Technical Support Document
for the
Clean Air Interstate Rule
Notice of Final Rulemaking

Regional and State SO_2 and NOx Emissions Budgets

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Regional and State SO_2 and NOx Emissions Budgets

This technical support document (TSD) provides a description of the data sources used in the calculation of regional and State emission budgets for sulfur dioxide (SO_2) and nitrogen oxides (NOx) under the final Clean Air Interstate Rule (CAIR) and EPA's proposal to include Delaware and New Jersey in the CAIR region. In addition, it describes in further detail the approaches used in State budget calculations, and the data used in each of these approaches.

This TSD outlines the calculation of the following:

- Regional Annual SO_2 Budgets with and without NJ and DE
- State Annual SO_2 Budgets with and without NJ and DE
- Regional Annual and Ozone Season NOx Budgets with and without NJ and DE
- State NOx Budgets with and without NJ and DE
  - Annual
  - Ozone Season
- Annual NOx Compliance Supplement Pool

Overview

EPA developed annual regional and state emissions budgets for SO_2 and NOx in three steps. EPA's first step was to determine the total amount of emissions reductions that would be achievable based on a highly cost-effective control strategy for the set of States covered. The Agency found this level of reductions was not possible at the program outset in 2010 (2009 for NOx), but achievable by 2015. The levels set for 2010 (2009) reflect the Agency's assessment of what was reasonable to achieve by these dates (with the dates driven largely by process requirements, i.e. development of State SIPs, and providing adequate time to install equipment). In the second step, EPA used the amount of emissions reductions that were highly cost-effective across the region for electricity generating units (EGUs) to set annual NOx and SO_2 emissions caps in 2010 (2009) and 2015 that would apply for States that chose to obtain reductions from EGUs. In the third step, EPA apportioned the regional emissions reductions – and the associated EGU caps – on a State-by-State basis, so that the affected States may determine the necessary controls of SO_2 and NOx emissions.

Under CAIR, States have several options for reducing emissions that significantly contribute to downwind non-attainment. They can adopt EPA's approach of reducing the emissions in a cost-effective manner through an interstate cap and trade program primarily for EGUs. This approach would, by definition, achieve the required cost-effective reductions. As an alternative, States could achieve all of the necessary emissions reduction from EGUs, but choose not use EPA's interstate emissions trading program. In this case, a State would need to demonstrate that it is meeting the EGU budgets outlined in this TSD. Finally, States could obtain at least some, or all, of their required emissions reductions from sources other than EGUs.

EPA's final air quality modeling found that 23 States + DC contribute significantly to PM 2.5 nonattainment, while 25 States + DC contribute to ozone nonattainment. The 23 States in addition to the District of Columbia found to contribute significantly to PM 2.5 nonattainment, and thus subject to the CAIR annual reduction requirements for SO_2 and NO_X, are Alabama, Florida, Georgia, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Mississippi, Missouri, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, West Virginia, and Wisconsin. The 25 States in addition to the District of Columbia found to contribute significantly to ozone nonattainment and thus subject to the CAIR seasonal requirement for NOx are Alabama, Arkansas, Connecticut, Delaware, Florida, Illinois, Indiana, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Missouri, New Jersey, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin. Note that Kansas, which was found to contribute significantly in earlier EPA modeling is no longer included in the program based on results of EPA's most recent modeling. Likewise, Massachusetts, which was originally found to contribute to PM 2.5 and ozone nonattainment, was found to contribute only to ozone nonattainment, and thus is now only subject to a seasonal requirement.

Regional SO_2 Budgets

The regional annual SO_2 budget represents the total cap level for SO_2 emissions for the region, whether it is achieved by EGUs or non-EGUs, or some combination of the two. For facilities in States that elect to control EGUs and participate in a cap-and-trade program, their portion of the regional budget is linked directly to existing allowance allocations under the Acid Rain Program. The calculated regional budget applies specially-designed allowance retirement ratios to existing Acid Rain Program allowances under CAIR beginning in 2010, (2:1), and increasing in 2015 and beyond (2.86:1). These ratios were developed to cut the allowance emission levels by half beginning in 2010 and 65 percent beginning in 2015.

EPA determined, through IPM analysis, that the resulting regionwide emissions caps (if all States choose to obtain reductions from EGUs) are highly cost-effective levels. More detail can be found in section IV of the preamble.

Under the final rule the annual regionwide SO_2 budget is calculated by adding together the title IV Phase-II allowances for all of the States in the control region, as listed in the Acid Rain Program 1998 Reallocation of Allowances for 2010 (63 FR 51,705) and making a 50 percent reduction for the 2010 cap and a 65 percent reduction for the 2015 cap. This results in a first phase SO_2 cap of about 3.6 million tons and a second phase cap of about 2.5 million tons, in the 23-State and DC control region. When Delaware and New Jersey are included, the total first phase cap is increased to approximately 3.7 million tons, and the total second phase cap to about 2.6 million tons. The regionwide budget is then apportioned to individual States, as is discussed in the following section.

As is discussed in the Notice of Final Rulemaking (NFR), EPA believes that basing budgets on title IV allowances is necessary in order to ensure the preservation of a viable title IV program. EPA believes it is important not to undermine the confidence that has developed in the market for title IV allowances, recognizing that it is key to the success of a trading program under CAIR.

Title IV allocation data based on the 1998 reallocation is available online at <http://www.epa.gov/airmarkets/allocations/index.html> .[1] In addition to the final title IV allowances from the 1998 reallocation, EPA also included the "Special Allowance Reserve" – a 250,000 annual set-aside from sources that was created for auction by EPA. Each boiler/generator included in the program contributes to this set-aside. This 250,000 allowance set-aside is created by deducting from each State's adjusted basic allowances on a pro rata basis, according to their share of total adjusted basic allowances. In calculating the CAIR SO_2 budgets, EPA redistributes the Special Allowance Reserve back to States on that same basis. Thus, the share of this reserve that is redistributed to States in the CAIR region is included in the calculation of the CAIR regional SO_2 budget. The column "250,000 Ton Special Allowance Reserve" in Table 1 shows the State results from this redistribution. Note, however, that this redistribution is merely an accounting mechanism for calculating State budgets. The actual allowances are not redistributed to the sources, but sold through the existing title IV auction.

State SO_2 Budgets

In the NFR, EPA is finalizing the proposal that annual State SO_2 budgets be based on each State's allowances under title IV of the CAA Amendments adjusted by CAIR retirement ratios for 2010 and 2015. As discussed above, before adjusting title IV allocations by these retirement ratios, EPA distributes the "Special Allowance Reserve" allowances back to sources in the States. Table 1 presents the 1998 title IV SO_2 allowance allocation that is used as a basis for CAIR state budgets.[2]

[1]The 1998 Reallocation of Allowances is discussed in detail in the document "Technical Documentation for the 1998 Reallocation of Allowances," available at http://www.epa.gov/airmarkets/allocations/arp/techdoc.pdf.

[2] The column "Additional allowances for Phase I Units" represents State shares of an additional permanent 50,000 tons that was allocated to Phase I units under Sec. 405 (a)(3) of the CAAA.

Table 1. Original Title IV Allowance Allocations that Include Special Allowance Reserve and Serve as a Basis for CAIR Calculation of SO_2 State Budgets for Electric Generation Units (tons)

State	2010 title IV Allocation with Phase I Addition			2010 Total Annual Allowances with Special Allowance Reserve	
	1998 Final Allocation	Additional Allowances for Phase I Units	Total Annual	250,000 Ton Special Allowance Reserve	Total Annual for CAIR Adjustment
Alabama	303,781	2,580	306,361	8,803	315,164
District of Columbia	1,375	0	1,375	40	1,415
Florida	492,741	0	492,741	14,159	506,900
Georgia	407,677	6,534	414,211	11,903	426,114
Illinois	371,340	3,237	374,577	10,764	385,341
Indiana	489,082	5,892	494,974	14,223	509,197
Iowa	124,608	0	124,608	3,581	128,189
Kentucky	363,834	3,166	367,000	10,546	377,546
Louisiana	116,546	0	116,546	3,349	119,895
Maryland	137,444	0	137,444	3,950	141,394
Michigan	347,232	0	347,232	9,978	357,210
Minnesota	97,181	0	97,181	2,793	99,974
Mississippi	65,640	0	65,640	1,886	67,526
Missouri	262,797	3,965	266,762	7,666	274,428
New York	262,728	0	262,728	7,550	270,278
North Carolina	267,011	0	267,011	7,673	274,684
Ohio	639,630	8,778	648,408	18,632	667,040
Pennsylvania	530,637	5,925	536,562	15,418	551,980
South Carolina	111,342	0	111,342	3,199	114,541
Tennessee	262,449	4,316	266,765	7,666	274,431
Texas	623,962	0	623,962	17,930	641,892
Virginia	123,410	0	123,410	3,546	126,956
West Virginia	414,095	5,607	419,702	12,060	431,762
Wisconsin	169,653	0	169,653	4,875	174,528
Total CAIR Region	**6,986,195**	**50,000**	**7,036,195**	**202,190**	**7,238,385**
Delaware	43,569	0	43,569	1,252	44,821
New Jersey	62,973	0	62,973	1,810	64,783
Total CAIR + DE, NJ	**7,092,737**	**50,000**	**7,142,737**	**205,252**	**7,347,989**

Source: US EPA

EPA is finalizing the budgets as noted in the Supplemental Notice of Proposed Rulemaking (SNPR), correcting for the proper inclusion of States covered under the final CAIR. The final annual State SO_2 Budgets are included in Table 2, below. State annual budgets for the years 2010-2014 (Phase I) are based on a 50 percent reduction from title IV allocations appearing in the "Total Annual for CAIR Adjustment" column in Table 1 for all units in the affected State. The State annual budgets for 2015 and beyond (Phase II) are based on a 65 percent reduction of title IV allocations in that column.

Table 2. Final Annual Electric Generation Units State SO_2 Budgets , 23 States + DC Region (tons)

State	State SO2 Budget 2010 - 2014	State SO2 Budget 2015 and thereafter
Alabama	157,582	110,307
District of Columbia	708	495
Florida	253,450	177,415
Georgia	213,057	149,140
Illinois	192,671	134,869
Indiana	254,599	178,219
Iowa	64,095	44,866
Kentucky	188,773	132,141
Louisiana	59,948	41,963
Maryland	70,697	49,488
Michigan	178,605	125,024
Minnesota	49,987	34,991
Mississippi	33,763	23,634
Missouri	137,214	96,050
New York	135,139	94,597
North Carolina	137,342	96,139
Ohio	333,520	233,464
Pennsylvania	275,990	193,193
South Carolina	57,271	40,089
Tennessee	137,216	96,051
Texas	320,946	224,662
Virginia	63,478	44,435
West Virginia	215,881	151,117
Wisconsin	87,264	61,085
Total CAIR Region	**3,619,196**	**2,533,434**
Delaware	22,411	15,687
New Jersey	32,392	22,674
Total CAIR + DE, NJ	**3,673,999**	**2,571,795**

Source: US EPA

The 23 final and 2 proposed State budgets would serve as effective binding caps, if States chose to control only EGUs, but did not want to participate in the trading program. For States controlling both EGUs and non-EGUs (or controlling only non-EGUs), these budgets would be compared to the States' 2010 total annual title IV allocation (with Special Allowance Reserve) to calculate the emissions reduction requirements for non-EGUs and the required caps for EGUs. Emissions reduction requirements for non-EGUs are described in detail in the section VII discussion in the CAIR preamble on SIP approvability. Table 3 presents the annual SO_2 emissions reduction requirements under CAIR.

