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INDEPENDENT REGULATORY  
REVIEW COMMISSION

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Environmental Quality Board  
Rachel Carson State Office Building, 15<sup>th</sup> Floor  
P.O. Box 8477  
Harrisburg, PA 17105-8477

August 26, 2006

By Electronic Transmission

Re: Comments on Proposed Mercury Emission Controls for Electric  
Generating Units in Pennsylvania; Standards for Contaminants –  
Mercury, 25 PA CODE CH. 123

Ladies & gentlemen:

These comments are submitted on behalf of Unions for Jobs and the  
Environment (UJAE), a §501(c)(4) organization of national and international  
labor unions.<sup>1</sup>

UJAE's member unions represent a spectrum of more than 3.2 million  
workers in electric power, transportation, coal mining, construction and  
other industries. UJAE members' jobs and economic wellbeing will be  
directly impacted by the Environmental Quality Board's ("EQB") decisions  
on the proposed standards for mercury emissions from power plants (36 Pa.  
Bull. 3185 *et seq.*, June 24, 2006).

<sup>1</sup> UJAE members joining these comments are: Brotherhood of Locomotive Engineers;  
International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and  
Helpers; International Brotherhood of Electrical Workers; Marine Engineers Beneficial  
Association; Sheet Metal Workers International Association; United Association of  
Journeyman and Apprentices in the Plumbing and Pipefitting Industry; United Food and  
Commercial Workers International Union; United Mine Workers of America; United  
Transportation Union; and Utility Workers of America. For further information about  
UJAE, *see*, [www.ujae.org](http://www.ujae.org).

Representatives of UJAE member unions participated actively in the Pennsylvania Department of Environmental Protection's ("DEP") Mercury Stakeholder process in 2005-06.

UJAE members also presented testimony in mercury emission control hearings earlier this year before the Pennsylvania Senate and House Environment and Natural Resources committees. The positions advanced in those hearings are restated below, supplemented by specific recommendations for improvements to DEP's proposed mercury rule.

In addition, UJAE member unions were invited, along with the Pennsylvania AFL-CIO, to engage in discussions with DEP, senior Rendell Administration officials and staff, and Pennsylvania House Democratic leaders on the development of a possible legislative alternative to the DEP rule. These discussions led to a proposed amendment sponsored by House Democratic Whip Mike Veon (Attachment 1).

The Veon Amendment was not put forward for a vote before the end of the legislative session in late June. In light of the concerns we have about the DEP mercury proposal, UJAE respectfully requests that EQB give due consideration to the basic framework and elements of the Veon Amendment in the context of this rulemaking. We also suggest several improvements to the Veon Amendment intended to improve its compliance flexibility while safeguarding jobs.

### **Background**

The interests of UJAE member unions in the mercury control issue are straightforward. If DEP's proposed rule leads to the closure of many of the Commonwealth's relatively old and small generating plants - as we expect it will - electrical workers, coal miners and workers in energy-related industries will lose their jobs. UJAE members view EPA's Clean Air Mercury Rule, and its national emission trading program, as the best means to "level the playing field" for these smaller and older powerplants, and to help preserve markets for the very high mercury-content coals produced in central Pennsylvania.

The United States is the only country in the world with a comprehensive regulatory program for reducing mercury emissions from industrial sources. Most major sources of mercury emissions, such as municipal and hospital waste incinerators, already are subject to EPA

mercury emission limitations. Mercury deposition in the U.S. from foreign sources, such as China, is expected to increase.<sup>2</sup>

Mercury is a pollutant that circulates through the global atmospheric environment. Emissions by U.S. electric utilities represent approximately one percent of global mercury emissions from natural and manmade sources. U.S. EPA estimates that domestic electric utilities contribute 11 tons of the 144 tons of mercury deposited annually in the continental United States. When EPA's Clean Air Mercury Rule is fully implemented, domestic utility deposition will decline to 3 tons annually.<sup>3</sup>

Mercury is a public health issue because it can be consumed by women of childbearing age who eat contaminated fish. Adverse health effects, in the form of developmental disorders, can occur among children of women exposed to high levels of mercury as a consequence of fish consumption.

More than 80% of dietary mercury consumption in the U.S. comes from saltwater fish such as tuna, cod, and swordfish. Canned tuna alone accounts for 30% of U.S. mercury consumption.<sup>4</sup> Controls on domestic electric utility emissions will have little or no impact on marine sources of mercury exposure. The mercury levels of ocean fish have not changed in hundreds of years, despite major increases in manmade mercury emissions.<sup>5</sup> Any reduction of U.S. utility mercury emissions will not impact the mercury content of saltwater fish consumed in this country.

The two major epidemiological studies examining the neurological effects of mercury consumption – conducted in the Seychelles and Faroe Islands – reached contradictory findings among populations largely dependent upon the consumption of saltwater fish containing high levels of mercury.<sup>6</sup> In the Faroe Islands, adverse developmental effects were observed among children of women who regularly consumed whale meat contaminated with both PCBs and mercury. In the Seychelles research, no

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<sup>2</sup> *Id.*, at 391.

<sup>3</sup> U.S. EPA, Clean Air Markets Division (Presentation to PA Mercury Stakeholders).

<sup>4</sup> For a review of the role of U.S. power plant mercury emissions in mercury-related health risks, see F. Lipfert, S. Morris, *et al.*, "Methylmercury, Fish Consumption and the Precautionary Principle," 55 *J. Air & Waste Mgmt. Assn.* 388 (April 2005).

<sup>5</sup> A. Krapiel, *et al.*, "Sources and Variations of Mercury in Tuna," 37 *Environ. Sci. Technology* 5551 (2003); G. Miller, *et al.*, 175 *Science* 1121 (1972).

<sup>6</sup> *See*, National Research Council, *Toxicological Effects of Methylmercury* (National Academy Press, 2000).

adverse developmental effects were noted among the children of women who consumed large quantities of contaminated fish. The latest followup research to the Seychelles study confirms the absence of adverse neurological effects to these children.

Reducing U.S. power plant mercury emissions by 70%-90% is estimated to reduce U.S. deposition of mercury by 5%-10% in the lower-48 states, and to reduce the average mercury content of domestic freshwater fish by 1%-2%.<sup>7</sup> Reducing the average content of mercury in canned tuna by eliminating the highest 10% to 20% of mercury-contaminated fish could reduce U.S. mercury consumption by 6% to 11%.<sup>8</sup> There is no evidence that controls on U.S. power plants would reduce the number or prevalence of mercury-related "fish advisories" in Pennsylvania or other states.

### **No Hot Spots in Pennsylvania**

Concerns about "hot spots" are often asserted as the basis for controlling utility mercury emissions on a plant-specific basis. Data presented by Dr. Terrence Sullivan of Brookhaven National Laboratory to the DEP mercury stakeholders dispels the myth of "hot spots" as a legitimate basis for imposing inflexible mercury controls on specific plants or units.<sup>9</sup>

Dr. Sullivan's analysis of soil and other data downwind of a diverse group of U.S. power plants did not reveal any specific evidence of mercury hot spots. At most, a relatively small increase in mercury concentration was observed in the immediate vicinity (<5 km) of specific plants.

Moreover, as Dr. Sullivan explained in his February 23rd testimony before the House Committee on Environment and Natural Resources, a "hot spot" becomes a public health issue only when other factors are present, including a large body of water to receive the deposition, a population of fish exposed to the deposition, and human consumption of these fish. No evidence was presented before the DEP Mercury Stakeholder Group indicating that Pennsylvania contains water bodies meeting all of these criteria.

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<sup>7</sup> Lipfert, *et al.*, n. 4 *supra*, at 391.

