Clean Air Task Force
American Lung Association
Respiratory Health Association of Metropolitan Chicago
Group Against Smog and Pollution
National Parks Conservation Association
Natural Resources Defense Council
Ohio Environmental Council
Southern Alliance for Clean Energy
Southern Environmental Law Center

October 1, 2010

VIA E-mail and Filing at regulations.gov

EPA Docket Center
EPA West (Air Docket)
U.S. Environmental Protection Agency
Mail Code: 2822T
1200 Pennsylvania Ave., NW
Washington, DC 20460

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

Re: Comments on Proposed Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone, 75 Fed. Reg. 45210 (August 2, 2010).

Dear Administrator Jackson:

The Clean Air Task Force ("CATF"), on behalf of the undersigned citizens' groups and on its own behalf, appreciates the opportunity to comment on EPA's Proposed Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone, published in the Federal Register on August 2, 2010 at 75 Fed. Reg. 45210 ("Transport Rule" or "TR").

The undersigned environmental and public health organizations are actively engaged in national, regional and local efforts to reduce harmful air pollution from fossil fuel-fired power plants, and have thousands of members who live and work in states impacted by that pollution. EPA's TR proposal would require substantial reductions in emissions of sulfur dioxide ("SO_2") and nitrogen oxides ("NOx") from power plants throughout the eastern United States. Those emissions are responsible for substantial

public health and environment damage, and can be transported substantial distances downwind.

The Clean Air Act ("CAA" or the "Act") requires state implementation plans ("SIPs") to include measures that adequately address transported pollution, and EPA has a duty to enforce these requirements, including but not limited to the promulgation Federal Implementation Plans ("FIPs") in the absence of compliant transport SIPs. EPA's proposed TR fulfills that duty only partially, not completely. In order to protect public health adequately, and to allow many areas around the country that will be in violation of the ozone and fine particulate ("$PM_{2.5}$") National Ambient Air Quality Standards ("NAAQS") to attain those standards, EPA must tighten the emission caps and expeditiously finalize the proposed rule. Tighter emission caps are necessary to eliminate significant contribution to nonattainment and maintenance problems in several remaining downwind areas, and are therefore required under the Act and governing regulatory precedent and policy. Additional reductions of power plant emissions are also feasible, cost-effective, and will produce public benefits dramatically higher than the costs of controls.

I. Overview

Today, fossil fuel-fired power plants remain—despite substantial regulatory focus and resultant emission reductions in recent years—the largest source of industrial air pollution in the country. These emissions are harmful in their own right, but through atmospheric interactions they are also primary contributors to ozone smog and fine particles, both of which are extremely harmful to human health and the environment. Earlier this month, CATF released a report updating its earlier analysis of US power plant pollution, projecting that PM emissions from the nation's coal-fired power plant fleet will cut short the lives of about 13,000 people this year.[1]

More than a decade ago, EPA promulgated the 1997 air quality standards for fine particulate matter and 8-hour ozone.[2] A more protective PM standard was established in 2006.[3] In 2008, EPA adopted a stronger 8-hour ozone standard. EPA recently determined that the 2008 ozone standard did not provide the protection required under the

[1] Clean Air Task Force (September 2010), *The Toll from Coal: An Updated Assessment of Death and Disease from America's Dirtiest Energy Source*, available online at http://www.catf.us/resources/publications/files/The_Toll_from_Coal.pdf (hereinafter "The Toll from Coal").

[2] The $PM_{2.5}$ and 8-hour ozone NAAQS revisions were promulgated in 1997 (62 Fed. Reg. 38652 and 62 Fed. Reg. 38856, July 18, 1997).

[3] The 24 hour $PM_{2.5}$ NAAQS was strengthened in 2006, while the annual level remained unchanged (71 Fed. Reg. 61144, October 17, 2006). The DC Circuit Court of Appeals found that EPA failed to justify its decision not to tighten the annual PM level, and remanded the rule back to EPA. *American Farm Bureau Federation v. EPA*, 559 F.3d 512 (DC Cir. 2009). EPA is now in the process of reviewing the $PM_{2.5}$ NAAQS, and is planning to propose revised PM standards by February 2011. 75 Fed. Reg. 45210 at 45220.

Clean Air Act and is currently considering strengthening that standard as well.[4] Today, however, many areas throughout the East and Midwest continue to exceed these health-based standards. In order for many Eastern nonattainment areas to have a realistic chance of meeting those standards and improving the health of their citizens, steep reductions in transported power plant emissions of SO_2 and NOx are absolutely necessary. Not only will steeper reductions allow states to attain the existing PM and ozone NAAQS, but they will also be necessary to help states achieve future air quality standards for PM and ozone, which are likely to be tightened in the next year or so.[5] Furthermore, additional reductions will deliver substantial additional public health benefits resulting from lower ambient pollution levels, regardless of attainment status.[6]

The problem would be much worse if many power plants had not reduced their emissions of SO_2 and NOx over the past few years. National power plant emissions of sulfur dioxide have fallen from 10.3 million tons per year in 2004 to 5.7 million tons last year, a drop of nearly 50 percent in five years.[7] NOx emissions from power plants have also fallen by about half during this period.[8] While these reductions may be attributed to a number of factors, including the "NOx SIP Call,"[9] New Source Review enforcement actions and a variety of state regulations, these air quality gains were consolidated and extended through EPA's 2005 Clean Air Interstate Rule ("CAIR").[10]

However, CAIR was invalidated by the DC Circuit Court of Appeals in 2008,[11] and much of the progress made over the past few years will be in jeopardy without a strong Transport Rule to replace CAIR. Flue gas desulfurization devices ("FGDs" or "scrubbers") and selective catalytic reduction ("SCR") are widely available and extremely effective, but they have an operation and maintenance cost, so many utilities

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[4] EPA promulgated a revised 8-hour ozone NAAQS in March 2008 (73 Fed. Reg. 16436, March 27, 2008). In September 2009, EPA announced that the Agency was reconsidering the 2008 ozone standard and in January, 2010, announced a proposal to strengthen the standard based on the same evidence that led to the 2008 decision (75 Fed. Reg. 2938, January 19, 2010). EPA has also begun work on its next review of the ozone standard, currently scheduled for completion in February 2014. U.S. EPA, *Integrated Review Plan for National Ozone Ambient Air Quality Standards Review-External Review Draft*, September 2009. Accessed at http://www.epa.gov/ttn/naaqs/standards/ozone/data/externalreviewdraftO3IRP093009.pdf.

[5] 75 Fed. Reg. at 45219-20.

[6] There is no known "safe" level for fine PM that has been determined to not be harmful to human health. *See, e.g.*, notes 58-61 and accompanying text, *infra*.

[7] The Toll from Coal, at p5.

[8] The Toll from Coal, at p6.

[9] EPA (1998), "Finding of Significant Contribution and Rulemaking for Certain States in the Ozone Transport Assessment Group Region for Purposes of Reducing Regional Transport of Ozone," 63 Fed. Reg. 57356 (October 27, 1998) ("NOx SIP Call").
See EPA. NOx Budget Trading Program/NOx SIP Call 2003-2008. Accessed at http://www.epa.gov/airmarkets/progsregs/nox/sip.html#sipcall. Although much of the control measures from the NOx SIP Call were in place by 2004, those measures continued to reduce NOx emissions into at least 2008. U.S. EPA *Our Nation's Air: Status and Trends Through 2008*. EPA-454/R-09-002. February 2010.

[10] EPA (2005), "Rule To Reduce Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule); Revisions to Acid Rain Program; Revisions to the NOx SIP Call; Final Rule," 70 Fed. Reg. 25162 (May 12, 2005).

[11] *North Carolina v. EPA*, 531 F.3d 896, modified on reh'g, 550 F.3d 1176 (D.C. Cir. 2008).

will not operate them unless they are required to do so. Furthermore, although progress has been made, in 2009 almost two-thirds of coal-fired units in the U.S. (over 700) are still operating with no sulfur scrubber in place.[12] These uncontrolled units represent about half of total US coal-fired boiler capacity.[13] This is clearly not adequate—at this point, every coal-fired power plant in the U.S. should be well-controlled.

We urge EPA to strengthen and finalize the proposed Transport Rule as soon as possible. First of all, this will lock in many of the emission reductions achieved by US power plants in the last five years. Second, the Transport Rule goes farther than CAIR in a number of states and is projected to allow many nonattainment areas in the East to reach attainment, at least for PM.[14] Third, as we discuss below, substantial reductions in power sector emissions beyond those required by the proposed TR are achievable and cost-effective, and the TR should be strengthened to capture those reductions.

We believe that EPA's TR proposal is a good step towards requiring needed air pollution reductions in the electric power sector, and we commend EPA for bringing the proposal forward.[15] We are concerned, however, that the proposal falls short of requiring the amount of cost-effective reductions that are reasonably obtainable, necessary to protect human health and the environment, and necessary to eliminate significant contribution to downwind nonattainment and maintenance problems.

We therefore urge EPA to:

- reduce the 2014 aggregate state budgets in the annual control region (including Texas) for SO_2 to 1.75 million tons (approximately equivalent to a 2 million ton nationwide cap);[16]
- reduce the 2014 aggregate state budgets in the annual control region (including Texas) for NOx to 900,000 tons (approximately equivalent to a 1.25 million ton nationwide cap); and
- include Texas, Arkansas, New Hampshire, North Dakota and Oklahoma in the control region for SO_2 and annual NOx purposes, and include Massachusetts and Missouri in the control region for ozone season NOx purposes.

[12] CATF analysis based on EPA CEMs data.
[13] *Id.*
[14] Attainment of the ozone NAAQS will be more difficult. Furthermore, EPA is currently reconsidering the 2008 ozone NAAQS, has made a revised proposal earlier this year to strengthen the standard (75 Fed. Reg. 2938), and is expected to finalize it later this year.
[15] We note that we do not take a position on whether or to what extent the TR proposal would satisfy EPA's obligation to a downwind state seeking remedy under CAA §126, 42 U.S.C. §7426, from the same interstate air pollution addressed in the TR proposal.
[16] Applying the same average percentage emission reduction in 2009 power plant NOx and SO_2 emissions that were within the TR plus Texas to those emissions outside of that area, our recommended regional caps would be approximately equivalent to a 2.0 million ton national SO_2 cap, and a 1.25 million ton national NOx cap.

Finally, we welcome EPA's stated intention to promulgate a number of rules in the future to require emission reductions from this sector beyond those in the Transport Rule proposal, including—

- additional transport rules as necessary to address upwind transport in connection with future revisions to the ozone or fine PM NAAQS (both primary and secondary), including a revised ozone NAAQS later this year and a further rulemaking addressing any associated needed reductions in transported NOx by 2012;
- Section 112(d) "MACT" standards, to be proposed by March 2011;
- revisions to the new source performance standards (NSPS) for coal and oil-fired power plants (including performance standards for GHG emissions); and
- best available retrofit technology (BART) and regional haze programs to protect visibility.[17]

We urge EPA to follow through expeditiously with these important regulatory efforts, which we fully support.