Table 3. SO_2 Emissions Reduction Requirements under CAIR and the Proposal to Include DE and NJ
(tons)

State	2010			2015		
	Total Annual 2010 Title IV Allowances	State Budget	Reduction Requirement	Total Annual 2010 Title IV Allowances	State Budget	Reduction Requirement
Alabama	315,164	157,582	157,582	315,164	110,307	204,857
District of Columbia	1,415	708	707	1,415	495	920
Florida	506,900	253,450	253,450	506,900	177,415	329,485
Georgia	426,114	213,057	213,057	426,114	149,140	276,974
Illinois	385,341	192,671	192,670	385,341	134,869	250,472
Indiana	509,197	254,599	254,598	509,197	178,219	330,978
Iowa	128,189	64,095	64,094	128,189	44,866	83,323
Kentucky	377,546	188,773	188,773	377,546	132,141	245,405
Louisiana	119,895	59,948	59,947	119,895	41,963	77,932
Maryland	141,394	70,697	70,697	141,394	49,488	91,906
Michigan	357,210	178,605	178,605	357,210	125,024	232,186
Minnesota	99,974	49,987	49,987	99,974	34,991	64,983
Mississippi	67,526	33,763	33,763	67,526	23,634	43,892
Missouri	274,428	137,214	137,214	274,428	96,050	178,378
New York	270,278	135,139	135,139	270,278	94,597	175,681
North Carolina	274,684	137,342	137,342	274,684	96,139	178,545
Ohio	667,040	333,520	333,520	667,040	233,464	433,576
Pennsylvania	551,980	275,990	275,990	551,980	193,193	358,787
South Carolina	114,541	57,271	57,270	114,541	40,089	74,452
Tennessee	274,431	137,216	137,215	274,431	96,051	178,380
Texas	641,892	320,946	320,946	641,892	224,662	417,230
Virginia	126,956	63,478	63,478	126,956	44,435	82,521
West Virginia	431,762	215,881	215,881	431,762	151,117	280,645
Wisconsin	174,528	87,264	87,264	174,528	61,085	113,443
Total CAIR	**7,238,385**	**3,619,196**	**3,619,189**	**7,238,385**	**2,533,434**	**4,704,951**
Delaware	44,821	22,411	22,410	44,821	15,687	29,134
New Jersey	64,783	32,392	32,391	64,783	22,674	42,109
Total CAIR + DE, NJ	**7,347,989**	**3,673,999**	**3,673,990**	**7,347,989**	**2,571,795**	**4,776,194**

Source: US EPA

Regional NOx Budgets

EPA is finalizing CAIR regional annual and ozone season NOx emissions budgets. The regional NOx budgets represent the total annual (or ozone season) cap level for NOx emissions for EGUs in the program. If a State wants to have non-EGUs make some of the reduction, the reductions in emissions from the base case need to be estimated to determine the level of emission reduction required.

In developing regional NOx budgets, EPA initially identified NOx budget amounts, as target levels for further evaluation, through the methodology of determining the highest recent Acid Rain Program (ARP) heat input from years 1999-2002 for each affected State, summing the highest State heat inputs into a regionwide heat input, and multiplying the regionwide heat input by 0.15 lb/mmBtu and 0.125 lb/mmBtu for 2009 and 2015, respectively. The EPA determined, through IPM analysis, that the resulting regionwide emissions caps (if all States choose to obtain reductions from EGUs) are highly cost-effective levels.

EPA proposed regional budgets as calculated above in the NPR. EPA determined that using the highest of recent years' Acid Rain Program heat input provided an approximation of the regionwide heat input, even though it did not include heat input from non-Acid Rain sources. Acid Rain Program data is available online in EPA's Clean Air Markets Division Data and Maps database (http://dcjsweb01.customs.epa.gov/gdm/index.cfm). The data set used by EPA in these budget calculations is available in the docket. This data is reported at the unit level, and was aggregated to the State level by EPA for use in budget calculations.

A number of commenters expressed concern that the regional budgets did not include heat input data from non-Acid Rain units. Multiplying the approximate recent heat input by 0.125 lb/mmBtu to develop a regionwide annual 2015 NOx cap could reasonably be expected to yield an average effective NOx emission rate (considering all EGUs potentially affected by CAIR for annual reductions, not only the Acid Rain units, and considering growth in heat input) somewhat less than 0.125 lb/mmBtu, on the order of about 0.12 lb/mmBtu or less. Likewise, multiplying the approximate recent heat input by 0.15 lb/mmBtu to develop a regionwide annual 2010 NOx cap could reasonably be expected to yield an average effective NOx emission rate for all CAIR units of about 0.15 lb/mmBtu or less. The EPA believes that the use of the highest annual heat input provides for a reasonable adjustment to reflect that there are some non-Acid Rain units that operate in these States that will be subject to the NOx budgets.

A number of commenters interpreted the correction of annual State NOx budgets made in the Notice of Annual Data Availability (NODA) to imply that non-ARP heat input had been incorporated into the calculation of the total regional NOx budget. EPA did not propose calculating region-wide budgets that reflected non-ARP heat input. However, as is discussed later in this document, State budgets – the distribution of the regional budget – were calculated using both ARP and non-ARP heat input. The NOx regionwide budget presented in the NODA remains unchanged from that presented in the SNPR. The Regional NOx budgets in the SNPR are slightly higher than those in the NPR because of the use of updated ARP heat input data in calculating the regional budget. The SNPR notes this in its discussion of the NOx budgets.

In the final rule, EPA is establishing both an annual and an ozone season only regionwide budget for NOx. The annual NOx budget applies to the 23 States + DC that the Agency finds contribute to PM 2.5 nonattainment. EPA is finalizing the approach of calculating the regional NOx budget using the highest Acid Rain Program heat input for each State for the years 1999-2002, multiplied by 0.15 lb/mmBtu (for 2009) and 0.125 lb/mmBtu (for 2015). This proposed approach provides a regionwide budget of 1.5 million tons beginning in 2010 and 1.3 beginning

in 2015. For the proposal to include Delaware and New Jersey, EPA calculated these States' contributions to the total regional budget in the same way. When these States are included, the regionwide NOx budget beginning in 2009 increases by approximately 18,000 tons, and the regionwide NOx budget beginning in 2015 increases by approximately 15,000 tons.

The ozone season regionwide budget applies to 25 States + DC that the Agency finds contribute to ozone nonattainment. These budgets are calculated using the same methodology as the annual regional budget, with the exception that ozone season Acid Rain Heat input data (May through September) is substituted for annual heat input data. The total NOx regionwide ozone-season budget is approximately 568,000 tons beginning in 2009 and 485,000 tons beginning in 2015.

State NOx Budgets

State Annual NOx Budgets

In the January 2004 proposal, EPA proposed annual NOx State budgets for a 28-State (and D.C.) region based on each jurisdiction's average heat input – using heat input data from Acid Rain Program units - over the years 1999 through 2002. EPA summed the average heat input from each of the applicable jurisdictions to obtain a regional total average annual heat input. Then, each State received a pro rata share of the regional NOx emissions budget based on the ratio of its average annual heat input to the regional total average annual heat input.

In the June 2004 SNPR, EPA proposed to revise its determination of State NOx budgets by supplementing Acid Rain Program unit data with annual heat input data from the U.S. Energy Information Administration (EIA), for the non-Acid Rain unit data, subtracting the heat input for potentially exempt cogeneration plants. A number of commenters had suggested that this would better reflect the heat input of the units that will be controlled under CAIR, and EPA agrees. For example, a State with a large number of non-Acid Rain units would not have the heat input from those units reflected in the percent of regional average annual heat input that the State's generation represents.

EPA also took comment in the SNPR on an alternative methodology that determines State budgets by multiplying heat input data by adjustment factors for different fuels. In the August NODA, EPA presented the corrected annual NOx budgets resulting from the improved methodology proposed in the SNPR.

The EIA data used by EPA for budget calculations can be downloaded from the EIA's electricity website, http://www.eia.doe.gov/cneaf/electricity/page/data.html The databases used by EPA to calculate heat input were the EIA-860 (2001 and 2002), EIA-860 A and B (1999 and 2000), EIA-759, 900, and 906, EIA-767, and the Federal Energy Regulatory Commission (FERC) FERC-423. These databases are described in Appendix A of this document. The specific datasets assembled by EPA are also described in Appendix A, and are available in the docket. The annual fossil fuel heat inputs used in budget calculations were calculated on a plant-level basis using

fuel and heat content information provided in various EIA databases and the FERC 423 database. Heat input was calculated at the plant level for plants having a generator using a fossil energy source with a nameplate capacity greater than 25 MW. Plant-level calculations were performed because the EIA data format prevented unit-level calculations for combustion turbines in the 1999-2002 data, and in the 1999 and 2000 data for non-utility boilers. In using State heat input totals from EIA data, EPA only considered heat input from plants that did not have any units reporting Acid Rain Program heat inputs for the specific year.

Furthermore, EPA subtracted heat input from potentially exempt cogeneration plants from the EIA heat input data. CAIR contains an exemption for FERC-qualifying cogenerators that do not sell more than one-third of their potential generating capacity to the grid. FERC-qualifying cogenerator plants were identified based on information in the 1999 and 2000 EIA-860B and 2002 EIA-860 databases. Potential exempt facilities were identified by calculating the ratio of annual sales to potential capacity (plant nameplate capacity times 8,760 potential operating hours) for FERC-qualifying cogenerators in the 1999 and 2000 EIA-860B databases. Sales data were no longer available with consolidation to a single EIA-860 database after 2000. A plant was flagged as potentially exempt if the ratio did not exceed 0.33 in 1999 and 2000, and the plant was not subject to the Acid Rain Program**.**

To calculate total State-level heat inputs for use in apportioning the regionwide budget to States, EPA summed the State-level ARP heat input total with the EIA non-Acid Rain plant heat input data for each of the four data years.

For the final rule, EPA has made a number of revisions to the heat input data used for NOx State budget calculations in reponse to comments. These comments in general addressed missing or erroneous unit heat input data, and correction of the exempt cogeneration status of plants. A detailed summary of revisions to heat input data in the response to comments is included in Appendix B.

EPA is finalizing an approach of calculating States budgets through a fuel-adjusted heat-input basis. State budgets would be determined by multiplying historic heat input data (summed by fuel) by different adjustment factors for the different fuels. These factors reflect for each fuel (coal, gas and oil), the 1999-2002 average emissions by State, summed for the CAIR region, divided by average heat input by fuel by State, summed for the CAIR region. The resulting adjustment factors from this calculation are 1.0 for coal, 0.4 for gas and 0.6 for oil. The factors would reflect the inherently higher emissions rate of coal-fired plants, and consequently the greater burden on coal plants to control emissions.

Such an approach is not equivalent to an approach based on historical emissions (which would give fewer allowances to States which have already cleaned up their coal plants). Under this approach, all coal, whether clean or controlled, would be counted equally in determining State budgets.

EPA believes that such an approach provides more allowances to States which are expected to

face the greatest costs of installing controls. It would also better match each State's projected need for allowances in the future (after installing controls) with the number of allowances they would receive.

It is not expected that this decision would disadvantage States with significant gas-fired generation. One reason is that the determination of the adjustment factor for natural gas included the contribution of heat input and emissions from older steam gas units. These units' capacity factors are declining and are expected to decline further over time as new cleaner combined-cycle gas units ramp up generation.

