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January 14, 2016

Gina McCarthy, Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington, DC 20460

Submitted via *http://www.regulations.gov*
Attention: Docket ID No. EPA–HQ–OAR–2009–0234

Re: *Supplemental Finding That It Is Appropriate and Necessary To Regulate Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units*

Dear Administrator McCarthy:

The Northeast States for Coordinated Air Use Management (NESCAUM) offer the following comments on the U.S. Environmental Protection Agency's (EPA's) proposed *Supplemental Finding That It Is Appropriate and Necessary To Regulate Hazardous Air Pollutants From Coal- and Oil-Fired Electric Utility Steam Generating Units* published on December 1, 2015 in the Federal Register (80 FR 75025-75042). NESCAUM is the regional association of air pollution control agencies representing Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont.

1. *Introduction*

NESCAUM supports EPA's cost approach in the proposed supplemental finding, as it is not unlike what a number of states have done in their own similar rulemakings that pre-date EPA's Mercury and Air Toxics Standards (MATS). The historical track record in these same states since rule implementation also demonstrates that the state rules did not impose a significant burden on the covered power plants, did not cause a drastic rise in electricity rates, and did not undermine electric grid reliability. Additional information also shows that power plants' compliance costs for MATS in actual practice are much less than initially estimated, as has been seen with many other air pollution regulatory programs.

Consistent with EPA's analysis, the states' own rulemakings have also recognized that the full benefits of reducing hazardous air pollutants (HAPs) are difficult to completely monetize in a benefit-cost analysis, but are real and substantial. The NESCAUM states agree that EPA's monetized benefits only capture a small slice of the actual benefits attainable by reducing the large amounts of mercury and other HAPs emitted by coal- and oil-fired power plants.

Based on states' practices in assessing costs of power plant controls and identifying their benefits, along with seeing the historical results from their rules, NESCAUM finds EPA's cost

approach in the proposed supplemental finding to be reasonable and a reflection of standard regulatory practice in the states. Consequently, NESCAUM also agrees that the cost analysis supports confirming EPA's previous finding that it is appropriate and necessary to regulate coal- and oil-fired electric utility steam generating units under section 112 of the Clean Air Act (CAA).

2. *EPA's cost approach is consistent with past state practices in similar rulemakings*

Prior to EPA's final promulgation of MATS, a number of states had already adopted stringent limitations on mercury emissions from new and existing fossil fuel power plants, often as part of multi-pollutant programs that included control cost considerations for sulfur dioxide (SO_2) and nitrogen oxides (NO_X). Power plant rules in Delaware,[1] Maryland,[2] Massachusetts,[3] New Jersey,[4] New York,[5] and Wisconsin[6] are illustrative of the cost considerations taken by these states. States recognized a broad range of public health and environmental benefits from their rules, and considered these in a similar manner as EPA's preferred approach in the proposed supplemental finding.

In considering costs, the states included similar cost factors as used by EPA. For example, Delaware and New York estimated the impact of their rules on retail electricity prices. While they projected an increase in cost of electricity generation for the affected power plants, they concluded that it was not of sufficient magnitude to expect increased rates for consumers.[7,8] In

[1] Delaware Department of Natural Resources & Environmental Control, Division of Air & Waste Management, Air Quality Management Section, *Technical Support Document for Proposed Regulation No. 1146, Electric Generating Unit (EGU) Multi-Pollutant Regulation*, September 2006 (pp. 47-56). Available at: http://www.dnrec.delaware.gov/dwhs/Info/Regs/Documents/8969c5c8305d44318a38de77339cdf66multi_p_TechSptDoc1.pdf.

[2] Maryland Department of the Environment, *Technical Support Document for Proposed COMAR 26.11.27, Emission Limitations for Power Plants*, December 26, 2006 (pp. 36-41). Provided by the Maryland Department of the Environment and included as an attachment to these comments.

[3] Massachusetts Department of Environmental Protection, Bureau of Waste Prevention, Division of Planning and Evaluation, *Evaluation of the Technological and Economic Feasibility of Controlling and Eliminating Mercury Emissions from the Combustion of Solid Fossil Fuel*, December 2002. Available at: www.mass.gov/eea/docs/dep/toxics/stypes/mercfeas.pdf.

[4] New Jersey Register, *Air Pollution Control: Control and Prohibition of Mercury Emissions*, Vol. 36, No. 1, 123(a), January 5, 2004 (available on-line via LexisNexis® at http://www.lexisnexis.com/njoal/).

[5] New York State Department of Environmental Conservation, 6 NYCRR Part 246, *Mercury Reduction Program for Coal-Fired Electric Utility Steam Generating Units*, 6 NYCRR Part 200.9, *Referenced Material Revised Regulatory Impact Statement*, 2006. Available upon request from the New York State Department of Environmental Conservation and included as an attachment to these comments.

[6] Wisconsin Department of Natural Resources, Bureau of Air Management, *Factsheet on Rule to Control Mercury Emissions from Coal-Fired Power Plants*, revised August 2008. Available at: http://dnr.wi.gov/files/PDF/pubs/am/AM392.pdf.

[7] Delaware Department of Natural Resources & Environmental Control, Division of Air & Waste Management, Air Quality Management Section, *Technical Support Document for Proposed Regulation No. 1146, Electric Generating Unit (EGU) Multi-Pollutant Regulation*, September 2006 (p. 50). Available at: http://www.dnrec.delaware.gov/dwhs/Info/Regs/Documents/8969c5c8305d44318a38de77339cdf66multi_p_TechSptDoc1.pdf.

addition, the historical experience in the states that adopted mercury standards in rulemakings prior to MATS renders it self-evident that the control costs did not impose an unreasonable burden on the covered power plants, did not cause a drastic rise in electricity rates, and did not undermine electric grid reliability.

3. *Actual control costs for power plants to comply with MATS have been less than estimated by EPA*

EPA's prospective technology cost estimates for MATS are conservative. Actual costs for power plants that are coming into compliance with MATS by April 2016 are now estimated to be about $2 billion annually, which is less than one-quarter of EPA's prospective annual cost estimate of $9.6 billion.[9] A number of factors are contributing to substantially lower actual compliance costs than estimated by EPA. These factors include:[10]

1) Improved dry sorbent injection and activated carbon injection technologies at significantly lower costs;
2) Significantly lower natural gas prices than EPA estimated; and
3) Less generation capacity installing fabric filters, dry flue gas desulfurization (FGD) systems, and wet FGD upgrades than EPA estimated.

Actual compliance costs coming in lower than pre-compliance estimates are not unusual based on the histories of other air pollution regulatory programs. NESCAUM's retrospective review in 2000 of several air pollution programs found a repeated pattern of high EPA cost estimates and much higher industry cost projections (often by a factor of two or more) as rules were promulgated, with lower actual compliance costs once the programs were implemented.[11] NESCAUM identified several common factors that contributed to the lower actual costs but are difficult to forecast in advance, and these are seen with MATS as well, such as unforeseen technology innovation and lower fuel costs.

4. *States recognize that the full benefits of reducing HAPs from power plants cannot be captured in a fully monetized benefit-cost analysis using currently available information*

In EPA's proposed supplemental finding, the agency "does not interpret CAA section 112(n)(1)(A) as requiring a formal benefit-cost analysis in which benefits are monetized and

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[8] New York State Department of Environmental Conservation, 6 NYCRR Part 246, *Mercury Reduction Program for Coal-Fired Electric Utility Steam Generating Units*, 6 NYCRR Part 200.9, *Referenced Material Revised Regulatory Impact Statement*, 2006 (p. 24). Available upon request from the New York State Department of Environmental Conservation and included as an attachment to these comments.

[9] *White Stallion Energy Center, LLC v. EPA*, D.C. Circuit Case No. 12-1100, Motion of Industry Respondent Intervenors to Govern Future Proceedings, filed September 24, 2015 (*see* Declaration of James E. Staudt and accompanying exhibits).

[10] *Ibid.* Staudt Declaration.

[11] NESCAUM, *Environmental Regulation and Technology Innovation: Controlling Mercury Emissions from Coal-Fired Boilers*, September 2000. Available at: http://www.nescaum.org/documents/rpt000906mercury_innovative-technology.pdf.

compared against the monetary costs of an action."[12] As EPA states in the proposed supplemental finding, its ability to quantify monetized benefits for MATS is constrained by the narrow scope of available information in the scientific literature. States that have adopted their own mercury power plant rules have also identified numerous and important benefits from their rules, but no state attempted to fully monetize these. Delaware, for example, "was not able to obtain sources of information that quantify the economic impact of mercury emissions reductions on neurological effects, cardiovascular effects, genotoxic effects, immunotoxic effects, or ecological effects. Therefore, while it is evident that economic benefits will accrue, for the purpose of quantifying economic benefits, no benefits were estimated for mercury reduction."[13] Consistent with the states' own experiences, NESCAUM agrees with EPA that the presently quantifiable benefits do not capture the full value of MATS in reducing HAPs from power plants, making a formal benefit-cost comparison incomplete and potentially misleading.

5. *While the full benefits of reducing mercury are difficult to quantify, more recent information indicates they are much more substantial than EPA's current estimates*

EPA explicitly lists a number of important benefits from reducing power plant mercury emissions that it could not quantify, which include; [14]

> (1) benefits from reducing adverse health effects on brain and nervous system development beyond IQ loss; (2) benefits for consumers of commercial (store-bought) fish (i.e., the largest pathway to mercury exposure in the U.S.); (3) benefits for consumers of self-caught fish from oceans, estuaries or large lakes such as the Great Lakes; (4) benefits for the populations most affected by mercury emissions (e.g., children of women who consume subsistence-level amounts of fish during pregnancy); (5) benefits to children exposed to mercury after birth; and (6) environmental benefits from reducing adverse effects on birds and mammals that consume fish.

In its 2011 Regulatory Impact Analysis for MATS, EPA limited its monetized benefits for mercury reductions solely to avoided IQ loss among freshwater recreational anglers and their families. EPA did not attempt to evaluate benefits for self-caught and commercially-bought saltwater fish because, in its view, it was nearly impossible to determine the source of methylmercury in those fish, hence an exposure connection to U.S. power plants.[15]

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[12] 80 Fed. Reg. at 75309.
[13] Delaware Department of Natural Resources & Environmental Control, Division of Air & Waste Management, Air Quality Management Section, *Technical Support Document for Proposed Regulation No. 1146, Electric Generating Unit (EGU) Multi-Pollutant Regulation*, September 2006 (p. 62). Available at: http://www.dnrec.delaware.gov/dwhs/Info/Regs/Documents/8969c5c8305d44318a38de77339cdf66multi_p_TechSptDoc1.pdf.
[14] 80 Fed. Reg. at 75040.
[15] U.S. EPA, *Regulatory Impact Analysis for the Final Mercury and Air Toxics Standards*, EPA-452/R-11-011 (December 2011), Chapter 4.

A recent study indicates that a connection between U.S. power plant mercury emissions and methylmercury levels in saltwater fish is not speculative. The study found a strong correlation of decreasing mercury in a commercially important ocean fish (bluefish) in the Mid-Atlantic bight (defined as the continental shelf waters from Cape Cod, Massachusetts, to Cape Hatteras, North Carolina) with decreasing U.S. mercury air emissions.[16] The study's authors concluded that if bluefish are representative of other marine predators, then the fish-consuming public has benefited from a decrease in the amount of mercury consumed due to decreases in mercury emissions occurring in the eastern United States. That is particularly true given that, as they note, women living in Atlantic coastal areas have shown higher mean mercury blood levels than other U.S. women of child-bearing age.

A NESCAUM analysis in 2005 indicated that the health benefits to the public when considering additional health endpoints (e.g., cardiovascular effects and premature mortality) and exposure pathways (e.g., ocean-caught fish) can be large, ranging up to $4.9 billion (2000$) under an assumed power plant mercury emissions cap of 26 tons per year, which was based on an earlier EPA proposal in 2002.[17] EPA's final MATS in 2012, however, is a four-fold decrease in power plant mercury emissions below NESCAUM's assumed 26 tons per year from 2002, and will ultimately achieve an aggregate mercury emissions level from U.S. power plants of 6.6 tons per year. Therefore, the full health benefits of MATS will be even larger than suggested by NESCAUM's 2005 estimates.

6. *Based on the states own rulemakings, it is common practice to consider the co-benefits of reducing other air pollutants in addition to HAPs*

EPA's consideration of the co-benefits of reducing other pollutants, such as SO_2 and NO_X, occurring with pollution controls for HAPs is a common and accepted practice among states that have previously adopted their own mercury power plant rules. In fact, many states adopting power plant mercury rules took a "multi-pollutant" approach, and considered a suite of control technology packages to simultaneously address criteria pollutants (SO_2 and NO_X for fine particulates, NO_X for ground-level ozone) as well as mercury. Based on the states' own approaches, NESCAUM agrees with EPA that it is appropriate to consider co-benefits from reducing other pollutants in addition to HAPs in the proposed supplemental finding.

7. *Summary*

Before EPA's promulgation of MATS, a number of states had already undertaken and finalized rulemakings to require mercury pollution reductions from their coal-fired power plants. Their rulemaking processes have taken control costs into account in a similar manner as in EPA's proposed MATS supplemental finding. States recognized multiple benefits for public health and

[16] Cross et al., Decadal Declines of Mercury in Adult Bluefish (1972–2011) from the Mid-Atlantic Coast of the U.S.A., 49 *Environ. Sci. Technol.* 9064–9072 (2015), DOI: 10.1021/acs.est.5b01953.
[17] NESCAUM, *Economic Valuation of Human Health Benefits of Controlling Mercury Emissions from U.S. Coal-Fired Power Plants*, February 2005. Available at: http://www.nescaum.org/documents/rpt050315mercuryhealth.pdf.

the environment from reduced exposure to mercury, many of which, as EPA indicates, are difficult to quantify on a monetary basis, but are real and substantial nonetheless.

The historical record since the states' adoption of their mercury rules, often as part of multi-pollutant programs targeting additional air pollutants, demonstrates that their rules did not impose a significant burden on the covered power plants, did not cause a drastic rise in electricity rates, and did not undermine electric grid reliability. Based on the states' own rulemaking considerations and the historical results after rule implementation, NESCAUM supports the cost approach taken by EPA in the proposed supplemental finding. In consequence, therefore, NESCAUM continues to agree with EPA that it is appropriate and necessary to regulate coal- and oil-fired electric utility steam generating units under section 112 of the Clean Air Act.

Sincerely,

Dr. Paul J. Miller
NESCAUM Deputy Director & Chief Scientist

Cc: NESCAUM Directors
NESCAUM Stationary Sources & Permitting Committee
EPA Regions 1 & 2

Attachments:
1) Maryland Department of the Environment, *TSD for Proposed COMAR 26.11.27*
2) New York State Department of Environmental Conservation, *Referenced Material Revised Regulatory Impact Statement*

TECHNICAL SUPPORT DOCUMENT

FOR

PROPOSED COMAR 26.11.27

EMISSION LIMITATIONS FOR POWER PLANTS

DECEMBER 26, 2006

PREPARED BY:

MARYLAND DEPARTMENT OF THE ENVIRONMENT
1800 Washington Boulevard
Baltimore Maryland 21230

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Introduction

These regulations were developed for the purpose of bringing Maryland into attainment with the National Ambient Air Quality Standards (NAAQS) for ozone and fine particulate matter by the 2010 attainment deadline, reducing mercury emissions from coal-fired electric generating units and reducing atmospheric deposition of nitrogen to the Chesapeake Bay and other waters of the State. The regulations establish new emission limitations for oxides of nitrogen (NOx), sulfur dioxide (SO2), and mercury on Maryland's largest power plants.

The regulations also conform to the NOx , SO2, and mercury requirements of the Healthy Air Act (Ch. 23, Acts of 2006), which was signed into law on April 6, 2006. The Act specifically vests the Department with regulatory authority to allocate the State-wide NOx and SO2 tonnage caps amongst the affected units, to establish procedures for determining the mercury baseline and generally implement its provisions through the adoption of regulations.

Overview of Expected Emission Reductions

Ninety-five percent of the air pollution emitted from Maryland's power plants comes from the six largest plants in the State. These regulations will cut NO_x emissions by approximately 45,000 tons each year, a 69 percent reduction from 2002 levels. SO_2 emissions will be cut by approximately 192,000 tons per year, or 80 percent from 2002 levels. NO_x and SO_2 are major contributors to fine particle pollution whereas NOx is a major contributor to ozone pollution. Mercury emissions from coal-fired plants will be reduced by 80 percent in 2010, and 90 percent in 2013. If Maryland does not comply with the NAAQS for ozone and fine particles, NO_x will be reduced by 49,000 tons per year in 2012, or 75 percent from 2002 levels. Under the second phase of reductions, SO_2 will be reduced by 205,000 tons per year, or 85 percent from 2002 levels.

