

**MERCURY EMISSIONS PETITION**

**ENVIRONMENTAL QUALITY BOARD MEETING**

**AUGUST 16, 2005**

## **The Pennsylvania Department of Environmental Protection's Perspective on Petitioners' Comments on the Mercury Emissions Petition Report**

**July 26, 2005**

### **Background**

On August 9, 2004, Citizens for Pennsylvania's Future (PennFuture), PennEnvironment, Pennsylvania Federation of Sportsmen's Clubs, Pennsylvania NOW, Pennsylvania State Building and Construction Trades Council, Pennsylvania Trout, Planned Parenthood Pennsylvania Advocates, Sierra Club Pennsylvania Chapter, Women's Law Project, and WomenVote PA (hereinafter "Petitioners") filed a petition for rulemaking, under 25 Pa. Code Chapter 23, requesting that the Pennsylvania Environmental Quality Board (EQB) adopt regulations to reduce mercury emissions from electric utilities located in the Commonwealth of Pennsylvania. Since the original filing of the petition, an additional 39 organizations have declared their intent to be co-petitioners. The petitioners seek to protect human health and the environment through the regulation of mercury emissions from coal-fired power plants in the Commonwealth. The petitioners requested that the Department exercise its statutory authority under the Pennsylvania Air Pollution Control Act (APCA), 35 P.S. § 4001 *et seq.*, and develop a regulatory program to "reduce the high emissions of mercury from Pennsylvania electric utilities." In Attachment A of the petition and supporting documents filed with the EQB, the petitioners suggested draft regulatory language including a mercury emission rate not to exceed 3.00 mg/MW-hr or a mercury control level of at least 90%.

In October 2004, the petition for rulemaking was accepted by the EQB for consideration. In January 2005, the Board granted the Department a 120-day extension to complete the report, required under Chapter 23.

The Department responded to the petition with a report entitled, "Response To Petition For The Development Of Regulations To Control Mercury Emissions" and sent that report to PennFuture on May 18, 2005. Subsequently, the National Wildlife Federation and PennFuture submitted comments on the report to the Department on June 17 and June 16, 2005, respectively.

### **Recommendation**

On August 16, 2005, the Department will recommend, based on the report and petitioners' comments, that a rulemaking to reduce mercury emissions be developed for EQB consideration. During the development of its regulatory proposal, the Department will confer with stakeholders including the Air Quality Technical Advisory Committee, the Citizens Advisory Council, the petitioners and representatives of the potentially regulated community.

## **National Wildlife Federation (NWF)**

### **NWF Comment:**

**Require 90 percent mercury control within three years of finalizing a rule.** The goal of this rule should be the greatest reductions feasible over a three year time period, recognizing the need for compliance flexibility to address technical obstacles or to gain multi-pollutant improvements. Such flexibility, however, should not include setting a less stringent control standard.

### **PA DEP Position:**

On page 7 of “Response To Petition For The Development Of Regulations To Control Mercury Emissions From Coal-Fired Utility Boilers” the Department sets forth its position on establishing cost effective and achievable mercury emission limits. We stated that, “The Department believes there should be separate emission standards for new and existing coal-fired boilers. Emission standards for new sources should be more stringent and held to a higher control technology standard because these new sources are designed prior to construction and must, at a minimum, install the best available control technology.” It is further stated, “As a result, the Department believes it is more appropriate to establish a cost effective level of control that is reasonably achievable taking into consideration various factors including source configurations.” And that, “In addition, the Department is also on record that EPA’s final mercury rulemaking inappropriately establishes emission standards based on the type of coal instead of the class, type or size of the source of emissions.”

The Department will recommend to the EQB the development of a rulemaking that effectively reduces the emissions of mercury in Pennsylvania and will at that time determine what level of control (i.e., % reduction and/or lb Hg/MW-hr) is cost effective for new and existing coal-fired utility boilers, and what timeframe is appropriate in which to apply the control. The Department will establish the compliance schedule during the regulation development process.

### **NWF Comment:**

**Set a percent reduction or emission rate standard.** A number of states have adopted an either/or compliance approach. It provides companies flexibility and could provide regulatory relief to companies already operating at a low emission rate or that already are capturing a significant amount of the mercury releases.

### **PA DEP Position:**

While developing the rule, the Department will review and consider this approach as it provides some flexibility for achieving mercury emission reductions.

**NWF Comment:**

**Include mechanisms to limit backsliding.** As with any rate-based standard, emissions of mercury could increase gradually over time if coal capacity increases. Some mechanism needs to be in place to prevent this from occurring.

