

2547

Kathy Cooper

From: Teresa McGee [teresa@epga.org]
Sent: Thursday, November 09, 2006 4:22 PM
To: IRRRC
Cc: jjewett@state.pa.us; jsmith@state.pa.us; Biden, Doug L.
Subject: EPGA Comments - Resend - Regulation #7-405 (2547)

Alvin Bush
IRRC Chairman:

Attached please find the comments of the Electric Power Generation Association for Regulation #7-405 (#2547). This is a resend of an earlier e-mail. Attachments were missing from the earlier version.

Regards,

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November 9, 2006

Honorable Alvin C. Bush
Chairman
Independent Regulatory Review Commission
333 Market St., 14th Floor
Harrisburg, PA 17101

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RE: Environmental Quality Board - Standards for Contaminants – Mercury (#7-405)

Dear Chairman Bush:

The Electric Power Generation Association would like to offer these additional comments on the final Environmental Quality Board (Board) regulation reducing mercury emissions from power plants now before your Commission for action.

The Electric Power Generation Association is a regional trade association of electric generating companies which own and operate more than 122,000 megawatts of electric generating capacity in the United States. As a result, we collectively have considerable experience in operating generating facilities and in taking actions to reduce environmental impacts from our facilities.

In fact, member companies have already taken steps to reduce mercury emissions by 33 percent from power plants in Pennsylvania from 1999 to 2004 and have announced plans to invest more than \$3 billion in advanced air pollution control equipment which will further reduce mercury, as well as emissions of sulfur dioxide and nitrogen oxide. The question is not whether to reduce mercury emissions, but how to do it in a way that does not threaten family-sustaining jobs, electric reliability, the use of Pennsylvania coal, cause significant increases in the cost of electricity or disruptions in the regional energy markets.

EPGA offers these additional comments for your consideration with the details on each following:

- The Requirement to Meet a Hard Cap Without Trading Effectively Imposes a 95 to 98 Percent Mercury Reduction Requirement Which Will Dramatically Increase Costs and Impair Pennsylvania's Competitiveness;
- "Hot Spots" Argument Provides No Rationale For Rejecting Emissions Trading Especially When the Industry Has Offered to Make 80% and 90% Reductions as Proposed by DEP
- Lack of Emission Allowances Limits Future Clean Energy Options;
- Adoption of the Final Rule Is Not Consistent With State Law;
- New Medical Studies Show Benefits Outweigh Risks of Eating Fish; and
- This is a Substantial Public Policy Issue the General Assembly Should Decide.

The Requirements to Meet a Hard Cap Without Trading Effectively Imposes a 95 to 98 Percent Mercury Reduction Requirement Which Will Dramatically Increase Cost and Impair Pennsylvania's Competitiveness

Although DEP and others have described the proposed rule as requiring an 80 percent reduction in mercury emissions in 2010 and 90 percent reduction in 2015 – 3 years earlier than the federal Clean Air Mercury Rule (CAMR) – the proposed rule is much more stringent than the 80 or 90 percent requirement suggests.

The proposed rule contains both (1) emissions standards (the 80% for phase 1, 90% for phase 2) and (2) annual caps on mercury emissions at each electric generating unit (EGU) that are based on CAMR allowance allocations. The industry has agreed to meet the emission standards (with the feasibility waivers included in DEP's regulations), but cannot accept the added requirement to meet the annual emission caps without trading.

The caps for each EGU will be based on the state's mercury budget allocated by EPA under CAMR. EPA developed the state budgets in the context of a national cap-and-trade program and substantially under-allocated allowances to states like Pennsylvania that burn bituminous coal. Meeting those caps without trading would require reductions of 95% to 98% - which would impose enormous costs on Pennsylvania's EGUs without any environmental benefit beyond that achieved by the 80% and 90% reductions required by the emissions standards component of the regulations.

In addition to the unnecessary expense imposed by the prohibition on emissions trading it also places the state in jeopardy of not being able to comply with its CAMR budget under EPA's rule. This is because meeting the budget allocation may be impossible at some plants. As there is no basis to believe surplus "non-tradable" allowances will be available in the state to make up the shortfall, Pennsylvania may well end up unable to comply with CAMR without forcing the retirement of some generating units and curtailing the output of others. This would be an unfortunate result for Pennsylvania's economy, one that could be avoided by adopting CAMR's cap-and-trade program in conjunction with requiring 80% and 90% reductions at each facility (with the feasibility waivers as provided for in the emissions standards section of the regulations).

