montgomery	33.68	24.40	24.40	23.15	23.15	23.09	23.09
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	26.34	26.34	26.13	26.14

*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).

Table 14. Maximum 24-hour $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Wisconsin Emissions.

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 Without Wisconsin Budget Increase	$500/ton With Wisconsin Budget Increase	$2,300/ton Without Wisconsin Budget Increase	$2,300/ton With Wisconsin Budget Increase	Control Scenario Without Wisconsin Budget Increase	Control Scenario With Wisconsin Budget Increase
Additional Emissions Added to Wisconsin (tons)				0	7,757	0	7,757	0	7,757
420030064**	Pennsylvania	Allegheny	59.93	50.72	50.72	48.63	48.63	48.52	48.53
420030093**	Pennsylvania	Allegheny	44.40	36.85	36.85	34.80	34.80	34.28	34.29
390350038**	Ohio	Cuyahoga	41.84	35.93	35.93	35.41	35.41	35.39	35.39
261630016**	Michigan	Wayne	41.28	36.20	36.20	35.65	35.65	35.61	35.61
390350060	Ohio	Cuyahoga	40.85	33.69	33.69	33.04	33.04	32.94	32.94
170311016**	Illinois	Cook	40.44	37.40	37.41	36.54	36.55	36.40	36.40
261630033**	Michigan	Wayne	39.81	36.59	36.59	35.23	35.23	34.95	34.96
180890022**	Indiana	Lake	39.58	37.00	37.01	36.51	36.51	36.30	36.30
540090011	West Virginia	Brooke	38.39	32.23	32.23	30.02	30.02	29.63	29.64
420710007**	Pennsylvania	Lancaster	38.37	37.43	37.43	37.18	37.18	37.08	37.08
390350045	Ohio	Cuyahoga	38.13	29.48	29.48	27.60	27.60	27.43	27.43
390811001	Ohio	Jefferson	37.88	30.27	30.27	28.03	28.03	27.76	27.76
261630019**	Michigan	Wayne	37.83	36.20	36.21	35.83	35.83	35.74	35.74
390350065	Ohio	Cuyahoga	37.67	28.79	28.79	27.00	27.00	26.81	26.82
170313301	Illinois	Cook	37.67	33.36	33.36	32.84	32.85	32.70	32.70
420070014	Pennsylvania	Beaver	37.42	30.46	30.46	28.70	28.70	28.49	28.49
420033007	Pennsylvania	Allegheny	37.40	30.73	30.73	28.81	28.81	28.63	28.64
010730023	Alabama	Jefferson	37.33	32.50	32.50	32.12	32.12	31.57	31.57
550790026	Wisconsin	Milwaukee	37.24	33.54	33.57	33.21	33.24	33.10	33.14
180970043	Indiana	Marion	37.20	29.00	29.00	27.82	27.82	27.76	27.76
261470005	Michigan	St Clair	37.14	34.16	34.16	33.38	33.38	33.29	33.29
550790043	Wisconsin	Milwaukee	37.10	34.22	34.26	33.92	33.96	33.92	33.95
180890026	Indiana	Lake	37.06	33.67	33.67	33.37	33.37	33.39	33.39
180970081	Indiana	Marion	36.96	28.83	28.83	27.59	27.59	27.54	27.54
180970066	Indiana	Marion	36.92	30.40	30.40	29.13	29.13	29.11	29.11
171191007	Illinois	Madison	36.83	31.19	31.19	30.66	30.66	30.64	30.65
550790010	Wisconsin	Milwaukee	36.71	33.47	33.50	33.13	33.16	33.13	33.16
390170003	Ohio	Butler	36.59	28.71	28.71	27.33	27.33	27.29	27.29
170316005	Illinois	Cook	36.42	35.09	35.10	34.82	34.82	34.45	34.45
420031008	Pennsylvania	Allegheny	36.35	28.15	28.15	25.62	25.62	25.38	25.39
261610008	Michigan	Washtenaw	36.32	30.20	30.20	29.33	29.33	29.26	29.26
170312001	Illinois	Cook	36.12	32.71	32.71	32.33	32.34	32.21	32.21
170310052	Illinois	Cook	36.07	30.62	30.62	30.31	30.32	30.20	30.20
421330008	Pennsylvania	York	36.06	34.55	34.55	33.91	33.91	33.79	33.80
261630015	Michigan	Wayne	36.00	33.04	33.04	31.99	31.99	31.91	31.91
010732003	Alabama	Jefferson	35.94	32.23	32.23	31.91	31.91	31.46	31.46
390618001	Ohio	Hamilton	35.85	28.23	28.23	26.73	26.73	26.64	26.64
171190023	Illinois	Madison	35.81	30.23	30.23	29.50	29.50	29.41	29.42
420031301	Pennsylvania	Allegheny	35.65	28.05	28.05	26.15	26.15	25.85	25.85
391130032	Ohio	Montgomery	35.61	25.99	25.99	24.62	24.62	24.54	24.54
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	26.34	26.34	26.13	26.14