<sup>8</sup> *Id.*, at 396.

<sup>9</sup> Dr. Sullivan's presentation is available on the PA DEP website at: [http://www.dep.state.pa.us/dep/deputate/airwaste/aq/regs/docs/Sullivan\\_Hotspots\\_Presentation\\_102805.pdf](http://www.dep.state.pa.us/dep/deputate/airwaste/aq/regs/docs/Sullivan_Hotspots_Presentation_102805.pdf)

## EPA's Clean Air Mercury Rule

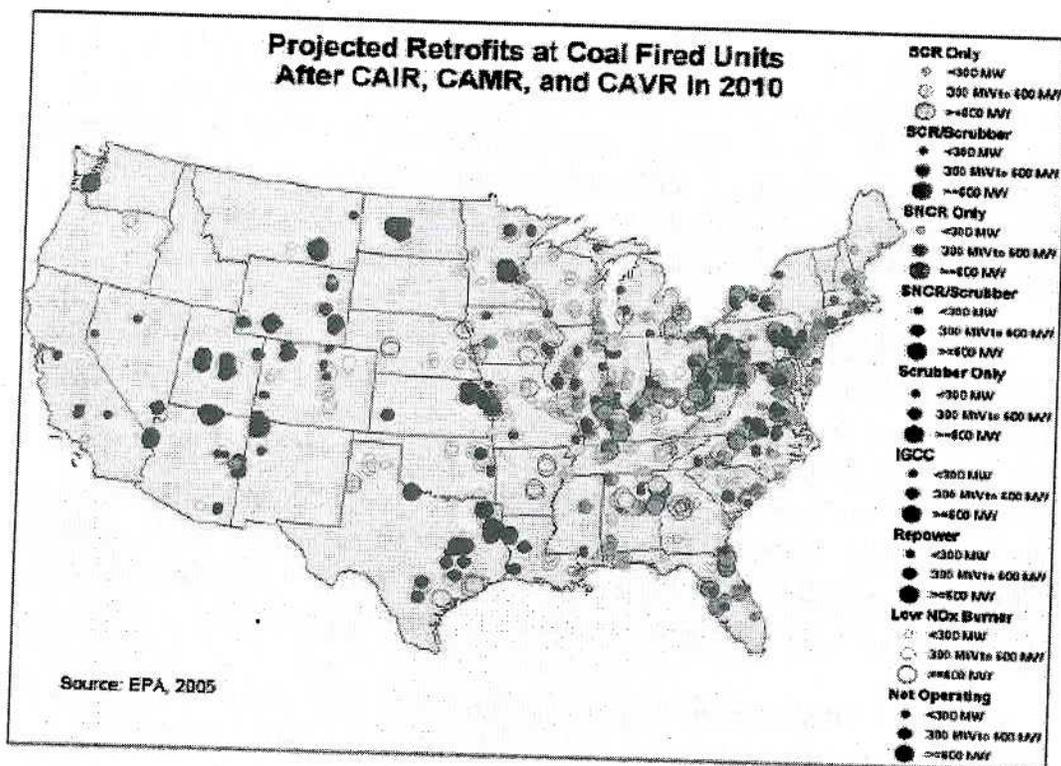
In March 2005, EPA promulgated the Clean Air Mercury Rule (CAMR), a program to reduce national emissions of mercury from electric generators by 70% in two phases commencing in 2010. Like the successful federal acid rain program, CAMR provides the opportunity for emissions trading, to reduce the cost of the program by concentrating reductions at sources with the most cost-effective control options.

CAMR is designed to work in tandem with EPA's companion Clean Air Interstate Rule (CAIR), requiring a 70% reduction of sulfur and nitrogen oxide emissions from electric generators in a 28-state eastern region. Most of the mercury reductions resulting from the first phase of CAMR will be achieved as a "co-benefit" of the installation of scrubbers and other pollution controls needed to meet CAIR's emission caps. EPA projects that more than 60 Gigawatts of eastern electric generating capacity will be retrofitted with scrubbers by 2010 as a result of compliance with the CAIR rule.

Figure 1 illustrates the extent of pollution control retrofits that EPA projects in response to the CAIR and CAMR rules by 2010. Most of the capacity to be controlled is located east of the Mississippi River, principally in Pennsylvania, West Virginia, along the Ohio River Valley, and in other areas upwind of Pennsylvania.

As shown by later exhibits, Pennsylvania will be the largest beneficiary of the mercury emission reductions resulting from these rules, even after the effects of interstate emission allowance trading are considered.

Figure 1



### Pennsylvania's Mercury Challenge

CAMR allocates mercury allowances among the states, which may then allocate these allowances to affected sources. While the U.S. average mercury reduction required by CAMR is 70%, Pennsylvania must achieve an 86% reduction simply due to its reliance on bituminous coals. This is a result of the EPA allowance allocation approach that rewarded extra allowances to units burning subbituminous and lignite coals.

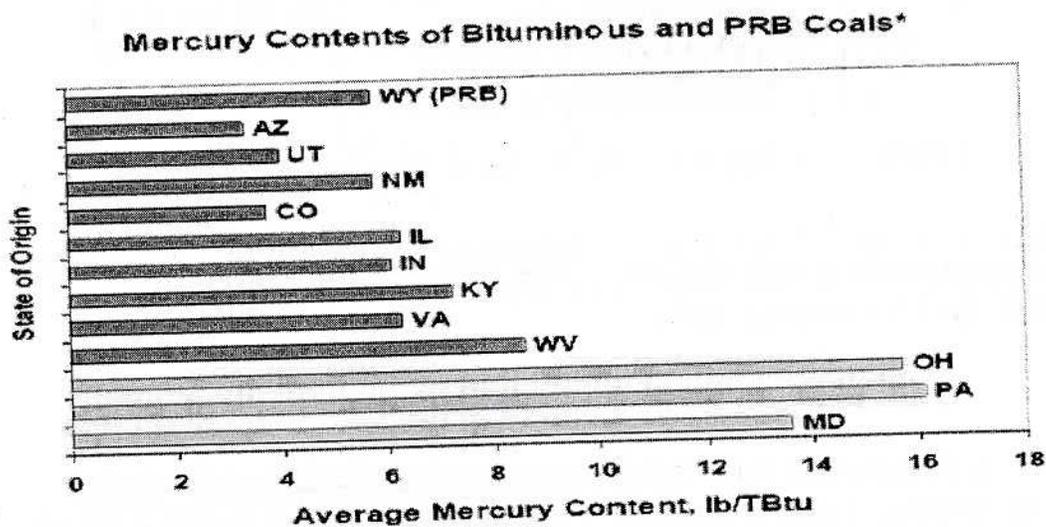
EPA's mercury allowance allocation to states provides substantially more allowances to units burning western subbituminous or lignite coals than to units burning bituminous coals. This allocation reflected EPA's uncertainty in 2003-04 about the effectiveness of mercury control technologies in reducing mercury emissions from plants using lower-rank western coals. A direct consequence of EPA's allocation methodology is that Pennsylvania confronts the largest proportional mercury reduction requirement of any state in the nation.

The inherent bias against Pennsylvania and other bituminous coals created by the EPA mercury allowance allocation methodology led the UMWA, along with Pennsylvania and other eastern state coal associations, to challenge the bases for EPA's allowance allocation in a lawsuit filed in 2005. UMWA and the state coal associations maintain that EPA's allocation methodology is arbitrary and capricious, and penalizes eastern bituminous coal states by requiring a disproportionately large mercury reduction, potentially leading to large-scale fuel-switching.