**PA DEP Position:**

The Department agrees and intends to propose mercury emission limits that would allow compliance demonstrations based on either a percent reduction or an emission rate standard (lb Hg/MW-hr). This approach would allow the owners and operators of affected facilities to comply with either a percent reduction or emission rate.

It is important to note that state plans adopted under Section 111(d) of the Clean Air Act may be more stringent than federal requirements. Consequently, the proposal developed for EQB consideration would establish emission reduction requirements below the federal cap of 1.78 tons of mercury per year for 2010 to 2017 and 0.702 tons of mercury per year for 2018 and beyond. Therefore, backsliding of the aggregate of the power plants would be prevented.

**NWF Comment:**

**Set an output-based standard to encourage efficiency.** Significant environmental gains can be made by improving the efficiency of today's coal burning power industry – today power plants operate, on average, at less than 35 percent efficiency. Given that coal burning is the largest source of air pollution and carbon pollution in Pennsylvania, every effort should be made to burn coal as efficiently as possible to reduce these releases. An output based standard would reward companies that already are efficient and would force others to begin to address this long overdue issue.

**PA DEP Position:**

The Department agrees that environmental gains can be made by improving the efficiency of producing electrical power from the energy released from burning coal. The Department will examine the feasibility of proposing an output-based standard in consultation during the development of a regulatory proposal for EQB consideration.

**NWF Comment:**

**Encourage investment in clean technologies for existing and new plants.** Given that only 27% of the coal-fired boilers in Pennsylvania currently have sulfur controls installed, and 26% have efficient particulate controls installed, the agency should explore options for encouraging investments that would tackle mercury and other pollutants of concern, including sulfur,

nitrogen, and fine particle emissions. At least one state has incorporated a multi-pollutant incentive into their rule, giving companies an additional two years (beyond the initial three) to comply with their mercury limit. This approach should be given strong consideration in states that are home to aging power plants (which, on average, are over 35 years old), that are not operating with the latest pollution control technology and that need to be modernized swiftly.

**PA DEP Position:**

The Department agrees that a multi-pollutant approach will achieve emission reductions for multiple pollutants, and not just mercury, which makes it a much more cost-effective approach. During the development of the mercury reduction regulation, the co-benefits derived from complying with other applicable requirements to reduce pollutants such as nitrogen oxides and sulfur dioxides will be considered.

**NWF Comment:**

**Require installation of continuous emission monitors.** Accurate measurement of total mercury releases is essential for compliance purposes. The most effective method is continuous emission monitors. This technology is very close to being widely commercially available, and should be required for all power companies. No other measurement technique is equivalent in its accuracy.

**PA DEP Position:**

The Department agrees with the importance in accurately measuring total mercury releases on a real time basis and will thoroughly investigate the availability of continuous mercury emission monitors while developing mercury control regulations for coal-fired utility boilers.

**NWF Comment:**

**Non-utility emission reductions should not be used to meet reduction target.** It is essential that this rule require reductions in mercury emissions from power plants, and not from non-utility sources. Also, we oppose the use of alternative compliance plans that would allow a power plant to fund community mercury clean up efforts in lieu of making emission reductions.

**PA DEP Position:**

The Department agrees that mercury emissions from power plants must be addressed. These sources account for approximately 77% of the actual mercury emissions in the Commonwealth's emissions inventory. However, we will examine options for reducing mercury emissions from other sources and will also pursue other cost-effective community mercury clean-up efforts.

## **PennFuture**

### **PennFuture Comment:**

DEP provided no specifics about its intended approach to reducing mercury pollution from Pennsylvania sources.

### **PA DEP Position:**

On page 11 of the Department's May 18 report, five priorities for the proposed regulation were set forth:

1. Examines mercury emission reduction strategies for electric generating units and other major emitter source categories.
2. Provides a mechanism for mercury "hotspot" impact assessment.
3. Encourages repowering with advanced clean-coal technologies by providing options for sources that could be so rebuilt.
4. Encourages the burning of cleaner PA coal and concomitantly discourages fuel switching to dirtier coal types.
5. Considers capacity and reliability concerns for delivery of power over the electric grid.

The Department intends to develop a regulatory approach to reduce mercury emissions in consultation with the Air Quality Technical Advisory Committee, the Citizens Advisory Council and other stakeholders including the petitioners and representatives of the potentially regulated community.

### **PennFuture Comment:**

The principles for action announced by DEP at the end of its response could undermine the effectiveness of a rule and fail to deliver the type of reductions that are necessary and feasible in the near term.

### **PA DEP Position:**

Nothing presented by the DEP's response to the petition precludes the Department from issuing appropriate rules pertaining to the control of mercury emissions from electric utility steam generating units.