*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).

Table 15. The Percentage of the Proposed Annual NO_x Emission Increase (tons) as a Function of Total Annual NO_x Emissions from all Source Sectors (tons).

State	2014 "Remedy" Control Scenario Total Annual NO_x Emissions	Proposed Annual NO_x Emission Increase	Proposed Annual NO_x Emission 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		
Illinois	540,361		
Indiana	424,250		
Iowa	217,221		
Kansas	240,384		
Kentucky	286,806		
Louisiana	466,098		
Maine	61,657		
Maryland	181,533		
Massachusetts	175,316		
Michigan	442,544	5,228	1.2%
Minnesota	338,438		
Mississippi	216,224		
Missouri	352,631		
Nebraska	169,571	3,599	2.1%
New Hampshire	47,482		
New Jersey	209,841	112	0.1%
New York	457,927	3,485	0.8%
North Carolina	317,230		
North Dakota	127,127		
Ohio	508,054		
Oklahoma	305,859		
Pennsylvania	514,563		
Rhode Island	18,808		
South Carolina	202,118		
South Dakota	65,500		
Tennessee	293,339		
Texas	1,368,612	1,375	0.1%
Vermont	22,824		
Virginia	333,985		
West Virginia	155,245		
Wisconsin	254,989	2,473	1.0%

Table 16. The Percentage of the Proposed Ozone-Season NO_x Emission Increase (tons) as a Function of Total Ozone-Season NO_x Emissions from all Source Sectors (tons).

State	2014 “Remedy” Control Scenario Total Ozone-Season NO_x Emissions	Proposed Ozone-Season NO_x Emission Increase	Proposed Ozone-Season NO_x Emission Increase as a Percentage of 2014 “Remedy” Total Emissions
Alabama	126,382		
Arkansas	87,920		
Connecticut	31,133		
Delaware	13,693		
District of Columbia	3,805		
Florida	261,497		
Georgia	161,301		
Illinois	221,011		
Indiana	176,143		
Iowa	97,478		
Kansas	97,635		
Kentucky	117,179		
Louisiana	195,346	4,231	2.2%
Maine	24,427		
Maryland	74,401		
Massachusetts	68,324		
Michigan	180,549		
Minnesota	144,960		
Mississippi	89,326	2,136	2.4%
Missouri	149,213		
Nebraska	74,095		
New Hampshire	18,785		
New Jersey	83,761	195	0.2%
New York	182,812	1,911	1.0%
North Carolina	130,132		
North Dakota	59,336		
Ohio	208,281		
Oklahoma	125,457		
Pennsylvania	208,800		
Rhode Island	7,251		
South Carolina	83,215		
South Dakota	31,739		
Tennessee	119,966		
Texas	576,926	1,375	0.2%
Vermont	8,796		
Virginia	136,976		
West Virginia	63,770		
Wisconsin	104,890		

Appendix A.