The proposed Veon Amendment recognizes the inequity of EPA's allowance allocations, and would require DEP to redistribute any allowances awarded to Pennsylvania in the event that UMWA and the state coal associations prevail in their litigation.

Pennsylvania's bituminous coals have, on average, the highest mercury content among all U.S. coals (Figure 2). Bituminous coals from Kentucky and West Virginia contain roughly one-half the mercury of Pennsylvania coals. As a result, Pennsylvania coals are at risk of fuel-switching if generators seek to reduce the mercury content of their coal feed. By comparison, Illinois lost more than one-half of its coal industry in the 1990s as a result of fuel-switching to meet the sulfur dioxide reduction targets of the 1990 acid rain law.

Figure 2

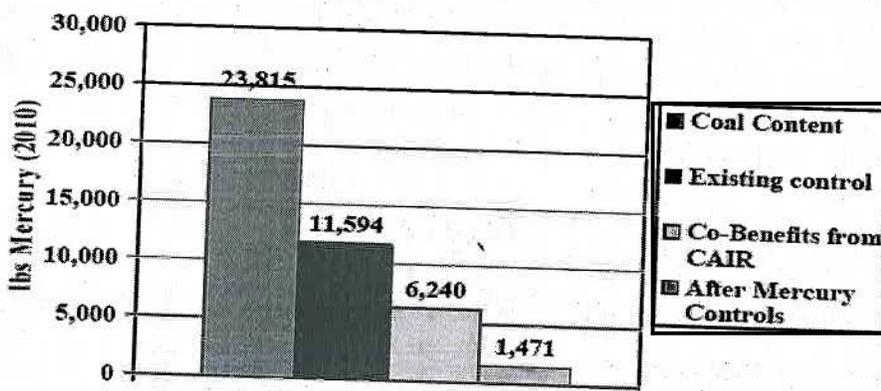


Source: CONSOL, Inc., derived from U.S. EPA ICR mercury database.

EPA's mercury allowance allocations to Pennsylvania will require very significant reductions of mercury emissions. Figure 3 illustrates the overall reduction of Pennsylvania mercury emissions from electric generators by 2010. Existing pollution controls are expected to reduce 51% of the 23,815 pounds of mercury contained in the coals consumed at Pennsylvania units, to a level of 11,594 pounds.

The pollution controls to be added in response to the CAIR rule are expected to reduce Pennsylvania mercury emissions by an additional 46%, to 6,240 pounds. Meeting the Phase I CAMR emission cap of 3,560 pounds will require yet another reduction of 43%, for an overall reduction of 85% from the mercury content of the coal. The CAMR Phase II cap of 1,404 pounds will require an overall reduction of 94% from the mercury content of coals consumed by Pennsylvania generators.

**Figure 3**  
**Pennsylvania Powerplant Mercury Emissions-2010**



EPA Mercury Rule sets 2010 state cap at 3,560 lbs, 2018 cap at 1,404 lbs

Source: T. Hewson, J. Marchetti and E. Cichanowicz, "Impact of Mercury Regulations on Pennsylvania Coal-Fired Power Plants," (Presented to the PA DEP Mercury Stakeholders, November 18, 2005).

### Mercury Control Benefits

A fundamental issue facing Pennsylvania policymakers is whether adopting utility mercury emissions controls more stringent than U.S. EPA's Clean Air Mercury Rule would bring about meaningful health benefits to the people of Pennsylvania. EPA's analyses supporting the federal mercury regulations are instructive.

Any proposal to reduce mercury emissions below the levels required by current federal law should be premised upon a demonstration that such controls are needed to protect public health. DEP has not performed any deposition analyses of the effects of its proposed rule. However, the mercury deposition analyses conducted by EPA in connection with the CAIR and CAMR rules indicate that:

- 1) Pennsylvania stands to be the largest beneficiary of mercury deposition reductions as a result of the CAIR rule; and
- 2) The deposition reductions in Pennsylvania due to the “co-benefits” of CAIR are approximately equal to those resulting from a hypothetical “zero-out” of all mercury emissions from electric generating units throughout the United States.

### **EPA’s Mercury Deposition Analyses**

U.S. EPA analyzed the mercury reductions resulting from implementation of the Clean Air Interstate Rule and the Clean Air Mercury Rule.<sup>10</sup> EPA’s March 2005 Final Regulatory Impact Analysis of the CAMR compares these mercury reduction benefits with those from a hypothetical “zero-out” strategy eliminating 100% of mercury emissions from U.S. electric utilities. While there are no practical means of eliminating all mercury emissions from electric utilities, EPA’s “zero out” analysis provides a useful benchmark for comparing the impacts of alternative mercury reduction proposals.

EPA’s modeling demonstrates that CAIR and other minor non-utility mercury emissions controls in 2020 will result in a similar reduction in total mercury deposition (Figure 4) as completely eliminating U.S. power plant mercury emissions (Figure 5). The principal reason for these results is that CAIR will bring about a large decrease in mercury emissions from power plants as utilities employ greater use of scrubber control technology to reduce SO<sub>2</sub>. These scrubbers effectively capture mercury as well as SO<sub>2</sub>.

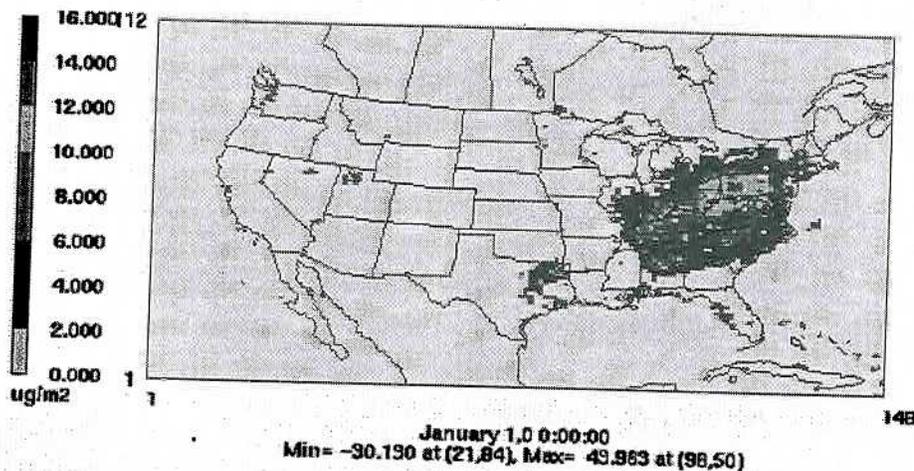
The benefits in Pennsylvania of EPA’s CAIR and CAMR rules are summarized in Figures 6 and 7. Figure 6 shows widespread mercury deposition from powerplants in 2001, with the highest concentrations in western Pennsylvania. When CAIR and CAMR are implemented (Figure 7),

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<sup>10</sup> Figures 4-5 are from U.S. EPA, Final Regulatory Impact Analysis of the Clean Air Mercury Rule (March 2005); Figures 6-7 are from U.S. EPA Region III, Air Protection Division.