State NOx budgets are calculated for both the annual regional NOx trading program and the ozone season regional NOx trading program. State budgets were determined by multiplying State-level average historic annual season heat input data (summed by fuel) by different adjustment factors for the different fuels. These factors reflect for each fuel (coal, gas and oil), the 1999-2002 average emissions by State, summed for the CAIR region, divided by average heat input by fuel by State, summed for the CAIR region. The resulting adjustment factors from this calculation are 1.0 for coal, 0.4 for gas and 0.6 for oil. The total State budgets are then determined by calculating each State's share of total fuel-adjusted heat input, and multiplying this share by the regionwide budget.

Proposed Inclusion of Delaware and New Jersey

EPA's proposal to include Delaware and New Jersey in CAIR would make these two States subject to an annual NOx reduction requirement. However, including these States in the apportionment calculation for States currently included in the CAIR annual NOx program, would change the budgets for those States. To maintain a consistent methodology, but avoid having to recalculate States' budgets, EPA considered these three States the equivalent of a small "region." EPA took the highest year heat input of 1999-2002 annual Acid Rain Program heat input for each of these States, and multiplied the total of these highest heat inputs by 0.15 for 2009-2014 and 0.125 for 2015 and beyond. The total budget for these two States is equal to approximately 17,000 tons annually in 2009-2014 and approximately 14,000 tons annually in 2015 and beyond (equal to these States' contribution to the regionwide budget when they are included). State budgets for DE and NJ are apportioned from the total budget for these two States based on each State's share of total fuel-adjusted heat input for the two States. Table 4 presents the Annual EGU State NOx budgets for the CAIR region plus DE and NJ.

Table 4. Final Annual Electric Generating Units NOx Budgets (tons)

State	State NOx Budget 2009*	State NOx Budget 2015**
Alabama	69,020	57,517
District of Columbia	144	120
Florida	99,445	82,871
Georgia	66,321	55,268
Illinois	76,230	63,525
Indiana	108,935	90,779
Iowa	32,692	27,243
Kentucky	83,205	69,337
Louisiana	35,512	29,593
Maryland	27,724	23,104
Michigan	65,304	54,420
Minnesota	31,443	26,203
Mississippi	17,807	14,839
Missouri	59,871	49,892
New York	45,617	38,014
North Carolina	62,183	51,819
Ohio	108,667	90,556
Pennsylvania	99,049	82,541
South Carolina	32,662	27,219
Tennessee	50,973	42,478
Texas	181,014	150,845
Virginia	36,074	30,062
West Virginia	74,220	61,850
Wisconsin	40,759	33,966
Total CAIR Region	**1,504,871**	**1,254,061**
Delaware	4,166	3,472
New Jersey	12,670	10,558
Total CAIR + DE, NJ	**1,521,707**	**1,268,091**

* Annual budget for NOx tons covered by allowances for 2009-2014.
** Annual budget for NOx tons covered by allowances for 2015 and thereafter.
Source: US EPA

These final State budgets would serve as effective binding caps, if States chose to control only EGUs, but did not want to participate in the trading program. For States controlling both EGUs and non-EGUs (or controlling only non-EGUs), these budgets would be compared to a baseline level of emissions to calculate the emissions reduction requirements for non-EGUs and the required caps for EGUs. Emissions reduction requirements for non-EGUs are described in detail in the Section VII discussion on SIP approvability in the CAIR preamble. Table 5 presents the annual NOx emissions reduction requirements under CAIR.

Table 5. Annual NOx Emissions Reduction Requirements under CAIR (tons)

State	2009			2015		
	Base Case	State Budget	Reduction Requirement	Base Case	State Budget	Reduction Requirement
Alabama	132,019	69,020	62,999	133,842	57,517	76,325
District of Columbia	0	144	0	35	120	0
Florida	151,094	99,445	51,649	150,997	82,871	68,126
Georgia	143,140	66,321	76,819	140,759	55,268	85,491
Illinois	146,248	76,230	70,018	159,452	63,525	95,927
Indiana	233,833	108,935	124,898	233,303	90,779	142,524
Iowa	75,934	32,692	43,242	81,311	27,243	54,068
Kentucky	175,754	83,205	92,549	176,208	69,337	106,871
Louisiana	49,460	35,512	13,948	50,274	29,593	20,681
Maryland	56,662	27,724	28,938	57,366	23,104	34,262
Michigan	117,031	65,304	51,727	120,234	54,420	65,814
Minnesota	71,896	31,443	40,453	74,289	26,203	48,086
Mississippi	36,807	17,807	19,000	37,477	14,839	22,638
Missouri	115,916	59,871	56,045	117,912	49,892	68,020
New York	45,145	45,617	0	43,994	38,014	5,980
North Carolina	59,751	62,183	0	61,235	51,819	9,416
Ohio	263,814	108,667	155,147	274,372	90,556	183,816
Pennsylvania	198,255	99,049	99,206	202,249	82,541	119,708
South Carolina	48,776	32,662	16,114	50,429	27,219	23,210
Tennessee	106,398	50,973	55,425	105,613	42,478	63,135
Texas	185,798	181,014	4,784	179,448	150,845	28,603
Virginia	67,890	36,074	31,816	59,823	30,062	29,761
West Virginia	179,125	74,220	104,905	175,828	61,850	113,978
Wisconsin	71,112	40,759	30,353	69,280	33,966	35,314
Total CAIR	**2,731,858**	**1,504,871**	**1,230,035**	**2,755,730**	**1,254,061**	**1,501,754**
Delaware	9,389	4,166	5,223	10,678	3,472	7,206
New Jersey	16,760	12,670	4,090	17,924	10,558	7,336
Total CAIR + DE, NJ	**2,758,007**	**1,521,707**	**1,239,348**	**2,784,332**	**1,268,091**	**1,516,296**

Source: US EPA

States Subject to Ozone-season NOx Requirements

EPA apportioned the ozone season regional budget to the 25 States + DC that were found to contribute significantly to ozone nonattainment using a methodology analogous to that which was used to apportion the annual regionwide NOx budget to States that were found to contribute significantly to PM nonattainment. In EPA's final air quality modeling for CAIR, CT and MA were found to contribute significantly to ozone nonattainment, and were included in the program. TX and GA, which were found to contribute to PM nonattainment but not ozone nonattainment, are not included in the ozone season program, and rather are subject only to the annual NOx

requirements.

For States subject to the ozone season NOx reduction requirements under CAIR, the budget calculation was performed using ARP and EIA heat input data that covers only the five month ozone season. State-level average ozone season heat input data (summed by fuel) was multiplied by different adjustment factors for the different fuels (1.0 for coal, 0.4 for gas, and 0.6 for oil). The total State budgets were then determined by calculating each State's share of total fuel-adjusted heat input, and multiplying this share by the regionwide ozone season NOx budget. For States that have lower EGU budgets under the SIP call than their 2009 CAIR budget, their SIP Call budgets are their State budgets under the CAIR seasonal NOx program.[3] State ozone-season NOx budgets are presented in Table 6, below.

[3] For Connecticut, the SIP call budget is also used in 2010 and beyond.

Table 6. Final Ozone Seasonal Electricity Generating Unit NOx Budgets (tons)

State	State NOx Budget 2009*	State NOx Budget 2015**
Alabama	32,182	26,818
Arkansas	11,515	9,596
Connecticut	2,559	2,559
Delaware	2,226	1,855
District of Columbia	112	94
Florida	47,912	39,926
Illinois	30,701	28,981
Indiana	45,952	39,273
Iowa	14,263	11,886
Kentucky	36,045	30,587
Louisiana	17,085	14,238
Maryland	12,834	10,695
Massachusetts	7,551	6,293
Michigan	28,971	24,142
Mississippi	8,714	7,262
Missouri	26,678	22,231
New Jersey	6,654	5,545
New York	20,632	17,193
North Carolina	28,392	23,660
Ohio	45,664	39,945
Pennsylvania	42,171	35,143
South Carolina	15,249	12,707
Tennessee	22,842	19,035
Virginia	15,994	13,328
West Virginia	26,859	26,525
Wisconsin	17,987	14,989
Total	**567,744**	**484,506**

* Seasonal budget for NOx tons covered by allowances for 2009-2014. For States that have lower EGU budgets under the SIP Call than their 2009 CAIR budget, this table includes their SIP Call budget.
** Seasonal budget for NOx tons covered by allowances for 2015 and thereafter.
Source: US EPA

Like the annual NOx State budgets, these final State budgets would serve as effective binding caps, if States chose to control only EGUs, but did not want to participate in the trading program. For States controlling both EGUs and non-EGUs (or controlling only non-EGUs), these budgets would be compared to a baseline level of emissions to calculate the emissions reduction requirements for non-EGUs and the required caps for EGUs. Emissions reduction requirements for non-EGUs are described in detail in the Section VII discussion on SIP approvability in the preamble.

Annual NOx Compliance Supplement Pool

EPA is establishing a NOx compliance supplement pool in the final CAIR of 198,494 tons of NOx allowances, which would result in a total compliance supplement pool of approximately

200,000 tons of NOx allowances when combined with EPA's proposed rulemaking to include Delaware and New Jersey. EPA is apportioning the compliance supplement pool to States based on the assumption that a State's need for allowances from the pool is proportional to the magnitude of the State's required emissions reductions (as calculated using the State's base case emissions and annual NOx budget). EPA is apportioning the 200,000 tons of NOx on a pro-rata basis, based on each State's share of the total emissions reduction requirement for the region in 2009. This is consistent with the methodology used in the NOx SIP Call. The compliance supplement pools for CAIR States and DE and NJ are calculated from these 200,000 tons. Table 7 presents each State's compliance supplement pool. Adjusting State shares of the 200,000 ton CSP to round to the nearest whole allowance results in a total CSP of 199,997 tons of NOx.

Table 7. State Annual NOx Compliance Supplement Pool (allowance tons)

State	Base Case 2009 Emissions	2009 State Annual NOX Budget	Reduction Requirement	Compliance Supplement Pool
Alabama	132,019	69,020	62,999	10,166
District Of Columbia	0	144	0	0
Florida	151,094	99,445	51,649	8,335
Georgia	143,140	66,321	76,819	12,397
Illinois	146,248	76,230	70,018	11,299
Indiana	233,833	108,935	124,898	20,155
Iowa	75,934	32,692	43,242	6,978
Kentucky	175,754	83,205	92,549	14,935
Louisiana	49,460	35,512	13,948	2,251
Maryland	56,662	27,724	28,938	4,670
Michigan	117,031	65,304	51,727	8,347
Minnesota	71,896	31,443	40,453	6,528
Mississippi	36,807	17,807	19,000	3,066
Missouri	115,916	59,871	56,045	9,044
New York	45,145	45,617	0	0
North Carolina	59,751	62,183	0	0
Ohio	263,814	108,667	155,147	25,037
Pennsylvania	198,255	99,049	99,206	16,009
South Carolina	48,776	32,662	16,114	2,600
Tennessee	106,398	50,973	55,425	8,944
Texas	185,798	181,014	4,784	772
Virginia	67,890	36,074	31,816	5,134
West Virginia	179,125	74,220	104,905	16,929
Wisconsin	71,112	40,759	30,353	4,898
CAIR Region Subtotal				**198,494**
Delaware	9,389	4,166	5,223	843
New Jersey	16,760	12,670	4,090	660
Total				**199,997**

Source: EPA

Regional and State SO_2 and NOx Emissions Budgets

Appendix A

Heat Input Calculations

Regional and State SO_2 and NOx Emissions Budgets

Overview of EPA Heat Input Data Files in the Docket and Online

EPA revised and updated heat input data files that were used for budget calculations in the SNPR and NODA, in response to comments. Revised data files are available in the docket. Plant heat input, both Acid Rain and Non-Acid Rain for the years 1999 to 2002 are provided in the "Plant 1999 to 2002 HI.xls" spreadsheet file, available in the docket. The file identifies at the plant level for each year the plant heat input used in the State heat input totals for each year, the classification of that heat input by Acid Rain or Non-Acid Rain (Plant Program field), and the source of the heat input data (HI Data Source field). State total heat input summaries can be checked using this spreadsheet by filtering on plant program, State, and year. EIA plant level heat input data is available in the spreadsheet "Rev EIA Plant HI.xls." Additionally, Acid Rain unit heat input data is available in the spreadsheet "CAIR State Acid Rain Units.xls." Both of these spreadsheets are available in the docket.