Documents, worksheets, and workbooks from the final TR used in this analysis (with the relevant document identification number) as well as a list of additional files created for this assessment. 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_rev.xlsx contains the emissions and fraction of emissions for the scenario 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. Additional copies of these files have been created and used for this assessment.
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. Additional copies of these files have been created and used for this assessment.
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 selected 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) and identifies which states, if any, are being adjusted.
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_500CT.xlsx (recreating the final TR file)
dailyPM_adjusted sulfate contributions and RRF_2014_2300CT.xlsx (recreating the final TR file)
dailyPM_adjusted sulfate contributions and RRF_2014_2300rem.xlsx (recreating the final TR file)
dailyPM_adjusted sulfate contributions and RRF_2014_2300CT_TXNYWI.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_500CT_TXNYWI.xlsx

dailyPM_adjusted sulfate contributions and RRF_2014_2300rem_TXNYWI.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_2300rem_WI.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_2300CT_WI.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_500CT_WI.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_2300rem_NY.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_2300CT_NY.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_500CT_NY.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_2300rem_TX.xlsx
dailyPM_adjusted sulfate contributions and RRF_2014_500CT_TX.xlsx

dailyPM_allyears_high_quarters_rev.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, variability analyses, and remedy simulations. EPA-HQ-OAR-2009-0491-4502. In the TR, this file was referred to as "dailyPM_allyears_high_quarters.xlsx"

These 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_500_CT.xlsx (recreating the final TR file)
dailyPM_all_years_all_quarters_2300_CT.xlsx (recreating the final TR file)
dailyPM_all_years_all_quarters_2300_remedy.xlsx (recreating the final TR file)
dailyPM_all_years_all_quarters_2300_CT_TX.xlsx
dailyPM_all_years_all_quarters_2300_remedy_TX.xlsx
dailyPM_all_years_all_quarters_500_CT_NY.xlsx
dailyPM_all_years_all_quarters_2300_CT_NY.xlsx
dailyPM_all_years_all_quarters_500_CT_WI.xlsx
dailyPM_all_years_all_quarters_2300_CT_WI.xlsx
dailyPM_all_years_all_quarters_2300_remedy_NY.xlsx
dailyPM_all_years_all_quarters_2300_remedy_WI.xlsx
dailyPM_all_years_all_quarters_500_CT_TX_NY_WI.xlsx
dailyPM_all_years_all_quarters_2300_CT_TX_NY_WI.xlsx
dailyPM_all_years_all_quarters_2300_remedy_TX_NY_WI.xlsx

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. A new file, containing the annual AQAT estimates for this assessment is called "annualPM25 AQAT_rev.xlsx"

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

2300 rem TX NY WI. This is a simulation of the 2014 "remedy" control scenario with the emission revisions made for Texas, New York, and Wisconsin.
2300 rem WI. This is a simulation of the 2014 "remedy" control scenario with the emission revisions made for Wisconsin.
2300 rem NY. This is a simulation of the 2014 "remedy" control scenario with the emission revisions made for New York.
2300 rem TX. This is a simulation of the 2014 "remedy" control scenario with the emission revisions made for Texas.
2300 rem. This is a simulation of the 2014 "remedy" control scenario with emissions from the final Transport Rule.
2300 CT TX NY WI. This is a simulation of the 2014 $2,300/ton cost threshold scenario with the emission revisions made for Texas, New York, and Wisconsin.
2300 CT WI. This is a simulation of the 2014 $2,300/ton cost threshold scenario with the emission revisions made for Wisconsin.
2300 CT NY. This is a simulation of the 2014 $2,300/ton cost threshold scenario with the emission revisions made for New York.
2300 CT. This is a simulation of the 2014 $2,300/ton cost threshold scenario with emissions from the final Transport Rule.
500 CT TX NY WI. This is a simulation of the 2014 $500/ton cost threshold scenario with the emission revisions made for Texas, New York, and Wisconsin.
500 CT WI. This is a simulation of the 2014 $500/ton cost threshold scenario with the emission revisions made for Wisconsin.
500 CT NY. This is a simulation of the 2014 $500/ton cost threshold scenario with the emission revisions made for New York.
500 CT TX. This is a simulation of the 2014 $500/ton cost threshold scenario with the emission revisions made for Texas.
500 CT. This is a simulation of the 2014 $500/ton cost threshold scenario with emissions from the final Transport Rule.

Appendix B.