### **PennFuture Comment:**

At one point in its response, DEP calls for “a cost effective level of control that is reasonably achievable taking into consideration various factors including source configurations” (DEP, p. 7). We believe that this formulation of the appropriate control standard is too open-ended, and could lead to higher levels of mercury pollution and risk to human health than should be allowed.

**PA DEP Position:**

Pennsylvania’s mercury regulation will be more stringent than the recently promulgated federal CAMR. The CAMR, adopted under Section 111 of the CAA, is EPA’s first attempt to regulate mercury from coal-fired utilities. Although EPA elected to develop its mercury requirements for coal-fired boilers under Section 111 of the CAA, Section 112 (d)(1) of the CAA authorizes the EPA Administrator to “distinguish among classes, types and sizes within a category or subcategory” in establishing emission limits for MACT standards. Thus, even for a technology-based standard, the CAA provides the statutory basis to take into account various source configurations. During the development of the Department’s mercury regulation, source configurations will be considered.

**PennFuture Comment:**

In developing its mercury regulation, we urge DEP to approach the issue from the “maximum achievable control technology” perspective that DEP has demanded of EPA for mercury regulation, a more protective standard than the “reasonable achievable” approach also mentioned by DEP in its response to our petition.

**PA DEP Position:**

The Department will develop a regulatory proposal for EQB consideration that effectively reduces the emissions of mercury in Pennsylvania and will at that time determine what level of control (i.e., % reduction and/or lb Hg/MW-hr) is cost effective for new and existing coal-fired utility boilers, and what timeframe is appropriate in which to apply the control. The Department will establish the compliance schedule during the regulation development process.

The mercury emission standard developed for “new sources” will meet the best available technology requirements set forth in Section 6.6(c) of the Air Pollution Control Act, 35 P.S. § 4006.6(c) and 25 Pa. Code § 127.12(a)(5). The term, “best available technology” is defined as “equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be available.” See, 25 Pa. Code § 121.1. Therefore, as an air contaminant, mercury emissions from “new sources” must be controlled through the use of best available technology.

**PennFuture Comment:**

We believe that that a wide range of options exist for existing coal-fired boilers to control their emissions by 90 percent. DEP intends that more stringent standards for new plants mean that older sources would not be required to reduce emissions to the maximum extent possible, we disagree with DEP's approach to this issue.

**PA DEP Position:**

On page 7 of "Response To Petition For The Development Of Regulations To Control Mercury Emissions From Coal-Fired Utility Boilers" the Department sets forth its position on establishing cost effective and achievable mercury emission limits. We stated that, "The Department believes there should be separate emission standards for new and existing coal-fired boilers. Emission standards for new sources should be more stringent and held to a higher control technology standard because these new sources are designed prior to construction and must, at a minimum, install the best available control technology." It is further stated, "As a result, the Department believes it is more appropriate to establish a cost effective level of control that is reasonably achievable taking into consideration various factors including source configurations." "In addition, the Department is also on record that EPA's final mercury rulemaking inappropriately establishes emission standards based on the type of coal instead of the class, type or size of the source of emissions."

The Department is committed to the development of a rulemaking that effectively reduces the emissions of mercury in Pennsylvania and will at that time determine what level of control (i.e., % reduction and/or lb Hg/MW-hr) is cost effective for new and existing coal-fired utility boilers, and what timeframe is appropriate in which to apply the control. The Department will propose a compliance schedule for review and comment during the rulemaking process.

**PennFuture Comment:**

DEP's response to our petition implies that mercury controls for Pennsylvania's boilers either will not be able to achieve significant mercury reductions or will be cost-prohibitive.

**PA DEP Position:**

The Department does not take the stance that mercury controls for PA's boilers will be cost prohibitive or that significant mercury reductions are not achievable.

**PennFuture Comment:**

We urge DEP to focus on developing a mercury rule that will achieve the maximum possible reductions in mercury emissions without attempting to promote specific types of coal.

**PA DEP Position:**



The Department strongly opposes the “coal ranking” or sub-categorization based on coal type. The regulatory proposal developed for EQB consideration will not set standards that are coal type specific. Sub-categorization may promote fuel switching away from cleaner Pennsylvania coal towards dirtier sub-bituminous coal. The U.S. EPA’s sub-categorization approach leads to a direct bias against eastern bituminous and anthracite coals. As a result of this inequity, Pennsylvania would continue to be impacted adversely by mercury emissions transported from areas requiring little or no reduction in mercury emissions. Mercury is a health hazard regardless of where it is emitted and from what type of coal. The overall goal of DEP’s mercury rule will be to greatly reduce mercury emissions.