Revised State-level heat input values for the 1999 through 2002 period have been summarized for the States subject to the Clean Air Interstate Rule. The data are in the "CAIR State Annual HI.xls" spreadsheet, available in the docket. This spreadsheet also provides State totals for Acid Rain heat input data and the supplemental EIA heat input data, excluding exempt cogeneration**.**

In addition to the updated State, unit, and plant files outlined above, heat input files differentiated by fuel type, which were used for the final State NOx budget calculations, were added to the docket. State level heat input by fuel type is available in the file "State Heat Input by Fuel.xls." This file contains State total heat input by fuel, State level Acid Rain Program heat input by fuel, and State level non-Acid Rain Program heat input by fuel. Also available in the docket are Acid Rain unit and non-Acid Rain plant level annual heat input by fuel, in the spreadsheet "Unit and Plant Level Fuel Annual Heat Input.xls." For ozone season heat input, State level heat input by fuel type is contained in the spreadsheet "State Ozone Season Heat Input by Fuel.xls." Acid Rain unit and non-Acid Rain plant level ozone season heat input by fuel is available in the spreadsheet "Unit and Plant Level Fuel Ozone Season Heat Input.xls."

Acid Rain Program Heat Input Data

Acid Rain Program units annual heat input data (million Btus) for the 1999 to 2002 were assembled by querying EPA's Data and Maps database. The data are summarized by State in the file "CAIR State Total HI.xls" and by unit in the file "CAIR State Acid Rain Units.xls."

Acid Rain Program unit level heat input data for the ozone season was also downloaded from EPA's Data and Maps database.

For the final rule, fuel-specific heat input data was used for the budget calculations. Fuel type information is not available for the hourly heat input reported by Acid Rain units that use flow CEMS to determine heat input (the majority of the total heat input). The primary fuel for the

units, however, is reported in Emission Data Report monitoring plan records. For estimating fuel-specific heat input EPA attributed all of a unit's heat input to the primary fuel. Some Acid Rain units had refuse or wood listed as a primary fuel. Because these units had been included in State-level ARP heat input data for calculation of the regional NO_X budgets, they were retained for the calculation of fuel-specific heat input. For the actual budget calculation, they were assigned the same adjustment factor as gas. Fuel types and EPA's classification of them are presented in Table A-1.

Table A-1. Acid Rain Program Fuel Codes and Categories

EDR Fuel Code	EDR Description	Heat Input Fuel Category
C	Coal	Coal
DSL	Diesel	Oil
G	Gas	Gas
NNG	Natural Gas	Gas
OGS	Other Gas	Gas
OIL	Oil	Oil
OOL	Other Oil	Oil
PNG	Pipeline Natural Gas	Gas
PRG	Process Gas	Gas
R	Refuse	Refuse
W	Wood	Wood

EIA Annual Heat Input Data

The EIA annual fossil fuel heat inputs in the spreadsheet tables were calculated on a plant-level basis using fuel use and heat content information provided in various EIA databases and the Federal Energy Regulatory Commission (FERC) 423 database (see Table A-2). Heat input was calculated at the plant level for plants having a generator with a nameplate capacity greater than 25 MW - fossil energy source. Plant-level calculations were performed because the EIA data format prevented unit-level calculations for combustion turbines in all years, and for non-utility boilers prior to 2001. Changes in EIA data reporting in 2001, which will be explained in more detail, resulted in different calculation methodologies for 1999 and 2000 heat input compared to 2001 and 2002 heat input. There is a drop-off in EIA heat input from 1999-2000 levels to 2001-2002 levels that may be because of the different methodologies.

EIA Heat Input Calculations

For utility units, annual heat inputs were calculated separately for boilers and turbines. The EIA-767 database was used for boilers. The database provides annual fuel quantity along with the corresponding heat content. The EIA-759 and FERC-423 databases were used to calculate heat input for utility combustion turbines. EIA-759 provides annual fuel quantity for all combustion turbines combined at a plant. To calculate heat input, the fuel quantity was matched with the fuel heat content reported for the plant in the FERC-423 database. Average FERC-423 fuel heat contents were used when there were no FERC-423 data for the fuel and plant. The EIA-759 is

now called EIA-906.

The calculations for non-utility plants were performed in two different ways because of a change in EIA databases after 2000. The 1999 and 2000 heat inputs were calculated using the EIA-860B data with heat input first calculated by the fuel burned based on reported quantity and heat content, and then totaled for all fossil fuels.

Some plants reported both non-utility and utility data (plants that were sold to a non-utility at some point during the reporting year) in 1999 and 2000. In those cases, the higher of the two calculated plant heat inputs was used, which in most cases was the utility heat input.

The 2001 and 2002 non-utility data were calculated similarly to the utility calculations due to changes in EIA reporting. Combustion turbine heat inputs were calculated at the prime mover level, based on consumption data in the EIA-906 database and fuel heat content data from the 2000 EIA-860B database. The post-2000 EIA-860 database no longer has fuel heat content and consumption information for non-utilities. The data in EIA-906 correspond to the utility EIA-759/900/906 data, and contain the amount of fuel burned by prime mover type, but do not contain fuel heat content information. Therefore, average fuel contents were calculated based on all fuels used and reported in the prior year 2000 EIA-860B, then applied to the EIA-906 fuel data to calculate heat input.

Non-utility plants began reporting the EIA-767 form for boilers in 2001, so the EIA-767 fuel quantity and heat content data were calculated on a boiler-specific basis for non-utility boilers having a generator with a nameplate capacity greater than 25 MW for 2001 and 2002.

It is important to note that the heat input calculated for all combustion turbine units (and for non-utility boilers prior to 2001) may contain heat input for generators under 25 MW. There was no way to segregate the fuel use for smaller units from the plant or prime mover level data.

The better segregation of non-utility boiler data after 2001 may account for some of the drop-off in EIA plant heat input when comparing 2001-2002 to 1999-2000. It also appears that not all of the non-utility boilers serving an affected generator were represented in the 2001 and 2002 data, but we estimate the magnitude of this missing data at about 1% of the total annual heat input (based on comparisons to the 1999-2000 methodology).

Exempt FERC Qualifying Cogenerators

The final CAIR contains an exemption for FERC-qualifying cogenerators that do not sell more than 33% of the potential generating capacity to the grid. FERC-qualifying cogenerator plants were identified based on information in the 1999 and 2000 EIA-860B and 2002 EIA-860 databases. Potential exempt facilities were identified by calculating the ratio of annual sales to potential capacity [plant nameplate capacity times 8,760] for FERC-qualifying cogenerators in the 1999 and 2000 EIA-860B databases. Sales data were no longer available with consolidation to a single EIA-860 database after 2000. A plant was flagged as potentially exempt in the EIA

Plant HI worksheet if the ratio did not exceed 0.33 in 1999 and 2000, and the plant was not subject to the Acid Rain Program.

EIA Ozone Season Heat Input Data

For the EIA ozone season heat input data, calculations and adjustments were done using the methodology described above, used fuel use data only for the months of May through September. The exception to this is non-utility plant fuel data in the EIA-860B database, which was used for the 1999 and 2000 heat input calculations, and available only on an annual basis. Annual heat input based on these files was adjusted by a factor of 5/12.

Table A-2 describes the EIA databases used in heat input calculations.

Table A-2. EIA and FERC Databases Used in Calculation of Heat Input Data to Supplement Acid Rain Program Heat Input Data

Database	Description
EIA-860 (Utility and Non-utility 2001-2002)	Plant- and generator-level data for power plants owned and operated by electric utilities and non-utilities. Includes generator nameplate, energy source, and FERC cogenerator status. Does not include electricity delivered to a utility by a non-utility plant.
EIA-860A (Utility 1999-2000)	Plant- and generator-level data for electric power plants owned and operated by electric utilities. Includes generator nameplate capacity and energy source.
EIA-860B (Non-utility 1999-2000)	Plant- and generator-level data, including specific information about generators and plant-level fuel usage and heat content, qualifying facility status, and electricity delivered to a utility for non-utility electric power plants.
EIA-759/900/906 (Utility all years and Non-utility 2001-2002)	Monthly and annual data on generation and fuel consumption at the power plant and prime mover level. Non-utility plants began reporting this data in 1999. No heat content data.
EIA-767 (Utility all years and Non-utility 2001-2002)	Monthly and annual steam-electric plant data from organic-fueled or combustible renewable steam-electric plants with a generator nameplate rating of 10 or more megawatts. Non-utilities began reporting EIA-767 beginning in 2001. Includes monthly generator generation and boiler fuel consumption and heat content.
FERC-423 (Utility all years)	Monthly deliveries of fossil fuels to utility, and now non-utility, generating facilities. Included are the specific energy source, quantity of fuel delivered, the Btu content, sulfur content, ash content, coal state and county of origin, coal mine type (surface/underground), as well as the supplier of fuel. Includes facilities with a fossil-fueled nameplate generating capacity of 50 or more megawatts.
Note: Databases were downloaded from EIA's electricity website: http://www.eia.doe.gov/cneaf/electricity/page/data.html	

EIA Annual And Ozone Season Heat Input Data by Fuel Type

To categorize EIA annual and ozone season heat input data by fuel type, fossil fuel heat inputs were calculated as described above using fuel type, fuel use, and heat content information provided in the various EIA databases and the FERC Form 423 database. For the purposes of calculating adjusted heat input by fuel type, EPA did not include non-fossil EIA heat input. To categorize heat input on a fuel basis, fuels were categorized as described in Table A-3.