In addition to the state-by-state and case-by-case analysis presented in this TSD, EPA also assessed the cumulative air quality impact in the $500/ton cost threshold and $2300/ton cost threshold scenarios used in the significant contribution/interference with maintenances assessment as well as the 2014 “remedy” control scenario assuming that all three states (Texas, New York, and Wisconsin) made the emission increases proposed in 2014. As shown in Tables B-1 through B-4 for the average and maximum design values for annual PM2.5 and 24-hour PM2.5, changes in concentration are small, and the patterns of attainment, nonattainment, and maintenance do not change (relative to the AQAT estimates of the final TR $500/ton cost threshold, $2300/ton cost threshold, and the “remedy” control scenarios).

Table B-1. Average Annual $PM_{2.5}$ DVs (μg/m^3) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Emissions Concurrently in Texas, New York, and Wisconsin.

Monitor Identification Number*	State	County	CAMx 2012 Base Case (μg/m^3)	AQAT 2014 Average Annual PM2.5 Design Values (μg/m^3).					
				$500/ton Without Budget Increases	$500/ton With Budget Increases	$2,300/ton Without Budget Increases	$2,300/ton With Budget Increases	Control Scenario Without Budget Increases	Control Scenario With Budget Increases
Additional Emissions Added to Wisconsin (tons)				0	7,757	0	7,757	0	7,757
Additional Emissions Added to New York (tons)				0	3,527	0	3,527	0	3,527
Additional Emissions Added to Texas (tons)				0	70,067	0	70,067	0	70,067
420030064	Pennsylvania	Allegheny	17.94	15.78	15.78	15.03	15.03	14.86	14.87
390350038	Ohio	Cuyahoga	15.99	14.10	14.10	13.60	13.60	13.51	13.52
10730023	Alabama	Jefferson	16.15	14.33	14.33	14.31	14.31	13.89	13.90
390618001	Ohio	Hamilton	16.01	13.54	13.55	13.01	13.01	12.96	12.97
261630033	Michigan	Wayne	15.73	14.35	14.36	13.87	13.87	13.77	13.78
390350060	Ohio	Cuyahoga	15.67	13.75	13.76	13.25	13.25	13.16	13.17
390610014	Ohio	Hamilton	15.76	13.29	13.29	12.75	12.75	12.70	12.71
390610042	Ohio	Hamilton	15.40	12.97	12.97	12.44	12.44	12.36	12.37
171191007	Illinois	Madison	15.46	13.83	13.85	13.56	13.58	13.39	13.40
10732003	Alabama	Jefferson	15.16	13.55	13.55	13.52	13.52	13.13	13.13
390350045	Ohio	Cuyahoga	15.14	13.23	13.24	12.73	12.73	12.64	12.65
180970081	Indiana	Marion	14.86	12.68	12.69	12.26	12.27	12.24	12.25
131210039	Georgia	Fulton	15.07	13.35	13.35	13.20	13.20	13.07	13.08
390617001	Ohio	Hamilton	14.74	12.30	12.30	11.76	11.76	11.71	11.72
390350065	Ohio	Cuyahoga	14.67	12.79	12.79	12.28	12.28	12.19	12.20
180970083	Indiana	Marion	14.71	12.53	12.54	12.11	12.12	12.09	12.10

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

Table B-2. Maximum Annual $PM_{2.5}$ DVs (μg/m^3) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Emissions Concurrently in Texas, New York, and Wisconsin.