**PennFuture Comment:**

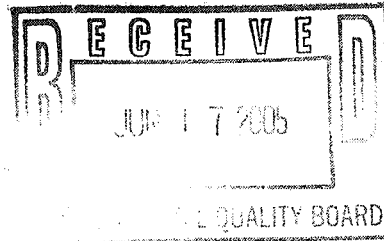
DEP recommends that its regulatory approach consider capacity and reliability concerns for delivery of power over the electric grid (DEP, p. 11). DEP appears to presume that the installation of mercury-reducing technology will have an impact on capacity and reliability. We believe this concern is misplaced. If DEP has developed evidence to support its concerns as to capacity and reliability, we request the opportunity to review and comment on your data.

**PA DEP Position:**

It’s imperative, for national security reasons, among others, that in the process of developing and implementing the new mercury control technology that the amount of electricity capable of being produced in Pennsylvania not be curtailed. Considering that the long-term reliability and performance data of mercury specific control is limited, the Department will draft a regulation that would prevent a possible shortage of electricity from Pennsylvania facilities. We also need to consider any impact that implementing the mercury control technology could have on reliability. We have no data on the viability of the electric grid. However, as stated in the May 18 report, reliability is a concern that we intend to address as we develop our proposed regulatory package.



June 16, 2005



**By E-mail and by Fedex**

Environmental Quality Board  
P.O. Box 8477  
Harrisburg, PA 17105-8477

Re: Petition for Rulemaking--Mercury Emissions

To the Environmental Quality Board:

On behalf of the Co-Petitioners, these comments reply to the response by the Department of Environmental Protection to our petition for rulemaking on mercury emissions. We appreciate the opportunity to reply and your consideration of our comments.

Citing serious risks to human health and the environment, our petition requested that DEP adopt rules to sharply reduce emissions of mercury to the air in Pennsylvania. Our petition included a model rule for DEP's consideration based on New Jersey regulations, which provide for a 90% control efficiency in reducing mercury pollution from certain sources.

In general, we believe that DEP's response shows that it understands many of our concerns, from the nature of the threat to EPA's failure to take effective action. However, DEP provided no specifics about its intended approach to reducing mercury pollution from Pennsylvania sources. In fact, the principles for action announced by DEP at the end of its response could undermine the effectiveness of a rule and fail to deliver the type of reductions that are necessary and feasible in the near term.

### The Need for Action

We agree with many of DEP's statements about the risks posed by mercury. As cited in our petition, we agree that 630,000 babies are born each year in the United States with levels of mercury in their blood that put them at risk of developmental disabilities (DEP, p. 1). We agree that the environmental impacts of mercury are significant, widespread, and adverse (DEP, p. 1). We agree that local emissions of mercury can have local harmful impacts (DEP, pp. 1, 3). We also agree that EPA's recent rulemaking on mercury is inadequate and agree with DEP's opposition to trading mercury emissions, which could create "hot spots" of mercury exposure (DEP, pp. 7, 11).

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### Availability of Controls

Effective mercury control technology exists and has been demonstrated to be effective on all coal and boiler types during full-scale testing. We believe that DEP's survey of plants that have been tested using activated carbon injection (DEP, pp. 10-11) is consistent with the references cited in our petition, and demonstrates that sources with a wide range of existing control configurations will be able to comply with a regulation that requires 90% control efficiency.

### Legal Standard for Controls

At one point in its response, DEP calls for "a cost effective level of control that is reasonably achievable taking into consideration various factors including source configurations" (DEP, p. 7). We believe that this formulation of the appropriate control standard is too open-ended, and could lead to higher levels of mercury pollution and risk to human health than should be allowed.

As discussed in our petition, Pennsylvania DEP officials were sharply critical of EPA for proposing to regulate mercury under Section 111 of the Clean Air Act (Petition, p. 5). Instead, they urged EPA to regulate under Section 112 of the Clean Air Act, and have since filed suit to challenge EPA's action under Section 111. Under Section 112, emissions standards for new or existing sources of hazardous air pollutants (HAPs) shall require the maximum degree of reduction of emissions, taking into account various factors. As DEP notes elsewhere in its response, "regulation under Section 112 has been historically and consistently interpreted as requiring HAPs to be controlled through installation and operation of maximum achievable control technology" (p. 8).

In developing its mercury regulation, we urge DEP to approach the issue from the "maximum achievable control technology" perspective that DEP has demanded of EPA for mercury regulation, a more protective standard than the "reasonably achievable" approach also mentioned by DEP in its response to our petition.