The Board has grossly underestimated the cost of implementing the proposed rule and has erroneously based its cost estimates on the cost of simply meeting the 90% reduction emissions standard. This cost estimate overlooks the cost imposed to obtain the 95% or greater reductions necessary to meet the CAMR-based annual emissions cap without trading. In phase 2, to meet the annual cap without trading will require extraordinary capital investments and operating costs. In fact, the cost per EGU will exceed the cost the Board projected for all EGUs combined. Based on what is known about power plant mercury emissions and their fate and transport in the environment, this extreme cost cannot be expected to produce any incremental environmental benefit to Pennsylvania beyond the 80% and 90% reductions required in the emissions standards section of the regulations..

DEP incorrectly claims that the proposed rule is necessary to offset the inequity in CAMR with regard to bituminous coal. To be sure, CAMR under-allocated allowances to EGUs in Pennsylvania burning bituminous coal, with the result that achieving the annual emissions caps based on those allowances requires 95% or greater reductions in mercury emissions from bituminous coal. However, rather than assisting bituminous coal and the EGUs that burn that coal, the proposed rule will increase the burden dramatically compared to their burden under CAMR by prohibiting trading to meet the annual caps.

It is important to remember that the Pennsylvania mercury budget under CAMR is very small, especially for a state that is second in the nation in the production of electricity and dependent on coal for a reliable and affordable power supply. CAMR also requires of Pennsylvania the largest percentage reduction in mercury emissions compared to any other state. Thus, mercury emission reduction compliance costs in Pennsylvania will be large and higher than in competing states, even with emissions trading.

However, allowing emissions trading at least limits potential costs per pound removed to the price of allowances (expected to be less than \$50,000 per pound). Disallowing trading substantially exacerbates the high costs to Pennsylvania EGUs under CAMR, and makes the cost per pound that the EGU may incur to reduce the last few pounds of mercury potentially unlimited.

“Hot Spots” Argument Provides No Rationale For Rejecting Emissions Trading Especially When the Industry Has Offered to Make 80% and 90% Reductions as Proposed by DEP

The Board’s environmental rationale for its proposal, and for rejecting trading, is that mercury is a neurotoxin that deposits locally thereby causing “hot spots.” However, the Board has offered no analysis in support of its contention that “hot spots” may exist or could create public health issues. Furthermore, the Board has not defined a “hot spot”. As the IRRC comments noted, nowhere does the Board identify the methods used for calculating the risk to public health – rather than just asserting that it exists. Nor does the Board offer any analysis of the methods to reduce such risks, the costs or the cost-effectiveness of such methods.

Further, even if there is a legitimate concern about hot-spots, the Board has not explained why emissions reductions expected under the emissions standards provisions of the rule (80% in 2010 and 90% in 2015) will not be sufficient to address that concern.

Finally, , the Board should be required to explain why it is necessary to require punitive annual emissions “caps” requiring reductions of 95 to 98 percent just to satisfy a “policy judgment” to ban interstate trading. This is especially troubling because there has been no demonstration of any health or environmental benefit resulting from this requirement.

EPGA believes that presentations at DEP’s mercury Work Group meetings and at the House and Senate hearings by US EPA, the Electric Power Research Institute (EPRI) and the Brookhaven National Lab provide ample evidence that hot spots of mercury deposition attributable to power plant emissions do not exist, and will not be a problem after implementation of CAMR. We will not repeat those findings here as we included them in prior comments to the Board. However, we would like to bring to the Commission’s attention two new issue briefs from EPRI related to this subject: “Mercury ‘Hot Spots’ – Emissions and Deposition Patterns” and “Interpretation of U.S. EPA Mercury Modeling – How much mercury emitted from a state eventually deposits there?”

The “Hot Spots” brief concludes that power plant mercury emissions do not and will not create or intensify any “hot spots” under CAMR with interstate trading. The modeling brief focuses on the state of Pennsylvania and shows that only 10 percent of all Pennsylvania mercury emissions deposit within Pennsylvania. Taken together, we believe the findings in these two briefs constitute a convincing case against the ban on interstate trading included in the proposed rule, particularly since there has been no demonstration by any party of a need to go beyond CAMR, and not even the suggestion of a need to go beyond the 80% and 90% reduction in the emission standards portion of the rule.