Table A-3. EIA Database Fuel Codes and Categories

ENGYSRC	Description	Fossil	Other Fuel	Coal	Oil	Gas
AB	Agriculture Byproducts (Bagasse, Rice Hulls, Peanut Hulls, Nut Shells, Cow Manure)	No	Yes	No	No	No
AC	Anthracite Culm	Yes	No	Yes	No	No
BG	Bituminous Culm	Yes	No	Yes	No	No
BL	Black Liquor	No	Yes	No	No	No
BP	Butane (Liquid)	Yes	No	No	No	Yes
BT	Batteries	No	No	No	No	No
BU	Butane (Gas)	Yes	No	No	No	Yes
COL	Coal (Generic)	Yes	No	Yes	No	No
DG	Digester Gas	No	Yes	No	No	No
DI	Diesel	Yes	No	No	Yes	No
FC	Fine Coal	Yes	No	Yes	No	No
FO1	Fuel Oil No 1	Yes	No	No	Yes	No
GAS	Gas (Generic)	Yes	No	No	No	Yes
GE	Geothermal	No	No	No	No	No
HY	Hydrogen	No	Yes	No	No	No
KE	Kerosene	Yes	No	No	Yes	No
LB	Liquid Byproduct	No	Yes	No	No	No
LF	Landfill Gas	No	Yes	No	No	No
LW	Lignite Waste	Yes	No	Yes	No	No
ME	Methane	No	Yes	No	No	No
MW	Municipal Solid Waste (Refuse)	No	Yes	No	No	No
NU	Nuclear	No	No	No	No	No
OW	Oil Waste	Yes	No	No	Yes	No
PET	Petroleum (Generic)	Yes	No	No	Yes	No
PG	Propane (Gas)	Yes	No	No	No	Yes
PH	Pitch	Yes	No	No	Yes	No
PL	Propane (Liquid)	Yes	No	No	No	Yes
PP	Paper Pellets	No	Yes	No	No	No
PS	Purchased Steam	No	No	No	No	No
PT	Peat	No	Yes	No	No	No
RL	Red Liquor	No	Yes	No	No	No
RT	Railroad Ties	No	Yes	No	No	No
SB	Solid Byproducts	No	Yes	No	No	No
SL	Solar	No	No	No	No	No
SM	Sludge Waste	No	Yes	No	No	No

SP	Sludge Oil	Yes	No	No	Yes	No
SS	Spent Sulfite Liquor	No	Yes	No	No	No
SU	Sulfur	No	Yes	No	No	No
SW	Sludge Wood	No	Yes	No	No	No
TI	Tires	No	Yes	No	No	No
TO	Tall Oil	No	Yes	No	No	No
UP	Utility Poles	No	Yes	No	No	No
WA	Waste Alcohol	No	Yes	No	No	No
WC	Waste Coal	Yes	No	Yes	No	No
WH	Waste Heat	Yes	No	No	No	No
WN	Wind	No	No	No	No	No
WT	Water	No	No	No	No	No
WW	Wood/Wood Waste	No	Yes	No	No	No
BFG	Blast-Furnace Gas	Yes	No	No	No	Yes
BIT	Bituminous Coal	Yes	No	Yes	No	No
DFO	Distillate Fuel Oil (Diesel, No 1 Fuel Oil, No. 2 Fuel Oil, No. 4 Fuel Oil)	Yes	No	No	Yes	No
JF	Jet Fuel	Yes	No	No	Yes	No
KER	Kerosene	Yes	No	No	Yes	No
LFG	Landfill Gas	No	Yes	No	No	No
LIG	Lignite	Yes	No	Yes	No	No
MSW	Municipal Solid Waste (Refuse)	No	Yes	No	No	No
NG	Natural Gas	Yes	No	No	No	Yes
NUC	Nuclear (Uranium, Plutonium, Thorium)	No	No	No	No	No
OBG	Other BioMass Gases (Digester Gas, Methane, other gases)	No	Yes	No	No	No
OBL	Other Biomass Liquids	No	Yes	No	No	No
OBS	Other Biomass Solids	No	Yes	No	No	No
OG	Other Gas	Yes	No	No	No	Yes
OO	Other Oil	Yes	No	No	Yes	No
OTH	Other (Batteries, Chemicals, Hydrogen, Pitch, Sulfur, misc technologies)	No	No	No	No	No
PC	Petroleum Coke	Yes	No	No	Yes	No
RFO	Residual Fuel Oil (No 5 Fuel Oil, No 6 Fuel Oil)	Yes	No	No	Yes	No
SLW	Sludge Waste	No	Yes	No	No	No
SUB	Subbituminous Coal	Yes	No	Yes	No	No
SUN	Solar (Photovoltaic, Thermal)	No	No	No	No	No
WOC	Waste/Other Coal (Anthracite, Coal Mixtures, Coke Breeze, Fine Coal, Tar Coal)	Yes	No	Yes	No	No
WDL	Wood/Wood Waste Liquids	No	Yes	No	No	No

WDS	Wood/Wood Waste Solids (Peat, Railroad Ties, Utility Poles, Wood Chips,other solids)	No	Yes	No	No	No
WND	Wind	No	No	No	No	No
WAT	Water	No	No	No	No	No
UR	Nuclear	No	No	No	No	No
FO2	Fuel Oil No 2	Yes	No	No	Yes	No
FO6	Fuel Oil No 6	Yes	No	No	Yes	No
ANT	Anthracite	Yes	No	Yes	No	No
OIL	Fuel Oil (Used prior to 1980)	Yes	No	No	Yes	No
GEO	Geothermal	No	No	No	No	No
WOD	Wood	No	Yes	No	No	No
WAS	Waste	No	Yes	No	No	No
WI	Wind	No	No	No	No	No
SP	Solar - Photovoltaic	No	No	No	No	No
SO	Solar - Thermal	No	No	No	No	No
	Water	No	No	No	No	No
1	Nuclear	No	No	No	No	No
2	Light Oil	Yes	No	No	Yes	No
3	Heavy Oil	Yes	No	No	Yes	No
4	Anthracite	Yes	No	Yes	No	No
5	Coke	Yes	No	Yes	No	No
6	Bituminous	Yes	No	Yes	No	No
7	Lignite	Yes	No	Yes	No	No
8	Fuel Oil (Used prior to 1980)	Yes	No	No	Yes	No
9	Natural Gas	Yes	No	No	No	Yes
A	Geothermal	No	No	No	No	No
B	Wood	No	Yes	No	No	No
C	Waste	No	Yes	No	No	No
D	Wind	No	No	No	No	No
E	Solar - Photovoltaic	No	No	No	No	No
F	Solar - Thermal	No	No	No	No	No
BTM	Bitumen	Yes	No	Yes	No	No
REF	Refuse	No	Yes	No	No	No
WD	Wood	No	Yes	No	No	No
RG	Refinery Gas	No	No	No	No	No
COG	Coke Oven Gas	Yes	No	No	No	Yes
FO4	Fuel Oil No 4	Yes	No	No	Yes	No
FO5	Fuel Oil No 5	Yes	No	No	Yes	No
CRU	Crude Oil	Yes	No	No	Yes	No
TOP	Top Crude	Yes	No	No	Yes	No
BKO	Bunker Oil	Yes	No	No	Yes	No
LPG	Liquified Gas	Yes	No	No	No	Yes
RRO	Rerefined Motor Oil	Yes	No	No	Yes	No
MIX	Coal-Oil Mixture	Yes	No	No	Yes	No
TDF	Tire-Derived Fuel	No	Yes	No	No	No

WO	Waste/Other Coal (Anthracite, Coal Mixtures, Coke Breeze, Fine Coal, Tar Coal)	Yes	No	Yes	No	No
BLQ	Black Liquor	No	Yes	No	No	No
OTG	Other Gas	Yes	No	No	No	Yes
SC	Coal-based Synfuel (includes briquettes, pellets, or extrusions formed by binding materials and othe	Yes	No	Yes	No	No

Heat Input for Non-Acid Rain Plants Provided by Commenters

There were a number of non-Acid Rain plants for which commenters had provided heat input data for the 1999-2002 period to replace plant heat input calculated based on EIA data. These were all plants with units subject to the NO_X Budget Program, and which had submitted primary fuel information in EDR monitoring plans. Heat input for these plants was attributed entirely to the primary fuel as described for Acid Rain Program units. Thes commenters provided only annual heat input. To calculate ozone season heat input for these plants, the annual heat input was multiplied by 5/12. Specific changes to the heat input data made in response to commenters are discussed in Appendix B.

Regional and State SO_2 and NOx Emissions Budgets

Appendix B

Data Set Corrections

Regional and State SO_2 and NOx Emissions Budgets

Revised EIA Heat Input Values

Heat inputs for individual plants were changed as a result of comments from Exelon, Dominion Power, and the Massachusetts Department of Environmental Protection. The revised annual heat inputs for the plants are identified in the table below.

Table B-1. Revised Facility Heat Inputs from Commenters (mmBtus)

State	Oris Code	FACILITY NAME	1999 Heat Input	2000 Heat Input	2001 Heat Input	2002 Heat Input
PA	3168	Richmond	174,437	117,683	115,893	196,329
PA	8012	Croydon Generating Station	678,112	461,682	344,261	686,569
PA	7704	Fairless Hills	2,687,828	3,001,110	2,780,378	3,068,851
VA	3797	Chesterfield 7	8,751,684	6,016,004	6,095,216	54,75,243
MA	1588	Mystic River 81 and 82				2,159,197
MA	10176	South Boston Combustion Turbine				33,273
MA	52026	Dartmouth Power			2,005,226	

In addition, three plants (one in New Jersey and two in Maine) had been incorrectly identified as Massachusetts plants. The State locations of the plants have been revised.

Massachusetts also pointed out missing heat input for other Non-Acid Rain plants, but did not provide heat input data, and in addition OTC NOx Budget Program data were not available in CAMD's Data and Maps Database. No changes were made in these cases, presented in Table B-2:

Table B-2. Missing Heat Input Data Noted in Comments but Not Provided

State	Oris Code	FACILITY NAME	Missing Heat Input Years
MA	1678	Waters River	2000 and 2001
MA	10802	Lowell Cogen	1999, 2000, and 2001

The April 14, 2004, EIA heat input data left out heat input from plants with fossil energy source steam turbines greater than 25 MWs that were located at plants with less than 100 MW total capacity. The error has been corrected in the "Sept1 Revised EIAPlantHI.xls" spreadsheet. Revised heat input values, as well as other corrections, are highlighted in red.

One commenter pointed out duplication errors in the EIA plant level heat input data. In these cases, the spreadsheet contained a duplicate plant row locating the plant in a different State in addition to the row with the correct location. EPA has corrected the data so that the spreadsheet

contains only the correct row. The list of corrections made is in Table B-3, below. State heat input budgets were revised for New Jersey. In most cases, the existence of a duplicate row had no effect on heat input data, because the data for the plant was only used if no units from the plant were included in the Acid Rain heat input data.

Table B -3. Duplicate Rows Deleted from EIA Plant Heat Input Worksheet

Incorrect State	Plant	ORIS	Impact
FL	William F. Wyman	1507	None - Used correct Acid Rain data
MA	North Jersey Energy Associates	10308	None - Plant was initially identified as an exempt cogeneration plant.
MI	Fitchburg	1601	None - No heat input during period.
MI	Georgetown Substation	7759	None - Used correct Acid Rain data.
NE	John S. Rainey Generating Station	7834	None - Used correct Acid Rain data.
NJ	Hunterstown	3110	Reduces NJ 1999 heat input
NJ	Mountain	3111	Reduces NJ 1999 - 2002 heat input.
NJ	Portland	3113	None - Used correct Acid Rain data.
NJ	Titus	3115	None - Used correct Acid Rain data.
NJ	Conemaugh	3118	None - Used correct Acid Rain data.
NJ	Seward	3130	None - Used correct Acid Rain data.
NJ	Shawville	3131	None - Used correct Acid Rain data.
NJ	Warren	3132	None - Used correct Acid Rain data.
NJ	Wayne	3134	Reduces NJ 1999 - 2002 heat input.
NJ	Keystone	3136	None - Used correct Acid Rain data.

Exempt Cogeneration Status

There were also comments on the exempt cogeneration status of four cogeneration plants, one in Virginia, and three in Massachusetts. The plants are all Acid Rain plants, so the plants are now identified as EGUs and not exempt. Affected plants are shown in Table B-4.