These regulations, combined with regional reductions from upwind power plants under federal cap and trade programs, will prevent more than 390 premature deaths in Maryland linked to fine particle air pollution exposure. Additional health benefits include reduced aggravation of asthma, bronchitis, and other chronic respiratory conditions. These regulations will also benefit the Chesapeake Bay by reducing the projected nitrogen load to the Bay by more than 400 tons per year.

Requirements of the Regulations

These regulations establish statewide tonnage caps for emissions of NOx and SO2 from 15 coal-fired electric generating units in Maryland effective in 2009 and 2012, and 2010 and 2013, respectively. The regulations further require the same coal-fired units to achieve a mercury emissions removal efficiency of 80% in 2010 and 90% in 2013, establish monitoring and reporting requirements, authorize the Department to reduce or

waive penalties for non-compliance under certain conditions and provide for judicial review of decisions by the Department to grant a reduction or waiver of penalties.

The Department expects the new standards to result in the installation of Selective Catalytic Reduction (SCR), Flue Gas Desulfurization (FGD), and mercury control technology on many of the units subject to the regulations. The phased approach for mercury emission reductions permits regulated units to achieve compliance in the first phase largely through co-benefits from the installation of SCR and FGD technology. Installation of SCR and FGD technology for NO_x and SO_2 emissions on a coal-fired unit can reduce mercury emissions by 80 percent or more without add-on mercury controls.

Comparison to Federal Standards

The Clean Air Interstate Rule (CAIR) and Clean Air Mercury Rule (CAMR) promulgated by the United States Environmental Protection Agency (EPA) and published on May 12, 2005 (70 FR 25162) and May 18, 2005 (70 FR 28606), respectively, implement cap-and-trade programs that permit compliance through the surrender of allowances.

Maryland's proposed regulations are more restrictive than the federal CAIR and CAMR rules insofar as they establish specific emission limitations for Maryland sources and, unlike the federal rules, do not permit surrender of allowances to achieve compliance. These regulations will require the installation of on-site pollution controls at Maryland power plants and ensure local emissions reductions where they are needed to attain the federal ambient air quality standards for ozone and fine particulate matter by the 2010 attainment deadline.

Reduction of Ozone and Fine Particulate Matter

Maryland's proposed regulations ensure the installation of on-site controls at Maryland power plants. This action is projected to result in significantly greater benefits to Maryland citizens and the Chesapeake Bay in the 2010 time frame than would otherwise be possible.

The regulations will reduce adverse ozone-related and fine particulate matter related health effects and health care costs as they reduce the quantity of pollutants emitted into Maryland's ambient air. These regulations will lead to an estimated reduction of more than 300,000 incidents in which Marylanders experience adverse health effects, that is hospitalizations, illnesses, restricted activity days, and other effects as defined by EPA, caused by air pollution and save Maryland over $2,000,000,000 in associated health care costs in 2010, the first year of implementation.

To conservatively estimate these benefits, the Maryland Department of the Environment (MDE) staff relied on the Regulatory Impact Analysis (RIA) EPA performed for CAIR for the 28-state control region in 2010. Based on Maryland's proportional population, these regulations will annually reduce premature mortality by approximately 400 cases, nonfatal heart attacks by approximately 550 cases, chronic bronchitis by 200 cases, acute

bronchitis by 500 cases, and hospital admissions and emergency room visits by 600 cases. EPA also conservatively estimated that nationally, every $1 spent on power plant controls produces $10 in annual health benefits.

Reduction in Nitrogen Deposition to the Chesapeake Bay

These regulations will further ensure that significant reductions in nitrogen deposition to the Chesapeake Bay from Maryland power plants are achieved by 2010, the target date for states participating in the Chesapeake 2000 Bay Agreement to meet their nitrogen reduction goal. Current research being conducted by the Maryland Department of Natural Resources Power Plant Research Program on atmospheric deposition indicates that approximately 33 percent of the nitrogen load to the Chesapeake Bay is the result of atmospheric deposition. Between one-third and one-half of the airborne deposition originates from upwind power plants. MDE projects that these regulations will achieve about 5 percent of Maryland's 2010 nitrogen reduction goal.

Reduction In Mercury Emissions

The proposed regulations will reduce mercury emissions from power plants in Maryland by 80% in the first phase, either as a co-benefit of NO_x and SO_2 controls or through the use of activated carbon injection technology.

Reductions in local mercury emissions are important to reduce mercury levels in the environment, especially in recreational fish species. Such reductions will lower public exposure to mercury, reduce the adverse health effects associated with consumption of contaminated fish, and, according to national estimates, result in lower health-related costs.

The reduction in local mercury emissions will help Maryland meet the Clean Water Act methyl mercury criteria for the 14 water bodies that are currently listed as impaired due to elevated mercury levels in fish. This reduction in local mercury emissions is also expected to reduce the number and frequency of statewide fish consumption warnings.

Meeting Ambient Air Quality Goals

Ozone:

EPA projects that much of Maryland will remain in nonattainment of the 8-hour ozone NAAQS in 2010, even after implementation of the first phase of CAIR. Accordingly, while CAIR will substantially improve Maryland's air quality, it will not, by itself, result in sufficient reductions to ensure that the entire State attains the NAAQS for 8-hour ozone. Furthermore, because CAIR permits compliance through the purchase of allowances and does not require installation of pollution controls, there is no guarantee that power plants in Maryland will install these controls as projected by EPA. These regulations ensure that controls will be installed to reduce pollutant emissions in Maryland where they are needed to attain the 8-hour ozone NAAQS.

PM2.5:

EPA data indicate that, with the estimated reductions from CAIR, which are based in part on installation of NO_x and FGD controls on nearly all of the electric generating units subject to these regulations, and other existing Clean Air Act programs, all of Maryland will attain the $PM_{2.5}$ NAAQS by 2010. In addition, a Maryland specific modeling analysis is provided in Appendix A.

Mercury:

For a large part of the eastern United States, domestic emissions are an important source of mercury. In 2003, the United Nations Environmental Program concluded there is sufficient evidence of significant global impacts from mercury to warrant further international action and urged all countries to adopt goals and take actions to reduce releases.

Like many states, Maryland finds itself facing a public health threat from mercury in both the recreational and commercial fishing sectors. Since coal-burning power plants are Maryland's most significant local sources of mercury, adoption of more restrictive standards will ensure that Maryland is directly and significantly addressing its local and regional contributions.

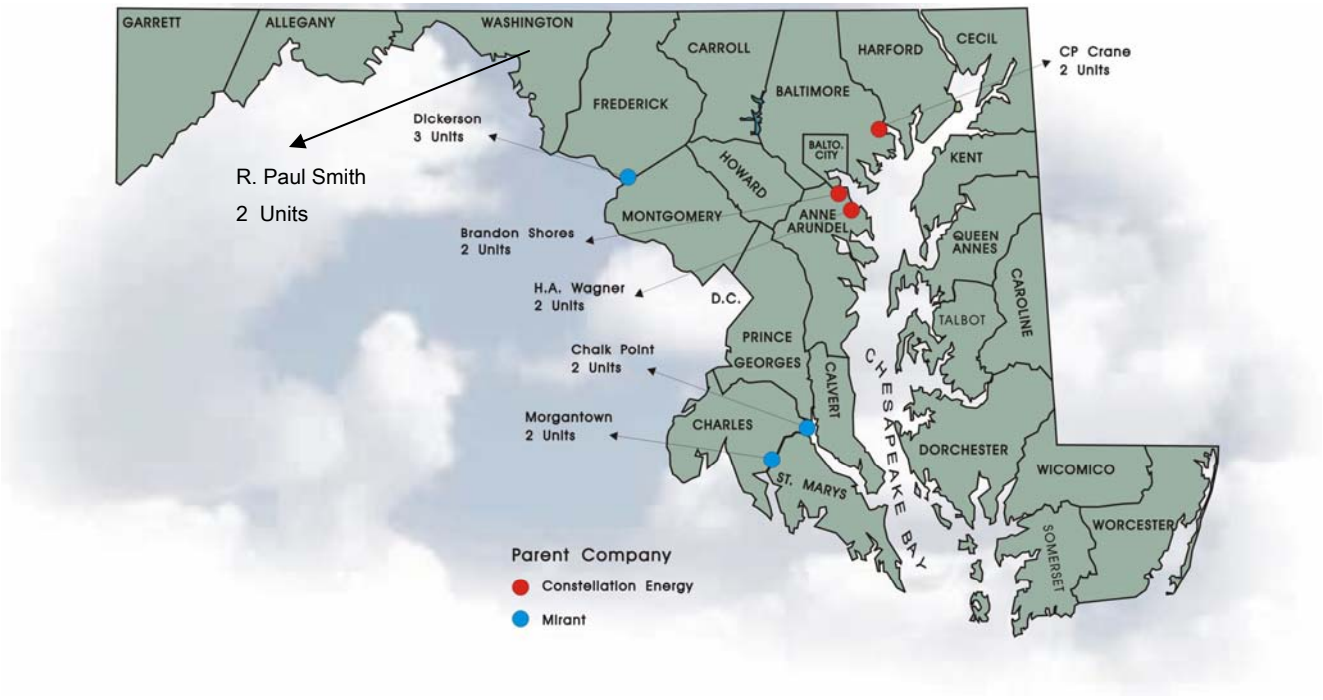
A recent Massachusetts mercury study, for example, documented relatively rapid improvements following reductions in local upwind mercury emissions. Decreases in local incinerator mercury emissions of 85 percent are reported to have lead to average reductions of mercury in fish tissue of 30—38 percent over a 3-4 year period. These data demonstrate that more stringent local standards can result in significant local improvements.

Affected Sources

These regulations affect the following 15 fossil fuel fired electric generating units:

ELECTRIC GENERATING UNIT	JURISDICTION
Constellation Energy Group System	
Brandon Shores 1 & 2	Anne Arundel County
H. A. Wagner 2 & 3	Anne Arundel County
C. P. Crane 1 & 2	Baltimore County
Mirant System	
Chalk Point 1 & 2	Prince George's County
Dickerson 1, 2, & 3	Montgomery County
Morgantown 1 & 2	Charles County
Allegheny Energy	
R. Paul Smith 3 & 4	Washington County

Coal-fired Power Plants Affected by the Regulations



Marylanders at Risk from Ozone and Fine Particle Pollution in Maryland

Almost 90% of Maryland's population lives in areas designated as nonattainment for ozone and fine particulate pollution. Marylanders at greater risk from these types of pollution are those with heart or lung diseases, older adults (possibly because they may have undiagnosed heart or lung disease), and children and adults who are active outdoors.

The number of Marylanders at risk from ozone and fine particle pollution is partly represented in asthma and cardiovascular disease statistics compiled by the Maryland Department of Health and Mental Hygiene. In 2003, 11.9% (501,000) of Maryland adults and 11.1% (153,000) of Maryland children under the age of 18 reported a history of asthma, 9,000 residents were hospitalized for asthma, and 38,000 residents were treated in emergency departments for asthma. The highest rates of asthma and its complications occurred in the very young, the elderly, African-Americans, low-income individuals, and residents of some jurisdictions, particularly Baltimore City. In 2003, charges for hospitalizations due to asthma totaled $41 million. Emergency department visits due to asthma cost an additional $28 million.

Cardiovascular disease, including heart disease and stroke, was the number one killer of Marylanders in 2003, accounting for 33% of all deaths in the State. Cardiovascular disease is a major cause of hospitalization in Maryland. For three diagnoses alone (heart attack, stroke, and congestive heart failure), hospital charges in 2003 cost over $338 million. These costs do not include long-term care and rehabilitation, lost productivity, and lost family resources.

The following pages present quantitative estimates of the health benefits of the proposed regulations, or, conversely, the health and economic burdens of ozone and fine particulate pollution in Maryland.

Sources:

Maryland Asthma Surveillance Report 2004
http://www.fha.state.md.us/mch/html/asthma/pdf/AsthmaReport2004Final.pdf

Maryland Vital Statistics Annual Report 2003
http://www.vsa.state.md.us/doc/03annual.pdf

Maryland Hospital Discharge Data Set, Center for Preventive Health Services, Maryland Department of Health and Mental Hygiene.

Health and Environmental Benefits of the Regulations

Summary

The regulations will reduce health care costs and adverse health effects as it reduces the quantity of pollutants emitted into Maryland's airshed. It is estimated that these regulations will lead to a reduction of over 300,000 incidences of adverse health effects, and save Maryland over 2 billion dollars in adverse health costs in 2010.

To conservatively estimate these benefits, MDE staff utilized EPA's CAIR regulatory impact analysis (RIA) document [1] data for the 28-state control region in 2010 and completed a proportional analysis based on the percentage of Maryland's population to the larger CAIR region. The results of this analysis have indicated that Maryland's proposed regulations will have annually reduced the following adverse health effects (approximate figures): premature mortality by 400 cases, non-fatal heart attacks by 500 cases, chronic bronchitis cases by 200, acute bronchitis by 500 cases, and hospital admissions and emergency room visits by 600 cases.

Certain quantified health benefits of the regulations may be related to ozone only, PM only, or both pollutants. Based on the available epidemiological data, EPA quantified decreased worker productivity, respiratory hospital admissions for children under two years of age, and school absences related to ozone but not PM. The PM-only health effects EPA quantified include premature mortality, nonfatal heart attacks, chronic bronchitis, acute bronchitis, upper and lower respiratory symptoms, asthma exacerbations, and days of work lost. The health effects that relate to both PM and ozone include hospital admissions, emergency room visits for asthma, and minor restricted activity days (MRADs).

[1] Regulatory Impact Analysis for the Final Clean Air Interstate Rule U.S. EPA, Office of Air and Radiation, Air Quality Strategies and Standards Division, Emission, Monitoring, and Analysis Division and Clean Air Markets Division, March 2005 (EPA-452/R-05-002).

Methodology

EPA's Innovative Strategies and Economics Group completed the Regulatory Impact Analysis (RIA) for CAIR. EPA did not develop state level benefits data for the CAIR analysis of health impacts. However, according to EPA staff, the results presented in the RIA are largely linear. Thus, to get an estimate for the Maryland benefits, the CAIR region based estimates could be proportioned from the total CAIR population based on Maryland's population. This is the methodology used to calculate the numbers in the tables below.

Maryland Incidence Reductions from CAIR for 2010 (estimated)

Health Effects Avoided	2010 Maryland Estimated Incidence Reduction
Premature mortality	390
Chronic bronchitis	207
Non-fatal heart attacks	510
Hospital admissions/ER visits	570
Acute bronchitis	480
Lower respiratory symptoms	5,700
Upper respiratory symptoms	4,200
Asthma exacerbations	7,200
Minor restricted activity days	249,000
Work loss days	39,000
School absence days	5,400
Total incidence reduction	**312,657**

Maryland Specific Estimated $ Values from CAIR Reductions (in millions of 1999$)

Health Effect/Productivity	2010 Estimated Value of MD Reductions ($M)
Premature mortality	$2,019.00
Chronic bronchitis	$75.60
Non-fatal heart attacks	$42.60
Hospital admission for respiratory causes	$1.36
Hospital admission for cardiovascular causes	$2.42
Acute bronchitis (ages 8-12)	$0.17
Lower respiratory symptoms (ages 7-14)	$0.09
Upper respiratory symptoms (ages 9-11)	$0.11
Emergency room visits for asthma	$0.09
Asthma exacerbations	$0.31
Minor restricted activity days	$12.66
Work loss days	$5.40
School absence days	$0.39
Health effects total	**$2,160.19**
Outdoor worker productivity	$0.23

Description of Health Indicators

Premature Mortality
Both long- and short-term exposures to ambient levels of air pollution have been associated with increased risk of premature mortality. The size of the mortality risk estimates from epidemiological studies, the serious nature of the effect itself, and the high monetary value ascribed to prolonging life make mortality risk reduction the most significant health endpoint quantified in EPA's Regulatory Impact Analysis (RIA).