Although there has been no demonstration by any party of a need to go beyond CAMR, we recognized DEP’s desire to ensure that substantial mercury reductions were made within Pennsylvania and not purchased from out of state. Therefore, EPGA along with our labor and industry coalition partners, proposed an alternative that requires 80% mercury reductions to be made at each facility in Pennsylvania starting in 2010 and 90% starting in 2015 – the same levels and timing as DEP’s proposed emission standards. These standards would be met without emissions trading. However, our proposal allowed the more stringent CAMR budget cap to be met through interstate trading. Without this provision we believe Pennsylvania remains at risk of either requiring technologically infeasible emission reductions or exceeding the state’s mercury budget under the federal rule.

A summary of our alternative appears at the end of this letter. DEP has rejected this proposal even though the effect on mercury deposition within the Commonwealth, when compared to the DEP proposed rule, would be immeasurable, as the amount of trading would be severely restricted due to the operation of the emission standards provision.

Lack of Emission Allowances Limits Future Clean Energy Options

As the IRRC observed in its comments to the Board, most of the states with significant coal-fired generation are adopting CAMR or a similar rule that allows for trading of allowances and, for future economic development and reasonably priced electricity considerations, for banking of allowances as well.

The lack of a market-based emission allowance trading system and the more stringent mercury reduction requirements mean there could be a significant shortage of emission allowances available to support the construction of new, cleaner coal-burning electric generating facilities in the future, further limiting our energy options in Pennsylvania.

A market-based emission allowance trading system encourages the over control of emissions on power plants where it is economically and technically feasible because the owners of those plants can sell those credits to others that need them.

Under the final rule, there is simply no incentive to generate any emission allowances beyond those needed to meet the mercury reduction standard because those allowances could be assigned to other, possibly competing power plants by DEP.

In addition, the more stringent 95 to 98 percent emission reduction requirement at each facility means there will be far fewer or no extra allowances available in the first place because of the more stringent CAMR cap.

One of the advantages of the federal cap-and-trade program is the ability to “bank” emission allowances to use to offset emissions from new, future generation. Without the ability to bank, future generation can grow only at the expense of existing generation. For a state like Pennsylvania, which is currently the largest generating state in the 14-state PJM wholesale market, and the second largest generating state in the United States, the inability to bank emission allowances constitutes a significant barrier to future expansion of coal-fired electric generating capacity and economic development.

What’s at stake is Pennsylvania’s share of nearly \$140 billion worth of investment in 93,000 megawatts of new coal-fired generating capacity that the US DOE expects to be built in the next 20 years.

A state that willingly subjects its coal-fired power plants to the level of competitive disadvantage inherent in this proposed rule cannot hope to attract its fair share of that future investment. A state with no banked allowances may be physically unable to attract that investment without putting its existing sources at further severe competitive disadvantage, possibly out of business. This situation will be further exacerbated by the proposed major transmission projects in PJM that will place even greater competitive pressure on (and could bypass) Pennsylvania based electric generation.

Adoption of the Final Rule Is Not Consistent With State Law

The Department of Environmental Protection has failed to provide the justification required by the state Air Pollution Control Act for regulating mercury in a way that goes beyond federal requirements or as a hazardous air pollutant. While presenting a case for mercury control in general (which to our knowledge no party has disagreed with) DEP has not made the case for the incremental health benefits to be gained from the Pennsylvania-specific mercury rule. The Department has simply implied (and in some cases openly asserted) that no mercury reductions in Pennsylvania could occur without the state-specific rule.

The state Air Pollution Control Act authorizes the Environmental Quality Board to regulate hazardous air pollutants (HAPS) subject to several provisions.

First, the Board has general authority to establish standards for HAPs for sources not included on the list of sources for HAP regulation under Section 112(c) of the federal Clean Air Act.

Second, the Board may adopt a health risk-based standard when needed to protect the public health. To do so, however, the board must provide a specific rationale, considering criteria such as public health significance and commercially available methods and costs to reduce such risks, as described in Section 112(f)(1) of the CAA.

Third, the board may not establish a more stringent standard for HAPS from existing sources than EPA establishes, unless justified as a health risk-based standard.

Finally, if EPA has not adopted a standard to control HAPs from a category of sources in accordance with the CAA schedule, DEP may establish an emission standard for a category of sources on a case-by-case basis for such sources, but that standard must be equivalent to the standard that would apply if EPA were to adopt a standard under Section 112 of the CAA.