Table B-4. Plants for which Cogeneration Status Was Corrected in EPA Data

State	Oris Code	FACILITY NAME
MA	10502	Indeck Pepperell
MA	10802	Lowell Cogen
MA	54586	Lowell Power, LLC
VA	54844	Gordonsville

Additionally, EPA has revisited the list of non-Acid Rain plants and has flagged and also excluded from heat input budget calculations any industrial plant which while operating, did not deliver electricity to a utility in 1999 or 2000 (years for which the data are available from EIA). The CAIR budgets only apply to plants which generate electricity for sale, and the industrial plants without sales should not have been included.

Further revisions to cogeneration status are highlighted in the spreadsheet "Rev EIA Plant HI.xls," available in the docket. The exemption flag, a "Y" in the column "F" field - "Exempt FERC Cogen (H and I $\leq$ 0.33) of the worksheet is based on whether the plant is a FERC qualifying cogeneration plant, and the amount of electricity delivered to utilities in 1999 or 2000. As is discussed earlier, heat input for plants for which the ratio of electricity sales to potential capacity did not exceed 0.33 were dropped from the data set.

U.S. ENVIRONMENTAL PROTECTION AGENCY

Air Mercury Rule

- Clean Air 2004 Home
- Clean Air Mercury Rule Home
- Basic Information
- Regulatory Actions
- Charts & Tables
- Technical Information
- Implementation

On March 15, 2005, EPA issued the Clean Air Mercury Rule to permanently cap and reduce mercury emissions from coal-fired power plants for the first time ever. This rule makes the United States the first country in the world to regulate mercury emissions from utilities.

On March 10, 2005, in a separate but related action, EPA issued the Clean Air Interstate Rule (CAIR), a rule that will dramatically reduce air pollution that moves across state boundaries.

Notice

On February 8, 2008, the D.C. Circuit vacated EPA's rule removing power plants from the Clean Air Act list of sources of hazardous air pollutants. At the same time, the Court vacated the Clean Air Mercury Rule. EPA is reviewing the Court's decisions and evaluating its impacts.

Read the Court's Opinion (PDF) (18pp, 51k)

Clean Air Rules of 2004

The actions described here are part of the suite of inter-related rules collectively known as the Clean Air Rules of 2004. These rules address ozone and fine particle pollution, nonroad diesel emissions, and power plant emissions of sulfur dioxide, nitrogen oxides and mercury.

Together the Clean Air Mercury Rule and the Clean Air Interstate Rule create a multi-pollutant strategy to reduce emissions throughout the United States.

Where to find more information:

Basic Information - Summary of the final Clean Air Mercury Rule as well as a summary of the design of the program and the benefits it will provide.

Regulatory Actions - Links to proposed and final rules, fact sheets, and other rulemaking documents.

Charts and Tables - A collection of printable charts, tables, and graphics

demonstrating the health and environmental benefits of the Clean Air Mercury Rule.

Technical Information - Technical support information and links to related information.

Mercury Home - Provides a broad range of information: actions by EPA and others, including international actions; effects on people and the environment; and how to protect you and your family.

Implementation - Links to frequently asked questions, implementation status, and other implementation topics.

- Air & Radiation Home

- Six Common Air Pollutants Home
- Ozone
- Particulate Matter
- Carbon Monoxide
- Nitrogen Oxides
- Sulfur Dioxide
- Lead
- Designations

Health and Environmental Impacts of NOx

NOx causes a wide variety of health and environmental impacts because of various compounds and derivatives in the family of nitrogen oxides, including nitrogen dioxide, nitric acid, nitrous oxide, nitrates, and nitric oxide.

Nitrogen Oxides

- NOx Home
- Emission Sources
- Causes for Concern
- Health & Enviro Impacts
- EPA Efforts to Reduce NOx
- EPA Offices
- NOx: How nitrogen oxides affect the way we live and breathe (PDF) (4pp, 774k)

Ground-level Ozone (Smog) - is formed when NOx and volatile organic compounds (VOCs) react in the presence of sunlight. Children, people with lung diseases such as asthma, and people who work or exercise outside are susceptible to adverse effects such as damage to lung tissue and reduction in lung function. Ozone can be transported by wind currents and cause health impacts far from original sources. Millions of Americans live in areas that do not meet the health standards for ozone. Other impacts from ozone include damaged vegetation and reduced crop yields

Acid Rain - NOx and sulfur dioxide react with other substances in the air to form acids which fall to earth as rain, fog, snow or dry particles. Some may be carried by wind for hundreds of miles. Acid rain damages; causes deterioration of cars, buildings and historical monuments; and causes lakes and streams to become acidic and unsuitable for many fish.

Particles - NOx reacts with ammonia, moisture, and other compounds to form nitric acid and related particles. Human health concerns include effects on breathing and the respiratory system, damage to lung tissue, and premature death. Small particles penetrate deeply into sensitive parts of the lungs and can cause or worsen respiratory disease such as emphysema and

bronchitis, and aggravate existing heart disease.

Water Quality Deterioration - Increased nitrogen loading in water bodies, particularly coastal estuaries, upsets the chemical balance of nutrients used by aquatic plants and animals. Additional nitrogen accelerates "eutrophication," which leads to oxygen depletion and reduces fish and shellfish populations. NOx emissions in the air are one of the largest sources of nitrogen pollution in the Chesapeake Bay.

Climate Change - One member of the NOx, nitrous oxide or N_2O, is a greenhouse gas. It accumulates in the atmosphere with other greenhouse gasses causing a gradual rise in the earth's temperature. This will lead to increased risks to human health, a rise in the sea level, and other adverse changes to plant and animal habitat.

Toxic Chemicals - In the air, NOx reacts readily with common organic chemicals and even ozone, to form a wide variety of toxic products, some of which may cause biological mutations. Examples of these chemicals include the nitrate radical, nitroarenes, and nitrosamines.

Visibility Impairment - Nitrate particles and nitrogen dioxide can block the transmission of light, reducing visibility in urban areas and on a regional scale in our national parks.

- Air & Radiation Home

- Six Common Air Pollutants Home
- Ozone
- Particulate Matter
- Carbon Monoxide
- Nitrogen Oxides
- Sulfur Dioxide
- Lead
- Designations

Sulfur Dioxide

Sulfur Dioxide

- SO_2 Home
- Emission Sources
- Causes for Concern
- Health & Enviro Impacts
- EPA Efforts to Reduce SO_2
- EPA Offices

Sulfur dioxide, or SO_2, belongs to the family of sulfur oxide gases (SOx). These gases dissolve easily in water. Sulfur is prevalent in all raw materials, including crude oil, coal, and ore that contains common metals like aluminum, copper, zinc, lead, and iron. SOx gases are formed when fuel containing sulfur, such as coal and oil, is burned, and when gasoline is extracted from oil, or metals are extracted from ore. SO_2 dissolves in water vapor to form acid, and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and their environment.

- SO_2 Emission Sources - Summarizes sulfur dioxide emissions by source at national, state and local levels.
- Chief Causes for Concern
- Health and Environmental Impacts of SO_2
- EPA's Efforts to Reduce SO_2
- U.S. EPA Offices

- Radon Home

- Where You Live
- A to Z Site Index
- Frequent Questions
- Glossary
- Publications
- Related Links

- National Radon Action Month
- Radon Health Risks
- Who Can Test or Fix Your Home for Radon?
- Radon and Real Estate
- Radon Resistant New Construction (RRNC)
- EPA Map of Radon Zones
- Radon in Drinking Water
- State Indoor Radon Grants (SIRG)
- Kids, Students and Teachers
- Hotlines
- TV and Radio Ads

Health Risks

Exposure to Radon Causes Lung Cancer In Non-smokers and Smokers Alike

For More Information on Radon Health Risks:

Radon Frequently Asked Questions

EPA's 2003 Radon Risk Assessment

Biological Effects of Ionizing Radiation (BEIR) VI Report: "The Health Effects of Exposure to Indoor Radon"

Radon Publications

- Citizen's Guide to Radon
- Home Buyer's and Seller's Guide to Radon
- Consumer's Guide to Radon Reduction

Technical Support Document to the 1992 Citizens Guide [EPA 400-R-92-011, May 1992] Copies can be ordered from EPA's National Center for Environmental Publications (NSCEP) www.epa.gov/nscep

Lung cancer kills thousands of Americans every year. The untimely deaths of Peter Jennings and Dana Reeve have raised public awareness about lung cancer, especially among people who have never smoked. Smoking, radon, and secondhand smoke are the leading causes of lung cancer. Although lung cancer can be treated, the survival rate is one of the lowest for those with cancer. From the time of diagnosis, between 11 and 15 percent of those afflicted will live beyond five years, depending upon demographic factors. In many cases lung cancer can be prevented; this is especially true for radon.

Smoking is the leading cause of lung cancer. Smoking causes an estimated 160,000* cancer deaths in the U.S. every year (American Cancer Society, 2004). And the rate among women is rising. On January 11, 1964, Dr.

Luther L. Terry, then U.S. Surgeon General, issued the first warning on the link between smoking and lung cancer. Lung cancer now surpasses breast cancer as the number one cause of death among women. A smoker who is also exposed to radon has a much higher risk of lung cancer.

Radon is the number one cause of lung cancer among non-smokers, according to EPA estimates. Overall, radon is the second leading cause of lung cancer. Radon is responsible for about 21,000 lung cancer deaths every year. About 2,900 of these deaths occur among people who have never smoked. On January 13, 2005, Dr. Richard H. Carmona, the U.S. Surgeon General, issued a national health advisory on radon. Visit www.cheec.uiowa.edu/misc/radon.html EXIT Disclaimer for more on a study by Dr. William Field on radon-related lung cancer in women.

Secondhand smoke is the third leading cause of lung cancer and responsible for an estimated 3,000 lung cancer deaths every year. Smoking affects non-smokers by exposing them to secondhand smoke. Exposure to secondhand smoke can have serious consequences for children's health, including asthma attacks, affecting the respiratory tract (bronchitis, pneumonia), and may cause ear infections.

Learning more about lung cancer. The following sources provide a wide range of good information about lung cancer, prevention, and treatment.

- American Cancer Society -- www.cancer.org EXIT Disclaimer
- American Lung Association -- www.lungusa.org EXIT Disclaimer
  ALA offers Facts About Lung Cancer EXIT Disclaimer
- National Cancer Institute -- www.nci.nih.gov/ EXIT Disclaimer
- Vanderbilt-Ingram Cancer Center -- www.mc.vanderbilt.edu/vicc EXIT Disclaimer
- Memorial Sloan-Kettering -- www.mskcc.org/mskcc/html/44.cfm EXIT Disclaimer

Studies Find Direct Evidence Linking Radon in Homes to Lung Cancer - Two studies show definitive evidence of an association between residential radon exposure and lung cancer. Two studies, a North American study and a European study, both combined data from several previous residential studies. These two studies go a step beyond earlier findings. They confirm

the radon health risks predicted by occupational studies of underground miner's who breathed radon for a period of years. Early in the debate about radon-related risks, some researchers questioned whether occupational studies could be used to calculate risks from exposure to radon in the home environment. "These findings effectively end any doubts about the risks to Americans of having radon in their homes," said Tom Kelly, Director of EPA's Indoor Environments Division. "We know that radon is a carcinogen. This research confirms that breathing low levels of radon can lead to lung cancer."

- Read the University of Iowa press release about the North American study at www.uihealthcare.com/news/news2005/03/21radon.html EXIT Disclaimer
- Abstract of the pooling of *North American Residential Radon studies* (PDF) (2 pp, 22KB, About PDF).
- Abstract of the pooling of the *European Residential Radon studies* (PDF) (1 page, 21KB, About PDF).