A. Basic Structure and Approach

The Clean Air Act requires states to include in their plans to implement the NAAQS "adequate provisions…prohibiting…any source or other type of emissions activity within the State from emitting any air pollutant in amounts which will…contribute significantly to nonattainment in, or interfere with maintenance by, any other State with respect to any such national primary or secondary air quality standard…." Section 110(a)(2)(D)(i)(I). If a state does not meet that requirement on its own, EPA must require it to do so or impose a federal implementation plan (FIP).[18] Once EPA has determined that transported pollution significantly contributes to downwind nonattainment problems, it must require that pollution to be eliminated. The DC Circuit Court of Appeals stressed this requirement in its decision overturning CAIR.[19]

EPA has thoroughly documented in the TR and elsewhere the problem of transported air pollution and its extensive and harmful effect of on downwind public health and welfare and resulting NAAQS attainment problems.[20] In this case, EPA has shown that in the absence of regional reductions in NOx and SO_2 emissions, widespread ozone and $PM_{2.5}$ nonattainment will be experienced in the East, South and Midwest.

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[17] *See, e.g.,* 75 Fed. Reg. at 213, 227-29.

[18] Section 110(c)(1) of the Act provides: "The Administrator shall promulgate a Federal implementation plan at any time within 2 years after the Administrator—
(A) finds that a State has failed to make a required submission or finds that the plan or plan revision submitted by the State does not satisfy the minimum criteria established under subsection (k)(1)(A) of this section, or
(B) disapproves a State implementation plan submission in whole or in part,
unless the State corrects the deficiency, and the Administrator approves the plan or plan revision, before the Administrator promulgates such Federal implementation plan."

[19] *North Carolina v. EPA,* 531 F.3d at 908.

[20] *See, e.g.*, TR, 75 Fed. Reg. 45210 at 45219—21; *see also* 69 Fed. Reg. 4566 at 4575-4609 (CAIR proposal); 63 Fed. Reg. 57356 *et.seq*. (NOx SIP Call)

More specifically, EPA has found that NOx and SO_2 emissions from 32 states (including DC) contribute significantly to nonattainment of the $PM_{2.5}$ or ozone NAAQS in other states. However, as we will discuss in detail below, and as EPA acknowledges in the TR proposal, EPA's air quality modeling shows that some downwind areas will continue to have nonattainment or maintenance problems even after the proposed rule is implemented.[21]

We generally support the basic structure of the TR, although the proposed SO_2 and NOx emission reductions are inadequate. We agree with EPA that the control of both regional and local reductions is a more cost-effective, balanced, and reasonable approach to addressing nonattainment than relying on local reductions alone.[22] We also generally support EPA's two-step approach to determining significant contribution, although we do have some concerns about its application, as well as its use of non-uniform cost thresholds to determine the level of required emission reductions.

EPA's analysis demonstrates that the TR will produce important public health and environmental benefits and will be dramatically cost-effective. According to EPA, by 2014 the proposed rule will annually prevent approximately 14,000 to 36,000 premature deaths,[23] 22,000 heart attacks, and about 1.8 million work days lost to illness.[24] A stronger rule could save many more lives and prevent many more health problems. In fact, we describe in Section V, *infra*, an analysis of an Alternate Control Scenario projecting that more stringent emission caps similar to the ones we propose here would save an additional 3600 to 9250 lives in 2015.[25]

EPA also estimates that benefits from the rule will exceed costs by from 50 to over 120 times (an estimate which omits many substantial benefits that were not included because EPA could not reduce them to a fixed monetary value).[26] This enormous benefit-cost ratio not only provides ample support for the proposed reductions, but also makes clear that there is ample room for more stringent emissions limits in the TR. The incremental public health benefits that will flow from a tighter rule will still exceed costs by an overwhelming margin.

We take no position on EPA's proposed choice of the "state budgets/limited trading" remedy[27] over the two alternative remedies under consideration, although we believe that any emission trading scheme that could reasonably result in the exceedance of a state's budget plus variability limit would be inconsistent with the court's decision in

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[21] 75 Fed. Reg. at 45213-14, 45283-85, 45288-89.
[22] *See, e.g.*, 75 Fed. Reg. at 45226-27.
[23] The lower estimate is based on the mortality coefficient from the 2002 Pope, et al study; the higher estimate is based on the 2006 Laden et al study. 75 Fed. Reg. at 45346.
[24] *Id.*
[25] As described in further detail in Section V, the range of additional premature deaths (3600 to 9250) in the Alternate Control Scenario were calculated using the same air quality/mortality coefficients that were used to produce EPA's estimated range of 14,000 to 36,000 premature deaths.
[26] 75 Fed. Reg. at 45346-52.
[27] 75 Fed. Reg. at 45305-06.

North Carolina v. EPA.[28] Thus, we completely agree that EPA may not allow unrestricted interstate allowance trading, may not permit any use of Title IV acid rain allowances as a means of TR compliance, and may not permit allowances that may have been "banked" under another emission trading program to be used for TR compliance.

B. Significant Contribution and Emission Budget Issues

EPA must tighten the stringency of the proposed state budgets. The Clean Air Act requires, and the record abundantly supports, more substantial SO_2 and NOx reductions from the electric power sector.

According to EPA's own statements and using its proposed approach to addressing transported air pollution under section 110(a)(2)(D), the TR proposal does not eliminate all of the projected contribution in upwind states to downwind nonattainment and maintenance problems. EPA's atmospheric modeling shows that even after the proposed rule is implemented:

- several downwind areas (Birmingham, Alabama and Allegheny County, Pennsylvania) will still experience nonattainment or maintenance problems under the 1997 annual PM2.5 NAQQS;[29]
- at least 14 downwind areas will continue to experience problems with nonattainment or maintenance of the 24-hour PM2.5 NAAQS; [30]and
- several downwind areas (Houston, Baton Rouge and New York City) will continue to experience ozone NAAQS attainment and maintenance problems.[31]

Furthermore, power plants in five states[32] that are in EPA's 37 state study region but outside of the proposed control region are projected to increase emissions following implementation of the rule, as they will be subject only to the much weaker Title IV acid rain restrictions. In fact, the increase in Texas is large enough to cause it to become a significant contributor (under the Agency's proposed 1% NAAQS threshold test) to downwind PM nonattainment and maintenance problems.[33]

EPA can address these residual nonattainment and maintenance problems by requiring deeper reductions, even while keeping within the basic framework of the proposal. With respect to $PM_{2.5}$, Group 2 states have minimal obligations under the current proposal, but there are clearly substantial additional reductions that can be obtained from those states at the $2000/ton cost threshold applicable under the proposal to Group 1 states. We urge EPA to require all states to meet the Group 1 state limits. In addition, there are also substantial additional SO_2 reductions available at slightly higher

[28] North Carolina v. EPA, 531 F.3d at 908.
[29] 75 Fed. Reg. at 45283.
[30] 75 Fed. Reg. at 45283-84. The remaining problem counties are Jefferson, AL; Cook and Madison, IL; Lake, IN; Oakland, Wayne and Washtenaw, MI; Hudson, NJ; NY, Suffolk and Westchester, NY; Cuyahoga, OH; Allegheny and Lancaster, PA; Brooke, WV; and Milwaukee, WI. *See* EPA (July 2010), "Copy of TR Nonattainment County Table070110.xls."
[31] 75 Fed. Reg. at 45288-89.
[32] These five states are TX, AR, MS, ND and SD. 75 Fed. Reg. at 45284.
[33] *Id.*

costs than $2000/ton; according to EPA estimates, additional reductions of about 500,000 tons of SO_2 could be obtained in 2014 by increasing the proposal's SO_2 cost threshold to $2400/ton.[34]

With respect to ozone, EPA should raise the $500/ton minimum cost threshold in the Transport Rule proposal for requiring ozone season NOx reductions, keeping in mind that EPA found in the 1998 NOx SIP Call that a cost threshold of up to $2000/ton (in $1990; the equivalent of approximately $3200 in $2006) of NOx removed was highly cost-effective.[35]

Finally, while we appreciate the simplicity of EPA's choice of a threshold for determining significant contribution for a state at 1% of the applicable NAAQS, we think that this level is too high. Rather, we think that *any* measureable level of contribution that can be eliminated cost-effectively is significant for purposes of section 110(a)(2)(D) of the Act. We suggest that, at a minimum, EPA should cut its proposed contribution threshold in half, *i.e.*, to no more than 0.5% of the applicable NAAQS. Applying such a minimum threshold would bring Texas, Arkansas, New Hampshire, North Dakota and Oklahoma into the control region for SO_2 and annual NOx purposes, and Massachusetts and Missouri into the control region for ozone season NOx purposes.[36]

II. Power Plant Emissions Seriously Endanger Public Health and Welfare

As stated above, power plants remain a major a source of NOx and SO_2 emissions, which react in the atmosphere to form other unhealthful secondary pollutants such as ground-level ozone and fine particulate matter such as sulfate and nitrate. EPA's "base case" estimates that by 2014, power plants will be responsible for over 70% of the SO_2 emissions and more than one-fifth of the NOx emissions in the region of the eastern and midwestern US impacted by EPA proposed rulemaking.[37]

A. Public Health Impacts

The link between power plant emissions and human health has been documented in an extensive body of scientific research drawing on multiple lines of epidemiological and toxicological evidence, including several rigorous, long-term multi-city epidemiological studies, one of which was conducted over nearly two decades in 150 U.S. metropolitan

[34] 75 Fed. Reg. at 45276 (Table IV.D-2).
[35] 75 Fed. Reg. at 45288.
[36] *See* discussion *infra* in Section IV.A.
We note that although we believe that our recommended lower threshold for determining significant contribution will require additional states to be included in the TR control regions, we have included only Texas emissions in our recommended emissions caps and the Alternate Control Scenario described in Section V *infra*.
[37] 75 Fed. Reg. at 4522-43; EPA's base cases do not include any reductions that would occur as a result of CAIR, as those requirements were invalidated by the DC Circuit in *North Carolina v. EPA*. 75 Fed. Reg. at 45217, 45243-44.

areas. That body of literature has been reviewed and summarized by the U.S. Environmental Protection Agency (EPA) in its 2009 Integrated Scientific Assessment for Particulate Matter. [38]

Public health concerns from power plant emissions have focused in large part on the role of very small airborne particles formed from power plant gases and other combustion sources in causing or contributing to a host of respiratory and cardiopulmonary ailments and increasing the risk of premature death. Fine particles are especially dangerous because they can bypass the body's defensive mechanisms and become lodged deep in the human lung. Particulate matter's toxicity has been linked to inflammatory responses caused by the invasion of particles (and adsorbed chemicals) into human tissues and organs. Based on several decades of research, EPA's 2009 assessment systematically documents thousands of studies linking particulate matter exposures to a host of health impacts including aggravation and causation of respiratory disease including decreased lung function, asthma attacks, lung cancer, and retardation of lung growth in children. The EPA assessment also documents fine particle-related cardiovascular disease such heart attacks, stroke and cardiac arrhythmia [39, 40] Fine particles have been linked to significant changes in heart rate variability, ectopic (out of place) heart beats and increases in blood inflammatory markers within hours of exposure.[41] Exposures to particles are associated with elevated risk of premature cardiac death, as documented in the two largest long-term exposure air pollution studies ever conducted.[42, 43, 44, 45, 46] Daily exposures to particles are also linked to premature death in the 90-city National Morbidity and Mortality Air Pollution Study.[47] New evidence suggests that exposure to

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[38] EPA December 15,2009 Integrated Science Assessment for Particulate Matter available at: http://www.gpo.gov/fdsys/pkg/FR-2009-12-15/html/E9-29591.htm.