DEP, by its own statements, has not provided the information, studies and justification needed to demonstrate the final rule meets these requirements, nor provided a case-by-case standard required by the state Air Pollution Control Act.

New Medical Studies Show Benefits Outweigh Risks of Eating Fish

New studies by the national Institute of Medicine and a Harvard School of Public Health study published in the *Journal of the American Medical Association* in October found the health benefits of eating fish regularly outweigh the risk from mercury and other contaminants, even for pregnant women and children. (See National Institute of Health, Health Day and Washington Post articles.)

The health risk of mercury to humans comes from eating fish contaminated by mercury, not through direct exposure to mercury emissions in the air.

Statements by the Department of Environmental Protection, presentations before DEP's Mercury Work Group and testimony by medical professionals before the Senate and House Environmental Resources and Energy Committees had previously concluded there were no studies to link mercury emissions from Pennsylvania power plants with any human health impacts in the Commonwealth.

DEP has consistently been unable to document any additional health or environmental benefits from adopting its final rule over the reductions achieved by the federal Clean Air Mercury Rule, especially in the face of scientific evidence that only 10 percent of mercury emitted in Pennsylvania is deposited in Pennsylvania.

This is a Substantial Public Policy Issue the General Assembly Should Decide

The public policy issues—environmental, health and economic—raised by this final rule will have a significant impact on family-sustaining jobs, electric reliability, the future use of Pennsylvania coal, the cost of electricity and regional energy markets. It must be emphasized that the Pennsylvania mercury rule, as currently proposed, places Pennsylvania EGUs at a severe competitive disadvantage compared to those in other states that are adopting CAMR. This is particularly troubling given that these sources must compete for generation market share in the largest and arguably most competitive wholesale power market in the world – PJM (The PJM market now extends from New Jersey to North Carolina to Northern Illinois and includes more than 165,000 megawatts of generating capacity.).

The Senate and House Environmental Resources and Energy Committees have held an unprecedented five public hearings on the implications of this rule and to look for alternatives that will significantly reduce mercury emissions without causing negative impacts on the Commonwealth.

The Senate has already taken bipartisan action and voted overwhelmingly to support an alternative emissions reduction plan, and more than 100 House members have introduced and have been working on their own plan, but unfortunately time will likely run out in this legislative session before any final action can be taken.

We believe the implications of the rule are so profound for the economy of Pennsylvania that establishing a mercury emissions reduction program should not be left to a rulemaking petition process where unelected members of the Environmental Quality Board have the ability to make this critical decision.

This issue should be resolved in the General Assembly and we would encourage the Commission to make this recommendation in its final action.

We believe these and other comments placed on the record offer more than enough justification for the Commission to disapprove this final rule based on several criteria outlined in the Regulatory Review Act, including:

- Direct and indirect costs imposed on the Commonwealth;
- Adverse effects on prices of goods and services;
- The protection of the public health, safety and welfare and the effect on natural resources;
- The reasonableness and need for the regulation; and
- A substantial policy that requires legislative review.

Accordingly, we respectfully recommend disapproval. Thank you for considering these additional comments. Feel free to contact me at any time about these comments.

Sincerely,

Douglas L. Biden

Douglas L. Biden
President
Electric Power Generation Association

Attachments:

1. Electric Power Research Institute, *Interpretation of U.S. EPA Mercury Modeling – How much mercury emitted from a state eventually deposits there?*, State of Pennsylvania, October 9, 2006
2. Electric Power Research Institute, *Mercury “Hot Spots” – Emissions and Deposition Patterns*, Issue Brief, August, 2006

These comments represent the views of EPGA as an Association of generating companies, not necessarily the views of any particular member company with respect to any specific issue.

Alternative to the Proposed DEP Mercury Regulation:

This alternative proposes that the Department of Environmental Protection (DEP) utilize a mercury control strategy that mimics the highly effective nitrogen oxides control strategy. Under this strategy, Pennsylvania would implement a Pennsylvania specific rule that requires all major source coal-fired units/facilities to meet an 80 percent reduction in 2010 and a 90 percent reduction in 2015. This proposal also allows for the implementation of presumptive mercury control technologies and alternative measures or technology that control mercury emissions by Jan. 1, 2010 for those sources which cannot technically or economically install control equipment to meet the specified standards. Simultaneously, DEP would issue a separate regulation that implements the “cap and trade” provisions of the CAMR. This multi-regulation approach has been extremely effective in controlling nitrogen oxides emissions as they relate to not only local concerns, but also relative to transport issues.