Monitor Identification Number*	State	County	CAMx 2012 Base Case (μg/m^3)	AQAT 2014 Maximum Annual PM2.5 Design Values (μg/m^3).					
				$500/ton Without Budget Increases	$500/ton With Budget Increases	$2,300/ton Without Budget Increases	$2,300/ton With Budget Increases	Control Scenario Without Budget Increases	Control Scenario With Budget Increases
Additional Emissions Added to Wisconsin (tons)				0	7,757	0	7,757	0	7,757
Additional Emissions Added to New York (tons)				0	3,527	0	3,527	0	3,527
Additional Emissions Added to Texas (tons)				0	70,067	0	70,067	0	70,067
420030064	Pennsylvania	Allegheny	18.33	16.17	16.17	15.42	15.42	15.25	15.26
390350038	Ohio	Cuyahoga	16.66	14.77	14.77	14.27	14.27	14.18	14.19
10730023	Alabama	Jefferson	16.46	14.64	14.64	14.62	14.62	14.20	14.21
390618001	Ohio	Hamilton	16.33	13.86	13.87	13.33	13.33	13.28	13.29
261630033	Michigan	Wayne	16.32	14.94	14.95	14.46	14.46	14.36	14.37
390350060	Ohio	Cuyahoga	16.18	14.26	14.27	13.76	13.76	13.67	13.68
390610014	Ohio	Hamilton	15.98	13.51	13.51	12.97	12.97	12.92	12.93
390610042	Ohio	Hamilton	15.77	13.34	13.34	12.81	12.81	12.73	12.74
171191007	Illinois	Madison	15.73	14.10	14.12	13.83	13.85	13.66	13.67
10732003	Alabama	Jefferson	15.64	14.03	14.03	14.00	14.00	13.61	13.61
390350045	Ohio	Cuyahoga	15.61	13.70	13.71	13.20	13.20	13.11	13.12
180970081	Indiana	Marion	15.16	12.98	12.99	12.56	12.57	12.54	12.55
131210039	Georgia	Fulton	15.10	13.38	13.38	13.23	13.23	13.10	13.11
390617001	Ohio	Hamilton	15.10	12.66	12.66	12.12	12.12	12.07	12.08
390350065	Ohio	Cuyahoga	15.10	13.22	13.22	12.71	12.71	12.62	12.63
180970083	Indiana	Marion	15.06	12.88	12.89	12.46	12.47	12.44	12.45

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

Table B-3. Average 24-hour $PM_{2.5}$ DVs ($\mu g/m^3$) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Emissions Concurrently in Texas, New York, and Wisconsin.