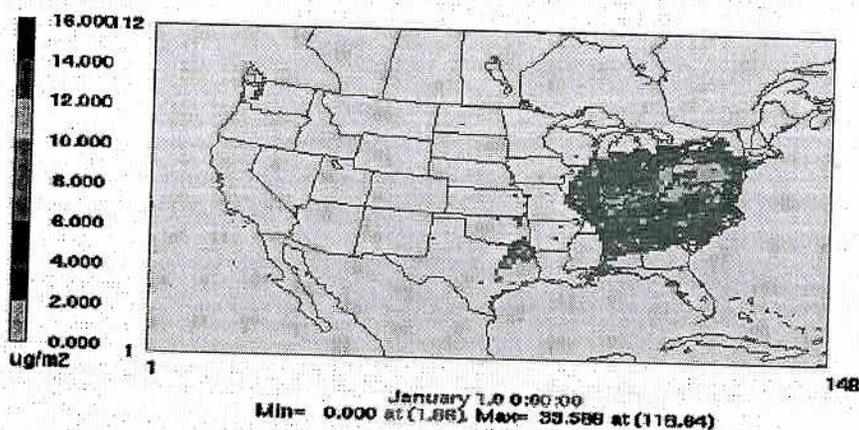
mercury deposition in Pennsylvania attributable to powerplants is essentially eliminated.

**Figure 4: Mercury deposition reductions resulting from CAIR, 2020**



**Figure 8-4. Change in Total Mercury Deposition for All Sources: 2020 (with CAIR) Relative to 2001**

**Figure 5: Mercury deposition reductions resulting from elimination of U.S. utility mercury emissions, 2001**



**Figure 8-3. Decrease in Total Mercury Deposition with Power Plant Zero-Out Simulation: 2001**

Figure 6

Total Annual Mercury Deposition from Power Plants: 2001

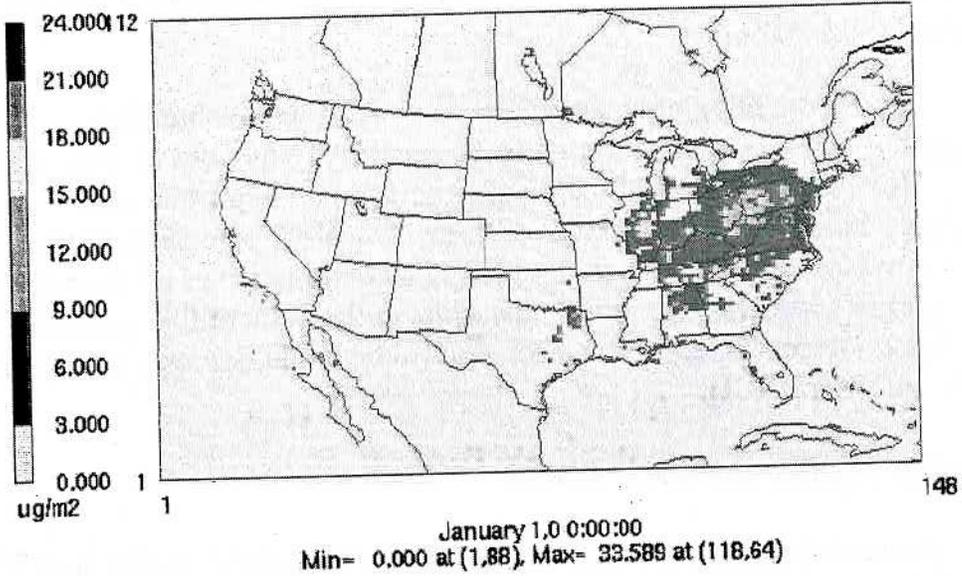
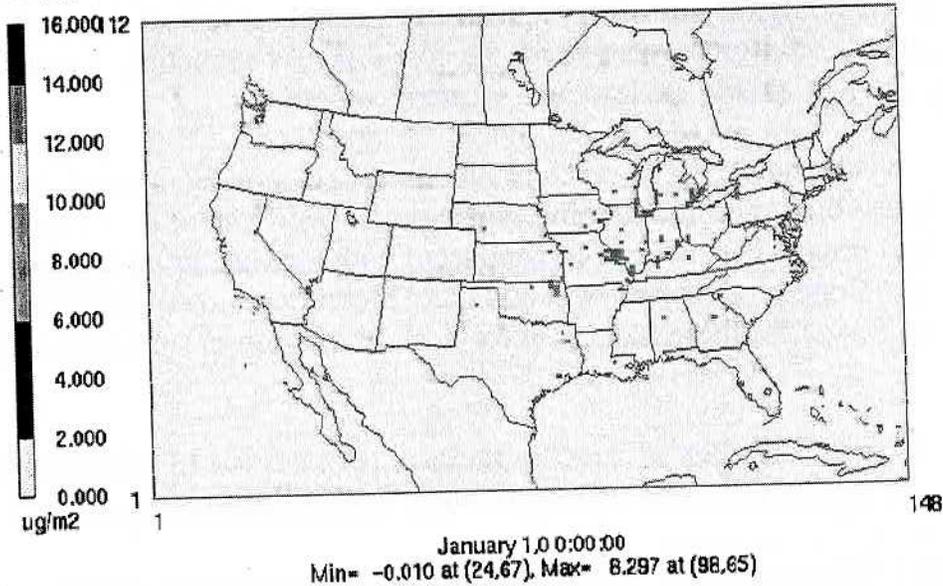


Figure 7

Total Annual Mercury Deposition from Power Plants after CAIR + CAMR: 2020



## Mercury Control Technologies

Achieving high levels of mercury emission control will require major investments in mercury control technologies, in addition to the investments in scrubbers and selective catalytic reduction (SCR) technologies needed to comply with CAIR.

The combination of wet scrubbers and SCR at units burning bituminous coal can achieve “co-benefit” mercury reductions of 85% or more. However, many older and smaller units do not represent cost-effective candidates for the retrofit of these controls. These units likely would comply with EPA’s mercury rule by a combination of allowance purchases or transfers (e.g., from other units in the same utility system) or by retrofitting mercury-specific emission control technologies such as activated carbon injection (ACI).

### Risks for Smaller and Older Plants

Pennsylvania has more than 30 coal generating units smaller than 250 MW and more than 40 years of age, representing 4,100 MW of generating capacity. These units are the most “at risk” of premature retirement if confronted with inflexible mercury control mandates.

Many of the presentations received by the Pennsylvania DEP mercury stakeholders’ group concerned the availability and cost of mercury-specific control technologies, such as ACI. There is general agreement that such technologies offer great promise for the cost-effective reduction of mercury emissions, particularly for low-rank western coals.<sup>11</sup>

To date, most ACI research has focused on removing mercury from units fueled by lignite and subbituminous coals. Only four of the 19 full-scale ACI tests to date have been conducted with high-sulfur bituminous coals, like those produced in Pennsylvania. Mercury removal performance has been poorer for these coals than for low-sulfur western subbituminous coals.

A recent summary of mercury removal performance by advanced ACI methods suggests that units burning western subbituminous coals may be

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<sup>11</sup> For EPA’s review of the performance and costs of alternative mercury control technologies, see, [http://www.epa.gov/ttn/atw/utility/ord\\_whtpaper\\_hgcontroltech\\_oar-2002-0056-6141.pdf](http://www.epa.gov/ttn/atw/utility/ord_whtpaper_hgcontroltech_oar-2002-0056-6141.pdf)

able to achieve 90% mercury reduction, while units burning eastern bituminous coals may be limited to reductions of 70% or less (see Attachment 2). In short, it now appears that ACI, the lowest-cost technology for reducing mercury emissions, will be most effective with western subbituminous coals. Achieving high levels of mercury reduction at plants burning bituminous coals will entail the installation of expensive FGD and SCR systems. This is a recipe for fuel-switching away from high-mercury Pennsylvania bituminous coals at smaller units that are not economic to retrofit with scrubbers, or for the premature retirement of these small units.

### **DEP's Proposed Mercury Rule**

DEP's proposed mercury rule would eliminate all trading of emission allowances both in-state and out-of-state, reflecting a "policy judgment" by DEP that the Clean Air Act prohibits trading of mercury emissions. The proposed rule would create a system of compliance preferences and presumptions for plants burning 100% bituminous coals and employing certain emission control technologies such as scrubbers, fabric filters and selective catalytic reduction.

