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THE CLEAN AIR MERCURY RULE (CAMR) AND BEYOND: STATE INNOVATION AND LEADERSHIP TO REDUCE MERCURY POLLUTION

Why Are the States Concerned About Mercury Pollution? This fact sheet provides information about some of the innovative alternatives being considered by states as they move to address mercury emissions from coal-fired electric generating units (EGUs) under the Clean Air Mercury Rule (CAMR) or through their own regulations. Mercury is an important issue to states because:

- It is a widespread problem. In 2004, fish consumption advisories were in effect in 44 states for 2,436 water bodies, totaling more than 13 million lake acres and 767,000 river miles. 21 states have statewide fish consumption advisories due to mercury. Advisories for saltwater fish, such as shark, tuna and swordfish, are also in place.
- Children are most at risk as the developing brain of the fetus and newborn is particularly sensitive to damage from mercury.
- More than 400,000 US newborns are exposed to unsafe levels of mercury every year.
- Mercury is also toxic to the immune system, kidneys and cardiovascular system and may increase heart attack risk in adults. Loons, otters and other wildlife are also at risk.

How Does Coal Combustion Contribute to the Mercury Problem? Coal-fired EGUs are the largest source of mercury emissions in the US, accounting for 43% of all emissions or about 48 tons of mercury pollution each year. This is a significant amount of mercury given that about one ten thousandth (0.0001) of a gram of mercury is enough to make a pound of fish unsafe to eat. EGUs can be a significant source of mercury deposition on a regional and local scale. Recent EPA data (Landis et al, 2006) demonstrated that coal combustion was responsible for about 70% of mercury deposition at a site near coal-fired EGUs in the mid-west. To avoid exacerbating existing local "hotspots" or creating new ones, many states are omitting or limiting the trading provisions of CAMR.[1] Monitoring programs in MA and FL have identified mercury hotspots and documented significant declines (20-30% in MA) in mercury levels in freshwater fish within a few years of state regulations that reduced mercury emissions from local incinerators. According to a recent analysis by researchers at the Harvard School of Public Health Center for Risk Analysis (Rice and Hammitt, 2005) the national costs of mercury emissions from coal-fired power plants, considering only their health impacts and not other environmental impacts, range from about $460 million to $7.8 billion per year.

Does CAMR Go Far Enough? From a cross-media perspective, many states are concerned that CAMR will not achieve the mercury emissions reductions needed to meet Total Maximum Daily Loads (TMDL) and water quality standards for mercury. Specific concerns are that:

- CAMR allows emissions trading, which can exacerbate local impacts and hotspots;
- Some state emission caps under CAMR actually exceed current emissions;
- According to TMDL analyses by MA, ME, RI and MN, mercury emission reductions of 80% or more will be necessary to lift many fish advisories;

[1] The Office of the EPA Inspector General recently released a report that also expressed concerns about local impacts of EGU mercury emissions.

- CAMR falls short of the needed reductions—its 2010 mercury emission cap of 38 tons per year (TPY) is only a 21% reduction. Due to emissions banking, 2020 emissions under CAMR are predicted to be about 24 TPY, a 50% reduction from current emissions. In contrast, several existing state regulatory programs will achieve 80-85% reductions much sooner than CAMR.

Can Mercury Emissions from Coal-fired Power Plants Be Controlled Cost Effectively? Cost estimates for controlling mercury pollution from power plants have dropped by about 90% since EPA began its regulatory efforts. Given the rapid pace of innovation and development in the private sector, it is very likely that these costs will decrease further, especially if state regulations help to create markets for mercury control technologies. The incremental costs for mercury-specific controls such as activated carbon injection (ACI), which can capture more than 90% of a power plant's mercury pollution, have been estimated to range from 0.02 to 0.08 ***cents*** per kilowatt-hour (kWh), or about 15 to 60 *cents* per month for a typical residential electric bill. This is only about 10-20% of the costs for SO_2 and NOx controls. Air pollution controls for SO_2, NOx and particulates can achieve significant levels of mercury control. Units that already have installed such controls are achieving in the range of an 80% or greater mercury control efficiency at no additional cost.

Controls For Mercury Pollution Cost Less Than Controls For Other Pollutants

Control Type	Annualized Levelized Cost
Activated carbon injection for mercury control	0.02 – 0.08 cents/kWh (about 10% of the cost to control SO_2)
FGD for SO_2 control	0.3 – 0.5 cents/kWh
SCR for NOx control	0.1 – 0.2 cents/kWh

FGD= flue gas desulfurization (scrubbers). SCR= selective catalytic reduction. Adapted from presentation by Dr. Praveen Amar, NESCAUM.

What Can States Do to Strengthen CAMR? Although some states are adopting CAMR as promulgated, many others are considering alternative regulations that strengthen CAMR. The status of state efforts in this area is summarized at the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) website. Briefly, some of the State alternatives include:

- ✓ limiting emission caps so they do not exceed current emissions;
- ✓ opting out of, or restricting, the federal trading program to limit the sale of local in-state reductions to up-wind sources;
- ✓ requiring faster reductions;
- ✓ imposing more stringent emission limits; and,
- ✓ adopting provisions to "retire" or buyout banked emission credits.

States Adopting or Considering Requirements beyond CAMR

Colorado	Montana
Connecticut	New Hampshire
Delaware	New Jersey
Georgia	New York
Illinois	North Carolina
Maryland	Pennsylvania
Massachusetts	Virginia
Michigan	Washington
Minnesota	

For Further Information on Specific Topics Visit the Following Links:

For information on fish consumption advisories in the US:
http://epa.gov/waterscience/fish/advisories/fs2004.html#2004

For information on mercury exposure and the numbers of newborns at risk:
http://epa.gov/waterscience/fish/forum/2005/presentations/Monday%20Slides%200919/afternoon/Mahaffey_Fish%20Forum%202005%20-%20Mahaffey%20Final.ppt

For information on state mercury reduction activities and strategies:
http://www.ecos.org/files/1948_file_Compendium_National_Overview_Final_03272006.pdf

For information on mercury control technologies and benefits:
http://www.nescaum.org/topics/mercury-control-technology

For more information on state actions to address mercury emissions form coal-fired electric generating units visit the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) website at
http://www.4cleanair.org/StatePrograms.pdf and
http://www.4cleanair.org/FinalMercuryModelRule-111405.pdf

EPA Inspector General Reports
http://www.epa.gov/oigearth/reports/2006/20060515-2006-P-00025.pdf
http://www.epa.gov/oig/reports/2005/20050203-2005-P-00003.pdf

Regional Mercury Deposition Monitoring with Event-Based Sampling
Matthew Landis, U.S. EPA National Exposure Research Laboratory, Presentation at the 2006 Mercury Science and Policy Conference, Newport, RI. Results submitted for publication in a scientific journal in February 2006 "*Sources of Mercury Wet Deposition in Eastern Ohio, USA*"

Economic impacts of mercury emissions:

Glenn Rice and James D. Hammitt, *Economic Valuation of Human Health Benefits of Controlling Mercury Emissions from U.S. Coal-Fired Power Plants,* Harvard School of Public Health Center for Risk Analysis, completed under an EPA grant managed by NESCAUM (February, 2005)

See also Leonardo Trasande, Philip J. Landrigan, and Clyde Schechter, "Public Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain," *Environmental Health Perspectives* 113(5): 590, March 2005.