[39] Dockery, D., and Stone, P. (2007) Cardiovascular risks from fine particulate air pollution. Editorial, New England Journal of Medicine, v. 356, no 5, p. 511-513, February 1, 2007.

[40] Peters, A. and Pope, C.A., Cardiopulmonary Mortality and Air Pollution, 360 The Lancet 1184 (October 19, 2002).

[41] Riediker, M, Williams, R., Devlin, R., Griggs, T., and Bromberg, P. (2003). Exposure to particulate matter, volatile organic compounds and other air pollutants inside patrol cars. Environmental Science and Technology, v. 37, p. 2084-2093.

[42] Laden F, Schwartz J, Speizer FE, Dockery DW. (2006) Reduction in fine particulate air pollution and mortality extended follow-up of the Harvard Six Cities Study. Am. J. Respir. Crit. Care Med. 173:667–672.

[43] Pope. C.A., Burnett, R.T., Thun, M.J, Calle, E.E., Krewski, D., Ito, Kaz, and Thurston, G.D. (2002), Lung Cancer, Cardiopulmonary Mortality, and Long Term Exposure to Fine Particulate Air Pollution, Journal of the American Medical Association, Vol. 287, p. 1132-1141.

[44] Dockery, D.W., Pope, C.A., Xu, S. and Spengler, J.D., et al (1993). An Association Between Air Pollution and Mortality in Six U.S. Cities. New England J. Medicine , v. 329, p. 1753-59. Available online at http://nejm.org/content/1993/0329/0024/1753.asp.

[45] Krewski, Daniel, Michael Jerrett, Richard T Burnett, Renjun Ma, Edward Hughes, Yuanli Shi, Michelle C Turner, C Arden Pope III, George Thurston, Eugenia E Calle, and Michael J Thun with Others (2009). Extended Analysis of the American Cancer Society Study of Particulate Air Pollution and Mortality. Health Effects Institute, Research Report no. 140. Available at: http://pubs.healtheffects.org/view.php?id=315,

[46] C. Arden Pope, III, Richard T. Burnett, George D. Thurston, Michael J. Thun, Eugenia E. Calle, Daniel Krewski, and John J. Godleski. Cardiovascular Mortality and Long-Term Exposure to Particulate Air Pollution: Epidemiological Evidence of General Pathophysiological Pathways of Disease Circulation, Jan 2004; 109: 71 – 77.

[47] Samet, J.M., Dominici, F., Zeger, S.L., Schwartz, J. and Dockery, D.W. (2000). National Morbidity, Mortality and Air Pollution Study, Part II: Morbidity, Mortality and Air Pollution in the United States;

particulate matter may elevate risk of cardiac disease specifically in women.[48] Recent studies have also succeeded in identifying plausible biological mechanisms such as systemic inflammation, accelerated atherosclerosis, hypertension, constriction of blood vessels and altered cardiac function to explain the cardiac and other serious health impacts associated with exposure to airborne fine particles. [49,50] Most recently, elevated fine particulate levels have also been linked to increased rates of adult diabetes.[51]

Research also indicates that exposure to particulate matter may result in shorter life-expectancy for people living in the most polluted cities compared to people who live in cleaner cities.[52,53,54,55] Studies suggest that fine particles may reduce the average life span of the general population by a few years, but the life of an individual dying as a result of exposure to air pollution may be shortened by 14 years.[56,57] Adverse effects, including excess mortality, occur even at low ambient concentrations of fine particles, suggesting no "safe" threshold for exposure to particulate matter. [58,59,60] Indeed, a September 10, 2010 letter from the Clean Air Scientific Advisory Committee states:

Health Effects Institute Research Report No. 94, Cambridge MA. Available at: http://www.healtheffects.org/pubs.htm.

[48] Miller, K., Siscovik, D., Sheppard, L., Shepherd, K., Sullivan, J., Anderson, G. and Kaufman, J. (2007). Long-term exposure to air pollution and incidence of cardiovascular events in women. New England Journal of Medicine, v. 356, No. 5, p. 447-458, February 1, 2007.

[49] Sun, Q, et al (2005). Long-term air pollution exposure and acceleration of atherosclerosis in an animal model. Journal of the American Medical Association. V. 294, no. 23 p. 3003-3010.

[50] Robert D. Brook, Barry Franklin, Wayne Cascio, Yuling Hong, George Howard, Michael Lipsett, Russell Luepker, Murray Mittleman, Jonathan Samet, Sidney C. Smith, Jr, and Ira Tager. Air Pollution and Cardiovascular Disease: A Statement for Healthcare Professionals From the Expert Panel on Population and Prevention Science of the American Heart Association, Circulation, Jun 2004; 109: 2655 – 2671.

[51] Pearson, JF, *et.al*. (2010), *Association Between Fine Particulate Matter and Diabetes Prevalence in the U.S.*, American Diabetes Association, Diabetes Care, October 2010 vol. 33 no. 10 2196-2201; pre-published online at: http://care.diabetesjournals.org/content/33/10/2196.

[52] Laden, F., J. Schwartz, F.E. Speizer, and D.W. Dockery. 2006. Reduction in Fine Particulate Air Pollution and Mortality. American Journal of Respiratory and Critical Care Medicine 173:667-672.

[53] Pope, C.A., Ezzati, M., Dockery, D. (2009). Fine particulate air pollution and life expectancy in the United States. New England Journal of Medicine, v. 360, no. 4, January 23, 2009.

[54] Brunekreef, B., Air Pollution and Life Expectancy: Is There a Relation? 54 Occup. Environ. Med. 781–84 (1997).

[55] U.S. EPA, OAR, "Final Report to Congress on Benefits and Costs of the Clean Air Act, 1970 to 1990", EPA 410-R-97-002 (October 1997) at I-23.

[56] Lippmann, M. and Schlesinger, R. B. (2000). Toxicological bases for the setting of health-related air pollution standards. Annual Review of Public Health, v.21: 309-333.

[57] Schwartz J; Coull B; Laden F; Ryan L (2008). The effect of dose and timing of dose on the association between airborne particles and survival. Environ Health Perspect, 116: 64-69.

[58] EPA (2009) Integrated Scientific Assessment for Particulate Matter, EPA/600/R-08/139F, p. 2-26. Available at: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546.

[59] Vedal, Sverre, Brauer, Michael, White, Richard, and Petkau, John, Air Pollution and Daily Mortality in a City with Low Levels of Pollution, 111 Environ Health Perspectives 45–51 (2003).

[60] Brauer, M., Brumm, J., Vedal, S., and Petkau, A. J. (2002). Exposure misclassification and threshold concentrations in time series analysis of air pollution health effects. Risk Anal. 22, 1183–1193.

"Although there is increasing uncertainty at lower levels, there is no evidence of a threshold (i.e., a level below which there is no risk for adverse health effects)." [61]

In 2000, 2004 and again in 2010, Clean Air Task Force commissioned Abt Associates to develop estimates of health impacts using a well-established and extensively peer-reviewed methodology that has been approved by both the U.S. Environmental Protection Agency's (EPA's) Science Advisory Board and the National Academy of Sciences (NAS). In fact, the same methodology has provided the basis for regulatory impact analyses in the context of recent EPA rulemakings. As noted earlier, Abt Associates' analysis finds that fine particle pollution from existing coal plants is expected to cause approximately 13,000 deaths in 2010. Additional impacts include more than 20,000 heart attacks per year.[62] The total monetized value of these adverse health impacts adds up to more than $100 billion per year. This burden is not distributed evenly across the population. Adverse impacts are especially severe for the elderly, children, and those with respiratory disease. In addition, the poor, minority groups, and people who live in areas downwind of power plants are likely to be disproportionately exposed to the health risks. However, between the 2004 and 2010 studies, over 130 flue gas desulfurization scrubbers were installed on power plants across the U.S. and, as a result, sulfur dioxide emissions and atmospheric sulfate levels have nearly declined by half over that short period. Consequently premature deaths have also declined from approximately 24,000 to 13,000 in 2010. As we discuss later, this clearly demonstrates the effectiveness of regulatory programs to address power plant emissions. Nonetheless, there is still a long way to go to fully remedy the problem.

EPA also has discussed, in its 2007 Integrated Risk Assessment for Ozone for the 2008 review of the National Ambient Air Quality Standard (NAAQS), the harm to human health resulting from ground-level ozone formed, in part, from nitrogen oxides emissions from power plants.[63] Short-term exposure to ozone can cause upper and lower respiratory system effects, including chest pain, coughing, throat irritation, shortness of breath, reduced lung function, inflammation and other changes of lung tissue, increased hospital admissions and emergency room visits, impaired immune systems, and exacerbation of asthma-related symptoms. Effects of longer term ozone exposure described by EPA include inflammation of and damage to the lining of the lungs, transient pulmonary function responses, transient respiratory symptoms, effects on exercise performance, increased airway responsiveness, increased susceptibility to respiratory infection, increased hospital and emergency room visits, transient pulmonary respiratory inflammation and premature mortality.[64]

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[61] CASAC letter to EPA Administrator Lisa Jackson, September 10, 2010. Available at: http://yosemite.epa.gov/sab/sabproduct.nsf/WebCASAC/CCF9F4C0500C500F8525779D0073C593/$File/EPA-CASAC-10-015-unsigned.pdf.

[62] The Toll from Coal.

[63] EPA (2007). Integrated Risk Assessment for Ozone. Available at: http://www.epa.gov/ttn/naaqs/standards/ozone/data/ozone_ra_final_tsd_7-2007.pdf .

[64] U.S. Environmental Protection Agency. *Air Quality Criteria for Ozone and Related Photochemical Oxidants*. 2006. EPA 600/R-05/004aF Available at http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=149923.