### **Bituminous Coal Provisions**

The proposed DEP rule offers favored treatment for plants burning 100% bituminous coals equipped with certain pollution control devices. Plants meeting certain criteria are presumed to meet the rule's percentage reduction and emission rate limitations, and are given a preferred "place in line" to receive mercury allowances in the event that they are not able to meet their annual mercury emission limits.

DEP explains these preferences on the grounds that bituminous-fueled units equipped with scrubbers and SCR have high mercury removal rates:

"The presumption of compliance only recognizes the established fact that mercury is removed with vastly greater efficiency from scrubbed plants burning bituminous coal than from scrubbed plants burning sub-bituminous coal. Bituminous coal contains more mercury than sub-bituminous coal. But it also contains more chlorine, which enhances the removal efficiency of mercury control technology.

Technical analysis shows that units burning 100 percent bituminous coal and controlling emissions with a wet flue gas desulfurization and selective catalytic reduction capture 90 percent of mercury emissions. In contrast, units that burn 100 percent sub-bituminous coal and control emissions with the same technologies capture only 16 percent of mercury emissions."<sup>12</sup>

Contrary to these assertions, the proposed rule ignores the well-accepted fact that bituminous coals mined in Colorado, Utah and other western states have much lower chlorine content than Pennsylvania and other eastern bituminous coals, and have poorer mercury removal in systems equipped with scrubbers.<sup>13</sup> The lower chlorine content of western bituminous coal reduces the amount of elemental mercury that is converted to divalent (HG2) form, thereby reducing the mercury captured by wet FGD systems.<sup>14</sup>

In sum, there is no technical justification for selecting units burning 100% bituminous coals for any form of preference or compliance presumption. To support its proposed preferences and compliance presumptions, DEP should restrict application of these provisions to units burning 100% eastern bituminous coals. Singling out eastern bituminous coal for preferential treatment would further enhance the prospect for successful constitutional challenges to the rule, discussed below.

### **Constitutional Issues**

UJAE welcomes DEP's concerns for Pennsylvania's bituminous coal production and consumption. However, we are concerned that the proposed rule could be subject to judicial challenge under the Commerce Clause of the

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<sup>12</sup> PA DEP, "State Mercury Rule Constitutionally Sound," News Release, May 30, 2006.

<sup>13</sup> For an analysis of EPA's ICR database for mercury removal by coal type, see, [www.epa.gov/ttn/atw/combust/utiltox/final\\_ensr\\_multivar.pdf](http://www.epa.gov/ttn/atw/combust/utiltox/final_ensr_multivar.pdf).

<sup>14</sup> See, Paul Chu, "Effect of SCRs on Mercury," 2006 Electric Utilities Environmental Conference (Electric Power Research Institute, Tucson, AZ, January 23, 2006).

U.S. Constitution.<sup>15</sup> A successful constitutional challenge could remove the rule's beneficial provisions, leaving a command-and-control regulation requiring plant-specific reductions at levels that could lead to the shutdown of many smaller and older generating units across the Commonwealth. The proposed rule's compliance presumptions and preferences favoring plants burning bituminous coals plainly discriminate against western, non-bituminous coals. As such, the rule likely would face the strict scrutiny applied in cases involving *per se* violations of the Commerce Clause.

In brief, the compliance presumptions in DEP's rule would favor plants burning 100% bituminous coals by presuming that the use of such coals, together with certain emission control technologies, is sufficient to satisfy DEP's proposed emission rate limitations for pulverized coal units. These limits are 80% removal from the coal as-fired or 0.024 lbs. hg/TBTU commencing in 2010, and 90% removal or 0.012 lbs. hg/TBTU commencing in 2015. Plants not meeting the criteria for these presumptions would need to demonstrate compliance. All units are subject to the annual emission limits resulting from the distribution of EPA's mercury allowances in non-tradable form.

The compliance preferences in the DEP rule likewise apply to plants burning 100% bituminous coals equipped with scrubbers and certain emission control technologies. If a plant meeting certain criteria exceeds its annual mercury budget, it may apply to DEP for additional mercury allowances from a compliance pool managed by DEP. Fluidized bed units burning waste coal are first in line, followed by pulverized coal units burning 100% bituminous coals equipped with scrubbers and other specified emission controls. Plants burning 100% bituminous coals that are not equipped with scrubbers would be farther back in line. Plants burning blended coals, or western subbituminous coals, would be last in line.

Generators seeking to burn bituminous coals with sorbent emission control technologies – but without scrubbers or other technologies specified in DEP's rule – would be disadvantaged by the system of preferences that DEP proposes for handing out allowances to plants unable to meet their

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<sup>15</sup> These concerns are based on a series of federal court decisions in the 1990s that struck down state laws seeking to protect local high-sulfur coal production from fuel-switching to comply with the 1990 acid rain control program. *See, e.g., Alliance for Clean Coal v. Miller*, 44 F.3d 591 (7<sup>th</sup> Cir. 1995). Comments filed in this rulemaking by Peter S. Glaser, Esq., of Troutman & Sanders on behalf of the Pennsylvania Coal Association discuss the Commerce Clause implications of the DEP rule in greater detail.

annual mercury limits. Under EPA's mercury rule, such a plant could simply purchase allowances on the open market to make up for any shortfall, or obtain transferred allowances from another plant in its system that overcomplies with its annual limit.

Utilities burning blended coals, or western bituminous coals, may be at an even greater disadvantage in the event that their mercury controls fall short. Their "place in line" would be far back, with no assurance of receiving any allowances if DEP's compliance pool is underfunded. With no incentive to over-control mercury emissions, such as EPA's mercury rule provides, the DEP compliance bank may not cover all potential requests for allowances.

This "place in line" uncertainty likely would inspire constitutional challenges to the DEP rule by western subbituminous coal interests. As the 7<sup>th</sup> Circuit stated in Alliance for Clean Coal v. Miller, 44 F.3d 591, challenging certain regulatory preferences for the use of Illinois coals:

"The Illinois Coal Act cannot continue to exist merely because it does not facially compel the use of Illinois coal or forbid the use of out-of-state coal. As recognized in West Lynn Creamery, even ingenious discrimination is forbidden by the Commerce Clause. 114 S. Ct. 2215. By "encouraging" the use of Illinois coal, the Act discriminates against western coal by making it a *less viable compliance option* for Illinois generating plants. *Id.*, at 596 (emphasis added.)

The fact that the DEP rule does not specifically identify Pennsylvania coal for favored treatment, but refers generally to bituminous coals, would not shield the rule from attack by firms that perceive their coals to be at a competitive disadvantage. Similarly, the rule's "even-handed" requirement of uniform percentage emission reductions and emission limits regardless of coal type is not a relevant defense to its compliance presumptions for plants using bituminous coals. We therefore read the DEP rule as if it contained no system of bituminous coal compliance performance presumptions, or preferences for receiving allowances from the compliance pool.

Without its preferential treatment for bituminous coal, the DEP rule is reduced to a command-and control Maximum Achievable Control Technology (MACT) requirement for achieving specific emission limitations on a plant basis, with no opportunity for emissions trading or

banking to provide compliance flexibility. This is a recipe for fuel-switching away from higher-mercury Pennsylvania coals, and for shutting down smaller and older powerplants that are not economic to retrofit with scrubbers in the context of the large PJM dispatch system. Moreover, with its severability provisions, the rule's MACT standards may continue to apply even if U.S. EPA is required to promulgate national MACT standards as a consequence of ongoing litigation to which DEP is a party.