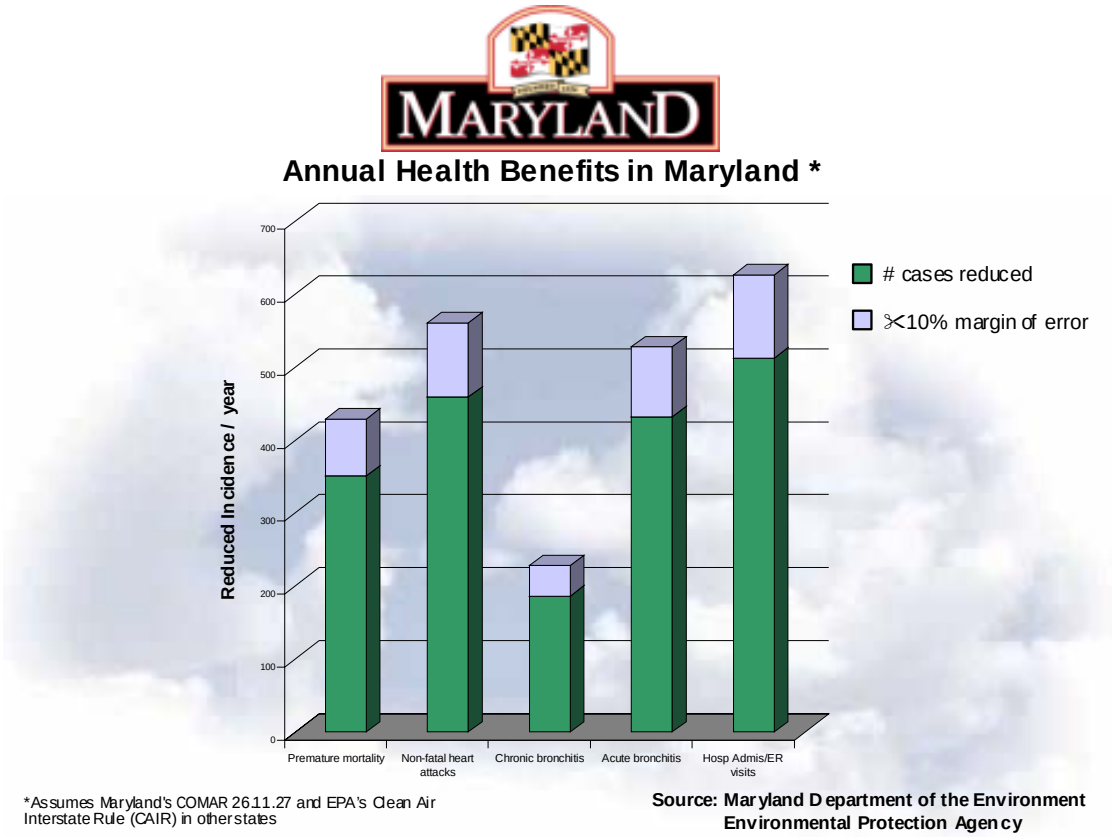
Chronic Bronchitis
Chronic Bronchitis (CB) is characterized by mucus in the lungs and a persistent wet cough for at least 3 months a year for several years in a row. CB affects an estimated 5 percent of the U.S. population (American Lung Association).

Acute Bronchitis
Around 4 percent of U.S. children between the ages of 5 and 17 experience episodes of acute bronchitis annually (American Lung Association). Acute bronchitis is characterized by coughing, chest discomfort, slight fever, and extreme tiredness, lasting for a number of days. With the exception of cough, most acute bronchitis symptoms abate within 7 to 10 days.

Nonfatal Myocardial Infarctions (heart attacks)
Nonfatal heart attacks have been linked with short-term exposures to PM2.5 in the United States and other countries. EPA used a recent study to examine the relationship between PM2.5 and nonfatal heart attacks. Given the lasting impact of a heart attack on long-term health costs and earnings, the RIA provided a separate estimate for nonfatal heart attacks. The estimate used in the CAIR analysis is based on the single available U.S. effect estimate. The finding of a specific impact on heart attacks is consistent with hospital admission and other studies showing relationships between fine particles and cardiovascular effects both within and outside the United States.

Hospital and Emergency Room Admissions
Because of the availability of detailed hospital admission and discharge records, there is an extensive body of literature examining the relationship between hospital admissions and air pollution. In addition, some studies have examined the relationship between air pollution and emergency room visits. The two main groups of hospital admissions estimated in the RIA are respiratory admissions and cardiovascular admissions.

Estimate of Selected Health Benefits from Maryland's Proposed Regulations



Mercury Benefits

Reductions in local mercury emissions are important to reduce mercury levels in the environment, especially in recreational fish species. Such reductions will lower public exposure to mercury, reduce the adverse health effects associated with consumption of contaminated fish, and, according to national estimates, result in lower health-related costs.

The reduction in local mercury emissions will help Maryland meet the Clean Water Act methyl mercury criteria for the 14 water bodies that are currently listed as impaired due to elevated mercury levels in fish. This reduction in local mercury emissions is also expected to reduce the number and frequency of Statewide fish consumption warnings.

Visibility Benefits

Changes in the level of ambient PM caused by the reduction in emissions from CAIR will change the level of visibility in much of the Eastern United States. Visibility directly affects people's enjoyment of a variety of daily activities. Individuals value visibility both in the places they live and work, in the places they travel to for recreational

purposes, and at sites of unique public value, such as the Great Smokey Mountains National Park. For the purposes of the EPA RIA analysis, recreational visibility improvements are defined as those that occur specifically in federal Class I areas. A key distinction between recreational and residential benefits is that only those people living in residential areas are assumed to receive benefits from residential visibility, while all households in the United States are assumed to derive some benefit from improvements in Class I areas.

Nitrogen Deposition

Atmospheric Deposition Basics

Typically, air pollution is thought of as smog that affects people's health, reduces visibility, and obscures majestic vistas in national parks, such as Shenandoah National Park. However, over time, it has become clear that air pollution also contributes to land and water pollution, which affects the health of the Chesapeake Bay's valuable living resources; its fish, shellfish, and other animals. Over the last thirty years, research has provided us with more knowledge on how air pollution can directly affect the Bay.

Since the passing of the Clean Air Act (CAA) and the Clean Water Act (CWA) in the early 1970's, air pollution and water pollution were largely considered two separate problems. However, there is now a better understanding of the link between these two environmental threats. Pollutants released into the air will eventually make their way back down to the earth's surface. Some of the factors that determine how far pollutants can travel through the air include: the makeup of the pollutant, weather conditions (wind, temperature, humidity), type and height of emission source (smokestack, automobile tail pipe), and the presence of other chemicals in the air. Airborne pollutants fall to the earth's surface by wet deposition or dry deposition. Airborne pollutants that deposit on the landscape can be transported into streams, rivers, and the Bay by runoff or through groundwater flow.

Computer models estimate that the primary nitrogen oxide (NOx) emissions airshed for the Chesapeake Bay is approximately 418,000 square miles. This is six and a half times larger than the Chesapeake Bay watershed. The airshed model shows that airborne nitrogen deposits to the Bay and its watershed from local emission sources, as well as from sources in places as far as Kentucky, Indiana, and Canada. These same computer models also estimate that about 33% of the total nitrogen load to the Bay comes from atmospheric deposition.

Sources of Air Pollution that Impact the Chesapeake Bay

Stationary and Area Sources
A stationary source of air pollution refers to an emission source that does not move (i.e., utilities, chemical and manufacturing industries). Often stationary sources are defined as large emitters who release relatively consistent qualities and quantities of pollutants. The term area source is used to describe the many smaller stationary sources. The emissions from individual area sources may be low but the collective emissions can be quite significant.

Mobile Sources
A mobile source of air pollution refers to a source that is capable of moving under its own power. In general, mobile sources imply on-road transportation. In addition, there is

also a non-road or off-road category that includes gas-powered lawn tools and mowers, farm and construction equipment, recreational vehicles, boats, planes, and trains.

Agricultural Sources
Agricultural operations, those that raise animals and grow crops, can generate emissions of gases, particulate matter, and chemical compounds. For example, animals confined to a barn or area (rather than field grazing) produce large amounts of manure. Manure emits various gases, particularly ammonia into the air. This ammonia can be emitted from the animal houses, manure storage areas, or from the land after the manure is applied. In crop production, the misapplication of fertilizers, herbicides, and pesticides can potentially result in aerial drift of these materials.

Natural Sources
Natural sources of air pollution are sources not caused by people or their activities. An erupting volcano emits particulate matter and gases; forest and prairie fires can emit large quantities of pollutants; plants and trees emit hydrocarbons; and dust storms can create large amounts of particulate matter. Wild animals in their natural habitat are also considered natural sources of pollution given that there is a certain amount of natural pollution emitted via biological activity. Regardless, it is very important to control the "excess" pollution caused by man's activities.

Air Pollution Transport and the Chesapeake Bay

Air transport is the term used to describe the mechanism by which air pollution moves from an emission source to other areas. The sources release emissions into the air as gas or particulate matter. As stated previously, the type and height of the source, the weather conditions, and the presence of other chemicals in the air influence the pollutants. The wind transports the pollutants, and if the wind carries the plume of pollution high enough in the air, it may travel for hundreds of miles before being brought to earth. This is known as long-range or long-distance transport. The transported air pollutants as well as local air pollutants are deposited by wet or dry deposition to surface waters, or the ground in the watershed, and then move through groundwater or runoff into the Bay.

Anthropogenic (man-made) Nitrogen Dioxide (NO_2) is the principle nitrogen compound that is adversely impacting the health of the Chesapeake Bay. The Maryland Department of the Environment (MDE), through efforts being coordinated by the Maryland Department of Natural Resources (DNR) and supported through the PPRP (Power Plant Research Program), has assisted with the evaluation of nitrogen loading to the Chesapeake Bay. This evaluation has focused on the mechanisms of wet and dry deposition (the means by which NOx is converted into a "Bay Pollutant") in the watershed and the surface of the Bay. The emissions inventory data compiled by and supplied by MDE, submitted to USEPA, has been used to continue airshed-modeling work.

Sources: Chesapeake Bay Program, EPA, NOAA, MDE, and Maryland DNR

Benefits to Chesapeake Bay from the Proposed Regulations

Estimating the Bay benefits from the proposed regulations involves the use of complex computer models and a thorough understanding of the complexities of deposition science. Using modeling results from a Maryland DNR study [1], the MDE calculated the following benefits from the proposed regulations to the Bay.

In 2004, all Maryland sources delivered 56.9 million lbs (28,450 TPY) of nitrogen to the Bay. The Chesapeake Bay 2000 (C2K) commitment is to reduce Maryland's nitrogen delivery to 37.25 million pounds (a 19.65 million pound reduction or 35%). If NOx emission reductions at power plants reach 85% the expected N load reduction to the Bay is estimated at 0.91 million pounds (455 tpy). If Maryland's 2010 reduction target is 19.65 million pounds (or 9,825 TPY) then the new Maryland regulation will help achieve about 5% of this goal.

[1]MD DNR PPRP Research on Atmospheric Deposition, 2005

Fine Particle Basics

Fine Particles

Particulate matter is a complex mixture of extremely small particles and liquid droplets. Particles smaller than 2.5 microns in diameter are known as "fine particles."

Fine particles can be emitted directly or formed secondarily in the atmosphere via atmospheric chemistry. Particles that are emitted directly (also known as primary emissions) come from sources such as diesel engines, wood burning activities, and other industrial and commercial combustion processes.

"Secondary" particles are those that are formed by reactions of gases in the atmosphere. For example, sulfur dioxide gas from combustion of coal in power plants and industrial boilers reacts with other gases in the atmosphere to form sulfate particles. Similarly, nitrogen oxide gas from combustion sources such as automobiles and industrial facilities forms nitrate particles in the atmosphere.

Other secondary particles include organic carbon particles, which can be formed when certain volatile organic compounds react with other gases in the atmosphere. Sources of organic particles include burning activities, motor vehicle emissions, and other combustion activities.

Sulfate and NOx

SO_2 and NOx contribute to the formation of fine particles and ground-level ozone, pollutants that, together, are associated with thousands of premature deaths and illnesses each year. According to EPA, reducing emissions of these pollutants will significantly address these health issues, in addition to improving visibility and protecting sensitive ecosystems. EPA's modeling predicts that when combined with existing emissions reduction requirements, these NOx and SO_2 regulations will help approximately 90% of "nonattainment areas" meet national air quality standards for ozone and particle pollution. (Source: EPA Fact Sheet Supplemental Proposal for Reducing Interstate Transport of Fine Particulate Matter and Ozone (Clean Air Interstate Rule)

http://www.epa.gov/cair/pdfs/cairsuppfs51804final.pdf**)**

Fine Particles and Human Health

Source: http://www.epa.gov/ttn/oarpg/naaqsfin/pmhealth.html

Fine particles are of health concern because they easily reach the deepest recesses of the lungs. Batteries of scientific studies have linked particulate matter, especially fine

particles (alone or in combination with other air pollutants), with a series of significant health problems, including:

- Premature death;
- Respiratory related hospital admissions and emergency room visits;
- Aggravated asthma;
- Acute respiratory symptoms, including aggravated coughing and difficult or painful breathing;
- Chronic bronchitis;
- Decreased lung function that can be experienced as shortness of breath; and
- Work and school absences.

Populations Most at Risk from Exposure to Fine Particles

http://www.epa.gov/ttn/oarpg/naaqsfin/pmhealth.html

- The Elderly: Studies estimate that tens of thousands of elderly people die prematurely each year from exposure to ambient levels of fine particles. Studies also indicate that exposure to fine particles is associated with thousands of hospital admissions each year. Many of these hospital admissions are elderly people suffering from lung or heart disease.

- Individuals with Preexisting Heart or Lung Disease: Breathing fine particles can also adversely affect individuals with heart disease, emphysema, and chronic bronchitis by causing the need for additional medical treatment. Inhaling fine particulate matter has been attributed to increased hospital admissions, emergency room visits and premature death among sensitive populations.

- Children: The average adult breathes 13,000 liters of air per day; children breathe 50 percent more air per pound of body weight than adults. Because children's respiratory systems are still developing, they are more susceptible to environmental threats than healthy adults. Exposure to fine particles is associated with increased frequency of childhood illnesses, which are of concern both in the short run, and for the future development of healthy lungs in the affected children. Fine particles are also associated with increased respiratory symptoms and reduced lung function in children, including symptoms such as aggravated coughing and difficulty or pain in breathing. These can result in school absences and limitations in normal childhood activities.

- Asthmatics and Asthmatic Children: More and more people are being diagnosed with asthma every year. Fourteen Americans die every day from asthma, a rate three times greater than just 20 years ago. Children make up 25 percent of the population, but comprise 40 percent of all asthma cases. Breathing fine particles, alone or in combination with other pollutants, can aggravate asthma, causing greater use of medication and resulting in more medical treatment and hospital visits.

Fine Particles Cause Visibility Impairment and Damage to our Environment

The same fine particles linked to serious health effects are also a major cause of visibility impairment in many parts of the U.S, including our national parks. In many parts of the U.S. the visual range has been reduced 70% from natural conditions. In the east, the current range is only 14-24 miles vs. a natural visibility of 90 miles. In the west, the current range is 33-90 miles vs. a natural visibility of 140 miles. Fine particles can remain suspended in the air and travel long distances. Airborne particles can also cause soiling and damage to materials. For example, soot stains and damages stone and other materials including monuments and statues. Fine particles can also form a film on plant leaves interfering with photosynthesis and plant growth.

The Fine Particle (PM 2.5) Standard

EPA issued National Ambient Air Quality Standards for Fine Particles (PM 2.5) in July 1997. The standards include an annual standard set at 15 micrograms per cubic meter, based on the 3-year average of annual mean PM 2.5 concentrations, and a 24-hour standard of 65 micrograms per cubic meter, based on the 3-year average of the 98th percentile of 24-hour concentrations. Maryland adopted these federal standards on January 26, 2005.

Differences between the PM 2.5 Standards and PM 10 Standards

Particulate < 10 micrometers (PM-10)		
Annual Arithmetic Mean	50 $\mu g/m^3$	Primary & Secondary
24-hour Average	150 $\mu g/m^3$	Primary & Secondary
Particulate < 2.5 micrometers (PM-2.5)		
Annual Arithmetic Mean	15 $\mu g/m^3$	Primary & Secondary
24-hour Average	65 $\mu g/m^3$	Primary & Secondary

Milestone Dates and Deadlines

Timeline Set by EPA for Implementing the PM2.5 Standards	
Date	**Action**
Feb. 2004	State designation recommendations to EPA
June 28- 29, 2004	EPA letters to States responding to PM2.5 designation recommendations
Fall 2004	EPA proposes implementation rule
April 5, 2005	EPA designations became effective
Spring 2005	EPA published draft PM2.5 implementation rule
April 5, 2008	State implementation plans due
Up to April 5, 2010 with extension up to 2015 possible	Attainment dates for nonattainment areas (based on the previous 3 years of monitoring data)

Maryland's PM2.5 Status

Air quality monitoring data from 2000-2002 show that monitors in Baltimore City, Baltimore County, Anne Arundel County, and Prince Georges County exceed the 15 micrograms/cubic meter annual standard. However, all of the PM2.5 monitor readings in Maryland are very close to the annual standard.