The Pennsylvania specific regulation:

- Applies on a unit specific basis.
- Results in unit specific emission limitations that could not be exceeded through emission allowance trading or use of emission reduction credits
- Is required regardless of the type of coal burned
- Allows alternative technologies to define the appropriate control technologies and strategies of smaller units
- Satisfies the EQB approval to develop a PA specific mercury rule

In addition to the Pennsylvania specific mercury rule, generators would still be required to comply with Pennsylvania CAMR emissions budgets (“cap”), which would include participation in the nationwide “cap-and-trade” program.

Benefits:

- Eliminates concerns about “hotspots” by requiring mercury emissions reductions at every PA coal-fired generating facility
- Does not drastically impair competitiveness of Pennsylvania wholesale electric generators, coal suppliers and support services and industries relative to out-of-state competitors even though it is more stringent than the CAMR requirements alone
- Helps to control electricity costs which helps to minimize drag on economic growth in Pennsylvania
- Provides for the most cost-effective “co-benefits” control strategies to be implemented through the implementation of CAIR
- Provides for certainty of compliance which is a critical need relative to obtaining financing and satisfying investors
- Accelerates installation of control equipment at many PA generating facilities by “front loading” the control measures at some facilities that would otherwise not be implemented until 2018, which then achieves the full mercury reductions by 2015 rather than 2018 through the implementation of Phase II of CAIR.
- Preserves the Environmental Quality Board’s approval of the PaDEP recommendation to develop a Pennsylvania specific Hg rule
- Does not disadvantage Pennsylvania wholesale electric generation in the event the CAMR is over-turned
- Guarantees that Pennsylvania will be able to comply with its federally mandated mercury budget.

Mercury “Hot Spots”—Emissions and Deposition Patterns

Issue Brief

Concerns have been raised about potential mercury “hot spots” in the United States, particularly those that might be associated with power plant emissions. A specific concern is that “hot spots,” if they occur, might not decline—but might actually become more numerous or severe—following full implementation of EPA’s trading approach for mercury emissions control. EPRI has examined this issue using computer models and data analyses and has concluded that power plant mercury emissions do not and will not create or intensify any “hot spots” under the regulations issued by EPA. In fact, power plants contribute little to the areas of highest deposition in the United States, either currently or in future regulatory scenarios.

Why Are There Concerns About Mercury Hot Spots?

In May 2006 the U.S. Environmental Protection Agency (EPA) issued its final Clean Air Mercury Rule (CAMR) regulating mercury emissions from coal-fired power plants. Prior to issuing CAMR and the parallel Clean Air Interstate Rule (CAIR) regulating other air pollutants, EPA defined a mercury “hot spot” as a location where deposition contributed by U.S. power plants alone is enough to raise mercury in fish tissue above the level EPA deems safe to consume. This is also the highest permissible level before waterways are classified as mercury impaired. In general, mercury “hot spots” are considered to be areas of excessively high mercury deposition compared to national or regional averages.

Widely scattered U.S. measurements of the amount of mercury depositing in precipitation show no strong deposition increases from the Midwest to the East that might reflect the greater number of mercury sources in the eastern United States. However, there has been speculation that some unmeasured U.S. locations may receive elevated mercury deposition, meeting some

general definitions of “hot spots.” At the same time there are concerns that the cap-and-trade regulatory approach of CAMR will allow some power plants to increase the amount of mercury they emit. Thus, there have been assertions that CAMR has the potential to create or exacerbate mercury “hot spots.”

EPRI has Applied State-of-the-Art Modeling to Evaluate the Potential for “Hot Spots” Under the Utility Mercury Regulation Issued by the U.S. EPA

Because it is impractical to look for “hot spots” by measuring mercury deposition at every location in the country, EPRI has run sophisticated state-of-the-art computer models to simulate the transport and deposition of the mercury released from power plants and other emission sources. These model runs looked at current emissions and deposition, and at scenarios of possible future deposition following implementation of EPA’s mercury emission control regulations for utility boilers. EPRI’s analysis considered the amount and chemical forms of mercury emitted from every coal-fired power plant in the U.S. under three scenarios: a 2004 Base Case for current conditions; EPA’s CAMR regulation; and a theoretical “zeroed-out” scenario under which all U.S. utility mercury emissions are eliminated.