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 Without Budget Increases	$500/ton With Budget Increases	$2,300/ton Without Budget Increases	$2,300/ton With Budget Increases	Control Scenario Without Budget Increases	Control Scenario With Budget Increases
Additional Emissions Added to Wisconsin (tons)				0	7,757	0	7,757	0	7,757
Additional Emissions Added to New York (tons)				0	3,527	0	3,527	0	3,527
Additional Emissions Added to Texas (tons)				0	70,067	0	70,067	0	70,067
420030064**	Pennsylvania	Allegheny	56.71	47.57	47.57	45.54	45.54	45.45	45.46
420030093**	Pennsylvania	Allegheny	39.11	32.19	32.19	30.25	30.25	29.88	29.88
390350038**	Ohio	Cuyahoga	39.46	34.18	34.18	33.51	33.51	33.46	33.47
261630016**	Michigan	Wayne	38.99	34.42	34.42	33.93	33.93	33.88	33.88
390350060	Ohio	Cuyahoga	37.78	31.50	31.50	30.60	30.61	30.51	30.51
170311016**	Illinois	Cook	37.58	34.13	34.14	33.13	33.14	32.95	32.97
261630033**	Michigan	Wayne	39.48	36.31	36.32	35.00	35.01	34.74	34.76
180890022**	Indiana	Lake	34.94	32.79	32.80	32.38	32.39	32.31	32.32
540090011	West Virginia	Brooke	37.57	30.60	30.60	29.07	29.07	28.83	28.84
420710007**	Pennsylvania	Lancaster	35.98	35.19	35.19	34.95	34.95	34.87	34.87
390350045	Ohio	Cuyahoga	34.80	27.69	27.69	26.30	26.30	26.23	26.24
390811001	Ohio	Jefferson	34.56	27.64	27.64	25.79	25.79	25.57	25.57
261630019**	Michigan	Wayne	37.34	35.27	35.28	34.93	34.93	34.87	34.88
390350065	Ohio	Cuyahoga	34.91	27.65	27.66	26.11	26.11	25.95	25.96
170313301	Illinois	Cook	34.97	31.11	31.11	30.54	30.54	30.35	30.37
420070014	Pennsylvania	Beaver	36.21	29.28	29.28	27.59	27.59	27.39	27.40
420033007	Pennsylvania	Allegheny	32.40	26.27	26.27	24.88	24.88	24.78	24.79
010730023	Alabama	Jefferson	36.96	31.93	31.93	31.61	31.61	31.10	31.11
550790026	Wisconsin	Milwaukee	33.62	30.48	30.51	30.15	30.18	30.08	30.11
180970043	Indiana	Marion	35.76	28.64	28.64	27.16	27.16	27.13	27.14
261470005	Michigan	St Clair	36.23	33.35	33.35	32.78	32.78	32.67	32.68
550790043	Wisconsin	Milwaukee	36.21	32.49	32.53	31.85	31.89	31.80	31.84
180890026	Indiana	Lake	34.08	30.91	30.91	30.52	30.52	30.49	30.49
180970081	Indiana	Marion	35.85	28.44	28.44	27.35	27.35	27.30	27.30
180970066	Indiana	Marion	35.73	29.22	29.22	28.13	28.13	28.10	28.10
171191007	Illinois	Madison	36.59	29.92	29.94	29.32	29.35	29.32	29.35
550790010	Wisconsin	Milwaukee	35.47	31.50	31.54	30.82	30.86	30.83	30.86
390170003	Ohio	Butler	34.40	28.07	28.07	26.49	26.49	26.47	26.48
170316005	Illinois	Cook	34.12	32.72	32.72	32.41	32.41	32.02	32.04
420031008	Pennsylvania	Allegheny	35.04	26.95	26.95	24.69	24.69	24.47	24.49
261610008	Michigan	Washtenaw	35.05	29.40	29.40	28.54	28.55	28.47	28.48
170312001	Illinois	Cook	33.62	29.84	29.85	29.58	29.58	29.50	29.51
170310052	Illinois	Cook	34.94	30.11	30.12	29.78	29.79	29.69	29.70
421330008	Pennsylvania	York	33.38	31.60	31.60	31.03	31.03	30.92	30.93
261630015	Michigan	Wayne	35.55	32.23	32.23	31.10	31.10	31.02	31.02
010732003	Alabama	Jefferson	35.31	31.42	31.42	31.10	31.10	30.62	30.63
390618001	Ohio	Hamilton	35.29	27.63	27.63	26.11	26.11	25.96	25.97
171190023	Illinois	Madison	35.11	29.23	29.23	28.49	28.49	28.41	28.43
420031301	Pennsylvania	Allegheny	33.95	27.16	27.16	25.21	25.21	24.96	24.97
391130032	Ohio	Montgomery	33.68	24.40	24.40	23.15	23.15	23.09	23.10
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	26.34	26.34	26.13	26.14

*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).

Table B-4. Maximum 24-hour $PM_{2.5}$ DVs (μg/m^3) in 2014 for SO_2 Emission Scenarios Assessed Using AQAT – Considering Additional Emissions Concurrently in Texas, New York, and Wisconsin.