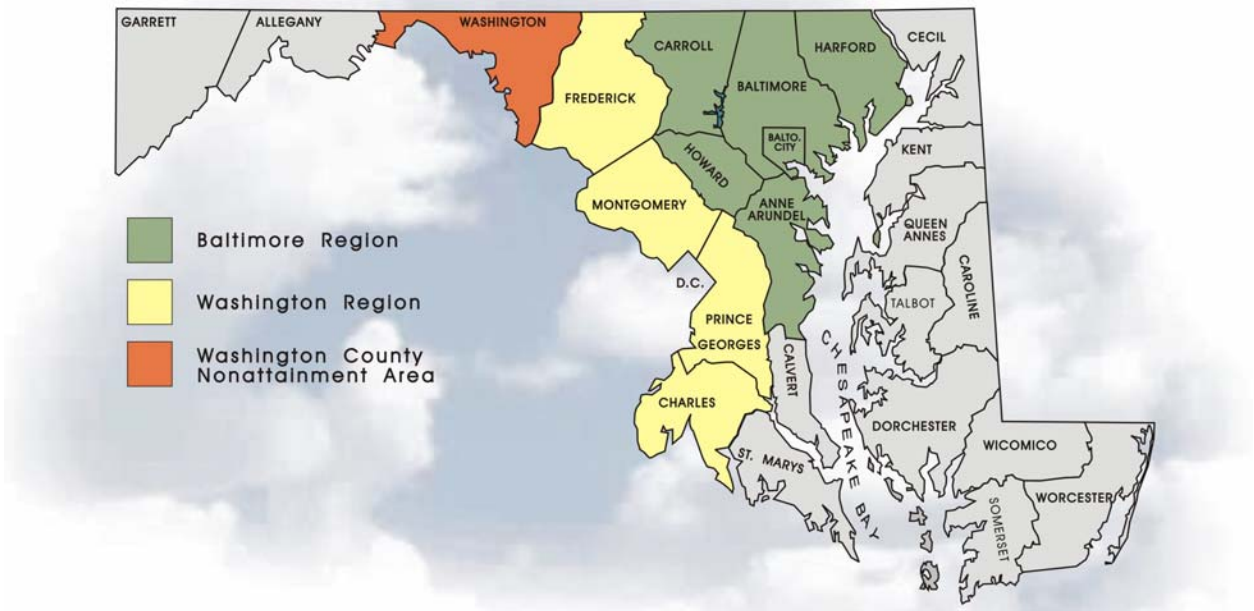
Maryland Counties Designated as Nonattainment under the PM2.5 Standard

The following counties have been designated as nonattainment under the PM2.5 standard: Washington, Frederick, Carroll, Baltimore, Baltimore City, Howard, Harford, Anne Arundel, Prince Georges, Montgomery, and Charles (see Figure below).

Robert L. Ehrlich, Jr., Governor **Michael S. Steele, Lt. Governor**

MARYLAND

Fine Particle Nonattainment Areas



Source: Maryland Department of the Environment

Ozone Basics

Ground-level ozone is formed when a mixture of common air pollutants react in heat and strong sunlight. The main ozone-causing pollutants are nitrogen oxides (NOx) from fuel burning sources like utilities and automobiles and volatile organic compounds (VOCs) from sources such as gasoline, paints, inks and solvents. These two categories of pollutants are also referred to as ozone precursors. The formation of ozone is dependent on weather conditions such as temperature, the amount of sunlight, and wind direction and speed. Because sunlight and high temperatures function as catalysts to form ozone, the problem is seasonal, with the ozone season lasting from May through September in the Baltimore and Washington Region. Typically, ozone levels escalate rapidly around noontime, peak in the afternoon and decline when the sun sets.

Ozone Precursors

A number of diverse sources discharge volatile organic compounds (VOCs) and nitrogen oxides (NOx), the two primary pollutants responsible for ozone formation. Man-made (anthropogenic) sources are divided into four categories: point, area, on-road mobile, and off-road mobile sources.

Point sources are primarily manufacturing businesses that produce emissions equal to or greater than 10 tons per year (tpy) of VOCs or 25 tpy of NOx. Large industrial plants such as power plants and chemical manufacturers are examples of point sources.

Area sources are smaller sources of air pollution whose emissions are too small to be measured individually. Examples of area sources include commercial and consumer products (such as paints and hairspray), bakeries, gasoline refueling stations, printing facilities and autobody refinishing shops.

Mobile sources are broken down into two categories: on-road mobile sources and off-road mobile sources. The former include cars, vans, trucks, and buses (i.e. vehicles that operate on highways). Off-road mobile sources include boats, lawn and garden equipment, construction equipment, and locomotives. Motor vehicles account for about 30-40% of the ozone forming pollutants in the Washington D.C. and Baltimore areas.

Effects of Ground Level Ozone

Exposure to ozone has been linked to a number of health effects, including significant decreases in lung function, inflammation of the airways, and increased respiratory symptoms, such as cough and pain when taking a deep breath. Exposure can also aggravate lung diseases such as asthma, leading to increased medication use and increased hospital admissions and emergency room visits. Active children are the group at highest risk from ozone exposure because they often spend a large part of the summer playing outdoors. Children are also more likely to have asthma, which may be aggravated by ozone exposure. Other at-risk groups include adults who are active outdoors (e.g., some outdoor workers) and individuals with lung diseases such as asthma and chronic

obstructive pulmonary disease. In addition, long-term exposure to moderate levels of ozone may cause permanent changes in lung structure, leading to premature aging of the lungs and worsening of chronic lung disease.

Source: http://www.epa.gov/airtrends/ozone.html

Ozone also affects vegetation and ecosystems, leading to reductions in agricultural crop and commercial forest yields, reduced growth and survivability of tree seedlings, and increased plant susceptibility to disease, pests, and other environmental stresses (e.g., harsh weather). In long-lived species, these effects may become evident only after several years or even decades of exposure and may result in long-term effects on forest ecosystems. Ground level ozone injury to trees and plants can lead to a decrease in the natural beauty of our national parks and recreation areas.

Source: http://www.epa.gov/airtrends/ozone.html

The 8-Hour Ozone Standard

In 1997, the Environmental Protection Agency (EPA) issued the new 8-hour ozone standard of 0.08 parts per million (ppm), averaged over eight hours. The new standard replaced the 1-hour standard of 0.12 ppm that had been in place since 1979. The design value, which is used to examine monitoring readings over time, for the 8-hour ozone standard is based on the 3-year average of the annual 4th highest daily maximum 8-hour ozone concentrations. This lower standard averaged over an 8-hour period is more protective of public health and will be harder to meet than previous 1-hour ozone standard.

Why the New Ozone Standard was Necessary

EPA issued the 8-hour ozone standard in July 1997, based on information demonstrating that the 1-hour standard was inadequate for protecting public health. Scientific information shows that ozone can affect human health at lower levels, and over longer exposure times than one hour.

Deadlines

Deadlines for meeting the 8-hour ozone standard range from 2007 to 2021, depending on the severity of an area's ozone problem. Areas with more significant ozone problems, such as Los Angeles, may have to apply more rigorous control measures, but will have a longer time to meet the 8-hour ozone standard. Maryland's deadlines under the 8-hour ozone standard range from 2007 for Washington, Kent, and Queen Anne's Counties to 2010 for the rest of the Nonattainment Areas including Baltimore, Philadelphia, and Washington DC (see table below).

States must detail control requirements in their state implementation plans (SIPs) demonstrating how they will meet the 8-hour ozone standard. The requirements may

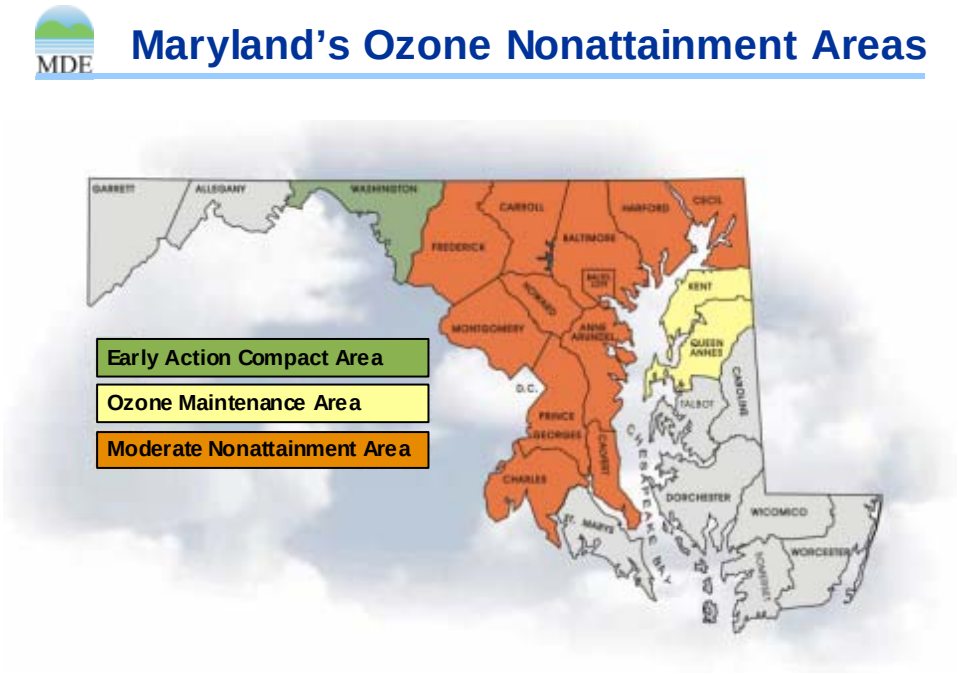
include stricter controls on industrial facilities, additional planning requirements for transportation sources, and vehicle emissions inspection programs. States must submit their plans to EPA by June 15, 2007 (three years after the EPA final designation process for nonattainment areas is complete).

8-Hour Ozone Nonattainment Areas in Maryland and Required Attainment Dates

On April 15, 2004 EPA designated areas throughout the country that exceeded the health-based 8-hr standards for ozone. These areas, called "nonattainment areas" have (or contribute to) ozone levels higher than allowed under EPA's 8-hour ozone national air quality standard. The table below delineates the classification and required attainment dates for Maryland's nonattainment areas.

Nonattainment Area	Counties	Classification	Attainment Date
Baltimore MD	Anne Arundel Baltimore City Baltimore Carroll Harford Howard	Moderate	June 2010
Kent & Queen Anne's Counties MD MDE submitted a request to EPA asking that these counties be designated as attainment under the 8-hr ozone standard based on their last three years of ozone monitoring data. These counties were redesignated Dec. 22, 2006.	Kent Queen Anne's	Maintenance Area	June 2007
Philadelphia – Wilmington, Atlantic City PA-DE-MD-NJ	Cecil	Moderate	June 2010
Washington DC-MD-VA	Calvert Charles Frederick Montgomery Prince George's	Moderate	June 2010
Washington Co. (Hagerstown) - MD - (EAC)	Washington	Basic (Deferred)	December 2007

The map below delineates the nonattainment areas in Maryland as well as the classification of each county.



Early Action Compact (EAC) Areas

The effective date of nonattainment designations will be deferred for certain areas of the country that do not meet the 8-hour ozone standard but had been meeting the 1-hour standard. These communities, known as *Early Action Compact areas*, have signed innovative agreements with EPA to reduce ground-level ozone pollution sooner than the Clean Air Act requires.

As long as Early Action Compact areas meet agreed upon milestones, the impact of nonattainment designations for the 8-hour ozone standard will be deferred. Washington County Maryland submitted an early action compact agreement in late 2002 and is taking part in this innovative program.

Effects of Mercury Emissions and Benefits of the Proposed Regulations

Mercury Basics

Mercury is a persistent, bioaccumulative toxic metal. Although mercury occurs naturally in the environment, human activities related to industrialization and modernization over the past 100 years have substantially increased the amount of mercury released to the environment, particularly via atmospheric emissions. Once released to air, it can be transported long distances and undergo several chemical transformations. While concentrations of mercury in the air are usually low, mercury emissions eventually reach our waterways where the toxic metal is transformed into methylmercury. This particularly toxic form of mercury readily bioaccumulates in fish tissue. Due to elevated levels of mercury contamination in freshwater fish, Maryland issues recommendations to limit fish consumption for a significant number of fresh water reservoirs and rivers.

Studies of fish-eating populations outside the U.S. have documented adverse effects of mercury on cognitive thinking, memory, attention, language, and fine motor skills. More recently, studies in adults have suggested that mercury may contribute to heart disease and thus may reduce the health benefits of eating certain fish species that are known to contain higher concentrations of mercury. Within the medical community, it is widely accepted that the fetus and young children are most sensitive to the toxic effects of mercury due to their rapidly developing nervous systems.

According to the National Health and Nutrition Examination Survey, 6% of U.S. women of child-bearing age have blood mercury levels at or above levels that may lead to increased risk of adverse mercury effects. Other studies suggest the percentage is higher. As exposures increase, there is progressively greater concern that adverse effects may occur. As a result, Maryland issues fish consumption advisories and recommendations for recreational and commercial fish consumption that are consistent with EPA and FDA guidance. Maryland residents are advised to eat fish in moderation and to avoid eating fish expected to have high levels of mercury. Given the value of fish in our diets, the toxic nature of mercury, and now widespread advisories in the U.S., it is appropriate to seek lower emissions of mercury to protect public health.

Local Mercury Reductions and Local Benefits

Studies in different parts of the United States demonstrate that local controls of mercury emissions lead to reduced levels of contamination found in fish tissue. An Everglades mercury study, for example, examined mercury fish tissue concentrations before and after pollution controls were installed at municipal and medical waste combustors in South Florida. According to this study, between 1991 and 2000, the total estimated local mercury emissions dropped nearly 93%, and mercury deposition declined by about 60%. Concurrently, from the mid-1990s to the year 2002, mercury concentrations in the

Everglades fish tissue declined by around 75% (Florida Department of Environmental Protection, 2003). Similar, but perhaps more rapid improvements were observed in a Massachusetts study (Hutcheson, M.S. *et al*., 2005). Over a 3-4 year period, an 85% decrease in local incinerator mercury emissions was followed by an average 30-38% reduction in fish tissue concentrations.

Maryland's Fish Consumption Recommendations Based on Mercury

When mercury contamination levels in fish tissue are elevated to levels believed to increase the risk of chronic health effects in humans, the State has the responsibility to issue fish consumption recommendations. Maryland's fish consumption recommendations are designed to protect the health of general, as well as sensitive, populations (i.e., young children; women who are or may become pregnant). Maryland issues such recommendations for recreationally caught fish, while the U.S. Food and Drug Administration issues recommendations for commercially marketed fish.

Freshwater Fish Consumption Recommendations in Maryland (Based on Mercury) [1]

Recommended Maximum Meals per Month for Maryland Waters

Recommendation Based on the Following Meal Size:
8 oz – General Population; 6 oz – Women; 3 oz – Children

Species	Waterbody	Recommended Meals/Month			Contaminants
		General Population	Women*	Children**	
Small and Largemouth Bass	Lake Lariat, Big Piney Reservoir, and Savage Reservoir; Potomac River at Spring Gap	1	1	AVOID	Methylmercury - risk driver
	Statewide: all publicly accessible lakes and impoundments	4	4	2	
	Statewide: all rivers and streams	No Advisory	8	8	
	Small and Largemouth Bass advisory for lakes and impoundments also apply to Pickerel, Northern Pike, and Walleye				
Yellow Perch	Big Piney Reservoir & Deep Creek Lake	4	4	4	Methylmercury - risk driver

[1] Consumption recommendations are based on the following body weights: adult (general population) 78.6 kg, women of child-bearing age 64 kg, and child (0-6 years) 14.5 kg. Meal size assumptions: general population - 8 ounces, women of child-bearing age - 6 ounces, children - 3 ounces. The reference dose (RfD) for methylmercury is $1x10^{4}$ mg/kg-d.

Bluegill	Statewide: all publicly accessible lakes and impoundments	8	8	8	Methylmercury - risk driver
	Statewide: all streams and rivers; Lake Habeeb	No Advisory	No Advisory	No Advisory	Methylmercury - risk driver
Walleye	Savage River Res. Jennings Randolph Res. Youghiegheny R. Lake	0.5 4 2	AVOID 3 2	AVOID 2 1	Methylmercury - risk driver
*** Women** = women of childbearing age (women who are pregnant or may become pregnant, or are nursing) **** Children** = all young children up to age 6					

The Maryland Department of the Environment (MDE) monitors and evaluates contamination levels in fish and shellfish throughout the state. Based on the contaminant levels measured in the edible portion of the fish and shellfish MDE issues guidelines for recreationally caught fish species. In 2004 MDE determined that Bay-wide, striped bass mercury concentrations were sufficiently elevated to recommend modest reductions in allowable consumption, particularly for children, if more restrictive guidelines were not already in place due to polychlorinated biphenyls (PCBs).

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Visibility Basics/ Benefits

One of the most basic forms of air pollution is haze, which degrades visibility in many American cities and scenic areas. Haze is caused when sunlight encounters tiny pollution particles in the air, which reduce the clarity and color of what we see, and particularly during humid conditions. Since 1988 the federal government has been monitoring visibility in national parks and wilderness areas. (http://www.epa.gov/visibility/)

Regional Haze Fact Sheet and Related Information:

http://www.manevu.org/interest.asp?fview=Communications%20Outreach

http://www.epa.gov/ttn/oarpg/t1/fr_notices/implemnt.pdf

http://www.epa.gov/oar/visibility/pdfs/facts.pdf

Visibility Benefits from the Clean Air Interstate Rule (CAIR)

Changes in the level of ambient particulate matter caused by the reduction in emissions from CAIR will change the level of visibility in much of the Eastern United States. Visibility directly affects people's enjoyment of a variety of daily activities. Individuals value visibility both in the places they live and work, in the places they travel to for recreational purposes, and at sites of unique public value, such as the Great Smokey Mountains National Park. For the purposes of the EPA Regulatory Impact Analysis[2], recreational visibility improvements are defined as those that occur specifically in federal Class I areas. However, it is a requirement under the Regional Haze Rule that all states that contribute to visibility degradation in Class I areas also reduce visibility-limiting emissions. A key distinction between recreational and residential benefits is that only those people living in residential areas are assumed to receive benefits from residential visibility, while all households in the United States are assumed to derive some benefit from improvements in Class I areas.