### Control Options

DEP states that standards for new sources of mercury should be more stringent than standards for existing sources (DEP, p. 7). We agree that new sources could achieve 90% or greater control with careful multi-pollutant design for conventional boilers or the adoption of integrated gasification combined cycle technology (which can achieve mercury control efficiency well in excess of 90%). However, we also firmly believe that a wide range of options exist for existing coal-fired boilers to control their emissions by 90 percent.

Pennsylvania sources include many old, large capacity coal-fired plants, several of which are among the worst mercury polluters in the nation. To achieve sharp overall reductions in mercury emissions, we must achieve maximum reductions from these old plants. The age of boilers at these plants does not preclude installation of controls. If

DEP intends that more stringent standards for new plants mean that older sources would not be required to reduce emissions to the maximum extent possible, we disagree with DEP's approach to this issue.

DEP claims that New Jersey has a limited number of coal-fired boilers that may not be representative of Pennsylvania's coal-fired boilers and cites this as a reason for not wanting to adopt New Jersey's regulatory approach (DEP, p. 7). In fact, with few exceptions, Pennsylvania's coal-fired boilers are similar to those found in New Jersey; the difference is that New Jersey's fleet is smaller. Like half of the 1,000 or so boilers in the United States, Pennsylvania's boilers are either tangential- or wall-fired units with cold-side electrostatic precipitators as the predominant particulate control. A few Pennsylvania facilities have fabric filters and several have flue gas desulfurization units. These configurations are the most common for bituminous-fired boilers and offer many options to reduce mercury emissions by either additional/optimized conventional controls or mercury-specific technologies.

DEP's response to our petition implies that mercury controls for Pennsylvania's boilers either will not be able to achieve significant mercury reductions or will be cost-prohibitive. However, we are confident that, upon further investigation, DEP will find readily available and cost-effective technologies for controlling mercury from Pennsylvania's coal-fired boilers.

#### Combustion of Pennsylvania Coal

DEP recommends that its regulatory approach encourage the burning of Pennsylvania coal (DEP, p. 11). We do not agree that this should be a priority for DEP action on mercury pollution.<sup>1</sup> Co-Petitioners do not seek a mercury regulation that will encourage additional new extraction and combustion of Pennsylvania coal; rather, we urge DEP to craft a rule that ensures that coal burning in Pennsylvania--regardless of where the coal originates--is done in the cleanest, most efficient manner possible.

For these reasons, we urge DEP to focus on developing a mercury rule that will achieve the maximum possible reductions in mercury emissions without attempting to promote specific types of coal.

#### Capacity and Reliability Concerns

DEP recommends that its regulatory approach consider capacity and reliability concerns for delivery of power over the electric grid (DEP, p. 11). DEP appears to presume that the installation of mercury-reducing technology will have an impact on capacity and reliability. We believe this concern is misplaced.

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<sup>1</sup> We also question whether the promotion of Pennsylvania coal extraction is a legally defensible basis for developing a regulation under the Air Pollution Control Act.

PJM, the system operator that serves most of Pennsylvania, reports a 27% reserve margin over peak load. The margin required for adequate generation is 15%, an amount at which PJM expects just one day of inadequate generation in 10 years. So, Pennsylvania has a significant surplus reserve margin over peak load.

Further, DEP has offered no evidence that cleaning up mercury would require taking generating units out of service for an amount of time that would impact the grid. In fact, journal articles authored by representatives of the Electric Power Research Institute and the Department of Energy, among others, conclude that installation of activated carbon technology results in minimal downtime.

If DEP has developed evidence to support its concerns as to capacity and reliability, we request the opportunity to review and comment on your data.

### Conclusion

For these reasons, we urge DEP to adopt a regulation for the reduction of mercury emissions that:

- applies to coal-fired boilers as defined in the suggested regulatory language submitted with our petition;
- requires at least 90% mercury control efficiency from all subject new and existing sources, including maximum possible reductions from existing plants, consistent with the standards in our suggested regulatory language;
- does not allow trading between plants;
- focuses on emission reductions without promoting any specific type of coal;
- requires 90% control efficiency by three years from issuance of the final DEP rule.

A list of the organizations that have signed on to this response is attached. Thank you for your attention to our comments.