### **Need for a Workable Pennsylvania Mercury Rule**

All UJAE member unions strongly support U.S. EPA's CAMR and its emission trading program as the best approach for reducing mercury emissions in Pennsylvania and other states.

The key advantages that implementation of a cap-and-trade mercury rule in Pennsylvania would bring – and that the DEP rule would not – include:

- 1) Providing incentives for plants to over-control mercury emissions, so that power providers can realize an economic benefit in exchange for major investments in pollution control technologies such as scrubbers;
- 2) Allowing for “banking” of emission reductions in excess of annual limits, to provide an incentive for early reduction of emissions, and to provide compliance flexibility in later years, with no adverse effect on the environment; and
- 3) Creating a more workable compliance mechanism that avoids reliance on administrative judgments about control technology performance, or the merits of competing requests for allowances in the event that control technologies do not perform adequately.

In light of these concerns with the proposed DEP rule, we urge the EQB to consider the potential advantages of an alternative mercury control approach such as that outlined in the Veon Amendment. These include:

- An emission trading program to encourage over-control of mercury emissions by potential allowance sellers, providing a direct financial benefit for related pollution control investments that create and maintain jobs for Pennsylvania workers;

- A 70% control limit for units smaller than 200 MW capacity that utilize carbon injection technologies, reducing the risks of closure (or fuel-switching) for many smaller generating units; and
- Avoidance of the substantial litigation risks associated with DEP's proposed system of preferences and presumptions favoring bituminous coals, and the need for a state-managed program of allowance transfers.

The proposed Veon Amendment does not address the ability to bank emissions allowances. This omission may reflect an informal U.S. EPA interpretation of the conditions necessary to obtain approval of a state mercury control plan outside of the CAMR national trading program. Since emission banking provides significant compliance benefits with no adverse environmental effects, the addition of an emissions banking provision would enhance the advantages of this alternative framework. U.S. EPA may well reconsider the acceptability of emissions banking in a well-designed, state-managed trading program.

If other issues arise concerning U.S. EPA's criteria for approving a state mercury plan incorporating statewide emission trading, DEP and EQB should look to the state mercury laws and regulations adopted in Maryland and Virginia. Each of these states has pursued a "rule within a rule" approach, accepting EPA's CAMR trading program while imposing more restrictive state limits.

In addition, we believe that the Veon Amendment could be strengthened by the addition or modification of the following program elements:

- 1) Credit for removal of mercury by coal washing, where generators or coal suppliers are in position to certify mercury reductions from as-mined coal, making these credits applicable to the rule's performance requirements for achieving certain percentage reductions subject to an annual emission cap;
- 2) A compliance presumption for pulverized coal units utilizing activated carbon injection technology;

3) Modification or elimination of the proposed annual system-wide compliance demonstration for potential allowance sellers, because this could be interpreted to preclude intra-system allowance sales or transfers among units of a commonly-owned system;

4) A mechanism for excused performance due to factors beyond the control of generators, similar to that included in Maryland's Healthy Air Act (SB 154).

Maryland's Healthy Air Act, enacted in May 2006, contains the following provisions excusing performance for factors beyond the control of generators, including impacts on costs and electric rates:

(2) (I) IF A PERSON THAT OWNS, LEASES, OPERATES, OR CONTROLS AN AFFECTED FACILITY CAN DEMONSTRATE, WITH CLEAR AND CONVINCING EVIDENCE, THAT THE POLLUTION CONTROL EQUIPMENT THAT IS NECESSARY TO ACHIEVE COMPLIANCE WITH THE REQUIREMENTS OF THIS SECTION IS UNATTAINABLE, DUE TO A LACK OF AVAILABLE SUPPLY, THE DEPARTMENT MAY REDUCE OR WAIVE ANY PENALTY DUE TO THE FAILURE TO ATTAIN COMPLIANCE UNTIL THE POLLUTION CONTROL EQUIPMENT BECOMES ATTAINABLE.

(II) IF A PERSON THAT OWNS, LEASES, OPERATES, OR CONTROLS AN AFFECTED FACILITY CAN DEMONSTRATE, WITH CLEAR AND CONVINCING EVIDENCE, THAT THE POLLUTION CONTROL EQUIPMENT THAT IS NECESSARY TO ACHIEVE COMPLIANCE WITH THE REQUIREMENTS OF THIS SECTION HAS SIGNIFICANTLY INCREASED IN COST DUE TO THE LIMITED AMOUNT OF SUPPLY AND, AS A RESULT, MAY SIGNIFICANTLY INCREASE ELECTRIC RATES, THE DEPARTMENT MAY REDUCE OR WAIVE ANY PENALTY DUE TO THE FAILURE TO ATTAIN COMPLIANCE UNTIL THE SUPPLY OF POLLUTION CONTROL EQUIPMENT BECOMES AVAILABLE SO AS TO REASONABLY LOWER THE COST OF THE POLLUTION CONTROL EQUIPMENT.

(III) IN DETERMINING WHETHER TO REDUCE OR WAIVE ANY PENALTY UNDER THIS PARAGRAPH, THE DEPARTMENT SHALL CONSULT WITH THE PUBLIC SERVICE COMMISSION AS TO THE AVAILABILITY AND COST OF THE POLLUTION CONTROL EQUIPMENT.

(3) (I) A DECISION BY THE DEPARTMENT TO REDUCE OR WAIVE ANY PENALTY UNDER PARAGRAPH (2) OF THIS SUBSECTION SHALL BE SUBJECT TO JUDICIAL REVIEW BY ANY PERSON WHO MEETS THE THRESHOLD STANDING REQUIREMENTS UNDER FEDERAL CONSTITUTIONAL LAW.

Finally, we suggest that the rule's severability provisions be modified to ensure that the emission performance standards required by the rule would not apply in the event that U.S. EPA is required by judicial action to promulgate national Maximum Achievable Control Technology standards under section 112 of the Clean Air Act. If EPA is required to issue plant-specific MACT standards, Pennsylvania's mercury rule should ensure that

Pennsylvania generators are subject to the same national MACT standards as other states.

With these suggested revisions, the alternative mercury emission control framework outlined in the Veon Amendment would provide a more workable state-specific mercury control plan for Pennsylvania.

We appreciate the opportunity to submit these comments on the proposed DEP mercury rule, and hope that our perspective will be useful to the EQB as it proceeds with the development of a Pennsylvania mercury rule.

Sincerely,

/s/

Eugene M. Trisko  
General Counsel  
Unions for Jobs and  
The Environment

Attachments (2)

## AMENDMENTS TO SENATE BILL NO. 1201

Sponsor: REPRESENTATIVE VEON

Printer's No. 1735

1 Amend Title, page 1, lines 1 through 4, by striking out all  
2 of said lines and inserting

3 Providing for reductions of mercury in the environment from  
4 coal-fired power plants through a limited intrastate cap and  
5 trade program and emission limitations and for powers and  
6 duties of the Department of Environmental Protection and the  
7 Environmental Quality Board.

8 Amend Bill, page 1, lines 7 through 17; pages 2 and 3, lines  
9 1 through 30, page 4, line 1, by striking out all of said lines  
10 on said pages and inserting

11 Section 1. Short title.

12 This act shall be known and may be cited as the Mercury  
13 Emissions Reduction Act.

14 Section 2. Findings and declaration of purpose.

15 The General Assembly finds and declares as follows:

16 (1) Mercury is a persisteht and toxic pollutant that  
17 bioaccumulates in the environment.