Visibility Benefits from the Proposed Regulations

The proposed regulations will give Maryland significant benefits in visibility improvements. Based on extrapolation of EPA CAIR regulatory impact data, it is estimated that Maryland may receive over $34 million worth of visibility improvements in terms of improved air quality and better recreational experiences. The earlier reductions proposed under these regulations should offer at least the amount of monetary benefits estimated for CAIR. Although Maryland does not have any Class I areas, there

[2] Regulatory Impact Analysis for the Final Clean Air Interstate Rule U.S. EPA, Office of Air and Radiation, Air Quality Strategies and Standards Division, Emission, Monitoring, and Analysis Division and Clean Air Markets Division, March 2005 (EPA-452/R-05-002)

are several in nearby states that will benefit, as will Maryland, with improved air quality and visibility. In addition, Maryland residents who visit these Class I areas will benefit in terms of having a clearer view of these beautiful wilderness areas. The table below lists the closest Class I wilderness areas and National Parks to Maryland.

Class I Areas Closest to Maryland

Class I Area	**State**	**Federal Land Manager**
Brigantine Wilderness Area	New Jersey	Fish and Wildlife Service
Shenandoah National Park	Virginia	National Park Service
Dolly Sods Wilderness	West Virginia	US Forest Service

Relationship of these Proposed Regulations to the Clean Air Interstate Rule (CAIR)

What is the federal Clean Air Interstate Rule (CAIR) ?

- On March 10, 2005, EPA issued the CAIR with the goal of attaining the PM2.5 standard. CAIR permanently caps power plant emissions of sulfur dioxide (SO2) and nitrogen oxides (NOx) in the eastern United States. CAIR achieves large reductions of SO2 and/or NOx emissions across 28 eastern states and the District of Columbia. When fully implemented in 2015, CAIR is expected to reduce SO2 emissions in these states by over 70 percent and NOx emissions by over 60 percent of 2003 levels.

- The CAIR establishes a “cap-and-trade” system for SO2 and NOx . Under the “cap-and-trade” approach in CAIR, EPA will allocate emission "allowances" for SO2 and NOx to each state. The states will be entitled to distribute those allowances to affected sources. Those sources then have the power to trade the allowances as they see fit. As a result, sources are able to choose from many compliance alternatives, including the purchase of excess allowances instead of installing direct emission controls.

How Do the Proposed Regulations Relate to CAIR ?

- These proposed regulations complement the federal CAIR program by ensuring that the local reductions necessary for Maryland to meet the ozone and fine particulate standards actually occur under the federal “cap-and-trade” framework. In other words, the regulations guarantee appropriate local reductions will occur where CAIR does not.

- These regulations will provide larger reductions in NOx, SO_2 and mercury more quickly than both CAIR and the Clean Air Mercury Rule (CAMR).

- These regulations modify some of the flexibility of CAIR but promote actual emission controls in Maryland. It is critical that these emission controls remain within Maryland in order for the state to reach attainment of the ozone and fine particulates national air quality standards.

The Relationship of the Proposed Regulations to the State Implementation Plan

How Will the Proposed Regulations Help Maryland Meet The New Health-Based Ozone And Fine Particulate Standards?

- These proposed regulations are the key to bringing Maryland into compliance with the new standards.

- Without the reductions from these regulations, the State will remain in nonattainment for both ozone and fine particulate matter and the health of Maryland's citizens will continue to be at risk.

- Significant reductions in air pollution transport from upwind sources, like power plants and cars, will also be needed to bring Maryland into compliance.

State Implementation Plan Development and Regulatory Efforts

A State Implementation Plan (SIP) is an enforceable plan developed at the state level that explains how the state will comply with air quality standards according to the federal Clean Air Act (CAA). A SIP must be submitted by the state government of any state that has areas designated as nonattainment for the federal air quality standards. SIPs include a collection of state and local regulations and plans to achieve healthy air quality under the CAA.

Since the early 1970's, the Maryland Department of the Environment (MDE) has been developing and implementing control programs to reduce emissions with the purpose of attaining all of the National Ambient Air Quality Standards (NAAQS). These control efforts have required reductions from sources in all sectors of the emissions inventory and ranged from traditional command and control regulations to voluntary programs focusing on emission reductions during significant ozone events. From a regulatory perspective, few emission sources have not been subject to some form of regulatory control at the state or federal level. For example, over 90% of the sources that were responsible for releasing VOC and NOx emissions in 1990 have been regulated.

The proposed regulations are MDE's most recent regulatory effort aimed at controlling point source emissions. Point sources refer to sources with a definitive emission stack that produce emissions above 25 tons per year of a particular pollutant. This regulation aims at controlling NOx, SO2, and Mercury (via co-benefits from NOx and SO2 controls).

Historically, Maryland only regulated NOx and VOC under the relevant federal ozone standards. This regulation focuses on NOx and SO2 as Maryland must also now comply

with a federal fine particle standard. For this reason, these regulations are directly connected to two NAAQS and will be included in the relevant SIPs for these two NAAQS. NOx is a precursor to both ozone and fine particulate matter and SO2 is a precursor to fine particle pollution.

Additional Measures for Attainment

Maryland is currently involved in the process of reviewing and analyzing potential control measures for inclusion in the ozone and fine particle SIP process. In addition to reviewing reasonable local measures, Maryland is working closely with regional organizations such as the Ozone Transport Commission (OTC). MDE is looking at possible regional regulations that will help all of the states governed under the OTC. These additional regulations will apply to all source sectors and play a significant role in SIP development.

Economic Analysis

Expected Costs to the Regulated Entity from these Regulations

The Clean Air Interstate Rule (CAIR) implements the federal cap-and-trade program for NO_x and SO_2 reductions on the same initial timetable as the reductions required by these regulations, that is, 2009 for NO_x reductions and 2010 for SO_2 reductions. In its analysis accompanying promulgation of CAIR, EPA projected that to comply with CAIR most of the electric generating units subject to these regulations in Maryland, would elect to install SCR and FGD control technology, rather than acquire and surrender allowances.

Control Year	Power Plant Name	Did EPA estimate SCR under the CAIR scenario?	Did EPA estimate FGD under the CAIR scenario?
2010	BRANDON SHORES 1	Existing	Yes
2010	BRANDON SHORES 2	Existing	Yes
2010	C P CRANE 1	Yes	No
2010	C P CRANE 2	Yes	No
2010	CHALK POINT 1	Yes	Yes
2010	CHALK POINT 2	Existing	Yes
2010	DICKERSON 1	Yes	Yes
2010	DICKERSON 2	Yes	Yes
2010	DICKERSON 3	Yes	Yes
2010	HERBERT A WAGNER 2	No	No
2010	HERBERT A WAGNER 3	Existing	Yes
2010	MORGANTOWN 1	Yes	Yes
2010	MORGANTOWN 2	Yes	Yes

Source: EPA CAIR Files (CAIR_CAVR_CAMR_Parsed_2010_Rate)

In response to CAIR, Constellation Energy Group, Inc.(CEG) announced its intention to install FGD control technology at Brandon Shores. CEG has now submitted applications for Certificates of Public Convenience and Necessity (CPCN) for installing FGD control technology on its two fossil-fired units at Brandon Shores by 2010. Mirant Mid-Atlantic, LLC announced its intention to add SCR controls at Morgantown to reduce NOx emissions pursuant to other requirements.

Subsequent to passage of the Healthy Air Act, CEG has also submitted applications for CPCNs to install equipment to substantially decrease NOx emissions from Unit 2 at Wagner and Units 1 and 2 at CP Crane. Mirant has submitted applications for CPCNs to install FGD on Units 1 and 2 at Chalk Point, to install SCR on Chalk Point Unit 1 and to install FGD at the Dickerson Power Plant.

Summary of Specific Cost Information

- Equipment to reduce SO_2, NO_x, and mercury emissions, primarily through the installation of SCR and FGD controls at most of the 15 affected units, has been estimated to cost between $1,800,000,000 - $2,100,000,000.

- Operating costs for that equipment will be $150,000,000 - $200,000,000 annually.

- Installing on-site controls will either eliminate or greatly reduce the need for affected units to purchase allowances for NO_x and SO_2, generating potential annual savings for all affected sources in the range of $150,000,000 to $400,000,000.

Assumptions and Calculations

It is difficult to determine the precise costs to regulated entities associated with implementation of these regulations because of a number of site-specific requirements and variables associated with the cost of installation and operation of pollution control equipment necessary to comply with these regulations at specific Maryland plants. Additionally, the regulations do not dictate compliance strategies.

The Department has previously examined a number of cost analyses in developing cost range estimates for these proposed regulations. EPA's economic impact analysis for CAIR estimates that capital costs of controlling these 13 units will cost approximately $1,300,000,000.

Using other cost analyses available, the Department conservatively estimates total capital costs for control of SO_2 and NO_x by 2010 could range from about $1,800,000,000 to $2,100,000,000 with variation dependent upon many factors, including assumptions regarding equipment cost factors, firms' compliance strategies, fuels used or available during the compliance period, and future demand growth and utilization of units. The estimated capital costs cited here have excluded in-place or legally required NO_x control units (from prior NOx control programs). New information is becoming available as the affected companies move forward to implement strategies to comply with the Healthy Air Act. This information shows the costs to be more in line with the higher end of the estimates.

Factors Influencing Compliance Cost Estimates

The variability associated with estimating compliance costs for a rule of this scope includes the following factors:

- Flexibility provided under an entity-wide cap, which provides owners of affected sources with the option of installing controls, switching fuels, or decreasing utilization of specific units;
- Variability associated with using general factors to estimate the cost of applying a particular control technology to a specific generating unit;
- Market-related variability of factors such as demand growth, allowance prices, fuel prices, availability and composition (e.g., sulfur, mercury, chlorine content), other generating capacity available to the firm, as well as labor and material costs during the implementation of the rule;
- Other information such as compliance strategy and plant utilization available to the affected entity that would influence its decision to use a particular control option.

Although flexibility provisions in a rule can reduce compliance costs, they also increase the uncertainty associated with estimating the potential cost of installing pollution control technology. *The system-wide cap* option for NOx and SO_2, for example, allows a firm to meet its regulatory emissions limit by applying a more stringent level of control to one affected unit in order to offset emissions at a lesser-controlled one. A company's compliance response might include add-on control devices, fuel-switching or reduced utilization. The particular suite of controls for a given unit selected by the owner would be driven by cost.

Estimation of Control Costs

In its very general discussion of control technologies, the U.S. EPA notes that the cost of post-combustion NOx control technology (selective catalytic reduction) ranges from $100 to $250 per kilowatt[3], while capital costs of sulfur control (flue gas desulfurization) range from $100 to $250 per kilowatt for units below 400 megawatts, and from $250 to $1500 for larger units[4]. To obtain a more refined estimate, this analysis used capacity-based factors developed by the U.S. EPA[5] for NOx control equipment and by Cinergy[6] for SO_2 control. The figures cited in this discussion are generally consistent with estimates for similar scenarios done by the U.S. EPA and the Maryland Public Service Commission.

[3] U.S. EPA, "Air Pollution Control Technology Fact Sheet," EPA-452/F-03-034 (values in 2001$)
[4] U.S. EPA, "Air Pollution Control Technology Fact Sheet," EPA-452/F-03-032 (values in 1999$)
[5] U.S., EPA, "Documentation Summary for EPA Base Case 2004 (V.2.1.9) Using the Integrated Planning Model," October 2004.
[6] Marchietti, J., Cichanowicz, J.E., and Hein, M., "Compliance Implications of the OTC CAIR-Plus Proposal in Maryland and Pennsylvania," January 2006.

Capital costs for NOx post-combustion controls (selective catalytic reduction) have been estimated at about $300 million for those affected units currently without controls. (About half of this figure reflects estimates of controls that have been at least in the planning phase at two plants.) Operating costs for SCR using the EPA factors were about $25 million. The capital cost estimate for limestone forced oxidized flue gas desulfurization, selected as a surrogate for various SO_2 controls, ranged from about $1.3 billion to about $1.7 billion. This estimate can reflect potential compliance options ranging from scrubbing at large (over 300 MW) units while switching to lower sulfur coal at others, to installing some form of sulfur control at all but the smallest unit. The actual level of and type controls deemed feasible at a unit would depend upon the many factors noted above, including the cost and composition of fuels. Annual operating and maintenance costs for SO_2 control measures of about $150 million were refined with factors used by the Maryland Public Service Commission[7] as well as the Cinergy analysis. The operation of both SCR and scrubber technology at a single unit can also achieve the co-benefit of significantly reducing mercury emissions. Where both devices are not used, an affected source may find it necessary to use low-mercury fuels and/or control devices such as activated carbon injection technology. Such capital costs[8] may range from approximately $5 million to $25 million, depending on the number and types of units requiring controls, with annual operating costs ranging from about $10 million to $30 million. This analysis does not preclude the source decision to install additional controls to maximize mercury capture. The owner of one large plant, for example, has stated its intention to install a fabric filter at a cost of about $100 million.

The SO_2 factors used in this discussion are regarded as conservative relative to other analyses. One affected owner has stated that scrubber installation at its largest plant would cost about $450 million, about 30% higher than projected by the factors used in this and other analyses. As noted above, scrubbers as well as fabric filters for mercury control at this facility had been anticipated prior to the development of these regulations according to the company statements. Excluding this plant from the analysis would reduce the estimated cost of the rule by about one-third.

Federal Regulations and Allowance Benefits

As noted in the table on page 42, the U.S. EPA has projected that installation of control equipment to meet the federal CAIR would be cost-effective for most of the affected units. To the extent that the EPA's projections for controls are realized, the incremental impact of the proposed regulations beyond federal requirements would be correspondingly lower than the total equipment costs described in this discussion.

Another way to view the impact of the proposed Maryland regulations is to consider the costs of compliance with the federal SO_2 requirements that affected sources could avoid

[7] Maryland Public Service Commission, "Memorandum re Cost and Profitability Analysis of SB 154 and HB 189 Emission Reductions Provisions," February 10, 2006.
[8] U.S. EPA, "Documentation Supplement for EPA Modeling Applications (V.2.1.6) Using the Integrated Planning Model," July 2003.

by meeting the State caps. Sources subject to CAIR must acquire enough SO_2 allowances to cover their emissions at a 2 to 1 ratio beginning in 2010. Assuming that sources subject to the proposed regulations continue to emit at their current emission rates, it is estimated that by 2010 these units would emit almost 300,000 tons of SO_2, thereby exceeding the amount of emissions allowed (about 60,000 tons) by their 2010 allocations (provided under the Title IV of the Clean Air Act) by almost 240,000 tons. To account for these excess emissions strictly through 2010 allowance purchases would result in expenditures from approximately $150 million to $400 million (at prices ranging from $300 to $800 per allowance). Consequently, by capping emissions to fewer than 50,000 tons, as required under the proposed regulations, these Maryland plants would avoid the significant cost of such allowances purchases during the first phase of CAIR.

Economic Analysis References

http://www.epa.gov/cair/pdfs/finaltech08.pdf…"Regulatory Impact Analysis for Final Clean Air Interstate Rule." The Cost, Economic, and Energy Impact analysis section is found in Chapter 7 of this document.

http://www.epa.gov/cair/pdfs/finaltech03.pdf …"Information Collection Request Supporting Statement for the Final CAIR." Section 6: *Estimating the Burden and Cost of the Collection* discusses the issue of respondent burden.

http://www.epa.gov/cair/pdfs/finaltech07.pdf …"Modeling of Control Costs, Emissions, and Control Retrofits for Cost Effectiveness and Feasibility Analyses." This document contains information regarding combustion control costs used in estimating average control costs.

http://www.epa.gov/cair/tsd0175.pdf …"Benefits of the Proposed Interstate Air Quality Rule: January 2004." EPA document that discusses the benefits and costs anticipated with the implementation of CAIR.

http://www.epa.gov/cair/tm0009.pdf …"Economic and Energy Impact of the Proposed Interstate Air Quality Rule: January 2004." EPA document that discusses the economic and energy impacts anticipated with the implementation of CAIR.

http://www.epa.gov/cair/tm0012.pdf …"An Analysis of the Marginal Cost of SO2 and NOx Reductions: January 2004." EPA document detailing marginal costs of SO2 and NOx reductions.

http://www.epa.gov/cair/tm0012.pdf …"Monitoring and Reporting Costs Under the Proposed Interstate Air Quality Rule: January 2004." EPA document detailing reporting costs associated with CAIR.