The risk of early death from ozone inhalation has just been recognized in the past six years. Researchers first published extensive analysis in 95 cities in 2004 and estimated that 3,700 deaths occurred annually from ozone.[65] Confirmation came in 2005. Three groups of researchers working independently reviewed and analyzed the research around deaths associated with short-term exposures to ozone. Each reported a small, but robust association between daily ozone levels and increased deaths.[66] In 2008 a committee of the National Research Council, a division of the National Academy of Sciences, reviewed the evidence again and concluded that "short-term exposure to ambient ozone is likely to contribute to premature deaths." They recommended that preventing early death be included in any future estimates of the benefits of reducing ozone.[67]

B. Public Welfare Impacts

Nitrogen and sulfur dioxide emissions and their secondary byproducts such as sulfate, nitrate and ozone, also contribute to numerous adverse welfare and environmental effects as documented in the most recent Integrated Scientific Assessments for Particulate Matter and Ozone.[68, 69] Such impacts include foliar damage to forests and crops, depletion of soil nutrients, and damages to materials such as metals and paint. Acid particles from power plants, such as sulfates and nitrates cause acid deposition-related nitrification, eutrophication and visibility impairment.[70, 71] CASAC recently addressed the lack of progress on regional haze and current inadequacy of current standards to remedy the problem.[72]

III. EPA's Proposed Power Plant SO_2 and NOx Emissions Budgets are Inadequate to Protect Public Health and Allow NAAQS Attainment and Must be Strengthened.

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[65] Bell ML, McDermott A, Zeger SL, Samet JM, Dominici F. Ozone and short-term mortality in 95 US urban communities, 1987-2000. *JAMA* 2004; 292:2372-2378.

[66] Bell ML, Dominici F, and Samet JM. A Meta-Analysis of Time-Series Studies of Ozone and Mortality with Comparison to the National Morbidity, Mortality, and Air Pollution Study. *Epidemiology* 2005; 16:436-445. Levy JI, Chermerynski SM, Sarnat JA. Ozone Exposure and Mortality: an empiric Bayes metaregression analysis. *Epidemiology* 2005; 16:458-468. Ito K, De Leon SF, Lippmann M. Associations Between Ozone and Daily Mortality: analysis and meta-analysis. *Epidemiology* 2005; 16:446-429.

[67] Committee on Estimating Mortality Risk Reduction Benefits from Decreasing Tropospheric Ozone Exposure, National Research Council. *Estimating Mortality Risk Reduction and Economic Benefits from Controlling Ozone Air Pollution*, 2008. Available at www.nap.edu/catalog/12198.html. .

[68] EPA December 15, 2009 Integrated Science Assessment for Particulate Matter, chapter 9. http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=216546#Download

[69] EPA (2009) Provisional Assessment of Recent Studies on Health and Ecological Effects of Ozone Exposure. Available at: http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=214003

[70] See CATF/Clear the Air, (2001) Unfinished Business: Why the Acid Rain Problem is not Solved. Available online at: http://www.catf.us/publications/reports/acid_rain_report.php.

[71] CATF/Clear the Air (2000) Out of Sight: Power Plant Emissions and Haze in Our National Parks. Available online at: http://www.catf.us/publications/reports/out_of_sight.php.

[72] CASAC letter to EPA Administrator Lisa Jackson, September 10, 2010. Available at: http://yosemite.epa.gov/sab/sabproduct.nsf/WebCASAC/CCF9F4C0500C500F8525779D0073C593/$File/EPA-CASAC-10-015-unsigned.pdf.

The severe harm to human health and the environment described above demand the most substantial reductions in regional power plant emissions of SO_2 and NOx that are feasible and cost-effective. EPA's proposal does not fully accomplish this—tighter budgets for both pollutants are quite feasible and cost-effective, and EPA should require them. Specifically, as previously indicated, we urge EPA to limit regional (including Texas) SO_2 emissions to 1.75 million tons annually and regional NOx emissions to 900,000 tons annually.[73]

A. Reasonable Determination of "Significant Contribution" Requires Additional Reductions of Power Plant Emissions of SO_2 and NOx.

EPA explains in the TR proposal that for reasons of administrative convenience it initially used a "simplified air quality assessment tool, rather than actual air quality modeling, to identify air quality impacts of the options considered."[74] However, EPA did follow up this simplified approach with more rigorous and refined air quality modeling of the selected emission budgets. This modeling produced different results, which raises several issues upon which EPA seeks comment. In essence, the refined modeling (CAMx) projected that a number of downwind areas would continue to experience nonattainment or maintenance problems with either the PM or ozone NAAQS, or both, even after implementation of the proposed TR. EPA indicates that it intends to conduct further analysis to determine whether additonal reductions are necessary, and notes that it is committed to providing downwind states full relief from upwind emissions.[75] We support EPA's stated intention in this regard, and submit that the court's opinion in *North Carolina v. EPA* requires no less.

EPA solicits comment on several aspects of this issue, including whether:

- any Group 2 states should be moved to Group 1 for purposes of SO_2 requirements;
- the \$2000/ton SO_2 marginal cost cut-off should be raised; and
- the \$500/ton NOx marginal cost cut-off should be raised.[76]

We submit that the answer to all of these questions is clearly "yes."

1. All Covered States Should be Subject to Group 1 SO_2 Requirements.

The thirteen states classified in "Group 2" under the proposed TR are subject only to the first phase of SO_2 emission requirements effective in 2012, [77] which are modest

[73] As previously stated:

- *supra* at note 16, our recommended regional emission caps are the rough equivalent of national caps of 2 MT for SO_2 and 1.25 MT for NOx, assuming equivalent out of region emission reductions; and
- *supra* at note 36, although we believe that our recommended lower threshold for determining significant contribution will require additional states to be included in the TR control regions, we have included only Texas emissions in our recommended emissions caps and the Alternate Control Scenario described in Section V *infra*.

[74] 75 Fed. Reg. at 45283. *See also,* EPA (July 2010), "Technical Support Document (TSD) for the Transport Rule—Analysis to Quantify Significant Contribution" at p8.

[75] 75 Fed. Reg. at 45213, 45283-84 (PM); 75 Fed. Reg. at 45213, 45288-89 (ozone).

[76] 75 Fed. Reg. at 45283.

indeed, representing slightly less than a 30% reduction in aggregate SO_2 emissions from the base case.[78] In reality, the 2012 emission limits (for both SO_2 and NOx) are at best anti-backsliding provisions—that is, they are intended to lock in emission reductions resulting from compliance with CAIR and other requirements. As EPA explained, "[k]eeping emissions of SO_2 and NOx from increasing by 2012 in 27 states and DC assures that recent gains are maintained and that states that significantly contribute to downwind $PM_{2.5}$ nonattainment and maintenance areas do not increase their contribution to those areas."[79] However, notwithstanding EPA's stated intent, the TR will actually allow some emissions to increase. In some cases the TR state budgets are higher than 2009 actual emissions, in many cases higher than the CAIR budgets, and in some cases, higher than both.[80]

In contrast, effective beginning in 2014, the fifteen Group 1 states are subject to additional and substantially more stringent SO_2 reduction requirements,[81] representing an approximate 72% aggregate SO_2 reduction from the 2014 base case.[82] As a result, power plants in some states are subject to significantly less stringent emission reduction requirements than those in neighboring states. We do not believe that such disparate treatment is either good policy or required by law, and we urge EPA to treat equally EGUs in all states found to be contributing significantly to nonattainment or maintenance problems in downwind states.

EPA's rationale for this proposed disparate treatment is that it projected that only "modest" reductions would be needed in Group 2 states in order to eliminate the nonattainment or maintenance problems in downwind areas to which those states were "linked."[83] However, as mentioned previously, these projections were based on screening level analysis from EPA's simplified air quality assessment tool; in contrast, EPA's more refined and accurate CAMx modeling indicated that a significant number of nonattainment or maintenance areas to which a majority of Group 2 states were linked will continue to have problems following implementation of the proposed TR.

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[77] Proposed Group 2 states are AL, CT, DE, DC, FL, KN, LA, MD, MA, MN, NE, NJ and SC. 75 Fed. Reg. at 45216.

[78] EGU emissions in Group 2 states for the 2014 base case total 1,118,141 tons, while the 2014 budgets for those states total 776,582 tons.

[79] 75 Fed. Reg. at 45227.

[80] For example, state EGU SO_2 emissions in 2009 according to EPA acid rain data were already below the 2014 TR state budgets in CT, DC, KN, LA and SC. The problem is more pronounced for NOx, where actual 2009 emissions were lower than the proposed TR budgets in 16 states (AL, CT, DE, FL, GA, IN, IA, KN, LA, MN, MO, NJ, NC, SC, WV and WI).

[81] Proposed Group 1 states are GA, IL, IN, IA, KY, MI, MO, NY, NC, OH, PA, TN, VA, WV and WI. 75 Fed. Reg. at 45216.

[82] EGU emissions in Group 1 states for the 2014 base case total 6,303,310 tons, while the 2014 budgets for those states total 1,723,421 tons.

[83] 75 Fed. Reg. at 45282. Under EPA's proposed significant contribution test, states are considered "linked" to downwind nonattainment or maintenance areas if they are projected to contribute at least 1% of the relevant NAAQS. 75 Fed. Reg. at 45233.

Initially, we note that EPA requests comment on whether it should use CAMx modeling in its determination of significant contribution and maintenance.[84] The answer to this question is clear. As a matter of policy (and perhaps of law), EPA should always use the best science and analytic tools that are available to it, within resource and time constraints. In this case, however, we do not need even to reach that issue, because here EPA has in fact performed analysis projecting residual significant contribution using the more detailed and accurate CAMx modeling as a follow-up to its initial screening analysis using its simplified air quality assessment tool (AQAT).[85] As EPA explains, AQAT assumes that the relationship between emission reductions and downwind pollutant contributions is linear, although the chemistry involved in the formation of PM from SO_2 and NOx emissions is more complex, and in fact the emission/air quality relationship in many situations is nonlinear. CAMx modeling provides a more accurate representation of these chemical, nonlinear interactions, and thus is a better predictor of downwind pollutant contribution than is the AQAT.[86] Furthermore, the differences in the predicted results in this case are material and biased—"the air quality assessment tool nearly always overestimated total reductions in $PM_{2.5}$ relative to the estimates from the CAMx modeling."[87] Therefore, the question in this rulemaking is whether EPA can ignore more refined and accurate evidence of contribution in favor of a cruder screening analysis. As a matter of policy, and to avoid the legal prohibition against arbitrary agency action, EPA must, without some compelling justification (and the Agency offers none), base its rulemaking decisions on the best analysis that it in fact has performed. In this case the best evidence of downwind contribution is clearly provided by the CAMx modeling.