18 (2) Accumulation of mercury in aquatic ecosystems has  
19 resulted in 45 states issuing fish consumption advisories.  
20 Pennsylvania has fish consumption advisories for mercury in  
21 80 waterways across this Commonwealth, which include  
22 Delaware, Ohio, Potomac and Susquehanna River basins and the  
23 Lake Erie basin.

24 (3) The mercury emission reductions called for by this  
25 act will help to reduce mercury deposition in Pennsylvania  
26 waterways, providing environmental and public health benefits  
27 in Pennsylvania exceeding those expected under the  
28 Environmental Protection Agency's Clean Air Mercury Rule  
29 (CAMR).

30 (4) Pennsylvania coal-fired power plants represent  
31 20,000 megawatts of capacity. These units accounted for  
32 approximately 77% of the more than five tons of mercury  
33 emitted into the air from all contamination sources in this  
34 Commonwealth.

35 (5) On March 15, 2005, the Environmental Protection  
36 Agency finalized CAMR which established standards of  
37 performance for mercury for new and existing coal-fired  
38 electric generating units. This rule establishes a cap and

1 trade program by which mercury emissions from new and  
2 existing coal-fired electric generating units are capped.

3 (6) In Pennsylvania the Phase 1 CAMR cap is 1.779 tons  
4 per year and the Phase 2 CAMR cap is 0.702 tons per year.  
5 This act is designed to cap mercury emissions from coal-fired  
6 power plants in this Commonwealth at 1.779 tons per year by  
7 2010 and by 0.702 tons per year by 2015, three years earlier  
8 than required by CAMR.

9 (7) This act in part is designed to take advantage of  
10 the co-benefit reductions that will occur under the Clean Air  
11 Interstate Rule (CAIR), designed to reduce sulfur dioxide and  
12 oxides of nitrogen emissions from electric generating units.  
13 The second phase of CAIR takes effect in 2015, the same year  
14 that the second phase of CAMR would commence in this  
15 Commonwealth.

16 (8) Significant mercury emission reductions can be  
17 obtained as a co-benefit of controlling sulfur dioxide and  
18 oxides of nitrogen emissions. Thus, the coordinated  
19 regulation of mercury, sulfur dioxide and oxides of nitrogen  
20 emissions allows mercury reductions to be achieved in a cost-  
21 effective manner.

22 (9) The implementation of CAMR alone will not ensure  
23 that emission reductions are achieved within this  
24 Commonwealth on a timely basis. Therefore, sources also must  
25 meet certain emission standards and install commercially  
26 available technology to achieve a 0.702 ton per year cap by  
27 2015.

### 28 Section 3. Definitions.

29 The following words and phrases when used in this act shall  
30 have the meanings given to them in this section unless the  
31 context clearly indicates otherwise:

32 "Affected CFB EGU." A new or existing CFB unit.

33 "Affected PCF EGU." A new or existing PCF unit.

34 "Air Pollution Control Act." The act of January 8, 1960  
35 (1959 P.L.2119, No.787), known as the Air Pollution Control Act.

36 "Board." The Environmental Quality Board of the  
37 Commonwealth.

38 "Clean Air Interstate Rule" or "CAIR." The final EPA  
39 regulatory action published at 70 Fed. Reg. 25162 (May 12, 2005)  
40 designed to reduce sulfur dioxide and oxides of nitrogen  
41 emissions from EGUs and known as the Clean Air Interstate Rule.

42 "Clean Air Mercury Rule" or "CAMR." The final EPA regulatory  
43 action published at 70 Fed. Reg. 28606 (May 18, 2005) designed  
44 to reduce mercury emissions from EGUs and known as the Clean Air  
45 Mercury Rule.

46 "CFB" or "circulating fluidized bed unit." Combustion of  
47 fuel in a bed or series of beds, including bubbling bed units  
48 and circulating bed units, of limestone aggregate or other  
49 sorbent materials in which these materials are forced upward by  
50 the flow of combustion air and the gaseous products of  
51 combustion and as otherwise defined under 40 CFR Pt. 60  
52 (relating to standards of performance for new stationary  
53 sources).

54 "Coal." All solid fuels classified as anthracite,  
55 bituminous, subbituminous or lignite by the American Society of  
56 Testing and Materials Standard Specification for Classification  
57 of Coals by Rank D388-77, 90, 91, 95, 98a or 99 and coal refuse.  
58 Synthetic fuels derived from coal for the purpose of creating  
59 useful heat, including, but not limited to, solvent refined

1 coal, gasified coal, coal-oil mixtures and coal-water mixtures  
2 are included in this definition for the purposes of this  
3 regulation.  
4 "Coal refuse." Waste products of coal mining, physical coal  
5 cleaning and coal preparation operations, such as culm or gob,  
6 containing coal, matrix material, clay and other organic and  
7 inorganic material.  
8 "Department." The Department of Environmental Protection of  
9 the Commonwealth.  
10 "EGU" or "electric generating unit." A stationary, coal-  
11 fired boiler or stationary, coal-fired combustion turbine in  
12 this Commonwealth serving at any time, since the later of  
13 November 15, 1990, or the start-up of the unit's combustion  
14 chamber, a generator with nameplate capacity of more than 25  
15 megawatts electric producing electricity for sale and as  
16 otherwise defined under 40 CFR Pt. 60 (relating to standards of  
17 performance for new stationary services).  
18 "MMBtu." One million British thermal units.  
19 "New EGU." An EGU which commenced construction, modification  
20 or reconstruction, as defined under 40 CFR Pt. 60 (relating to  
21 standards of performance for new stationary sources), on or  
22 after January 30, 2004.  
23 "PCF" or "pulverized coal-fired unit." A steam generating  
24 unit in which pulverized coal is introduced into an air stream  
25 that carries the coal to the combustion chamber of the steam  
26 generating unit where it is fired in suspension. The term  
27 includes both conventional pulverized coal-fired and  
28 micropulverized coal-fired steam generating units.  
29 "Phase 1." The period from January 1, 2010, through December  
30 31, 2014.  
31 "Phase 2." The period beginning January 1, 2015, and each  
32 subsequent year thereafter.  
33 "System-wide emissions averaging." Owners of two or more  
34 affected facilities under common ownership or operator control  
35 within this Commonwealth may achieve compliance with the annual  
36 emission limitation by ensuring that the mean mercury emissions  
37 of the total system would be less than the total emissions  
38 achieved through compliance with the applicable unit-specific  
39 mercury emission limitation. The aggregate mass emissions from  
40 all units, under the averaging plan, must be less than the mass  
41 emissions that would otherwise occur if each unit were subject  
42 to the applicable emissions limitation.  
43 Section 4. Environmental Quality Board.  
44 (a) Duty.--The board shall have the power and its duty shall  
45 be to adopt rules and regulations to implement the provisions of  
46 this act. The regulations adopted under this act shall be  
47 promulgated consistent with the provisions of the Air Pollution  
48 Control Act.  
49 (b) Proposed regulations.--The proposed regulations, adopted  
50 by the board on May 17, 2006, and published in the Pennsylvania  
51 Bulletin on June 24, 2006, to reduce mercury emissions from EGUs  
52 under the Air Pollution Control Act shall be deemed to have been  
53 proposed consistent with and under the authority of this act so  
54 long as the board's final rulemaking conforms to the  
55 requirements of this act.  
56 Section 5. Department of Environmental Protection.  
57 The department shall have the authority to establish a  
58 program to reduce mercury emissions from new and existing coal-  
59 fired power plants including, but not limited to, a program

1 authorizing the purchase or sale of mercury allowances among  
2 owners and operators of any affected EGU in this Commonwealth.  
3 Section 6. Emission standards.