Monitor Identification Number*	State	County	CAMx 2012 Base Case (μg/m^3)	AQAT 2014 Maximum 24-hour PM2.5 Design Values (μg/m^3).					
				$500/ton Without Budget Increases	$500/ton With Budget Increases	$2,300/ton Without Budget Increases	$2,300/ton With Budget Increases	Control Scenario Without Budget Increases	Control Scenario With Budget Increases
Additional Emissions Added to Wisconsin (tons)				0	7,757	0	7,757	0	7,757
Additional Emissions Added to New York (tons)				0	3,527	0	3,527	0	3,527
Additional Emissions Added to Texas (tons)				0	70,067	0	70,067	0	70,067
420030064**	Pennsylvania	Allegheny	59.93	50.72	50.72	48.63	48.63	48.52	48.53
420030093**	Pennsylvania	Allegheny	44.40	36.85	36.85	34.80	34.80	34.28	34.29
390350038**	Ohio	Cuyahoga	41.84	35.93	35.93	35.41	35.41	35.39	35.40
261630016**	Michigan	Wayne	41.28	36.20	36.20	35.65	35.66	35.61	35.61
390350060	Ohio	Cuyahoga	40.85	33.69	33.70	33.04	33.04	32.94	32.95
170311016**	Illinois	Cook	40.44	37.40	37.41	36.54	36.55	36.40	36.42
261630033**	Michigan	Wayne	39.81	36.59	36.59	35.23	35.23	34.95	34.97
180890022**	Indiana	Lake	39.58	37.00	37.01	36.51	36.51	36.30	36.31
540090011	West Virginia	Brooke	38.39	32.23	32.23	30.02	30.02	29.63	29.64
420710007**	Pennsylvania	Lancaster	38.37	37.43	37.43	37.18	37.18	37.08	37.08
390350045	Ohio	Cuyahoga	38.13	29.48	29.49	27.60	27.60	27.43	27.44
390811001	Ohio	Jefferson	37.88	30.27	30.27	28.03	28.03	27.76	27.77
261630019**	Michigan	Wayne	37.83	36.20	36.21	35.83	35.83	35.74	35.75
390350065	Ohio	Cuyahoga	37.67	28.79	28.80	27.00	27.00	26.81	26.83
170313301	Illinois	Cook	37.67	33.36	33.36	32.84	32.85	32.70	32.71
420070014	Pennsylvania	Beaver	37.42	30.46	30.46	28.70	28.70	28.49	28.50
420033007	Pennsylvania	Allegheny	37.40	30.73	30.73	28.81	28.81	28.63	28.64
010730023	Alabama	Jefferson	37.33	32.50	32.50	32.12	32.12	31.57	31.58
550790026	Wisconsin	Milwaukee	37.24	33.54	33.57	33.21	33.24	33.10	33.14
180970043	Indiana	Marion	37.20	29.00	29.00	27.82	27.82	27.76	27.77
261470005	Michigan	St Clair	37.14	34.16	34.16	33.38	33.38	33.29	33.30
550790043	Wisconsin	Milwaukee	37.10	34.22	34.26	33.92	33.96	33.92	33.96
180890026	Indiana	Lake	37.06	33.67	33.67	33.37	33.37	33.39	33.39
180970081	Indiana	Marion	36.96	28.83	28.83	27.59	27.59	27.54	27.55
180970066	Indiana	Marion	36.92	30.40	30.40	29.13	29.13	29.11	29.11
171191007	Illinois	Madison	36.83	31.19	31.21	30.66	30.68	30.64	30.67
550790010	Wisconsin	Milwaukee	36.71	33.47	33.50	33.13	33.16	33.13	33.17
390170003	Ohio	Butler	36.59	28.71	28.71	27.33	27.33	27.29	27.30
170316005	Illinois	Cook	36.42	35.09	35.10	34.82	34.82	34.45	34.47
420031008	Pennsylvania	Allegheny	36.35	28.15	28.15	25.62	25.62	25.38	25.40
261610008	Michigan	Washtenaw	36.32	30.20	30.20	29.33	29.33	29.26	29.27
170312001	Illinois	Cook	36.12	32.71	32.71	32.33	32.34	32.21	32.22
170310052	Illinois	Cook	36.07	30.62	30.62	30.31	30.32	30.20	30.21
421330008	Pennsylvania	York	36.06	34.55	34.56	33.91	33.92	33.79	33.80
261630015	Michigan	Wayne	36.00	33.04	33.04	31.99	31.99	31.91	31.92
010732003	Alabama	Jefferson	35.94	32.23	32.23	31.91	31.91	31.46	31.46
390618001	Ohio	Hamilton	35.85	28.23	28.23	26.73	26.73	26.64	26.65
171190023	Illinois	Madison	35.81	30.23	30.23	29.50	29.50	29.41	29.44
420031301	Pennsylvania	Allegheny	35.65	28.05	28.05	26.15	26.15	25.85	25.86
391130032	Ohio	Montgomery	35.61	25.99	25.99	24.62	24.62	24.54	24.54
420030116	Pennsylvania	Allegheny	35.59	27.97	27.97	26.34	26.34	26.13	26.14

*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 μg/m^3 at the $500 cost threshold in 2014 (as modeled in AQAT in the TR).