Group 2 states linked by CAMx to areas with continuing nonattainment and maintenance problems with respect to the 24-hour $PM_{2.5}$ NAAQS are Connecticut, Kansas, Maryland, Massachusetts, Minnesota, Nebraska, and New Jersey.[88] In addition, EPA's modeling shows that Florida emissions are linked to continuing maintenance problems in Birmingham, Alabama.[89] EPA requests comment on whether these states should be moved from Group 2 to Group 1.[90] We think not only that EPA should do so, but that it is required by law to do so, because otherwise these states will have not met their obligation under section 110(a)(2)(D) to eliminate their contribution to downwind nonattainment and maintenance problems.

As mentioned before, EPA should go farther, and simply do away with the distinction between Group 1 and Group 2 states, subjecting all contributing states to the

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[84] 75 Fed. Reg. at 45284.
[85] *See, e.g.*, 75 Fed. Reg. at 45283.
[86] *See* EPA (July 2010), "Technical Support Document (TSD) for the Transport Rule—Analysis to Quantify Significant Contribution" at pp 9, 25-27.
[87] *Id*., at 27.
[88] 75 Fed. Reg. at 45283.
[89] *Id.*
[90] This change appears to be part of a scenario that EPA evaluated as a "more stringent alternative" in the rulemaking process. *See* EPA (June 2010), "Regulatory Impact Analysis for the Proposed Transport Rule" at p10-11 (hereinafter "TR RIA").

same 2014 SO_2 requirements.[91] EPA, in its extensive analysis of pollution transport over the last decade, has characterized the problem of widespread regional nonattainment as one of "collective contribution"—that is, the transport problem results from emission contributions from local sources combined with relatively small individual contributions from a large number of upwind sources typically spread out over many states.[92] We agree, and believe that the uniform approach to the collective contribution problem is best suited to address the transport problem. Most significantly, it treats all similar sources that are contributing to downwind nonattainment and maintenance problems in the same manner.[93] Because electric power moves across state borders, it is important to create as level a competitive regulatory "playing field" as possible. A rule that creates significantly different reduction requirements could not only lead to competitive distortions within the eastern US power market, but this in turn could create a shift in power production (and emissions) from states with tighter emission requirements to those with less stringent requirements. These problems may be largely avoided by a rule that requires all contributing sources to eliminate emissions above a certain cost threshold.

In fact, EPA has used this uniform reduction approach in its previous transport rules, and it has withstood direct legal challenge. In the case of *Michigan v. EPA*, which concerned the NOx SIP Call, several state and industry petitioners specifically challenged this approach as lacking a rational basis, complaining that

> "where two states differ considerably in the amount of their respective NOx contributions to downwind nonattainment, under the EPA rule even the small contributors must make reductions equivalent to those achievable by highly cost-effective measures."[94]

The DC Circuit Court of Appeals rejected this claim, holding that EPA's uniform approach to emission reductions was lawful.[95]

Finally, as discussed earlier in note 80 and accompanying text and in note 91, actual SO_2 emissions in 2009 from EGUs in five states that are presently proposed to be included in Group 2 for SO_2 reduction purposes were already below their proposed TR SO_2 state caps. In other words, the TR would allow these states to *increase* their SO_2 emissions from current levels. Clearly, such increases will not help reduce transport or assist downwind areas in solving their attainment and maintenance problems and

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[91] The only remaining Group 2 states not found by CAMx to be linked to areas with continuing downwind attainment or maintenance problems are AL, DE, DC, LA and SC. DC was not modeled separately, but combined with MD. 75 Fed. Reg. at 45256, notes 50 and 51. And as stated in note 80, *supra*, three of these states (DC, LA and SC) already had actual SO_2 emissions in 2009 that were actually lower than their proposed stated budgets for 2014.

[92] *See, e.g.,* 75 Fed. Reg. at 45236.

[93] We note that once EPA departs from a uniform approach to reductions, it is hard to determine where to draw lines between states subject to lower standards and those subject to higher standards. This is similar to the problem the Agency noted in its discussion of the "binning" approach to significant contribution. *See* EPA (July 2010), "Technical Support Document (TSD) for the Transport Rule-- Alternative Significant Contribution Approaches Evaluated" at pp13-15. In this case, we do not think it reasonable to apply a \$2000/ton SO_2 cut-off for EGUs in 23 states and apply a much more lenient cut-off of \$500/ton to EGUs in 5 states.

[94] *Michigan v. EPA*, 213 F.3d 673, 679 (DC Cir. 2000), cert. denied, 532 US 904 (2001).

[95] *Id. See also, North Carolina v. EPA*, 531 F.3d at 908, 917.

therefore should not be permitted. Such a problematic result could be rectified in several ways, including by moving these states from Group 2 to Group 1.

We urge EPA to apply its "Group 1" SO_2 emission reduction requirements uniformly to EGUs in all contributing states.

2. The $2000/ton SO_2 marginal cost cut-off should be raised to $2400/ton.

EPA also seeks comment on whether the cost cutoff applied to SO_2 reduction requirements should be raised. We think that it should. EPA notes that a $2000/ton control cost for SO_2 is "relatively low" compared to other potential SO_2 control measures.[96] EPA analysis shows that about 500,000 additional tons of SO_2 would be reduced in the TR region in 2014 using a slightly higher cut-off of $2400/ton of SO_2 reduced.[97] Such a cost is still relatively low in comparison to SO_2 controls on other potential sources that a state might regulate to meet its attainment and maintenance obligations, which EPA estimates go as high as $16,000/ton.[98] These additional reductions will not only be highly cost-effective on a relative basis, but will also save additional lives and provide other substantial human health and environmental benefits far in excess of incremental costs.

3. The $500/ton annual NOx marginal cost cut-off should be raised to at least $3200/ton.

The wintertime PM issue identified by EPA in the TR proposal is related not only to SO_2 formation of sulfates, but also to NOx formation of nitrates. EPA states, "during the winter, $PM_{2.5}$ contains a larger nitrate component than in summer months….Given this large contribution from nitrates in the winter, EPA is also taking comment on whether there should be a higher cost threshold for annual nitrogen oxides."[99] This larger nitrate contribution does indeed justify a higher cost threshold for NOx controls.

Over a decade ago, in the 1998 NOx SIP Call, EPA found that NOx reductions of up to an *average* cost of $2000/ton (in $1990) of NOx removed were highly cost-effective; this cost threshold is the equivalent of approximately $3200 in $2006.[100] EPA determined the $2000/ton average cost figure based on "NOx emissions controls that are available and of comparable cost to other recently undertaken or planned NOx measures."[101] However, EPA claims in the instant rulemaking that it will be difficult to

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[96] 75 Fed. Reg. at 75281.

[97] EPA projects that SO_2 emissions in the TR would be 2,410 tons in 2014 with a $2000/ton cutoff, and 1,912 tons with a $2400/ton cutoff. *See* 75 Fed. Reg. at 75276, Table IV.D-2.

[98] 75 Fed. Reg. at 75281, 75288.

[99] 75 Fed. Reg. at 75284.

[100] 75 Fed. Reg. at 45288.
Specifically, EPA determined in the NOx SIP Call that "highly cost-effective" controls were those that "achieve the greatest feasible emissions reduction but still cost no more than $2000 per ton of ozone season NOx emissions removed (in 1990 dollars), on average." NOx SIP Call, 63 Fed. Reg. at 57399.
We note that EPA primarily based its determination of "highly cost-effective" controls in the NOx SIP Call on *average* costs rather than incremental or marginal costs used by EPA in the proposed TR. Thus, the equivalent marginal cost in $2006 of those controls found highly cost effective in the NOx SIP Call would be significantly higher than $3200/ton.

[101] 63 Fed. Reg. at 57400.

require additional NOx reductions (*i.e.*, reductions beyond those resulting from a $500/ton *marginal* cost threshold) without causing unacceptable delay in the finalization of the TR, noting that, unlike the case with SO_2 controls, NOx controls for other source categories are available at costs between $500 and $3200/ton.[102] In fact, the emission budgets in the NOx SIP Call were calculated on the basis of reductions not only from power plants, but also from large industrial, commercial and institutional boilers; cement kilns; and large stationary reciprocating internal combustion engines.[103] Notwithstanding EPA's assertion that including non-EGU reductions in this TR rulemaking would delay finalization of the TR beyond spring 2011, we do not believe that is necessarily so. NOx emissions from these additional source categories have been regulated in conjunction with the NOx SIP Call and other programs for over a decade, and EPA should by now have sufficient cost and other information available to analyze in a timely fashion the impact of regulation of these sources under the proposed TR.[104]

Furthermore, as discussed above in connection with SO_2,[105] and in note 80 and accompanying text, actual NOx emissions in 2009 from EGUs in sixteen states were already below their proposed TR NOx state caps. Here too, the TR would allow these states to *increase* their NOx emissions from current levels. This should not be permitted, and increasing the cost threshold for NOx reductions is one way to address this problem.

In view of the foregoing, we urge EPA to raise the NOx cost threshold uniformly[106] to at least $3200/ton and to include, at minimum, EGUs, large boilers, large stationary combustion engines and cement kilns in the TR FIPs.

4. The $500/ton ozone season NOx marginal cost cut-off should also be raised to at least $3200/ton.

For reasons similar to those discussed above in connection with annual NOx, the cost threshold for ozone season NOx reductions should also be raised. EPA's CAMx modeling shows not only that a number of downwind areas will continue to have nonattainment and maintenance problems with respect to the PM NAAQS, but also that several areas will have similar problems with the ozone NAAQS. Specifically, remaining ozone problem areas include Houston, Baton Rouge and New York City.[107] States linked to those problem areas include Alabama, Arkansas, Florida, Georgia, Illinois, Kentucky, Louisiana, Mississippi, Tennessee and Texas, as well as Connecticut, Delaware, Indiana,

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[102] *Id.*
[103] 75 Fed. Reg. at 45290.
[104] For example, NESCAUM has published an in-depth report on emission controls for ICI boilers. *See* NESCAUM (2008, revised 2009), *Application and Feasibility of NOx, SO2, and PM Emissions Control Technologies for Industrial, Commercial, and Institutional (ICI) Boilers*, available at: http://www.nescaum.org/topics/air-pollution-control-technologies.
[105] *See* section III. A.1, *supra*.
[106] For the reasons stated earlier in connection with SO_2 emissions, EPA should establish a single cost threshold for NOx, and not establish different "groups" of states with different reduction requirements.
[107] 75 Fed. Reg. at 45288.