4 (a) General rule.--The owners and operators of new and  
5 existing EGUs shall comply on a rolling 12-month basis with a  
6 numerical limitation established by regulation or minimum  
7 control efficiency established by regulation at each EGU as  
8 follows:

9 (1) For affected PCF EGUs with a nameplate capacity of  
10 200 megawatts and greater:

11 (i) An 80% control of total mercury measured from  
12 the coal input to the boiler by January 1, 2010.

13 (ii) A 90% control of total mercury measured from  
14 the coal input to the boiler by January 1, 2015.

15 (2) For affected CFB EGUs that burn 100% coal refuse, a  
16 95% control of total mercury by January 1, 2010.

17 (3) For affected CFB EGUs that burn 100% coal, a 90%  
18 control of total mercury by January 1, 2010.

19 (4) For all affected CFB units that burn any other  
20 combination of coal and coal refuse, a prorated emission  
21 standard based on the percentage of heat input from the coal  
22 and the percentage of heat input from the waste coal as  
23 determined by the board through regulation.

24 (5) Notwithstanding the requirements of subsection  
25 (a)(1) for affected PCF EGUs with a nameplate capacity less  
26 than 200 megawatts that employ mercury-specific control  
27 technology, including activated carbon or other sorbent  
28 injection technologies, at least a 70% control of total  
29 mercury by January 1, 2010.

30 (b) Alternative.--Notwithstanding the emission standards  
31 established under this act, the department shall approve in an  
32 applicable plan approval or operating permit, or both, an  
33 alternative mercury emission standard or compliance schedule, or  
34 both, if the owner or operator of an affected EGU demonstrates  
35 in writing to the department's satisfaction that the mercury  
36 reduction requirements are not technologically or economically  
37 feasible.

38 Section 7. Limited intrastate trading program.

39 (a) Compliance with limitations.--In addition to the annual  
40 emission standards established under section 6, the owner or  
41 operator of a new or existing EGU shall comply with the emission  
42 limitations established by the department.

43 (b) Caps.--A Phase 1 cap of 1.779 tons per year shall become  
44 effective in 2010 and a Phase 2 cap of 0.702 tons per year shall  
45 become effective in 2015. Owners and operators of affected EGUs  
46 must demonstrate compliance with the emission limitation by  
47 holding one allowance for each ounce of mercury emitted in any  
48 given year. Allowances shall be transferable among all affected  
49 EGUs within this Commonwealth in accordance with the provisions  
50 of this section.

51 (c) Allowance set aside.--For each calendar year beginning  
52 January 1, 2010, the department shall set aside a total number  
53 of annual allowances for the owners and operators of existing  
54 EGUs in this Commonwealth according to a formula based on  
55 baseline heat input in MMBtu and other factors deemed  
56 appropriate by the department. The department shall also set  
57 aside allowances for new sources for future economic growth.

58 (d) Duty of owner or operator.--The sale of mercury  
59 allowances within the limited intrastate trading program

1 established under this section shall occur only after an EGU  
2 owner or operator demonstrates in writing to the department that  
3 the EGUs under common ownership or operator control are in  
4 compliance with both the mercury emission standard and annual  
5 emission limitation established for each coal-fired EGU. Such  
6 demonstration shall not be required more often than once each  
7 calendar year in which allowance sales occur.

8 (e) Common ownership or operator control.--The owners or  
9 operators of two or more affected facilities under common  
10 ownership or operator control within this Commonwealth may  
11 achieve compliance with the annual emission limitation through a  
12 systemwide emissions averaging plan, established by regulation.  
13 Section 8. Severability and relations to other laws and  
14 regulations.

15 (a) Severability.--The provisions of this act are severable.  
16 If any provision of this act, or part thereof, or its  
17 application to any person shall be held invalid, the invalidity  
18 shall not affect other provisions or applications of this act  
19 which can be given effect without the invalid provisions or  
20 applications.

21 (b) Effect of regulation or court decision.--The statutory  
22 authority to reduce mercury emissions from EGUs and the  
23 regulations authorized by this act and promulgated under the  
24 authority of this act and the Air Pollution Control Act remain  
25 in full force and effect and shall be unaffected in the event  
26 that any of the following occur:

27 (1) The Environmental Protection Agency amends the CAMR.

28 (2) The Environmental Protection Agency promulgates  
29 regulations establishing performance or emission standards to  
30 control mercury emissions from EGUs under section 112 of the  
31 Clean Air Act (69 Stat. 322, 42 U.S.C. § 7401 et seq.), which  
32 regulations are incorporated by reference under section 6.6  
33 of the Air Pollution Control Act.

34 (3) The decision of a court of competent jurisdiction  
35 vacates, remands or otherwise orders changes to CAMR that  
36 impose requirements on EGUs to control mercury emissions.

37 (c) Additional requirements.--Nothing in subsection (b) or  
38 in this act shall limit or otherwise affect the department's or  
39 board's authority to develop or promulgate additional  
40 requirements or standards to control mercury emissions from EGUs  
41 to comply with applicable requirements of the Clean Air Act.

42 (d) Additional or expanded cap.--Subject to the requirements  
43 of subsection (b), in the event that the Commonwealth receives  
44 an additional or expanded annual mercury emissions cap beyond  
45 that currently established by CAMR, as a result of a successful  
46 challenge to CAMR in Federal court, the additional or expanded  
47 annual mercury emissions cap shall be used to assist new and  
48 existing sources as determined by the board through regulation.  
49 Section 9. Effective date.

50 This act shall take effect immediately.

**2006 Electric Utility Environmental Conference**

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**“Mercury Sorbent Injection with  
Cold-Side ESPs”**



**Sorbent Technologies Corporation**

Sid Nelson Jr.; Ron Landreth, Ph.D.; Xin Liu, Ph.D.;

Zhong Tang, Ph.D.; & Jon Miller

# Conclusion: B-PAC Appears Widely Applicable

<u>Coal</u>	<u>PM Unit</u>	<u>Hg Removal</u>	<u>lb/MMacf</u>	<u>Plant</u>	<u>Utility</u>	<u>Data</u>
Bitum. Low-S	CS ESP	85%	5.0	Allen	Duke	Apogee/ST
Bitum. High-S	CS-ESP	70%	4.0	Lausche	OhioU	SorbTech
Bitum. HighSO <sub>3</sub>	CS ESP	NA**	4.0	Merrimack	PSNH	SorbTech
Bitum. Low-S	HS ESP	80%*	6.4	Cliffside	Duke	SorbTech
Bitum. Low-S	HS ESP	50%	5.0	Buck	Duke	SorbTech
Subbitum. Blend	CS-ESP	90%	3.0	St. Clair	Detroit Ed.	SorbTech
Subbituminous	CS-ESP	90+%	3.0	St. Clair	Detroit Ed.	SorbTech
Subbituminous	CS-ESP	90%	3.2	Stanton 1	GRE	EERC/URS
Lignite	SD/FF	95%	1.5	Stanton 10	GRE	EERC/URS
Lignite	CSESP**	70%***	1.5	Stanton 10	GRE	EERC/URS

\* when under low-load conditions at this plant.

\*\* Public Service of New Hampshire has not yet publicly released this data.

\*\*\* actually the in-flight Hg removal across the spray dryer.



## Summary

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1. Sorbent injection into ESPs is simple, inexpensive, increasingly demonstrated, and commercially-available.
2. Brominated PAC (B-PAC) appears to be the best and most cost-effective mercury control available for many typical sorbent injection applications.
3. Careful sorbent evaluations can lower costs 50% or more.
4. Western coals are less expensive for retrofit Hg control, particularly compared to plants with high  $SO_3$ .