February 10th 2006 Memorandum from the Maryland Public Service Commission Analysis Titled: Cost and Profitability Analysis of SB 154 and HB 189 Emission Reduction Provisions

Economic Benefits and Costs of the IAQR/Mercury, Carper and OTC Proposals – With Focus on Maryland Powerpoint Dated May 28th, 2004, prepared by Resources for the Future for the Maryland PPRP.

DRAFT – Review of Cost Implications of the Maryland Clean Power Rule – Dated February 15th, 2006, prepared by the Maryland PPRP

Trade/ Timing/ Boilermaker Analysis

MDE utilized the following report "Technical Support Document for the Final Clean Air Interstate Rule: Boilermaker Labor Analysis and Installation Timing, EPA Docket Number OAR-2003-0053, March 2005" for the purposes of assessing if Maryland's COMAR 26.11.27 requirements can be met by the affected parties in terms of labor, materials, and timing.

http://www.epa.gov/cair/pdfs/finaltech05.pdf

In summary, the EPA analysis for the CAIR rule states that there are no timing, boilermaker, or trade concerns evident under the CAIR rule. In reviewing all of the EPA's analysis scenarios there were only two cases where labor became an issue and that is when all of the CAIR controls were required for all of the CAIR states (28 states) in one short-term specific timeframe. This is not the case under the Maryland regulation where only Maryland controls are required by 2010. The CAIR rule estimated through economic modeling (IPM Modeling) that almost every power plant in Maryland would install SCR and FGD (Scrubbers) to meet the CAIR requirements. Maryland's proposed regulations are mandating a very similar control technology requirement, therefore the EPA trade analysis holds as feasible.

Control Year	Power Plant Name	Did EPA estimate SCR under the CAIR scenario?	Did EPA estimate FGD under the CAIR scenario?	Does EPA's Boilermaker Analysis identify an problem with this scenario	Does MDE potentially predict SCR under HAA?	Does MDE potentially predict FGD under HAA?
2010	BRANDON SHORES 1	Existing	Yes	No	Yes	Yes
2010	BRANDON SHORES 2	Existing	Yes	No	Yes	Yes
2010	C P CRANE 1	Yes	No	No	Yes	No
2010	C P CRANE 2	Yes	No	No	Yes	No
2010	CHALK POINT 1	Yes	Yes	No	Yes	Yes
2010	CHALK POINT 2	Existing	Yes	No	Yes	Yes
2010	DICKERSON 1	Yes	Yes	No	Yes	Yes
2010	DICKERSON 2	Yes	Yes	No	Yes	Yes
2010	DICKERSON 3	Yes	Yes	No	Yes	Yes
2010	HERBERT A WAGNER 2	No	No	No	No	No
2010	HERBERT A WAGNER 3	Existing	Yes	No	Yes	Yes
2010	MORGANTOWN 1	Yes	Yes	No	Yes	Yes
2010	MORGANTOWN 2	Yes	Yes	No	Yes	Yes

Appendix A

Air Quality Modeling

Appendix B

EPA's CAIR Boilermaker Analysis

Appendix C

CAIR Related References

The web links below are hereby referenced in this Technical Support Document:

http://www.epa.gov/cair/pdfs/finaltech01.pdf - Clean Air Interstate Rule - Emissions Inventory Technical Support Document

http://www.epa.gov/cair/pdfs/finaltech02.pdf - Technical Support Document for the Final Clean Air Interstate Rule - Air Quality Modeling

http://www.epa.gov/cair/pdfs/finaltech04.pdf - Demonstration that CAIR Satisfies the "Better-than-BART" Test As proposed in the Guidelines for Making BART Determinations

http://www.epa.gov/cair/pdfs/finaltech07.pdf - Modeling of Control Costs, Emissions, and Control Retrofits for Cost Effectiveness and Feasibility Analyses

http://www.epa.gov/cair/pdfs/finaltech08.pdf - Regulatory Impact Analysis for the Final CAIR

6 NYCRR Part 246, Mercury Reduction Program for Coal-Fired Electric Utility Steam Generating Units

6 NYCRR Part 200.9, Referenced Material

Revised Regulatory Impact Statement

1. STATUTORY AUTHORITY

The statutory authority for this promulgation is the Environmental Conservation Law (ECL) Sections 1-0101, 3-0301, 19-0103, 19-0105, 19-0301, 19-0303, 19-0305, and 19-0311.

ECL section 1-0101. This section declares it to be the policy of New York State to conserve, improve and protect its natural resources and environment and control air pollution in order to enhance the health, safety and welfare of the people of New York State and their overall economic and social well being. Section 1-0101 further expresses, among other things, that it is the policy of New York State to coordinate the State's environmental plans, functions, powers and programs with those of the federal government and other regions and manage air resources to the end that the State may fulfill its responsibility as trustee of the environment for present and future generations. This section also provides that it is the policy of New York State to foster, promote, create and maintain conditions by which man and nature can thrive in harmony by, among other things, preserving the unique qualities of special resources such as the Adirondack and Catskill forest preserves and providing that care is taken for the air resources that are shared with other states in the manner of a good neighbor.

ECL section 3-0301. This section empowers the Department to coordinate and develop programs to carry out the environmental policy of New York State set forth in section 1-0101. Section 3-0301 specifically empowers the Department to: provide for the prevention and abatement of air pollution; cooperate with officials and representatives of the federal government, other States and interstate agencies regarding problems affecting the

environment of New York State; encourage and undertake scientific investigation and research on the ecological process, pollution prevention and abatement, and other areas essential to understanding and achievement of the environmental policy set forth in section 1-0101; and monitor the environment to afford more effective and efficient control practices.

ECL section 19-0103. This section declares that it is the policy of New York State to maintain a reasonable degree of purity of air resources, which shall be consistent with the public health and welfare and the public enjoyment thereof, the industrial development of the State, and to that end to require the use of all available practical and reasonable methods to prevent and control air pollution in the State. "It is declared to be the policy of the State of New York to maintain a reasonable degree of purity of the air resources of the State . . . and to that end to require the use of all available practical and reasonable methods to prevent and control air pollution."

ECL section 19-0105. This section sets out the purpose of Article 19, "to safeguard the air resources of the State from pollution . . ."

ECL section 19-0301. This section declares that the Department has the power to promulgate regulations for preventing, controlling or prohibiting air pollution and shall include in such regulations provisions prescribing the degree of air pollution that may be emitted to the air by any source in any area of the State. Specifically Sections 19-0301(1)(a) and (b) state that:

1. Consistent with the policy of the state as it is declared in section 19-0103, the department shall have power to:

a. Formulate, adopt and promulgate, amend and repeal codes and rules and regulations for preventing, controlling or prohibiting air pollution in such areas of the state as shall or may be affected by air pollution . . .

b. Include in any such codes and rules and regulations provisions establishing areas of the state and prescribing for such areas (1) the degree of air pollution or air contamination that may be permitted therein, and (2) the extent to which air contaminants may be emitted to the air by any air contamination source.

2. Section 19-0301(2)(a) further provides that it shall be the duty and responsibility of the Department to prepare and develop a general comprehensive plan for the control or abatement of existing air pollution and for the control or prevention of any new air pollution recognizing various requirements for different areas of the state.

ECL section 19-0303. This section provides that the terms of any air pollution control regulation promulgated by the Department may differentiate between particular types and conditions of air pollution and air contamination sources. Section 19-0303 also provides that the Department, in adopting any regulation which contains a requirement that is more stringent than the CAA or its implementing regulations, must include in the Regulatory Impact Statement, among other things, an evaluation of the cost-effectiveness of the proposed regulation in comparison to the cost-effectiveness of reasonably available alternatives and a review of the reasonable available alternative measures along with an explanation of the reasons for rejecting such alternatives. The analysis of the cost effectiveness of Part 246 is set forth in Section 4 – Costs. The analysis of alternatives and their cost-effectiveness is set forth in Section 8 - Alternatives.

ECL section 19-0305. This section authorizes the Department to enforce the codes, rules and regulations established in accordance with Article 19. Section 19-0905 also empowers the Department to conduct or cause to be conducted studies and research with respect to air pollution control, abatement or prevention.

2. LEGISLATIVE OBJECTIVES

Article 19 of the ECL was enacted for the purpose of safeguarding the air resources of New York from pollution, to ensure the protection of the public health and welfare, the natural resources of the State, physical property, and industrial development. It is the stated policy of the State to require the use of all available practical and reasonable methods to prevent and control air pollution in New York. To facilitate this policy objective, the Legislature bestowed specific powers and duties on the Department, including the power to adopt and promulgate regulations for preventing, controlling and prohibiting air pollution. This authority specifically includes promulgating standards for the coordination of State and Federal pollution reduction programs.

On March 15, 2005 EPA announced the final Clean Air Mercury Rule (CAMR). CAMR limits mercury emissions from new and existing coal-fired electric steam generating units, and creates a market-based cap-and-trade program that will permanently cap utility mercury emissions nationwide in two phases: the first phase cap is 38 tons beginning in 2010; the second phase cap set at 15 tons beginning in 2018. EPA believes these mandatory declining caps will ensure that mercury reduction requirements are achieved and sustained. On May 18, 2005, EPA promulgated Emission Guidelines and Compliance Times for Coal-Fired Electric Steam Generating Units. (70 Fed-Reg 28606-28700) Pursuant to 40 CFR 60.4141, all States are required to submit to the Administrator their designated mercury allowances for each coal-fired electric steam generating unit by November 15, 2006. Regardless if a State is adopting the federal program or creating its own State control plan, all States must require applicable sources to limit mercury emissions at or below levels which meet the

allocations designated in 40 CFR 60.4140. For New York State, these distributions equal 786 pounds per year of allowable mercury emissions in 2010-2017 and 310 pounds per year in 2018 and beyond.

The Department is proposing to adopt a mercury regulation which will, in two phases, achieve a 90 percent reduction from the coal-fired electricity generating units covered by the CAMR. The State regulation being proposed will set limits for each applicable stationary coal-fired boiler that has ever served a generator with a nameplate capacity of greater than 25 MWe (Megawatt electrical, or megawatt produced as electricity) producing electricity for sale or a stationary coal-fired combustion turbine that has ever served a generator with a nameplate capacity of greater than 25 MWe and supplying in any calendar year more than one-third of the unit=s potential electric output capacity or 219,000 MWh, whichever is greater, to any utility power distribution system for sale.

Phase I of the proposed State regulation, 6 NYCRR Part 246, will impose facility-wide mercury emission limitations, based upon the state mercury budget distributed to New York State by EPA. Applicable facilities will not be permitted to generate and trade mercury reductions with other facilities or other States as allowed under the federal CAMR program. The Department will limit applicable facilities to a specified amount of mercury emissions expressed in pounds per year in total, not to exceed New York's mercury state budget. The facility-wide emission limitations will be in effect from 2010 to 2014. The Department is withholding 40 pounds of emissions from the overall State CAMR mercury budget of 786 pounds for new sources. Individual new sources will also be required to meet an emission rate limit of 0.6 pounds of mercury per trillion Btu on a 30-day rolling average basis.

Starting in 2015, the State mercury regulation will establish a facility-wide emission limit. Each applicable facility will be required to meet an emission rate limit of 0.6 pounds per trillion Btu on a 30-day

rolling average basis. This is expected to result in annual emissions of mercury from applicable units of less than 200 pounds. Since the State rule will meet or exceed the minimum federal requirements to limit emissions of mercury from applicable units to 786 pounds in 2010 and 310 pounds in 2018, the Department will submit Part 246 to EPA for approval in accordance with 40 CFR 60.24 in lieu of New York State accepting the model rule requirements of the federal Clean Air Mercury Rule.

3. NEEDS AND BENEFITS

Mercury is a toxic metal that persists and cycles in the environment as a result of natural and human activities. When mercury is released into the air, it is transported and eventually deposited back onto the earth. The distance of this transport and eventual deposition depends on the chemical and physical form of the mercury emitted. In aquatic ecosystems, inorganic mercury is transformed into an extremely toxic organic form of mercury, methylmercury. Methylmercury bioaccumulates up the food chain as humans and animals consume mercury-contaminated organisms, particularly fish. Two conditions common in the Northeast, acidified water bodies and elevated ozone levels, are thought to promote the deposition of mercury into the environment.

Mercury emissions are a major threat to public health and natural resources in New York State. Due to the high levels of mercury in freshwater fish, the Department and the New York State Department of Health have issued specific warnings advising that pregnant women and children should not consume any servings of specific fish species that are caught in 93 lakes and more than 265 miles of rivers in the State. The New York State Department of Health publication, 'Chemicals in Game and Sportfish 2006-2007', identified fifty-two new areas with elevated mercury levels in fish since the 2003-2004 edition, bringing the number of lakes in New York State with specific fish advisories for mercury to 93. [1] The Department has an on-going study that

[1] Chemicals in Sportfish and Game, New York State Department of Health - 2006-2007 Health Advisories, URL http://www.health.state.ny.us/nysdoh/fish/docs/fish.pdf

will increase our knowledge about mercury in fish from New York State waters. Preliminary information about mercury levels in the Adirondack and Catskill Mountain regions suggest that larger, older individuals of pickerel, northern pike, small mouth and largemouth bass, walleye and yellow perch often have relatively high levels of mercury in their flesh, higher levels than similar fish from other regions in the state. Because of this, infants, children under 15 and women of child-bearing age are advised to avoid consuming fish from Adirondack and Catskill Mountain waters. In addition, the 2006-2007 Department of Health publication lists a new section entitled "Regional Advice" which advises that women and children consuming fish in the Catskills and Adirondack regions should eat no more than one meal per month of certain fish, and avoid consuming northern pike, pickerel, walleye, large and small mouth bass and large yellow perch altogether. The list of restricted water bodies and fish species continues to grow each year. Many of the lakes sampled are in remote rural and mountainous areas of the State that do not have any known mercury inputs other than atmospheric deposition.

The current deposition rate of mercury in all areas of New York State needs to be reduced to a much greater degree than would be achieved by the emissions caps established by EPA as part of the cap-and-trade program. EPA's Mercury Study Report to Congress concluded that the Great Lakes, the Ohio River Valley, the Northeastern United States and scattered areas in the south are predicted to have the highest annual deposition rates of mercury in the United States.[2] A recently completed study of mercury deposition in the Adirondack Mountain region of New York showed that sources located in the United States contribute 42 percent of the mercury deposition in this region.[3] Regional modeling work conducted by the Electric Power Research Institute

[2] U.S. Environmental Protection Agency. Mercury Study Report to Congress. Volume II: An Inventory of Anthropogenic Mercury Emissions in the United States. 1987. URL http://www.epa.gov/ttn/oarpg/t3/reports/volume1.pdf

[3] New York State Energy Research and Development Authority. Contributions of Global and Regional Sources of Mercury Deposition to New York State. 2002. URL http://www.nyserda.org/environment/NYSERDAreport02-09.pdf

concluded that 80 percent of the mercury deposition that occurs in the southern New York region and surrounding states comes from sources based in the United States.[4]

The Deposition modeling study conducted in the Florida Everglades[5] was designed to simulate changes in atmospheric deposition of mercury from local and distant sources and to determine how these changes will affect the Total Maximum Deposition Loads (TMDLs) and the concentration of mercury in top-of-the-food chain predatory fish. It was estimated that it takes an 80 percent reduction in mercury emissions from the maximum deposition rate to reduce the mercury concentration in predatory fish three-fold to meet the current Florida fish advisory action level of 0.5 ppm. The study also predicts an initial rapid decrease in mercury concentrations of predatory fish - 10 years for an approximately 50 percent decline, and a slower response of 30 years for approximately 90 percent decline. The Florida deposition model study showed that while fish mercury levels are directly related to the contribution of mercury to the water body, the reduction in fish mercury levels will only occur after many years once deposition is reduced. The Department expects that fish mercury levels will also decrease in Adirondack lakes in a similar timeframe but the Florida study showed that the conversion from deposited mercury to methyl mercury is dictated by the geology of the water body and ultimately the water chemistry. The western Adirondacks are considered a "hotspot" due to their unique geology and acidified lakes. A significant inverse relationship is found in Adirondack lakes between lower pH levels and increasing fish mercury levels and adult and juvenile loons.[6,7] Research such as the Florida study and documented reductions in western Massachusetts shows that New York needs to act earlier than 2018 to

[4] Levin, L. 2003. "Overview of Mercury Emissions and Their Fate in the Environment". Presentation at AWMA Annual Meeting San Diego, CA. June 25, 2003

[5] Integrating Atmospheric Mercury Deposition and Aquatic Cycling in the Florida Everglades: an approach for conducting a Total Maximum Daily Load analysis for an atmospherically derived pollutant, Florida DEP, Tetra Tech, Inc. and University of Michigan Air Quality Laboratory, October, 2003

[6] Environmental Monitoring, Evaluation and Protection in New York, Linking Science and Policy, NYSERDA Environment Program, October 2005

[7] Internal DEC work, Bureau of Habitat, Division of Fish and Wildlife, H. Simonim, J. Loukmas, paper to be published 2006

reduce mercury emissions and achieve greater than the 70 percent reduction predicted from CAMR if mercury levels in fish are to be eliminated or significantly reduced within the next ten to fifteen years as the Florida model indicates. The Department implemented the Acid Deposition Reduction Programs in 2003 to reduce emissions of Sulfur Dioxide and Nitrogen Oxides. The federal Clean Air Interstate Rule (CAIR) will add to these reductions in 2010 and 2015. Part 246 is designed to work in conjunction with these regulations and their timeframes to allow the regulated community an opportunity to plan effectively. The recovery of New York's lakes and rivers will be a slow process and the Department needs to act to reduce mercury emissions sooner than the timetable for reductions under CAMR to protect the health of New Yorkers and our wilderness and wildlife areas.