The 2004 Base Case simulates mercury emissions from power plants and all other mercury sources (such as municipal and medical waste incinerators) in the U.S. and around the world. The model simulations of CAMR are for the year 2020, when all emission reduction measures required by CAIR and CAMR together will be fully implemented. Some growth in electricity generating capacity is anticipated as allowed by CAMR rules in which a portion of the allowances provided to each state is set-aside for new plants. While some new mercury

emissions will occur from these permitted facilities, the overall trend in utility emissions is downward. The CAMR scenario and the “zeroed-out” scenario reduce power plant emissions according to the regulatory requirements or set them to zero, respectively, but keep emissions from all other sources at their 2004 levels. This approach allows researchers to estimate the impact of EPA’s utility mercury regulation alone.

To perform the simulations, EPRI used a national emissions prediction model to evaluate the amount and chemical forms of mercury emitted from U.S. power plants under each scenario. These emission results were fed into an atmospheric fine-scale model which simulates the chemistry and physics of mercury emitted into the atmosphere. The output of this simulation was then used to calculate amounts and patterns of deposition throughout the U.S. under current conditions, CAMR, and the “zeroed-out” scenario.

The U.S. EPA performed its own modeling using a similar approach, but with two differences. First, EPA employed projections of future U.S. mercury emissions in both the utility sector and in other sectors of the economy, including a slight growth in mercury emissions from other sectors to reflect future changes in population and economic activity. Second, EPA employed a 36 km square grid in its atmospheric deposition model (vs. the 20 km square used in EPRI’s model). This regular rectangular grid was then transformed into an irregular grid that roughly outlined U.S. freshwater drainage basins. Despite these differences, the total deposition and general patterns of deposition seen in the EPRI and EPA results were very similar.

EPA and EPRI Results Show That the Greatest U.S. Mercury Deposition is Produced by Emissions From Sources Other Than U.S. Power Plants

According to both EPA and EPRI computer simulations—both before and after imposition of the utility mercury CAMR regulation—the locations of highest mercury deposition in the U.S. are predominantly impacted by emissions from non-power plant sources. To clarify this, a broad definition was used to define “utility-dominated” locations: all locations where half or more of the deposited mercury originates from U.S.

power plants. Even under this broad definition, less than 1% of the U.S. (0.4% of the land area) falls into this category prior to implementation of CAIR and CAMR. Following CAMR, no location in the U.S. is dominated by utility-originated mercury. That is, after EPA’s cap and trade program, no location in the U.S. would receive more than half of its mercury deposition from U.S. power plants. Not only will utilities at that time be emitting lower levels of mercury to meet the regulatory requirements, but some plants will reduce their emissions beyond their required levels. This will provide those utility companies with emissions “credits” that they can “bank” and use to offset emissions from new, future generation. Because new generation throughout the U.S. must meet the existing national and state mercury caps, there is little or no economic incentive to increase emissions at existing plants. Instead, there is a greater incentive to reduce emissions to allow for future generation needs. The same results were found by both EPA and EPRI (and other independent researchers) in analyzing future regulatory scenarios.

Currently, areas in the U.S. with the highest mercury deposition receive most of their mercury from municipal and medical waste incinerators. These areas of high mercury deposition—located primarily in the mid-Atlantic and southern New England states—will continue to exist even after power plants have fully reduced their emissions. The contributing non-utility incinerators are currently at, or will soon reach, their assigned lower levels of mercury emissions, so those deposition high points will remain in the future. Even if the hypothetical “zeroing-out” of utility mercury were to occur, those highest deposition locations would remain high, since they are not significantly influenced by any utility mercury emissions. So the complete elimination of that utility mercury will not result in significantly lower deposition of mercury at the highest-deposition points in the U.S.

The CAMR rule issued by EPA would play an important role in reducing deposition in locations that do have substantial mercury from utility sources. Power plant-dominated locations would all see reductions in their absolute deposition values. Most of this reduction occurs under CAIR (aimed at pollutants other than mercury) rather than under CAMR because most electric utility

mercury deposition is due to emissions of divalent mercury, the form most readily captured by controls to be implemented under CAIR. The elemental form of mercury emitted in flue gas, which is not readily removed by control equipment required by CAIR, does not impact local deposition; elemental mercury is virtually insoluble in water. Thus, if utility mercury emissions were forced to change from a 70% reduction under CAMR to a complete 100% cessation, there would be very little additional change in mercury deposition.