FOR THE CO-PETITIONERS



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Erie County Environmental Coalition  
Erie Region Conservancy  
Friends of the Nescopeck  
Gaia Defense League  
Green Valleys Association  
Ground Zero Action Network  
Mountain Watershed Association  
Learning Disabilities Association of America  
Liberty Resources, Inc.  
National Wildlife Federation  
PennEnvironment  
Pennsylvania Council of Churches  
Pennsylvania Federation of Sportsmen's Clubs  
Pennsylvania Interfaith Climate Change Campaign  
Pennsylvania League of Conservation Voters  
Pennsylvania PTA  
Sierra Club Pennsylvania Chapter  
Ten Mile Creek Watershed Conservancy  
Tri-State Citizens Mining Network  
Women's Health and Environmental Network  
Women's Way  
Yough Riverkeeper



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June 17, 2005

Kathleen McGinty, Secretary  
Pennsylvania Department of Environmental Protection  
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Dear Secretary McGinty:

We are writing in response to the May 18, 2005 report submitted by your agency to the Environmental Quality Board in response to the petition filed by PennFuture. As you know, National Wildlife Federation and its affiliate Pennsylvania Federation of Sportsmen's Clubs joined PennFuture on this important petition.

We were encouraged by your decision to move forward with a state rulemaking process to curb mercury releases from coal-fired power plants in Pennsylvania. It's evident that swift progress can be made to reverse mercury contamination if aggressive steps are taken to address all mercury sources. Given that such progress is unlikely at the federal level, it is imperative for states like Pennsylvania to move forward, as you have indicated.

A number of states have already invested significant resources evaluating the technical and economic feasibility of controlling mercury from power plants, including regulatory strategies and compliance options. We encourage you to build on the efforts of other states, especially Massachusetts, Connecticut, and New Jersey, where the end result was a regulatory framework that achieved significant mercury reductions over a three to five year time period. While we recognize that Pennsylvania has its own unique challenges, many of the underlying principles and rulemaking elements could be applied in Pennsylvania.

As you know, National Wildlife Federation has been an integral player in the federal rulemaking effort, having participated in the two-year stakeholder process that preceded the proposal of the rule. In this capacity, NWF spent considerable time developing recommendations on how a rule should be crafted, and what specific components should be integrated into the final rule. NWF also has provided technical and policy support to state mercury rulemaking efforts in Wisconsin,

Michigan, and Indiana, as well as in the Northeast, and is happy to provide any insights from this experience that may be useful.

As your Department begins its own rulemaking process, we urge you to consider incorporating the following regulatory elements. We strongly believe that there is sufficient technical and economic data to support the integration of all these elements; in some cases, the precedent has already been set by other states.

***Require 90 percent mercury control within three years of finalizing a rule.*** The goal of this rule should be to achieve the greatest reductions feasible over a three year time period, recognizing the need for compliance flexibility to address technical obstacles or to gain multi-pollutant improvements. Such flexibility, however, should not include setting a less stringent control standard.

***Set a percent reduction or emission rate standard.*** A number of states have adopted an either/or compliance approach. It provides companies flexibility and could provide regulatory relief to companies already operating at a low emission rate or that already are capturing a significant amount of their mercury releases.

***Include mechanisms to limit backsliding.*** As with any rate-based standard, emissions of mercury could increase gradually over time if coal capacity increases. Some mechanism needs to be in place to prevent this from occurring.

***Set an output-based standard to encourage efficiency.*** Significant environmental gains can be made by improving the efficiency of today's coal burning power industry—today power plants operate, on average, at less than 35 percent efficiency. Given that coal burning is the largest source of air pollution and carbon pollution in Pennsylvania, every effort should be made to burn coal as efficiently as possible to reduce these releases. An output based standard would reward companies that already are efficient and would force others to begin to address this long overdue issue.

***Encourage investment in clean technologies for existing and new plants.*** Given that only 27% of the coal-fired boilers in Pennsylvania currently have sulfur controls installed, and 26% have efficient particulate controls installed, the agency should explore options for encouraging investments that would tackle mercury and other pollutants of concern, including sulfur, nitrogen, and fine particle emissions. At least one state has incorporated a multi-pollutant incentive into their rule, giving companies an additional two years (beyond the initial three) to comply with their mercury limit. This approach should be given strong consideration in states that are home to aging power plants (which, on average, are over 35 years old), that are not operating with the latest pollution control technology and that need to be modernized swiftly.

***Require installation of continuous emission monitors.*** Accurate measurement of total mercury releases is essential for compliance purposes. The most effective method is continuous emission monitors. This technology is very close to being widely commercially available, and should be required for all power companies. No other measurement technique is equivalent in its accuracy.



***Non-utility emission reductions should not be used to meet reduction target.*** It is essential that this rule require reductions in mercury emissions from power plants, and not from non-utility sources. Also, we oppose the use of alternative compliance plans that would allow a power plant to fund community mercury clean up efforts in lieu of making emission reductions.