The term "hot-spot" has been used by the EPA and environmental organizations to describe a particular area vulnerable to sustained mercury deposition based upon different regulatory scenarios. One of the shortcomings of CAMR is that the federal cap-and-trade strategy will not mitigate the current "hot-spots" created by localized deposition from coal-fired electric utilities who buy may buy allowances rather than install pollution control equipment to reduce emissions. The Department believes,[8] that the Adirondacks or the Northeast region is a "hot-spot" due in part to persistent deposition of mercury from the coal-fired electric utility sector. Consequently, the Department has opposed the trading of mercury allowances. Recent research in Ohio and Massachusetts has addressed the issue of localized deposition at near-by receptors from coal-fired electric utilities and municipal waste combustors respectively. New York State has implemented regulations[9] that are stricter than the federal National Emission Standard for Hazardous Air Pollutants for Municipal Waste Combustors to minimize localized deposition impacts, and anticipates that reductions achieved from the proposed Part 246 will do the same for the coal-fired electric utilities located in New York State.

[8] Docket letter - OAR-2002-0056-5458, Comments on the Proposed Clean Air Mercury Rule, June 2004

[9] 6NYCRR Parts 219-2 and 219-7, Municipal and Private Solid Waste Incineration Facilities and Mercury Emission Limitation for Large Municipal Waste Combustors Constructed on or Before September 20, 1994

The electric utility industry, along with municipal solid waste combustors and the Portland cement manufacturing sector comprise the largest point source categories of mercury emissions in New York State. Since 1999, New York State has reduced emissions from the municipal solid waste combustor sector by approximately 90 percent. New York State is currently examining technology to reduce emissions in the Portland cement manufacturing sector following the EPA's promulgation of a National Emission Standard for Hazardous Air Pollutants (NESHAP) which did not control mercury from this source category.[10] With the proposed reductions targeted for 2015, the statewide reduction in mercury from 1999 levels will equate to 75 percent[11] statewide for all point sources comprised of fuel burning equipment, incineration and manufacturing.

With respect to solid waste initiatives that reduce mercury to the environment, the Department recently promulgated regulations that prohibit the use and possession of non-encapsulated mercury and set standards for the recycling of dental amalgam waste and pre-encapsulated elemental mercury wastes from dental offices. The regulations also require dentists to install mercury amalgam separators and collection equipment, which is designed to remove 99 percent of that mercury waste that would have ended up in the wastewater treatment plants, and ultimately in New York State=s waterways. Some of this wastewater mercury ends up as sludge and is subsequently burned in sewage sludge incinerators. Sewage Sludge Incineration is another source category the EPA decided not to regulate under the National Emission Standard for Hazardous Air Pollutants program. New York State conducted a successful pilot automotive switch collection and recycling program to prevent mercury-containing switches used on the hoods and trunks of cars from entering the waste stream. Over 5,000 switches containing over 10 pounds of mercury were collected during this project and New York State recognizes that this is a significant source of elemental mercury and has been addressing this issue with recyclers and auto manufacturers. On July 12, 2004, Governor Pataki signed into law Chapter 145 of the

[10] NESHAP for Portland Cement Manufacturing, Subpart LLL, 6/14/99

[11] NESCAUM inventory for 1998-2202 Mercury Study, A Framework for Action, February, 1998

Environmental Conservation Law, which bans the sale and distribution of mercury-added novelty products, the sale of mercury fever and body thermometers without a prescription, and the use or purchase of elemental mercury in schools.

In conclusion, the Department has determined that federal cap-and-trade program would prolong the existence of "hot spots" in the Catskill and Adirondack region until 2020 and beyond. Allowing the banking and sale of mercury allowances to be sold to New York applicable facilities or to facilities in regions where westward winds prevail would not reduce the unacceptable mercury concentrations in fish and wildlife in New York's lakes, streams and estuaries. Regional concentrations will be reduced sooner through implementation of a New York State rule which controls facility-wide mercury emissions five years earlier and to a greater extent than the federal rule.

4. COSTS:

a). Costs to Regulated Utilities

New York currently has thirteen coal-fired electric utility steam generating stations, two of which, AES Hickling and AES Jennison, have been on cold standby since October 2000. The thirteen stations have electric generation capacities per plant ranging from 50 MW to 800 MW. There are two cogeneration facilities, Trigen Energy-Syracuse and WPS Niagara Generating Facility, generating steam for both electric production and process use. At this time, only those units which meet the federal definition of electric utility steam generating unit, including the thirteen coal-fired steam generating stations and the two co-generation units, will be subject to Part 246.

Mercury control that has been achieved through the operation of existing oxides of nitrogen, sulfur dioxide, and particulate matter control equipment at the thirteen active facilities is expected to range from 25

percent to 90 percent. Based upon data collected during the Information Collection Request (ICR) conducted in 1999, EPA established emission reduction factors for the numerous types of coal-fired and coal derived fuel-fired electric utility steam generating units. Facilities employing effective sulfur dioxide and particle control achieved the greatest co-benefits in mercury reduction. These facilities included either wet scrubber or spray dryer adsorption systems in conjunction with baghouse fabric filters. These control systems exhibited the greatest mercury control when firing bituminous coal and to a lesser degree when firing sub-bituminous coal, 97 percent vs. 75 percent respectively. Facilities employing low sulfur coal for sulfur control and an electrostatic precipitator (ESP) for particle control exhibited mercury control ranging from 28 percent to 60 percent depending on if the ESP was being operated as a hot-side ESP or cold-side ESP. The US Department of Energy /National Energy Technology Laboratory (DOE/NETL) began carrying out a comprehensive mercury research and development program in the 1990s. To date, DOE/NETL's has tested various control options under a two phase program. The first phase started in 2001 and the second phase is finishing this year. Phase two focuses on longer term, large scale field testing on a broad range of coal rank and air pollution control devices. Activated carbon injection has shown the most promise as a near term mercury control technology.[12]

The Department believes the thirteen facilities will choose from two control devices in order to achieve compliance with the proposed regulatory cap and timelines. The two control devices the Department has identified are: (1) the addition of an activated carbon injection unit in conjunction with a cold-side electrostatic precipitator; and (2) the addition of a baghouse fabric filter and activated carbon injection unit. Facilities potentially not requiring additional add-on control devices in the State's 2010 regulatory timeframe would be those already equipped with spray dryers or wet scrubbers, which in series with effective particle control may demonstrate a near equivalent degree of control as a fabric filter baghouse in combination with an activated carbon injection system. The future addition of an oxidizing catalyst, precipitating agent or carbon additive

[12] Feeley, T.; Bricket, L.; O'Palko, B; Murphy, J.; Jones, A.; An Update on the US DOE's Phase II Mercury Control Technology Field Testing Program. Sept. 19-21, 2005 Air Quality V presentation

may be required by those sources operating wet scrubbers to promote further oxidation of elemental mercury and greater capture and control.

The future actual costs of regulating mercury emissions from the electric utility steam generating sector are directly related to any additional control device(s) required on a plant-by-plant basis, in addition to the volume and cost of reagent required. Reagents for mercury capture in most cases consist of a powdered activated carbon or carbon enhanced with a halogen such as bromine. The incremental cost of generation for New York coal-fired units implementing a standard or enhanced powdered activated carbon system will be in the range of 0.37 to 1.66 mills/kWh[13,14]. A mill is defined as one-tenth of a cent. This is approximately one percent to eight percent increase on the 20 to 30 mills/kWh ($0.02/kWh to $0.03/kWh) most coal-fired power plants currently incur to generate electricity. For comparison, in the day ahead market during a summer month a kWh is sold by a generator for approximately $0.08 upstate and $0.15 downstate[15]. Monitoring, record keeping and reporting are being incorporated into Part 246 from CAMR and regulated facilities will incur the same costs with the Department's program or the federal CAMR.

The Department in coordination with NYSERDA compared a reference or business-as-usual case (absent either CAIR or a mercury control program) to each of three policy cases: New York's proposed approach for implementing both CAIR and a mercury control program, CAIR only, and mercury only. CAIR and Mercury policies (implemented together, as proposed) could increase wholesale electricity prices by an average of 1.7 percent or $1.14 per MWh over the 2010 to 2020 timeframe. For a typical residential customer

[13] USDOE/NETL, *Preliminary Cost Estimate of Activated Carbon Injection for Controlling Mercury Emissions from a Un-Scrubbed 500 MW Coal-Fired Power Plant*, prepared by Science International Corporation, May 2003

[14] Sorbent Technologies Corporation, Sid Nelson Jr. – Recipient Project Director, *Advanced Utility Mercury-Sorbent Field-Testing Program: Semi-Annual Technical Progress Report*

[15] New York State Independent System Operator, July 26, 2005 – URL http://www.nyiso.com/public/market_data/zone_maps.jsp

(using 750 kWh per month), this translates into a monthly retail bill increase of $0.86. Model runs assuming CAIR only (i.e., without a mercury control program) and mercury only control program (i.e., without CAIR) indicate that virtually the entire incremental electricity price impact of implementing CAIR and a mercury rule together is due to CAIR. There is virtually no incremental electricity price impact due to mercury control in conjunction with the sulfur and NOx CAIR program.[16]

Given the variability in the type, operation and fuel mix of sources in the electric utility steam generating sector, EPA believes emissions must be monitored continuously through the use of continuous emissions monitoring systems (CEMS) or sorbent trap monitoring systems to ensure the needed accuracy and reliability. However, alternative monitoring methodologies may be appropriate for a limited number of small sources. Rigorous quality assurance and quality control requirements for mercury CEMS and sorbent trap monitoring systems are necessary to assure the emission reduction goals are met, and to assure high quality emission data are collected.

CAMR includes mercury monitoring requirements that are cost-effective and technically viable based on compliance-capable technologies. These technologies are subject to rigorous quality assurance standards based on those already established in Part 75. Industry continues to develop new and better mercury CEMS, with current technologies being demonstrated at various coal-fired power plant sites in the United States. It is apparent through the results from each subsequent field evaluation that the reliability and accuracy of mercury CEMS continues to improve.[17] There are several mercury monitors currently available that have an approximate cost of between $130,000 and $200,000 for the product and installation per stack.

[16] NYSDEC, NYSERDA, and ICF International, Modeling Results for CAIR and Mercury. May 18, 2006

[17] *Mercury Emissions Monitoring Program for Coal-Fired Boilers under the Clean Air Mercury Rule Status Report*, US EPA Clean Air Markets, February 2006

Most facilities in New York will need to install activated carbon injection systems to work in conjunction with existing cold-side ESPs, especially those facilities burning western sub-bituminous coals. Some facilities may need to install pulse jet fabric filter baghouse systems for particulate collection to achieve the higher rates of mercury capture proposed for 2015 than could be realized through operation of a cold-side ESP alone. For those facilities combusting sub-bituminous coals, high percentage sub-bituminous coal blends, or facilities with existing fabric filter baghouses, total capital requirements include the purchase and installation of dosing and storage equipment related to the powdered activated carbon injection (PACI) system. The PACI has a fixed cost of approximately $984,000 (2003 dollars). Annualized over 20 years at an interest rate of approximately 10 percent this translates to a cost of $117,460 per year[18]. The Huntley and Dunkirk Steam Stations in New York have begun converting to a western sub-bituminous coal. Through research projects partially funded by DOE, it has been demonstrated that mercury emissions from facilities burning sub-bituminous coals are more readily controlled using an enhanced PACI system, brominated or treated carbons than previously understood prior to the promulgation of CAMR[19].

Annual operating costs and reagent costs will drive the cost of mercury control for most facilities in New York. Studies show that, for a unit combusting sub-bituminous coal, an insufflation rate of three pounds of brominated powdered activated carbon (PAC) per million actual cubic feet of flue gas exiting the stack can achieve at least 90 percent reduction of mercury. The cost of enhanced PAC is approximately $0.68 to $0.85 per pound[20]. The cost of enhanced carbon applied to year 2004 flue gas air flow rates would equate to a range of $40,000 to $700,000 depending on size of the unit and the overall electric production rate of the facility.

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[18] USDOE/NETL, *Preliminary Cost Estimate of Activated Carbon Injection for Controlling Mercury Emissions from a Un-Scrubbed 500 MW Coal-Fired Power Plant*, prepared by Science International Corporation, May 2003

[19] Sorbent Technologies Corporation, Sid Nelson Jr. – Recipient Project Director, *Advanced Utility Mercury-Sorbent Field-Testing Program: Semi-Annual Technical Progress Report*

[20] *Sorbent Injection into a Slipstream Baghouse for Mercury Control: Screening and Parametric Results*, Jeffrey Thompson, et al. Discussion by Sid Nelson Jr., Sorbent Technologies Incorporated, Air Quality V - September 21, 2005

The cost of land filling the additional carbon material can vary greatly, but can be approximated as $17 per ton of fly ash based on a 2001 report from the American Coal Ash Association[21]. This translates to an additional $2,000 to $20,000 (in 2004 dollars) for disposal costs. Numerous studies have shown that mercury captured on activated carbon surfaces will not leach into liquid collection systems in landfills after disposal. Those facilities that are currently selling collected ash may have problems associated with carbon content of ash and may find it difficult to continue sale of the product. Average sales are approximately $18 per ton of fly ash with 50 percent of the ash sold going to Portland cement companies as a kiln additive. An alternative control scheme would be to install activated carbon injection with a polishing fabric filter baghouse after the primary particulate collection device, for example a cold-side ESP, so that fly ash composition and its sale would not be negatively affected for sale in commercial uses.

b.) Costs to the State

The costs to the Department for promulgating Part 246 will include additional Central Office staff and Regional Office staff to modify permits and create monitoring conditions in the permitting database to assure uniformity from Region to Region. Approximately 15 Title V facility permits will have to be modified to incorporate Part 246 requirements. Department staff will be responsible to review stack test protocols, field witness the required stack tests, review final reports and CEM relative accuracy tests. Implementation of the federal or state rule requires quarterly submittals of compliance documentation which will need to be reviewed, tracked and acted upon if necessary.

The modification of Title V permits requires trained environmental engineers with knowledge of utility combustion systems, sulfur dioxide and particle control devices and knowledge of CEM documentation and

[21] American Coal Ash Association, 2001 coal combustion product (CCP) production and use statistics

stack testing. At the current staffing levels, the addition of new staff will be needed to continue some of the routine permitting and compliance work currently being performed by more experienced staff.

These costs, however, would be incurred whether the Department adopted Part 246 or implemented the federal rule as written. Indeed, the federal cap and trade program would likely entail more significant administrative costs since the Department would have to approve and keep track of trading allowances. Under Part 246, facilities in New York will not be allowed to trade mercury allowances.

c.) Source of Information upon which the cost analysis is based.

The information used to determine the costs to the affected industries is based upon the Department of Energy's National Energy Technology Laboratory (DOE/NETL). DOE/NETL continues to conduct pilot studies involving slip stream tests and full scale tests involving many innovative technologies to determine mercury control[22] from applicable CAMR facilities.

5. LOCAL GOVERNMENT MANDATES

Local governments will not be directly impacted by Part 246 with the exception one municipality which owns and operates an electric generating facility. The future costs of regulating mercury emissions from the electric generating utility sector are directly related to the additional control devices required on a plant-by-plant basis. Jamestown Power's Samuel A. Carlson Generating Station, a municipally owned electric generating facility, operates four boilers in total, which are divided into two emission units; emission unit U-00003 contains boilers No.9 and No.12 (rated at 190 and 297 MMBtu/hr, respectively) exiting to a single stack, emission point 00003. U-00004 contains boilers No.10 and No.11 (each rated at 190 MMBtu/hr), exiting to a

[22] USDOE/NETL, *Preliminary Cost Estimate of Activated Carbon Injection for Controlling Mercury Emissions from a Un-Scrubbed 500 MW Coal-Fired Power Plant*, prepared by Science International Corporation, May 2003

single stack, emission point 00004. The facility exhausts flue gas through one stack per generator for a total of two stacks. Taking into consideration the installation an activated carbon injection system and use of an enhanced activated carbon at an insufflation rate of 3 lb carbon/MMACF, electric use to operate any additional pollution control equipment and operating costs in addition to reagent materials and land filling of additional fly ash; the installation would have an associated incremental cost of generation (implementation cost) in the range of 0.23 to 0.63 mills/kWh. The facility would also be required to install, operate, and maintain a continuous monitoring system to measure and record mercury mass emissions. Based upon Staff discussions and interviews with mercury emissions monitoring companies, the Department estimates that the purchase and installation of a mercury monitoring system is currently in the range of $130,000 to $200,000 per unit. An annualized cost per monitoring unit is predicted by EPA to be on the order of $89,500 per year for testing, maintenance, and operation[23]. Although increases may be minimal, the on-site cost of installing, operating, and maintaining mercury emission control equipment would directly increase the cost of generation associated with the Mercury Reduction Program units[24].