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World Health Organization Launches International Radon Project

The World Health Organization (WHO) says radon causes up to 15% of lung cancers worldwide. In an effort to reduce the rate of lung cancer around the world, the World Health Organization (WHO) launched an international radon project to help countries increase awareness, collect data and encourage action to reduce radon-related risks. The U.S. EPA is one of several government agencies and countries supporting this initiative and is encouraged by WHO's attention to this important public health issue. "Radon poses an easily reducible health risk to populations all over the world, but has not up to now received widespread attention," said Dr. Michael Repacholi, coordinator of WHO's Radiation and Environmental Health Unit. He went on to say that "radon in our homes is the main source of exposure to ionizing radiation, and accounts for 50% of the public's exposure to naturally-occurring sources of radiation in many countries."

- Read the WHO Press Release EXIT Disclaimer
- Read the EPA News Release
- Visit the World Health Organization's International Radon Project site - www.who.int/ionizing_radiation/env/radon/en/index.html EXIT Disclaimer

The U.S. Surgeon General, Richard Carmona, Issues National Health Advisory on Radon

The Surgeon General of the United States issued a Health Advisory in 2005 warning Americans about the health risk from exposure to radon in indoor air. The Nation's Chief Physician urged Americans to test their homes to find out how much radon they might be breathing. Dr. Carmona also stressed the need to remedy the problem as soon as possible when the radon level is 4 pCi/L or more. Dr. Carmona noted that more than 20,000 Americans die of radon-related lung cancer each year.

- Read the Surgeon General's News Release EXIT Disclaimer

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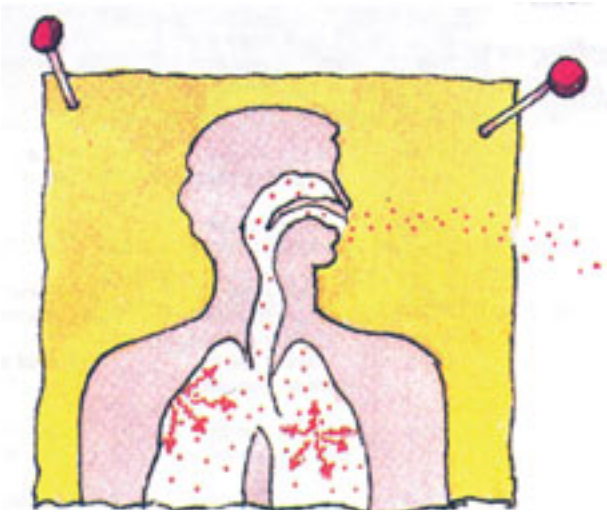
Why is radon the public health risk that it is?

EPA estimates that about 20,000 lung cancer deaths each year in the U.S. are radon-related. Exposure to radon is the second leading cause of lung cancer after smoking. Radon is an odorless, tasteless and invisible gas produced by



the decay of naturally occurring uranium in soil and water.

Radon is a form of ionizing radiation and a proven carcinogen. Lung cancer is the only known effect on human health from exposure to radon in air. Thus far, there is no evidence that children are at greater risk of lung cancer than are adults.

Radon in air is ubiquitous. Radon is found in outdoor air and in the indoor air of buildings of all kinds. EPA recommends homes be fixed if the radon level is 4 pCi/L (pico Curies per Liter) or more. Because there is no known safe level of exposure to radon, EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L. The average radon concentration in the indoor air of America's homes is about 1.3 pCi/L. It is upon this level that EPA based its estimate of 20,000 radon-related lung cancers a year upon. It is for this simple reason that EPA recommends that Americans consider fixing their homes when the radon level is between 2 pCi/L and 4 pCi/L. The average concentration of radon in outdoor air is .4 pCi/L or 1/10th of EPA's 4 pCi/L action level.

For smokers the risk of lung cancer is significant due to the synergistic effects of radon and smoking. For this population about 62 people in a 1,000 will die of lung-cancer, compared to 7.3 people in a 1,000 for never smokers. Put another way, a person who never smoked (never smoker) who is exposed to 1.3 pCi/L has a 2 in 1,000 chance of lung cancer; while a smoker has a 20 in 1,000 chance of dying from lung cancer. Figure A compares the risks between smokers and never smokers; smokers are at a much higher risk than never smokers, e.g., at 8 pCi/L the risk to smokers is six times the risk to never smokers.

The radon health risk is underscored by the fact that in 1988 Congress added Title III on Indoor Radon Abatement to the Toxic Substances Control Act. It codified and funded EPA's then fledgling radon program. Also that year, the Office of the U.S. Surgeon General issued a warning about radon urging Americans to test their homes and to reduce the radon level when necessary (U.S. Surgeon General).

Unfortunately, many Americans presume that because the action level is 4 pCi/L, a radon level of less than 4 pCi/L is 'safe'. This perception is altogether too common in the residential real estate market. In managing any risk, we should be concerned with the greatest risk. For most Americans, their greatest exposure to radon is in their homes; especially in rooms that are below grade (e.g., basements), rooms that are in contact with the ground and those rooms immediately above them.

> ***It's never too late to reduce your risk of lung cancer. Don't wait to test and fix a radon problem. If you are a smoker, stop smoking. Consider quitting. Until you can quit, smoke outside and provide your family with a smoke-free home*** *(www.epa.gov/smokefree).*
>
> *Take the Smoke-free Home Pledge today!*

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Radon Risk If You Smoke

Radon Level	If 1,000 people who smoked were exposed to this level over a lifetime*...	The risk of cancer from radon exposure compares to**...	WHAT TO DO: Stop smoking and...
20 pCi/L	About 260 people could get lung cancer	250 times the risk of drowning	Fix your home
10 pCi/L	About 150 people could get lung cancer	200 times the risk of dying in a home fire	Fix your home
8 pCi/L	About 120 people could get lung cancer	30 times the risk of dying in a fall	Fix your home
4 pCi/L	About 62 people could get lung cancer	5 times the risk of dying in a car crash	Fix your home
2 pCi/L	About 32 people could get lung cancer	6 times the risk of dying from poison	Consider fixing between 2 and 4 pCi/L
1.3 pCi/L	About 20 people could get lung cancer	(Average indoor radon level)	(Reducing radon

0.4 pCi/L	About 3 people could get lung cancer	(Average outdoor radon level)	levels below 2 pCi/L is difficult.)

Note: If you are a former smoker, your risk may be lower.
pCi/L (pico Curies per Liter)
* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).
** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.

Radon Risk If You've Never Smoked

Radon Level	If 1,000 people who never smoked were exposed to this level over a lifetime*...	The risk of cancer from radon exposure compares to**...	WHAT TO DO:
20 pCi/L	About 36 people could get lung cancer	35 times the risk of drowning	Fix your home
10 pCi/L	About 18 people could get lung cancer	20 times the risk of dying in a home fire	Fix your home
8 pCi/L	About 15 people could get lung cancer	4 times the risk of dying in a fall	Fix your home
4 pCi/L	About 7 people could get lung cancer	The risk of dying in a car crash	Fix your home
2 pCi/L	About 4 people could get lung cancer	The risk of dying from poison	Consider fixing between 2 and 4 pCi/L
1.3 pCi/L	About 2 people could get lung cancer	(Average indoor radon level)	(Reducing radon levels below 2 pCi/L is difficult.)
0.4 pCi/L		(Average outdoor radon level)	

Note: If you are a former smoker, your risk may be higher.
pCi/L (pico Curies per Liter)
* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).
** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.

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EPA Home Privacy and Security Notice Contact Us

Last updated on Monday, August 4th, 2008.
http://www.epa.gov/radon/healthrisks.html
Print As-Is

Pennsylvania
Bureau of Air Quality
Clean Air Plans

Pennsylvania's Clean Air Plans

- Reducing Fine Particulate Pollution
- Reducing Ozone Pollution
- Reducing Carbon Monoxide
- Reducing Sulfur Dioxide Pollution
- Multi-Pollutant Regulations/Plans
- Reducing Toxic Emissions
- Reducing Pollution from Vehicles

For files not found here, please see the **Clean Air Plans Archive**

Infrastructure SIP Submittals

Proposed Revision to Pennsylvania Section 110(a)(2)(K) Infrastructure SIPSection

- Infrastructure (110k) SIP revision
- Infrastructure (110k) PA Bulletin Notice

The Department of Environmental Protection (Department)has submitted a SIP revision that confirms the Commonwealth's compliance with section 110(a)(2)(A)--(M) of the CAA (42 U.S.C.A. §§ 7410(a)(2)(A)--(M)) pertaining to general responsibilities. and a SIP revision meeting the interstate transport requirements of section 110(a)(2)(D)(i) of the CAA (42 U.S.C.A. §§ 7410(a)(2)(D)(i)).

- Pa. Bulletin Announcement 9/15/07
- Submittal Letter to EPA 12/7/07
  - Infrastructure SIP Submittal, Confirmation (PDF)
- Submittal Letter to EPA 12/7/07
  - CAIR SIP Submittal (PDF)
  - Comment/Response Document
- Allegheny County Implementing Agreement (PDF)
- Philadelphia County Implementing Agreement (PDF)

Plans for Reducing Fine Particulate Pollution

PM2.5 Modeling Protocols

The modeling protocols provide background information and describe the basic structure of the PM2.5 modeling demonstration that the Pennsylvania Department of Environmental Protection will undertake. These demonstrations will become part of the Commonwealth's State Implementation Plan that will ensure the eight annual PM2.5 nonattainment areas will meet ambient standards. Modeling protocols follow the structure outlined in section 12.2 of the U.S. EPA's April 2007 guidance.

- Harrisburg - Lebanon - Carlisle (PDF)
  - Appendices - A, B, C, D, E
- Johnstown (PDF)
  - Appendices - A, B, C, D, E
- Lancaster (PDF)
  - Appendices -A, B, C, D, E
- Philadelphia - Wilmington - PA, NJ, DE (PDF)
  - Appendices - A, B, C, D, E
- Pittsburgh - Beaver Valley (PDF)
  - Appendices - A, B, C, D, E
- Liberty-Clairton (PDF - Accessed 12/5/07)
- Reading (PDF)
  - Appendices - A, B, C, D, E
- York (PDF)
  - Appendices - A, B, C, D, E

Plans for Reducing Ozone Pollution

Ground-level ozone pollution occurs when hydrocarbons and nitrogen oxides bake in the sun. These gases come from unburned fuel and solvents, car exhaust, factory stack emissions and homeowners' and individuals' activities. The federal government set a National Ambient Air Quality Standard for ozone to protect public health. For areas that do not meet the standard, the state must submit a State Implementation Plan (SIP) to the EPA that outlines the measures that will be taken to attain the health-based ozone standard. States are also responsible for submitting maintenance plans to the EPA that detail how the state will assure the standard will continue to be met for the next 10 years.

Final RACT SIP Revision for the 8-hour Ozone Standard Submitted to EPA for Approval

DEP has submitted to EPA for approval a revision to the State Implementation Plan (SIP). The revision is a demonstration that shows existing rules enacted by the DEP fulfill the Reasonably Available Control Technology (RACT) requirements under the 8-hour ozone National Ambient Air Quality Standards (NAAQS).