Maryland, New Jersey, North Carolina, Ohio, Pennsylvania, Virginia, West Virginia and Michigan—that is, all but five of the states in the proposed TR.[108]

For the reasons stated above with respect to annual NOx,[109] EPA should adopt a cost threshold for determining ozone season NOx reductions at a level no lower than $3200/ton in $2006, and should require NOx reductions from EGUs, large boilers, large stationary combustion engines and cement kilns. EPA should also apply this higher cost threshold on a uniform basis for all covered sources in all contributing states in the TR, for the reasons stated earlier in connection with SO_2 reductions.[110]

B. Tighter Control on Regional Power Plant Emissions are Feasible and can be Implemented without Threatening the Economy or the Electric Power System.

As EPA found in conjunction with the CAIR rulemaking, emissions control technology for SO_2 emissions is well demonstrated and well established, and has been commercially available for decades.[111] Wet and dry flue gas desulfurization (FGD) technologies have been available for over 30 years, and routinely achieve SO_2 control efficiencies of 90 to 98+%.[112] In conjunction with its 1999 regional haze rulemaking, EPA proposed in its 2001 BART Guidelines a presumption that "an SO_2-control level in the 90—95% range is generally achievable" for uncontrolled boilers and thus should be considered to be best available retrofit technology for purposes of controlling visibility-impairing SO_2 emissions.[113]

Reductions in power plant NOx emissions in the 90% range are also feasible using selective catalytic reduction (SCR) technology.[114] SCR technology for NOx control, although more recent than FGD control for SO_2, is also in widespread use in the utility industry and is reliable and effective. EPA reports that "[o]perating data available from many plants indicate that the 90% NOx removal rate has been met or exceeded at these plants."[115] And a 2001 report by the Northeast States for Coordinated Air Use Management (NESCAUM) stated:

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[108] 75 Fed. Reg. at 45268-70, 45288-89. The five states not linked to these three problem areas are DC, Kansas, New York (only because NYC is part of New York State and technically not downwind of itself), Oklahoma and South Carolina. DC was not modeled separately, but combined with MD. 75 Fed. Reg. at 45256, note 54.

[109] *See* section III. A.3, *supra*.

[110] *See* section III. A.1, *supra*.

[111] *See, e.g.*, 69 Fed. Reg. at 4612.

[112] *See, e.g.*, 69 Fed. Reg. at 4612; Srivastava, R.K., and Jozewicz, W., *Controlling SO_2 Emissions: Analysis of Technologies*, EPA/600/SR-00/093, November 2000.
See also, Dene, C,; Baker, L.A.; and Keeth, R.J., *FGD Performance Capability* , Paper #62, available at: http://www.adeq.state.ar.us/ftproot/Pub/commission/p/Closed%20Permit%20Dockets%202006-2010/08-006-P%20AEP%20Service%20Corp.%20&%20SWEPCO-Sierra%20Club%20&%20Audubon%28Consolidated%29/2009-04-27_HC_SC-BP_EX.100.PDF.

[113] EPA (July 20, 2001), "Proposed Guidelines for Best Available Retrofit Technology (BART) Determinations Under the Regional Haze Regulations," 66 Fed. Reg. 38108 at 38130.

[114] *See, e.g.*, 69 Fed. Reg. at 4612.

[115] 69 Fed. Reg. at 4612.

> "Recent experience with actual SCR installations and vendor representations concerning expected system performance suggest that future SCR installation—especially when coupled with advanced low-NOx burner technology—can be expected to consistently deliver reductions in excess of 90 percent."[116]

Not only are substantial power plant reductions technically feasible, they will not threaten material economic or power system dislocation. A comprehensive study of the US electric generating system prepared this August on behalf of the Clean Energy Group, a coalition of some of the nation's largest generating companies, concluded that "without threatening electric reliability, the industry is well-positioned to respond" to EPA planned rulemakings for the power sector, including but not limited to the TR.[117] Other key findings of the CEG study include:

- "Even though some units will likely retire in lieu of complying with the new regulations, electric system reliability will not be compromised if the industry and its regulators proactively manage the transition to a cleaner, more efficient generation fleet."
- "Industry data counter concerns that it will cost the industry too much to comply with EPA's proposed air regulations, that pollution controls cannot be installed soon enough, or that the EPA regulations will lead to the closure of otherwise economically healthy power plants."
- "The existing substantial excess capacity, the industry's proven track record to timely construct new generation and to efficiently coordinate the scheduling of planned outages, together with capacity upgrades, transmission enhancements, "smart grid" investments, fuel conversions, DR and EE, should mitigate reliability concerns."[118]

Recent history fully supports these conclusions. As previously noted, power plants in the US have reduced their emissions of NOx and SO_2 substantially in the last few years; in fact, NOx emissions have been declining for a decade since promulgation of the NOx SIP Call. These reductions are the result of the installation of large numbers of emission controls during this short period. The CEG Reliability Study states that:

> "Of the 310 GW of coal capacity in the United States, 150 GW have installed FGD systems and another 55 GW have FGD controls planned, representing 65% of the coal fleet…..Additionally, about 50 percent of coal capacity in the US has installed or soon will be retrofit with advanced NOx controls…." [citations omitted] [119]

Furthermore, industry has shown that with proper planning, it can install substantial controls relatively quickly. As the CEG Reliability Study points out:

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[116] NESCAUM (2001), *Power Companies Efforts to Comply with NOx SIP Call and Section 126: Progress Report*, available online at http://www.nescaum.org/topics/air-pollution-transport.

[117] MJ Bradley & Associates and the Analysis Group (August 2010), *Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability*, at p4, available at: http://www.mjbradley.com/documents/MJBAandAnalysisGroupReliabilityReportAugust2010.pdf (hereinafter, the "CEG Reliability Study")

[118] CEG Reliability Study, at pp4-5, 24.

[119] CEG Reliability Study, at p18.

"For example, during the peak of scrubber construction, between 2008 and 2010, approximately 60 GW of coal capacity was retrofit with scrubber controls, highlighting the industry's ability to complete a substantial number of retrofits over a short period of time. In 2009 and 2010, the industry completed between 50 and 60 scrubber retrofits each year." [citations omitted] [120]

IV. Other Issues

A. Geographical Coverage of the Proposed Emission Caps.

The geographical scope of the proposed TR must be expanded. There are two separate but inter-related problems with the current proposal.[121] First, EPA's choice of a 1.0% NAAQS threshold for determining significant contribution is too high, and should be reduced by at least half to 0.5%. Second, EPA's analysis of the air quality impacts of its TR proposal projects that EGUs in five states will *increase* their SO2 emissions.[122] As a result, the amount of downwind contribution from Texas will exceed EPA's 1% NAAQS threshold for significant contribution,[123] and that of Arkansas and North Dakota will also exceed our recommended reduced significant contribution threshold of no more than 0.5% of the applicable NAAQS.

First of all, we support EPA's adoption of a metric for determining when a state's impacts on the air quality of a downwind area are considered to be "linked" for purposes of significant contribution that is based on a small percentage of the applicable NAAQS without constraint from EPA's monitoring rounding conventions.[124] We do believe that there is merit in selecting this percentage approach, as it provides for consistent treatment of the different NAAQS and offers a template can be easily applied to any future amended NAAQS. However, we could find no specific justification for the 1% level chosen by EPA, and we submit that this level is too high. In fact, *any* measureable level of contribution that can be eliminated cost-effectively is significant for purposes of section 110(a)(2)(D) of the Act. In this regard, we request EPA to consider the following:

- EPA's analysis of transport over the years has shown that nonattainment problems result from a combination of local sources and the collective impact of many relatively small contributions from large numbers of sources in many upwind states;[125]
- $PM_{2.5}$, ozone and their precursor emissions are responsible for severe, adverse, and widespread human health and environmental impacts;
- additional emission reductions from power plants will produce societal benefits far in excess of costs;

[120] CEG Reliability Study, at p19.
[121] EPA has requested comment on each. 75 Fed. Reg. at 45237, 45284.
[122] 75 Fed. Reg. at 45284. These five states are TX, AR, MS, ND and SD.
[123] *Id.*
[124] 75 Fed. Reg. at 45237.
[125] *See, e.g.*, 75 Fed. Reg. at 45237. *See also* note 91, *supra*, and accompanying text.

- as EPA notes in the TR, "there are adverse health impacts associated with ambient $PM_{2.5}$ and ozone even at low levels;"[126]
- reducing the significant contribution threshold will broaden the number of states covered, resulting in a more equitable sharing of the emission reduction burden; and
- as discussed below, reducing the significant contribution threshold will help address the problem of projected increases of emissions in states not covered by the TR.

Good policy requires a reduction in the significant contribution threshold, and such a reduction is clearly legally justifiable. In upholding EPA's use of a low minimum state contribution threshold level in the NOx SIP Call, the US Court of Appeals for the DC Circuit observed that in the context of a pollutant that has some adverse health effects at every level (as noted above, both ozone and fine PM are in this category), "it is hard to see why *any* ozone-creating emissions should not be regarded as fatally "significant" under section 110(a)(2)(D)(i)(I)."[127]

In view of the above, we suggest that, at a minimum, EPA should cut its proposed contribution threshold to no more than 0.5% of the NAAQS. Such a threshold of no more than 0.5% of the applicable NAAQS would, using EPA analysis, expand coverage of the TR to the following states at a minimum: for purposes of SO_2 and annual NOx control, AR, NH, ND, OK and TX; and for purposes of ozone season NOx control, MA and MO.[128]

The second problem with the geographical area proposed to be covered by the TR is that EGU emissions in five states not subject to the rule are projected by EPA to increase. For example, Texas SO_2 emissions are expected to increase by over 130,000 tons, producing downwind air quality impacts that will exceed EPA's proposed 1% NAAQS threshold for significant contribution.[129] Therefore, whether or not EPA lowers its proposed significant contribution threshold, Texas must be included in the TR control region for SO_2 and NOx.

We also note that EPA did not evaluate many states in the western US for their potential contribution to ozone and $PM_{2.5}$ nonattainment problems, but that emissions in Colorado may also increase as a result of the TR.[130] We believe that, for all future transport rulemakings, EPA should analyze the contribution of all 48 states in the continental US, and require emission reductions from any state whose emissions are found to contribute to downwind nonattainment in excess of the minimum threshold.

B. Selection of Remedy.

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[126] *Id.*
[127] *Michigan v. EPA*, 213 F.3d 663, 678 (D.C. Cir. 2000), *cert. denied*, 532 U.S. 904 (2001).
[128] *See* 75 Fed. Reg. at 45255-56 (Table IV.C-13), 45261 (Table IV.C-16) and 45268 (Table IV.C-19).
[129] 75 Fed. Reg. at 45284.
[130] 75 Fed. Reg. at 45284 (note 60).

The Court in *North Carolina v. EPA* stated that whatever method EPA uses to determine significant contribution to downwind nonattainment or maintenance problems for section 110(a)(2)(D) purposes, emissions from any state so determined to be significantly contributing must be eliminated.[131] This requirement was central to the Court's reasoning in striking down the interstate trading provisions in CAIR. Therefore, any emissions trading scheme proposed in the TR must be able to demonstrate compliance with this core statutory requirement; that is, any trading scheme must ensure that emissions from *each individual state* that have been found to be significantly contributing to downwind nonattainment are eliminated.