The EPA Mercury Regulation Would Neither Increase Mercury Deposition in High-Deposition Areas nor Create New High-Deposition Areas

EPA and EPRI modeling results show that every state will experience overall reductions in mercury deposition due to CAMR. The greatest reductions will occur in the mid-Atlantic and southeastern states because CAIR and CAMR incorporate greater incentives for the types of power plants located in these regions to pursue highly effective mercury controls. These power plants tend to burn eastern bituminous coal, which emits a relatively higher proportion of divalent mercury—the chemical form most easily captured by the emission control devices for sulfur and nitrogen oxides required by CAIR. Because of the cost-effectiveness to reduce mercury emissions at these plants, they are more likely to install highly effective mercury capture controls and therefore will have a greater relative impact on reducing mercury emissions and deposition. Again, neither CAIR nor CAMR substantially lowers the areas of highest mercury deposition values, which are dominated by municipal and medical waste incinerators.

New EPA Findings from Steubenville, Ohio Are in Concert With EPRI Research Results

EPA established a mercury measurement site in Steubenville, Ohio in 2002; findings from that experiment have been presented in slide show presentations (no published results have been issued to date). The

Steubenville investigators found that 60-70% of the mercury deposited at their location in rainfall is from coal-fired sources at “local/regional” scales (up to 1000 miles distant). It is important to note that most mercury deposition research defines “local” as being within 50 km (30 miles) of the mercury emission source. In the case of Steubenville, “local/regional” includes most of the eastern and midwestern United States. EPRI modeling shows that 64% of the wet-deposited mercury at Steubenville may be from U.S. coal-fired power plants. This is one indication of the power of atmospheric modeling to replicate data-based conclusions. Other coal-fired sources are also present in the immediate area of the EPA Steubenville measurement site, including plants manufacturing coke for steelmaking. EPRI modeling shows that 42% of the mercury wet deposition occurring within a 15 mile radius of the Steubenville site is attributable to U.S. power plants. Further, the Steubenville researchers assumed no conversion of oxidized mercury emitted from power plants to elemental mercury, a process which has been measured in several power plant plumes in the U.S.

Contact Information

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INTERPRETATION OF U.S. EPA MERCURY MODELING
How much mercury emitted from a state eventually deposits there?

State of Pennsylvania

Provided by
Electric Power Research Institute
Palo Alto, California

October 9, 2006

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In 2003, the Office of Water at U.S. EPA developed model results and slide show presentations of those results to show where mercury emissions from within each U.S. state eventually deposited, either within the state or at distant locations. The model used was the U.S. EPA REMSAD II model (REMSAD stands for “Regional Modeling System for Aerosols and Deposition”). The results represented conditions for 1998.