6. PAPERWORK

Part 246 adopts the federal requirements for monitoring, reporting, and record keeping thereby eliminating redundant or duplicative reporting. Facilities will not incur additional costs in this regard. In addition, Part 246 does not implement the labor intensive cap-and-trade-portion of the federally mandated model rule, which requires the tracking of emission credits, reducing the regulatory burden on facilities to track allowances. Facilities subject to Part 246 are required to submit quarterly reports electronically, in accordance with federal requirements, and along with their compliance reporting under the Acid Rain and CAIR rules. The coordination of reporting for these three regulatory programs will reduce paperwork requirements substantially.

[23] Federal Register / Vol. 70, No. 95 / Wednesday, May 18, 2005 / Rules and Regulations, pp 28634

[24] NYSDEC, NYSERDA, and ICF International, Modeling Results for CAIR and Mercury. May 18, 2006

7. DUPLICATION

The proposed rule does not duplicate or conflict with any other New York or federal rule. The federal model rule, Emission Guidelines and Compliance Times for Coal-Fired Electric Steam Generating Units, is the first regulation to control the emissions of a bio-persistent, bioaccumulating hazardous air pollutant from an electric steam generating source. New York State has opted to not accept the model cap-and-trade rule, but in stead submit a State Plan containing an alternate strategy to reduce mercury emissions from coal-fired power plants in a shorter time frame requiring greater reductions.

8. ALTERNATIVES

Pursuant to ECL Sections 19-0303 (b) and (c), when the Department adopts a regulation which contains a requirement that is more stringent than the Clean Air Act, the Department must provide, among other things, an evaluation of the cost-effectiveness of the proposed rule in comparison with the cost effectiveness of reasonably available alternatives and discuss the reasonably available alternative measures considered by the Commissioner and the reasons for rejecting those alternatives. The Department evaluated four alternatives. These alternatives are: (1) adopt a regulation based on CAMR's cap-and-trade approach; (2) take no action; (3) adopt the STAPPA/ALAPCO model rule; (4) adopt 6 NYCRR Part 246, a State-specific mercury regulation with definite emission limits. The Department also received comments from the public urging the Department to require proposed Part 246 Phase II emission reductions by 2010 instead of 2015.

a). Adopt CAMR Cap-And-Trade program or Take No Action

The Department rejected the alternatives of submitting a state regulation based on CAMR or taking no state action and allowing EPA to implement a federal plan based on CAMR for two reasons. First, the cap-and-trade program will continue to contribute to the widespread elevated regional concentrations of mercury and also, as reported by the Inspector General of the EPA, would potentially postpone the mitigation of local "hot

spots" of mercury deposition.[25] Second, the mercury reductions called for under CAMR are not to the level necessary to promote biologic recovery, decreasing mercury concentrations to below the fish advisory action level.

Regional concentrations can be reduced much sooner through implementation of a program which requires actual emission reductions in facilities in both New York and states which are upwind of the affected areas in New York State. The federal mercury program includes a provision allowing the "banking" of mercury allowances from year to year, which enables facilities to emit more mercury than their initial allocation. Although CAMR ensures that mercury emissions nationwide will be constrained to the federal mercury budget, CAMR does not provide assurances of mercury reductions on a state or local level where mercury emissions could exceed State budgets through the banking and trading of allowances. Thus, the federal rule therefore does not achieve nor ensure the emission reductions that are technically and economically achievable in the most expeditious manner. The federal program allows trading which will potentially allow the "hotspot" problem to continue if emission reductions do not occur in these sensitive areas. The banking provisions of the federal program will potentially also stretch the achievement of final reduction goal of 15 tons per year nationwide to 2025.[26] This delay will prolong the adverse environmental and public health impacts caused by the emission of mercury into the atmosphere and is not acceptable to the Department.

The federal regulation will not achieve the necessary reductions of deposited mercury compounds. The federal rule claims a 70 percent reduction of mercury compounds from all coal-fired electric utilities by 2018 but on a local level reductions may not achieve or even approach a 70 percent reduction. The Department's analysis has shown that a 90 percent reduction by 2015 by New York applicable sources can be done in a cost effective manner. The time frame for implementing Part 246 runs parallel with the implementation of State

[25] USEPA Monitoring Needed to Assess Impact of Clean Air Mercury Rule Hotspots, Report No 2006-P-00025, May, 2006

[26] STAPPA/ALAPCO Docket letter regarding EPA's Notice of Reconsideration, November 2005

ozone and particulate matter regulations that will work to reduce NO_x and SO_2 emissions from power plants as required under CAIR. As discussed in Section 4 of this document, when studying the costs of implementing both Part 246 and CAIR, and co-benefits are considered, IPM modeling suggests that a significant portion of the incremental cost for wholesale and retail electricity prices is related to a control strategy necessary to satisfy emission limitations imposed on facilities through the implementation of CAIR. With the implementation of co-benefit, multi-pollutant control strategies in almost all cases no further mercury-specific control technology would be required. Section 4 identifies additional mercury-specific equipment, such as activated carbon injection systems, that may be required to be installed to meet Phase II emission rate limits on a facility basis. In almost all cases, the Jamestown facility is discussed separately in Section 5, costs associated with additional equipment installation, maintenance and operation are far outweighed by other control systems necessary for compliance with CAIR

The sensitive ecosystems found in New York and the Northeast require reductions in both acid rain precursor emissions (NOx and SO_2) and mercury deposition to see meaningful changes in mercury levels in fish, mammals and birds. As stated in the Needs and Benefits Section, New York State needs greater reductions to see meaningful changes in fish and wildlife mercury concentrations. For these reasons, the alternatives of implementing the CAMR rule through State regulation or a federal plan were not selected.

b.) STAPPA/ALAPCO Model Rule

STAPPA/ALAPCO, a national organization representing State interests for the implementation of federal air programs, issued a model rule with more stringent requirements than CAMR. Under STAPPA's model rule, all new major electric generating units would be required to install state-of-the-art mercury emission controls when built and all existing electric generating units would be required to install technology on an earlier timetable than CAMR. STAPPA's rule includes two options to provide owners and operators of electric

generating units flexibility to craft their own compliance plan. Option I under STAPPA's model rule requires a facility to install pollution control technology achieving an 89 percent reduction in mercury emissions no later than 2008 on units generating half of a generating company's power and to install technology achieving a 90-95 percent reduction on the remaining units by 2012. Option II allows an owner or operator to postpone compliance with mercury emission limitations on all units until 2012, if the owner or operator makes enforceable commitments to install state-of-the-art technology to reduce emissions of sulfur oxides, nitrogen oxides, particulate matter, and mercury to specified levels. Option II is designed to allow owners and operators of units that do not yet have scrubbers and/or selective catalytic reduction ("SCR") units installed to synchronize their installation of criteria pollution control equipment with mercury control technology.

The Department rejected STAPPA/ALAPCO's model rule and requests from public commenters to require the implementation of Phase II emission standards by 2010. First, most New York facilities cannot meet Phase II emission limits with existing pollution control equipment and will need to make modifications to existing control systems. The Department does not believe that all facilities could complete this work by 2010 or 2012. Second, the time frames for implementation conflict with CAIR and the Regional Greenhouse Gas Initiative (RGGI). Furthermore, there are questions whether these reductions are achievable by deadlines in the model rule. CAIR requires the State to implement NO_x and SO_2 controls on power plants through an emission budget and trading program in two phases. The first phase of the program requires additional NO_x reductions in 2009 and SO_2 reductions in 2010. The second phase of CAIR requires NO_x and SO_2 reductions in 2015. New York is a signatory state of the RGGI Memorandum of Understanding (MOU). In the RGGI MOU, States agree to a program to stabilize CO2 emissions from power plants at current levels from 2009 to 2015 and reduce CO2 emissions by 10 percent by 2019. As a result, major actions, modifications and construction projects are likely to occur at New York's coal fired power plants by 2010, but more specifically by 2015. Also, the Department believes that it is not realistic for New York's electric generating units to meet a 2008 and 2012 timeframe for

these emission reductions. For example, facilities selecting limestone with forced oxidation systems, wet flue gas desulfurization, for the co-benefit control of sulfur dioxide and mercury require at least 27 to 36 months from award of contract to control technology testing. In addition, facilities selecting selective catalytic reduction systems for the control of NO_x and to further promote the oxidation of mercury require at least 21 to 35 months from award of contract to technology testing[27]. Under both the outlined examples it is assumed that planned outages, usually the Spring or Fall season when demand is lowest, fall in line with completion of construction for timely tie-in to the flue gas handling system. Taking into consideration necessary construction schedules and unit downtimes, the timeframes identified in the STAPPA model rule or a timeframe associated with a compliance date of 2010 as suggested by commenters are not sufficient to implement all of the necessary controls while keeping electricity system reliability at an acceptable level by the model rule deadlines.

c.) State Specific Plan

The Department has chosen to implement a New York State specific mercury emission reduction program to meet the requirements of the federal CAMR and its own stated goals of implementing a mercury emission reduction program that will prohibit trading and require steep emission reductions in a timely and cost-effective manner. The Department chose to use the emission trading budget required by the federal CAMR in Phase I to establish facility emission limitations in order to achieve the interim federal budget mandate in the clearest, most concise manner possible. The Department by requiring strict adherence to the budget levels on a facility basis is not allowing trading between locations in order to assure that emission reductions occur throughout the State so that the "hotspot" issue mentioned above is addressed.

The Department set the mercury limitation for 2015 based on the ability of these units to control mercury emissions in a cost effective manner. The cost analysis for this proposal shows that the incremental

[27] EPA, *Final Report: Engineering and Economic Factors Affecting the Installation of Control Technologies for Multipollutant Strategies*, EPA-600/R-02/073, October 2002, Appendix A

cost of generation for applicable units, when considering co-benefit control strategies, will be in the range of 0.37 to1.66 mills/kWh and virtually no incremental electricity price impact to consumers. Therefore, the Department opted to require this aggressive control regimen that will facilitate significant reductions of a highly toxic compound. Section 3 Needs and Benefits discusses the benefits that will occur as a result of the implementation of Part 246.

The Department also considered the timing for implementing these mercury control requirements. At the same time that the EPA promulgated CAMR, EPA promulgated CAIR, both of which have timeframes that overlap with this proposed regulation. In addition, New York electric generating units already need to comply with 6 NYCRR Part 238, Acid Deposition Reduction SO_2 Budget Trading Program in 2009. The Department and EPA expect co-benefit reductions of mercury when the implementation of CAIR and 6 NYCRR Part 238 are achieved in 2010 and 2009 respectively. Part 246 is designed to have similar dates for achieving emission reductions as the CAIR rule to create consistency for the regulated industry and to provide facilities with an ability to align construction projects with planned outage time periods. Part 246 has a second phase in 2015, in conjunction with other electric generating sector regulations such as RGGI and the second phase of CAIR. As CAIR implements another round of SO_2 reductions, it is logical to coordinate mercury reductions with SO_2 reductions, again as in Phase I, allowing for an alignment of construction schedules. The federal CAMR, with its second phase implementation in 2018, would have imposed an additional regulatory timeframe for the regulated community to contend with. The Department believes that a better approach is to have consistent implementation dates for these regulations inasmuch as they impact the same regulated entities.

While EPA believes that sources will mainly utilize add-on equipment to control sulfur dioxide and obtain co-benefits of mercury reduction, the Department believes that many existing facilities across the nation will meet sulfur reductions by coal switching to lower sulfur coal. The use of low sulfur coal will not

necessarily result in a current reduction in mercury emissions. There are low cost mercury control options available to those facilities that choose to fuel switch to comply with CAIR and 6 NYCRR Part 238. Mercury reductions from facilities utilizing low sulfur coal for sulfur control can reduce mercury emissions by applying more effective particle control or the injection of powered activated carbon and upgraded electrostatic precipitator units. Still it is the decision of the owners of the individual facilities to opt for the optimal control configuration for their plants. Timing the implementation of these programs to start at or near the same time will take advantage of these decisions being made by the owners, increase the probability that construction schedules will be coordinated, and assure that these important emission reductions are made in the most expeditious and cost-effective manner possible. It is for these reasons that the Department has chosen to control mercury emissions from coal fired power plants in the manner proposed in Part 246.

9. FEDERAL STANDARDS

Part 246, exceeds the minimum standards of the federal government in the following ways. First, the proposed rule has no provisions for trading of excess mercury emissions within or out of state because a cap-and-trade program would maintain existing local hot spots of mercury deposition and more importantly, continue to contribute to widespread regional concentrations of mercury. Regional concentrations can be reduced much sooner through implementation of a New York State rule which limits mercury emissions earlier and to a greater extent. Second, Part 246 shortens the timeframe for final compliance from 2018 to 2015. Third, Part 246 does not allow "banking" of allowances generated by control of emissions to be sold and/or kept for future use after 2018. These last two items highlight the Department's goal of adopting a mercury rule which will not exacerbate or contribute to widespread deposition of mercury in New York State's sensitive Adirondack and Catskill mountain lakes areas and coastal estuaries.

For EPA to regulate mercury emissions from the electric utility steam generating sector under section 111(d) of the Clean Air Act (Act), EPA needed to reverse its December 2000 regulatory finding in which the Administrator found that it was both appropriate and necessary to regulate utilities under Section 112 of the Act as a result of the Utility Study to Congress. The revision to the December 2000 regulatory finding allowed the EPA to conclude that it did not have to rely on the results the Utility Study and could consider new information as well as other sections of the Act to regulate this source category. EPA decided that the costs of regulating mercury exceeded the benefits to public health and concluded that any benefits directly related to the reduction of mercury in fish and wildlife are unrelated to public health and do not justify regulation under section 112. EPA states that section 112(n)(1)(a) requires EPA to analyze only the "hazards to public health" resulting from utility HAP emissions, not the environmental effects caused by such emissions. The Department does not agree with this analysis or conclusions. New York State's natural wilderness areas are largely responsible for the State's valuable tourist industry. New York's abundance of wildlife, waterfowl and fish has attracted sportsman and outdoorsman for years and are a significant makeup of New York's tourist income. Equally important are New York's Native American tribes and members of environmental justice communities who depend greatly on New York's abundant natural resources, in particular wildlife, fish and waterfowl, for subsistence living and whose public health would be significantly adversely affected by the consumption of mercury laden food. Thus, the Department sees a direct correlation between controlling mercury emissions from coal-fired electric utilities and protecting the public health and environment by maintaining healthy lakes, fish, birds, waterfowl and wildlife. The adoption of Part 246 is in furtherance of the Department's statutory responsibility under the Environmental Conservation Law to protect the air resources of the State and require use of all practical and reasonable methods to prevent and control air pollution.

New York State Energy and Research Authority (NYSERDA) has calculated the costs of the proposed mercury rule and the federal Clean Air Interstate Rule (CAIR) on the citizens of New York in the form of their

monthly electric bill increase due to these regulatory actions. The estimated New York retail electricity price impact showed that the costs to the consumer of implementing Part 246 to be $0.002 per month. For both regulations (CAIR and Part 246), the cost will be $0.86 per month equating to 0.8 percent of their total monthly bill. For the industrial consumer, the cost increase for CAIR and Part 246 equals $193 per month or 1.7 percent of their monthly bill, the mercury only portion for the industrial user is $0.5 cents per month.[28] Thus the Department concluded costs associated with the adoption and implementation of Part 246 were reasonable given the significant benefits associated with reducing mercury deposition to the environment.

10. COMPLIANCE SCHEDULE

The compliance schedule for the proposed rule includes two Phases, Phase I, 2010 and Phase II, 2015. The first compliance date is mandated from the federal Emission Guidelines and Compliance Times for Coal-Fired Electric Steam Generating Units, and all electric generating units in the nation will be on the same compliance schedule. In Phase II, the proposed rule coordinates the requirements of the Clean Air Interstate rule and the Regional Greenhouse Gas Initiative. The Department believes that the regulated sources will have ample time to comply with the Phase II portion of the rule three years earlier than federally required because of the advances in mercury pollution control demonstrated by the Department of Energy's National Energy Technology Laboratory.

[28] NYSDEC, NYSERDA, and ICF International, Modeling Results for CAIR and Mercury. May 18, 2006