When the rulemaking effort is underway, NWF's technical staff would welcome the opportunity to meet with your staff to discuss any of the issues raised in this letter. In addition, as you know we analyzed the cost to Pennsylvania's electricity consumers if every power plant had to install activated carbon injection to meet a 90 percent control efficiency target. The monthly charge was minimal—about \$1.00. If you are interested in learning more about our Pennsylvania cost analysis, we'd be glad to give a short presentation.

Pennsylvania's 1.2 million anglers – and all who treasure the state's fish, wildlife, and outdoor recreation opportunities – are counting on the DEP to follow-up its positive announcement with aggressive action to reduce mercury emissions from the state's power plants. We look forward to working closely with you to make this happen.

Thank you, Secretary McGinty, for your leadership on this issue.

With kind regards,

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**RESPONSE TO PETITION  
FOR THE DEVELOPMENT OF REGULATIONS  
TO CONTROL MERCURY EMISSIONS  
FROM COAL-FIRED UTILITY BOILERS**

**By  
PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION  
BUREAU OF AIR QUALITY  
HARRISBURG, PA**

**May 18, 2005**

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## **I. BACKGROUND INFORMATION ON MERCURY**

### **A. Mercury is a Toxic Pollutant of Concern**

Mercury is a persistent, toxic, bio-accumulative pollutant. There is extensive scientific data that substantiates the adverse effects of mercury on the development of the brain in humans and animals. These adverse effects can include mental retardation, cerebral palsy, deafness, blindness and certain speech disorders. According to EPA's own scientists, more than one child in six born in the United States could be at risk for developmental disorders as a result of mercury exposure in the mother's womb. This finding is double EPA's previous estimates and shows that 630,000 of the 4 million babies born each year could be at risk of developmental disorders. Mercury deposition to and accumulation in the aquatic ecosystem has resulted in 45 states issuing fish consumption advisories. In short, mercury is a highly toxic pollutant – one specifically targeted by Congress when it amended Section 112 of the federal Clean Air Act in 1990. The environmental impacts of mercury are significant, widespread and adverse.

### **B. Global Mercury Emissions**

Mercury cycles throughout the environment as a consequence of both natural and human activities. The annual global cycling of mercury in the earth's atmosphere amounts to about 5,000 tons. It is estimated that 4,000 tons are the consequence of anthropogenic activities. The United States is responsible for 3 percent of the global anthropogenic emissions. Coal-fired power generation in the United States contributes approximately forty percent of this amount.

A recent Florida Everglade Study indicates that mercury concentrations found in fish and wading birds in the Everglades have dropped by 60 to 70 percent due to local mercury emission reduction efforts. This illustrates the point that despite the fact that there are global mercury transportation issues, local emission reduction efforts are very significant to the local air quality and environmental impacts.

As a consequence of the large, natural emissions of mercury to the atmosphere and the difficulty in accurately measuring anthropogenic emissions, these emissions and their subsequent influence on terrestrial deposition and uptake in the food chain is a subject of significant uncertainty. Nonetheless, the EPA has already issued regulations to control emissions from several types of processes, including municipal waste combustors and medical waste incinerators, and has recently issued final regulations for coal-fired power generators (i.e., electric utilities). Municipal waste combustors are estimated to emit nearly 4.3 percent of all U.S. anthropogenic emissions. Medical waste incinerators emitted nearly 2.4 percent of all U.S. anthropogenic emissions of mercury. Coal-fired utility boilers are estimated to emit nearly 40.8 percent of all U.S. anthropogenic emissions for a total of 47.8 tons per year of mercury. Based on the U.S. EPA Office of Air Quality Planning and Standards' 1999 National Emissions Inventory for Hazardous Air Pollutants, it was estimated that Pennsylvania utilities emitted 10.4% of the total mercury emissions from all U.S. coal-fired utilities. Currently, electric

generating units in Pennsylvania are the third largest emitters of mercury in the U.S. (4.4 tons), behind Texas and Ohio, which accounts for 77% of Pennsylvania's total mercury inventory.