EPA has proposed an approach to implementing the emission reduction requirement in the TR that it asserts meets this test, and also has described two alternative approaches which for various policy reasons it does not prefer.[132] We believe that the two alternate remedy options—called "state budgets/intrastate trading" and "direct control"—would each be consistent with the Court's opinion, because each would require that EGU emissions in a covered state would remain below the state budget (plus variability limit, in the case of the direct control option).[133] Although EPA's preferred option, called the "state budgets/limited trading" remedy, would allow interstate trading of allowances, EPA has proposed "assurance provisions" that it asserts will "ensure that every state is making reductions to eliminate the portion of significant contribution and interference with maintenance that EPA has indentified…." [134]

However, we do not think that EPA has provided sufficient justification for this assertion. For one thing, EPA is not now proposing to require these assurance provisions until 2014, based solely on the proposition that "state-specific budgets are based on known air pollution controls and thus a high level of certainty exists about where reductions will occur."[135] EPA is taking comment on this issue. We do not find this proposition convincing, because even though the location of control installations may be known, what is not known—and in fact according to EPA is the reason for the 2012 limits—is whether those controls will in fact be operated.[136] That depends on a number of factors, economic and otherwise, that are not clearly known. Therefore, if EPA decides to proceed with its limited trading remedy, it must include assurance provisions starting in 2012, and not wait until 2014.

While EPA's assertion that the assurance provisions will necessarily 'limit emissions from each state to an amount equal to that state's budget with the variability limit"[137] may be true, we do not believe that EPA has provided adequate support for this assertion. The "assurance provisions" essentially would require an EGU that (1) is located in a state that has exceeded its emission budget plus variability limit and (2) has emissions of its own that exceed its proportional share of the state budget plus variability

[131] *North Carolina v. EPA*, 531 F.3d at 908.
[132] *See, e.g.*, 75 Fed. Reg. at 45303-36.
[133] *Id.*
[134] 75 Fed. Reg. at 45305.
[135] 75 Fed. Reg. at 45306.
[136] *See, e.g.*, 75 Fed. Reg. at 45227.
[137] *See, e.g.*, 75 Fed. Reg. at 45313.

limit, to surrender one extra allowance for each excess ton of emissions.[138] Although EPA asserts that its proposed "allowance surrender requirement is significant, and EPA believes sufficient, to ensure that the state emissions will not exceed the budgets plus variability limits,"[139] we could find no evidence in the record to support this assertion. EPA requests comment on this issue and we submit that EPA must increase the penalty for exceedances of the limits to the point where it will clearly ensure that the state budget plus variability limit will not be exceeded.[140] Furthermore, EPA would need to test such a requirement with modeling to determine whether the increased surrender requirement would be projected to prevent any exceedances (with an ample margin of safety). Another option—less desirable in our view—would be to make any exceedance of the assurance provisions a violation of the CAA, punishable by discretionary statutory penalties.[141]

C. The Proposed Rule Inappropriately Uses the 1997 Ozone NAAQS as the basis for Assessment of Contributions from Transported Ozone.

In this proposal, EPA chose to use the 1997 8-hour ozone NAAQS to assess contributions to nonattainment areas. Since rounding is applied that standard was effectively 0.084 ppm. The 1997 standard is now 13 years old and is no longer the current NAAQS. In 2008, the EPA replaced that the 1997 standard with a tighter one, set at 0.075 ppm. As discussed earlier, the EPA has now proposed to strengthen that standard to between 0.060 ppm and 0.070 ppm, with the decision scheduled for announcement in late October.[142] We applaud EPA's effort in this regard, and agree that a tighter standard is fully justified. However, the 2008 standard remains in effect, and unless and until it is superseded, EPA should determine and eliminate significant contribution to nonattainment and interference with maintenance of that standard.

The TR should be based on the most recently adopted standard, even if nonattainment areas have not been designated. EPA does not need to wait for designations to employ the current NAAQS. Thanks to EPA's careful assessment of county-specific data, the evaluations can be based against the contributions to *individual* counties that currently have design values showing violations of the NAAQS. Even if the ultimate nonattainment areas are larger or smaller than the single county, at a minimum it is clear that county or that portion of the county is violating the standard and will need assessing against the impact of transported ozone.

EPA's proposed TR assessment uses only the monitors in one or two counties in any nonattainment area. The assessments do not require calculations based on impacts to

[138] 75 Fed. Reg. at 45313.
[139] 75 Fed. Reg. at 45314.
[140] For example, in the NOx SIP Call, EPA automatically deducted allowances from source with an excess of emissions over allowances from the following year's allocation in the amount equal to three times the excess. *See* 75 Fed. Reg. at 45302.
[141] While making compliance with the assurance provisions a "hard and fast" CAA requirement may well address the legal issues, the administrative difficulty and uncertainty in implementing such an approach could well reduce its effectiveness.
[142] 75 Fed. Reg. 2938, January 19, 2010

every county in a nonattainment area—only those counties where transport contributes to that county's violation. Logically, that county's design value would at least equal the design value for the nonattainment area once designated. EPA can and should analyze counties with design values in violation of the standard and take action.

EPA should determine that as a federal action, the TR should be based on the identification of transported pollution into areas that show a design value in violation of the existing NAAQS. Otherwise, the designation process will automatically add a minimum of two years to the ability to enforce the rule, making it more challenging for states to achieve attainment and risking lives and health in the intervening years. However, under the proposed rule, to use the 1997 standard means that the Agency proposes to use a standard that the Agency itself recognized two years ago was insufficiently protective and replaced. The fact that the Agency itself recognizes that the 2008 NAAQS is insufficient only further weakens any logical basis for using the 1997 NAAQS.

For this rule, at least any county with current design values above 0.075 ppm should be assessed for the impact of the transported ozone. Any county that receives a significant part of its ozone for an 0.084 ppm standard from transported pollution will also absolutely get a significant part of its ozone under a 0.075 ppm or a more protective standard.

Unfortunately, using the 1997 ozone NAAQS fundamentally means that many areas that need transported ozone controlled in their ability to meet either the 2008 or the 2010 ozone standard will not get that assistance.[143]

Ozone transport is a well-established phenomenon in the eastern United States. Thanks to the NOx SIP Call, the impact on ozone from cutting NOx from power plants is also well-documented. EPA has design values for all counties with ozone monitors. EPA can readily identify the counties that would fail to meet the 0.075 ppm ozone standard using that data. EPA should assess the burden upwind states are placing on these downwind counties using the current ozone NAAQS.

EPA is proposing to review and revise the TR after the 2010 standard is adopted in 2011. We support such action, but this Transport Rule should require emission reductions needed to eliminate downwind contribution nonattainment and maintenance problems under the 2008 ozone NAAQS.

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[143] For example, this proposed rule identifies eleven states that contribute a significant portion of the ozone into Pennsylvania, all of which shows up in only two counties—Philadelphia County and Bucks County. However, under a 75 ppb model, other counties in Pennsylvania would need to get help from the TR to tackle the significant contribution of unhealthy air coming into their communities. For example, one could assume that Allegheny County or Beaver County also suffer significant contributions from out-of-state ozone transport. Yet without assessing the contributions against the 0.075 ppm standard, neither of these counties will receive sufficient assistance from reduced transport. [We are assuming that some anomalies in the analysis may simply be errors; for example, it is unclear how ozone from Tennessee can make a significant contribution to nonattainment in Philadelphia County, PA and not also make a significant contribution to nonattainment in Harford County, MD.

D. Other Areas where EPA Requests Comment.

1. EPA requests comment on the use of banked allowances from other trading schemes for purposes of compliance with TR requirements.[144] Consistent with the Court's opinion in *North Carolina v. EPA*, the Agency must not allow the use in the TR of any SO_2 or NOx allowances banked or otherwise carried over under the CAIR program or the Title IV acid rain program, and we support EPA's proposal to exclude these allowances for TR compliance.[145]

2. EPA requests comment on the use of opt-in provisions.[146] We do not favor allowing sources that are not subject to the emission reduction requirements to be issued allowances that would increase the overall state emission budgets. Due to the uncertainty that any reductions made by such units would be surplus, verifiable, permanent and enforceable, we are concerned that such opt-in provisions could compromise the integrity of the EGU emission reductions requirements of the TR, and jeopardize assurance that a state's significant contribution would be eliminated, as required by the Court in *North Carolina v. EPA*.[147]

V. CATF Analysis of Alternate Control Scenario

In order to demonstrate that deeper reductions of NOx and SO_2 emissions are feasible, cost-effective, and will provide substantial additional human health benefits, CATF, with the assistance of ICF Consulting and MSB Energy Associates, has evaluated the benefits and costs of tighter emission caps and schedules than proposed by EPA in the TR. This alternate scenario is a regional (EPA's proposed PM transport region plus Texas) annual EGU SO_2 cap of 1.75 million tons, with a regional annual EGU NOx cap of 900,000 tons, each effective in 2014 ("Alternate Control Scenario").

A. Alternate Control Scenario Analysis Methodology.

In conducting this analysis, CATF endeavored to use whenever possible methods and procedures used by EPA, taking into consideration the time and resource constraints under which we were working. Specifically, ICF Consulting evaluated the Alternate Control Scenario using the Integrated Planning Model (IPM) used by EPA in the updated TR IPM runs (TR Base Case v.4.10, TR SB Limited Trading v.4.10, etc.).[148] CATF's analysis modified the EPA runs by reducing the levels of the 2014 emission caps, by using a control region that modified EPA's proposed TR PM control region of 28 states by adding Texas, and by moving the states of Florida, Connecticut, Kansas, Maryland,

[144] 75 Fed. Reg. at 45339.
[145] 75 Fed. Reg. at 45338-39.
[146] 75 Fed. Reg. at 45308.
[147] *North Carolina v. EPA*, 531 F.3d at 907-08.
[148] EPA's IPM model results can be found at: http://www.epa.gov/airmarkets/progsregs/epa-ipm/BaseCasev410.html.

Massachusetts, Minnesota, Nebraska, and New Jersey from "Group 2" to "Group 1" for purposes of SO_2 control.[149]

This analysis predicts emission levels and costs of the Alternate Control Scenario. CATF then determined incremental emission reductions and costs by comparing the emissions and costs from EPA's TR proposal and to those from the Alternate Control Scenario.