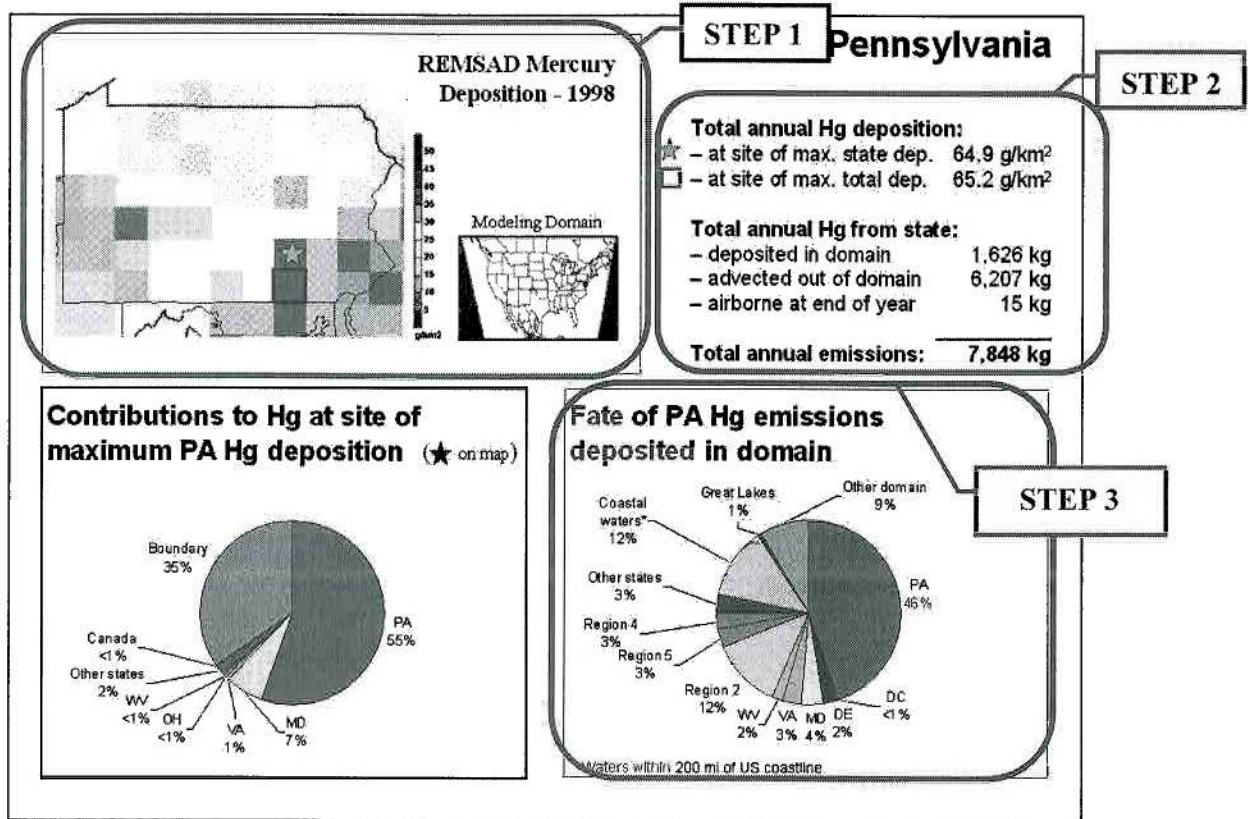
Recently, several state agencies have been provided summaries of these U.S. EPA slides that are significantly in error and misleading in interpretation. Combined with citing the authority of the U.S. EPA as the source, these misinterpretations have the potential to seriously undermine public understanding of the behavior of mercury in the environment.

In fact, as is shown below, the U.S. EPA slide clearly shows that only 10% of all Pennsylvania mercury emissions deposit within Pennsylvania.

Mercury Emissions Balance Sheet for Pennsylvania

- 1. 7848 kg (17266 lbs) of mercury is emitted annually from *all* sources in Pennsylvania (in the EPA modeling exercise).**
- 2. 748 kg (1646 lbs) – or 10% – of Pennsylvania-emitted mercury deposits within the state.**
- 3. 878 kg (1932 lbs) of Pennsylvania-emitted mercury deposits outside the state but within North America.**
- 4. 6222 kg (13688 lbs), or 79%, of Pennsylvania-emitted mercury never returns to North America, most of it depositing elsewhere around the world.**

Note: The lower left segment of each slide shows the origin of the mercury arriving at the single location falling completely within the state that is modeled as having the highest mercury deposition. In this case, a significant portion of the mercury arriving at that location in Pennsylvania originates outside North America; 55% comes from within Pennsylvania.



- STEP 1.** The slide shows a map of both the state in question (in this case, the State of Pennsylvania), and of the “Modeling Domain.” “Modeling Domain” is a standard term for the geographic area which is represented in the model data and results. The domain used by the U.S. EPA modeling is all of North America – the United States, Canada, and Mexico – and nearby waters of the Atlantic and Pacific Oceans.
- STEP 2.** The table on the upper right of each slide is an accounting of the model-derived fate of *all* (not just utility) mercury emissions from the state being modeled. In this case, Pennsylvania, a total of 7848 kg of mercury is emitted to the atmosphere. Of that total, 1626 kg (or 21%) of all state emissions deposit in the domain (essentially, all of North America). Most of the state emissions, 6207 kg (or 79%) of the emissions, is *advected* (that is, transported by winds) out of the North America domain to deposit elsewhere in the world.
- STEP 3.** Finally, in the lower right, a pie chart shows where mercury emissions from the state deposit when they are among the **21% depositing somewhere in North America** (not the 79% of state emissions that deposit outside North America, elsewhere around the globe). Of the 1626 kg depositing somewhere within North America of the original 7848 kg emitted, 46% of 1626 kg, or 748 kg (about 1646 pounds) deposits in Pennsylvania.