- Transmittal Letter to EPA (PDF) 9/25/06
- RACT SIP Revision (PDF)

- Comment and Response Document (PDF)

Final RACT Revision for Philadelphia County Under the 8-Hour Ozone Standard Submitted to EPA for Approval

DEP has submitted to EPA for approval a revision to the State Implementation Plan (SIP) for Philadelphia County. The DEP concurs with the Philadelphia Air Management Services that this Reasonably Available Control Technology (RACT) SIP revision meets the requirements under the 8-hour ozone National Ambient Air Quality Standard.

- Transmittal Letter to EPA 9/25/06
- Philadelphia County RACT SIP Revision

Philadelphia Area Attainment Plan

DEP has submitted a revision to the State Implementation Plan (SIP) for the Southeastern Pennsylvania area included in the Philadelphia-Wilmington-Atlantic City, PA-DE-MD-NJ eight-hour Ozone Nonattainment Area (Philadelphia Nonattainment Area). The Pennsylvania portion of this “moderate” eight-hour ozone nonattainment area consists of Bucks, Chester, Delaware, Montgomery and Philadelphia counties.

The SIP revision demonstrates how the area will attain the health-based eight-hour ozone NAAQS by June 2010 by presenting evidence from photochemical modeling, ozone trends and regional transport impacts. The plan demonstrates how the area will meet 2008 and 2009 reasonable further progress milestones for emission reductions through state and federal control measures. It also contains the base year 2002 emissions inventory, a reasonably available control measure analysis, a contingency plan to bring the area back into attainment should violations of the NAAQS occur after the standard is attained, and mobile source emission budgets for purposes of transportation conformity.

Appendices to all documents are available upon request by contacting the division staff at 717-787-9495.

- Pa. Bulletin Announcement (PDF)
- Final Attainment Plan (PDF)
- Transmittal Letter (PDF)
- Technical Appendices TOC (PDF)

State Implementation Plan Revision Incorporating the Amended Pennsylvania Clean Vehicles Program.

DEP has submitted to EPA for approval a revision to the State Implementation Plan (SIP). The SIP revision incorporates the recently amended Pennsylvania Clean Vehicles (PCV) program requirements.

- Transmittal Letter to EPA (PDF) 5/31/07
- Final Amended PCV Program Regulation (12/9/2006)
- Technical Correction of PCV Program Regulation (1/13/2007)
- Proposed Amended PCV Program Regulation (02/11/2006)
- PCV Program Regulation Comment & Response Document (PDF)
- SIP Revision Technical Support Document (PDF)

Redesignation Requests, Maintenance Plans and 2002 Base Year Inventories

DEP has submitted eight-hour ozone maintenance plans and base year inventories for twelve counties that were designated "attainment" for the eight-hour standard. However, one-hour ozone redesignation requests and maintenance plans for these counties were never approved by EPA prior to revocation of the one-hour standard, obligating Pennsylvania to submit State Implementation Plan revisions demonstrating attainment of the eight-hour ozone standard for at least ten years.

Pa. Bulletin Notice

Columbia	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS 8mb)
Crawford	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS 8mb)
Juniata	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS)
Lawrence	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS 8mb)
Northumberland	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS 8mb)
Pike	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS)

Schuylkill	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS)
Snyder	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS)
Somerset	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS)
Susquehanna	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS)
Warren	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS)
Wayne	• Maintenance Plan (PDF) • 2002 Base Year Inventory (MS XLS)

DEP is submitting State Implementation Plan revisions for all nonattainment areas which are attaining the eight-hour ozone standard and requesting that these areas be redesignated. The Maintenance Plans demonstrate how the air quality in the area will be maintained through 2018. Base year (2002) inventories are also being submitted. Appendices to all documents are available upon request by contacting Arleen Shulman at 717-772-3926.

County/Area	Plan Detail
York-Adams	Ozone SIP Revision Submitted to EPA May 23, 2008 • Pa. Bulletin Notice • Transmittal Letter • SIP Revision Approved by EPA on January 14, 2008 . • Pa. Bulletin Announcement (PDF) • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)

Clearfield-Indiana	Ozone SIP Revision Submitted to EPA May 23, 2008 • Pa. Bulletin Notice • Transmittal Letter • SIP Revision Submitted to EPA on June 14, 2007. • Pa. Bulletin Announcement (PDF) • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)
State College (Centre County)	Approved by EPA on November 14, 2007 • Pa. Bulletin Announcement (PDF) • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)
Allentown-Bethlehem-Easton	Proposed to be approved by EPA on January 7, 2008. • Pa. Bulletin Announcement (PDF) • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)
Scranton/Wilkes-Barre	Proposed Ozone SIP Revision • Pa Bulletin Notice • Proposed SIP Revision Submitted to EPA on June 12, 2007. • Pa. Bulletin Announcement (PDF) • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)

Pittsburgh-Beaver Valley	Proposed to be approved by EPA on July 11, 2007. • Pa. Bulletin Announcement (PDF) • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)
Erie	Approved by EPA on October 9, 2007. • Pa. Bulletin Announcement (PDF) • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)
Mercer	Approved by EPA on October 19, 2007. • Pa. Bulletin Announcement • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)
Cambria	Approved by EPA on August 1, 2007. • Pa. Bulletin Announcement • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)

Harrisburg - Lebanon - Carlisle	Approved by EPA on July 25, 2007. • Pa. Bulletin Announcement • Comments & Responses (PDF) • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)
Blair	Approved by EPA on August 1, 2007. • Pa. Bulletin Announcement • Request for Redesignation (PDF) • Redesignation Transmittal Letter (PDF) • Maintenance Plan (PDF) • Maintenance Plan Transmittal Letter (PDF) • Technical Appendices Table of Contents (PDF)
Greene	Ozone SIP Revision Submitted on May 23, 2008 • Pa. Bulletin Notice • Transmittal Letter • SIP Revision Submitted to EPA on January 25, 2007. • Pa. Bulletin Announcement (PDF) • Comments & Responses (PDF) • Redesignation Transmittal Letter (PDF) • Request for Redesignation (PDF) • Maintenance Plan Transmittal Letter (PDF) • Maintenance Plan (PDF) • Technical Appendices Table of Contents (PDF)

Reading	Submitted to EPA on January 25, 2007. • Pa. Bulletin Announcement (PDF) • Comments & Responses (PDF) • Redesignation Transmittal Letter (PDF) • Request for Redesignation (PDF) • Maintenance Plan Transmittal Letter (PDF) • Maintenance Plan (PDF) • Technical Appendices Table of Contents (PDF)
Franklin	Approved by EPA on July 25, 2007. • Redesignation Transmittal Letter (PDF) • Request for Redesignation (PDF) • Maintenance Plan Transmittal Letter (PDF) • Maintenance Plan (PDF) • Technical Appendices Table of Contents (PDF)
Tioga	Approved by EPA on July 6, 2007. • Pa. Bulletin Announcement • Redesignation Transmittal Letter (PDF) • Request for Redesignation (PDF) • Maintenance Plan Transmittal Letter (PDF) • Maintenance Plan (PDF) • Technical Appendices Table of Contents (PDF)
Lancaster	Approved by EPA on July 6, 2007. • Pa. Bulletin Announcement • Redesignation Transmittal Letter (PDF) • Request for Redesignation (PDF) • Maintenance Plan Transmittal Letter (PDF) • Maintenance Plan (PDF) • Technical Appendices Table of Contents (PDF)

Architectural Industrial Maintenance (AIM) Variances

SAU-SEA Application for Variance (8/04)

- Application (PDF)
- Addendum (PDF)
- Draft Proposed Order (PDF)

Sherwin-Williams Stain Variance (5/04)

- Denial Letter (PDF)
- Denial Document (PDF)
- Minwax Water-Based Product Specifications (PDF)
- Comment/Response Document (PDF)
- Application (PDF)(1.1M)
- Draft Proposed Order (PDF)

Sherwin-Williams - Clear Wood Coatings (Varnishes) Variance

- Application (PDF)(1.4M)
- Draft Proposed Order (PDF)
- Coating Descriptions (PDF)(3.3M)
- Comment/Response Document (PDF)
- Denial Document (PDF)
- Denial Letter (PDF)

Ozone Transport

SIP Revisions To Reduce Regional Transport of Ozone
See the Air Quality Regulations page.

Plans for Reducing Carbon Monoxide

Final Revision to the Pennsylvania State Implementation Plan for Maintaining the Carbon Monoxide National Ambient Air Quality Standard for the Years 2007-2017 in Philadelphia County (9/3/04) (PDF)

- **Notice of Public Hearing**
- **Final SIP**
- **Transmittal Letter to EPA**

Plans To Reduce Sulfur Dioxide (SO_2) Pollution

The federal government has set standards for SO_2 to protect public health. For areas that do not meet the standard, the state must submit a State Implementation Plan (SIP) to the EPA that outlines the measures that will be taken to attain the health-based standard. After areas achieve the standard, states must also submit maintenance plans to assure the standard will continue to be met for the next 10 years.

Status: Approved by EPA on 7/1/04
Final Warren County SIP Revision - Conewango Township, Pleasant Township, Glade Township, and City of Warren, Warren County SO_2 Maintenance Plan and Redesignation Request (5/04)

- Maintenance Plan (PDF)
- Redesignation Request (PDF)
- Letter to EPA (PDF)
- PA Bulletin Notice (PDF)

Multi-Pollutant Regulations/Plans

DEP Comments on EPA's Notice of Proposed Rulemaking: Rule to Reduce Interstate Transport of Fine Particulate Matter and Ozone (4/5/04)

- DEP Comments (PDF)
- Multi-Pollutant Strategy Position of the OTC (PDF)

Plans to Reduce Toxic Emissions

Section 111 of the federal Clean Air Act contains a priority list of pollution sources that states must regulate. New sources must meet certain performance standards, and existing sources must meet prescribed emissions guidelines. The following plans aim to reduce toxic emissions and meet these standards.

Section 111(d)/129 State Plan for Hospital/Medical/Infectious Waste Incinerators (9/98)

- Download State Plan (PDF)

Section 111(d)/129 State Plan For Large Municipal Waste Combustors (4/98)

- Download State Plan (PDF)

Section 111(d)/129 State Plan For Municipal Solid Waste Landfills (6/97)

- Download State Plan (PDF)

Plans to Reduce Pollution from Vehicles

Vehicles emit a number of harmful air pollutants that have the potential to adversely affect people's respiratory systems. These chemicals and particles are particularly dangerous for children, the elderly and those with existing respiratory problems such as asthma. As people increasingly depend on their cars and drive more and more miles, it is important that the vehicles' exhaust systems become cleaner. The following plans aim to reduce air pollution resulting from automobiles and other vehicles to help Pennsylvania attain the health-based ozone standard.

NEW Transportation Conformity SIP Revision
Submitted to EPA May 29, 2008

- Pa Bulletin Notice
- Final Transportation Conformity SIP Revision
  - Volume I
  - Volume II
- Cover
- Transmittal Letter
- Comment/Response Document

Final SIP Revision Vehicle Emissions Inspection/Maintenance Program; Program Changes for Philadelphia and Pittsburgh Regions (1/04). Approved by the EPA October 6, 2005.

- Final SIP Revision (PDF)
- Technical Appendices available upon request. Please contact Yvette House, at (717) 787-9495.

Final SIP Revisions for the Enhanced Vehicle Emissions Inspection/Maintenance Program (11/03). Approved by the EPA October 6, 2005.

- Final SIP Revisions (PDF)
- Technical Appendices are availabel upon request. Please contact Yvette House, at (717) 787-9495.

Enhanced Vehicle Emission Inspection/Maintenance Program

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