In order to estimate incremental benefits resulting from the Alternate Control Scenario, CATF estimated avoided deaths from $PM_{2.5}$ exposure by utilizing estimated avoided deaths per ton of SO_2 pollution removed based on EPA's own benefits analysis in the TR. CATF directly applied these estimates to the SO_2 emissions inventories derived from the IPM runs for the Alternate Control Scenario.[150] The estimated incremental health benefits were converted to dollar benefits by applying EPA's TR estimate of the value of a statistical life (VSL) to the number of estimated avoided deaths. This approach results in an underestimation of the incremental benefits of the Alternate Control Scenario, since there are many benefits from reduced $PM_{2.5}$ levels in addition to avoided premature death, some of which may be reduced to a monetary value and some of which may not.[151] Nevertheless, avoided deaths do provide a useful basis for benefit comparison, because EPA has found that "the benefits are driven primarily by the reduction in premature fatalities each year, which account for over 90% of total benefits" [that were monetized by EPA].[152]

The costs of the EPA's proposed TR and the Alternate Control Scenario came directly from the IPM runs.

B. Alternate Control Scenario Analysis Results.

The results of the CATF analysis of the Alternate Control Scenario are summarized in the tables below. They demonstrate that tighter limits on EGU SO_2 and NOx emissions are feasible, cost-effective, and produce substantial incremental benefits well in excess of incremental costs.

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[149] Air quality modeling and analysis of the type EPA used in the TR is quite complex, expensive and time-consuming. Furthermore, the aggregate emission caps proposed in the TR result from EPA's establishment of individual state budgets for EGU emissions. CATF did not have the time or resources available to establish individual state budgets from the "bottom up" as EPA did. Rather, the state budgets modeled in the Alternate Control Scenario were calculated by reducing each state's budget as proposed in the TR by applying the ratio of our recommended regional caps divided by the overall regional caps in the proposed TR (as noted above, adjusted by adding Texas to the control region, and moving the states of Florida, Connecticut, Kansas, Maryland, Massachusetts, Minnesota, Nebraska, and New Jersey from "Group 2" to "Group 1" for purposes of SO_2 control).

[150] EPA calls this approach the "Benefits-per-Ton" approach. It was used by the Agency for determining the health impacts of several alternate scenarios in the proposed TR. *See, e.g.*,TR RIA at pp81-83. Also, it is discussed in more detail in Appendix A attached hereto.

[151] 75 Fed. Reg at 45347-52.

[152] 75 Fed. Reg. at 45347.

National EGU emissions[153] are shown in Tables V.1 – V.3. Table V.1 shows that national SO2 emissions would be 29% lower under the Alternate Control Scenario than the proposed TR.

Table V.1 National SO_2 Emissions
(Millions of Tons)

	2012	2015	2020	2030
EPA Transport Rule	4.6	3.8	3.7	3.8
CATF Alternate Control Scenario	3.8	2.7	2.7	2.7

Table V.2 National NOx Emissions
(Millions of Tons)

	2012	2015	2020	2030
EPA Transport Rule	1.9	1.9	2.0	2.1
CATF Alternate Control Scenario	1.9	1.6	1.6	1.7

Table V.3 National Mercury Emissions
(Tons)

	2012	2015	2020	2030
EPA Transport Rule	32.1	30.4	30.5	31.4
CATF Alternate Control Scenario	30.8	27.1	27.1	28.0

Tables V.4 and V.5 show the differences in mortality, and the monetary value of those differences, between the EPA Transport Rule and the Alternate Control Scenario.

Table V.4 Range of Additional Avoided Mortality
(Deaths)[154]

	2012	2015	2020	2030
CATF Alternate Control Scenario Compared to EPA Transport Rule	2400 to 6150	3600 to 9250	3100 to 7950	3200 to 8200

[153] In estimating national emissions, the Alternate Control Scenario did not assume any additional emission reductions outside of the control region (TR plus Texas) beyond the base case scenarios. Therefore, the national emissions predicted in this scenario are higher than the "equivalent" national caps described earlier at, *e.g.*, note 16.

[154] The range of additional premature deaths (3600 to 9250) in the Alternate Control Scenario were calculated using the same air quality/mortality coefficients that were used to produce EPA's estimated range of 14,000 to 36,000 premature deaths. 75 Fed. Reg. at 45346-47. EPA's lower estimate was based on the Pope *et al.*, 2002 health effects study, while the upper estimate was based on the Laden *et al.*, 2006 study. *Id.*

Table V.5 Range of Value of Additional Avoided Deaths
(Billions of 2006 Dollars)

	2012	**2015**	**2020**	**2030**
CATF Alternate Control Scenario Compared to EPA Transport Rule	18.9 to 48.6	27.8 to 71.5	24.4 to 62.7	25.1 to 64.5

Tables V.6 and V.7 compare the costs of the EPA Transport Rule and the Alternate Control Scenario. Table V.7 shows that the predicted costs of the additional reductions in the Alternate Control Scenario are only 2-3% higher than the costs of the proposed Transport Rule.

Table V.6 Annual Incremental Cost of Scenarios
(Billions of 2007 Dollars)

	2012	**2015**	**2020**	**2030**
EPA Transport Rule	126.2	141.8	152.1	195.3
CATF Alternate Control Scenario	125.1	146.3	155.5	199.1

Table V.7 Increase in Cost of Alternate Control Scenario

	2012	2015	2020	2030
CATF Alternate Control Scenario Compared to EPA Transport Rule (Billions of 2007 Dollars)	-1.1	4.5	3.4	3.7
CATF Alternate Control Scenario Compared to EPA Transport Rule (% difference)	-0.9	3.2	2.2	1.9

Taken together, the above comparisons show that the Alternate Control Scenario will prevent over 3000 to 8000 premature deaths each year from 2015 through 2030, while incurring costs over the proposed Transport Rule of only 2-3%. The monetizable value of this additional benefit will exceed incremental costs by roughly 6-18 times.

VI. Conclusion

In conclusion, we support the general approach and direction of EPA's TR proposal, but we submit that it is not sufficiently stringent to adequately protect public health or to provide adequate emission reductions to allow nonattainment areas to achieve attainment of the PM and ozone NAAQS as expeditiously as practicable. EPA must finalize a stronger rule as soon as possible.

We urge the Agency to issue a rule that includes that following adjustments to its August 2 proposal:

- reduces the 2014 annual control region SO_2 cap to about 1.75 million tons (including Texas);
- reduces the 2014 annual control region NOx cap in to about 900,000 tons (including Texas);
- ensures that significant contribution from each state, as projected by CAMx modeling, is eliminated;
- increases the level of the cost-effectiveness cut-offs for SO_2 and for annual and ozone season NOx, applying them in a uniform manner, thereby, *e.g.*, requiring all proposed "Group 2" states to meet "Group 1" SO_2 requirements;
- adopts a minimum threshold for state significant downwind contribution at 0.5% of the applicable NAAQS, rather than the proposed 1% NAAQS threshold, thereby slightly expanding the coverage of the emissions caps and the scope of the reductions; and
- uses the current NAAQS as the basis for assessment of the significant contributions, including the 2008 ozone NAAQS.

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Appendix A

Benefits Estimation Methodology

for the

Alternate Control Scenario

The technical analysis in these comments is based on runs of the EPA's Integrated Planning Model (IPM Model).[i] The EPA used this model to analyze the costs and benefits of its proposal for the Transport Rule. We expanded on the EPA analysis by procuring a model run based on more stringent emission reduction requirements, and by slightly changing the control region analyzed.[ii] The IPM model's direct outputs include costs, emissions, fuel and electricity prices, and details of the generating system.

The IPM Model does not provide a direct output of health impacts or the value of health impacts. That must be calculated using other methods. We used a method developed by the EPA called the "Benefits per Ton" approach.[iii] EPA has used this method in situations where time or resource constraints prevent it from performing air quality modeling, because it "can provide a reliable estimate of the benefits of emission reduction scenarios."[iv] In this case, EPA used this approach to analyze the health impacts of several TR alternative scenarios, including the intrastate and direct control remedies.[v] This method works by calculating the health impacts for particular scenario using detailed air dispersion and health impact modeling, and then using those results to calculate the health impacts per ton of SO_2. The method assumes that SO_2 is the primary driver of $PM_{2.5}$ related health impacts.[vi]

We used the data in EPA's description of the Transport Rule to calculate that the impact of national SO_2 emissions on premature mortality was 3,164 premature deaths per million tons of SO_2. This calculation was based on EPA's figure of 14,000 lives saved compared to the Base Case resulting from a reduction of 4.42 million tons of SO_2.[vii]

The IPM Model gives emissions for 2012, 2015, 2020, and 2030. Using the difference in emissions for the EPA Transport Rule and the Alternate Scenario for each of those years and the deaths per ton figure, we calculated the additional mortality reduction for the Alternate Scenario compared to the EPA Transport Rule.

The value of the mortality reduction from the Transport Rule to the Alternate Control Scenario was calculated using EPA's Value of a Statistical Life (VSL) of $6.3 (2000$) million per life.[viii] The VSL was multiplied times the premature mortality reductions to calculate the monetary value of benefits. This method produces a conservative calculation of actual benefits, and in fact underestimates them, because we did not consider any benefits beyond premature mortality. Those benefits include both some benefits that are monetizable and many more that are not.[ix]

[i] The EPA's IPM Model outputs for the Transport Rule analysis can be found at http://www.epa.gov/airmarkets/progsregs/epa-ipm/BaseCasev410.html

[ii] The aggregate emission caps proposed by EPA in the TR are the sum of the individual state budgets for EGU emissions established by EPA. CATF did not have the time or resources available to establish individual state budgets from the "bottom up" as EPA did. Rather, the state budgets modeled in the Alternate Control Scenario were calculated by reducing each state's budget as proposed in the TR by applying the ratio of our recommended regional caps divided by the overall regional caps in the proposed TR. Prior to applying these proportionate reductions, we adjusted EPA's proposed SO_2 control region by adding Texas to the control region, and moving the states of Florida, Connecticut, Kansas, Maryland, Massachusetts, Minnesota, Nebraska, and New Jersey from "Group 2" to "Group 1" for purposes of SO_2 control.

[iii] *See, e.g.*, TR RIA, p81-83.

[iv] TR RIA, p81.

[v] *Id.*

[vi] *See* TR RIA, p81.

[vii] Premature deaths estimated in the TR by EPA ranged from 14,000 to 36,000. 75 Fed. Reg. at 45346-47. The lower estimate was based on the Pope *et al.*, 2002 health effects study, while the upper estimate was based on the Laden *et al.*, 2006 study. *Id.*

[viii] TR RIA at pp111-13. In the TR analysis, EPA adjusted the VSL to 2006$ (we assume that the reference on page 76, item 4, of the TR RIA to a VSL of $6.3M in 2006$ is a mistake) and to account for income growth to 2014, producing an adjusted VSL of $7.8M. TR RIA at pp112, note 25. We have also used this adjusted value of $7.8M in the analysis of the Alternate Control Scenario.

[ix] *See, e.g.*, 75 Fed. Reg. at 45347-52.