### **C. Forms of Mercury Emitted**

Typical mercury (Hg) concentrations in uncontrolled flue gas are in the low parts per billion range. The mercury in the flue gas can be characterized as being in two forms: oxidized or elemental. The ability of an air pollution control system to capture the mercury is dependent, in part, on the species of the mercury in the flue gas. The most common characteristics of the coal-fired power plant that are thought to influence mercury emissions are the mercury content of the coal, the type of burner(s) in the plant, the boiler operating conditions, the design and operation of the particulate collection devices, and the design and operation of any flue gas treatment systems. When the coal is burned in an electric utility boiler, the resulting high combustion temperatures vaporize the Hg in the coal to form gaseous elemental mercury ( $\text{Hg}^0$ ). Subsequent cooling of the combustion gases and interaction of the gaseous  $\text{Hg}^0$  with other combustion products results in a portion of the Hg being converted to gaseous oxidized forms of mercury ( $\text{Hg}^{+2}$ ) and particle bound mercury ( $\text{Hg}_p$ ). The term *speciation* is used to denote the relative amounts of these three forms of Hg in the flue gas. The total mercury in the flue gas ( $\text{Hg}_T$ ) is the sum of  $\text{Hg}_p$ ,  $\text{Hg}^{+2}$ , and  $\text{Hg}^0$ . Even forms of elemental mercury that are not considered reactive at the time they are emitted, but are deposited on land and vegetation, have been shown to have impacts on the ecosystem. According to the Hubbard Brook Research Foundation study, recent research has shown that elemental mercury can rapidly be converted to reactive gaseous mercury (RGM). Thus, elemental mercury can have local and regional impacts. The study describes two ways by which elemental mercury can be converted to RGM rapidly. These conversions occur near marine boundary layers caused by atmospheric effects in the presence of marine aerosols, and by elemental mercury being taken up through leaf stomata. The first mechanism facilitates the conversion of elemental mercury over seawater bodies, and the second is particularly relevant to the heavily forested Northeastern United States. This uptake allows for elemental mercury to affect watersheds on local and regional scales.

## **II. BACKGROUND INFORMATION ON THE PETITION FOR RULEMAKING**

### **A. Introduction**

On August 9, 2004, Citizens for Pennsylvania's Future (PennFuture), PennEnvironment, Pennsylvania Federation of Sportsmen's Clubs, Pennsylvania NOW, Pennsylvania State Building and Construction Trades Council, Pennsylvania Trout, Planned Parenthood Pennsylvania Advocates, Sierra Club Pennsylvania Chapter, Women's Law Project, and WomenVote PA (hereinafter "Petitioners") filed a petition for rulemaking, under 25 Pa. Code Chapter 23, requesting that the Pennsylvania Environmental Quality Board (EQB) adopt regulations to reduce mercury emissions from electric utilities located in the Commonwealth of Pennsylvania. Since the original filing of the petition, an additional 39 organizations have declared their intent to be co-petitioners. The petitioners seek to protect human health and the environment through the regulation of mercury emissions from coal-fired power plants in the Commonwealth. They request that the Department exercise its statutory authority under the

Pennsylvania Air Pollution Control Act (APCA), 35 P.S. §4001 *et seq.*, and develop a regulatory program requiring a 90% control level to reduce the mercury emissions from electric utilities.

At the EQB meeting on January 18, 2005, the Department requested a 120-day extension to complete its report on the petition for rulemaking. This extension was requested to allow the Department to conduct an analysis of EPA's final mercury rule, scheduled for release by March 15, 2005. The EQB granted that request.

This report is in response to the petition filed on August 9, 2004 for rulemaking to control mercury emissions from electric generating units in Pennsylvania.

### **B. The Petition for Rulemaking Process**

Persons may submit to the EQB a petition for rulemaking and propose to adopt a new regulation or amend or repeal an existing rule as provided under Section 1920-A of the Administrative Code. 71 P.S. §510-20. The EQB has adopted a policy statement entitled "Environmental Quality Board Policy for Processing Petitions – Statement of Policy" which establishes guidelines for the processing of rulemaking petitions. 25 Pa. Code Chapter 23.

On October 19, 2004, the EQB accepted the PennFuture petition and published a notice of acceptance in the *Pennsylvania Bulletin* on October 30, 2004. The Department had an initial 60-day period to prepare a report evaluating the petition. On January 18, 2005, the Department requested and was granted a 120-day extension for the preparation of the report.

Upon completing the report, the Department should send a copy of the report to the Petitioners. Within 30 days of the mailing of the report, the Petitioners may submit to the Department a written response to the report. 25 Pa. Code §23.6.

The Department should prepare a recommendation to the EQB based on the report and comments received from the Petitioners. If regulatory amendments are recommended, the Department should develop a proposed rulemaking for EQB consideration within 6 months after the Department mailed its report to the petitioners. If regulatory amendments are not recommended, the Department should present its recommendation and basis to the EQB at the first meeting occurring at least 45 days after the Department mailed its report to the petitioners. 25 Pa. Code §23.7.

### **C. The PennFuture Mercury Reduction Petition**

As noted, on August 9, 2004, the Petitioners filed a petition for rulemaking with the EQB to adopt a new regulatory program to control mercury emissions from electric utilities located in Pennsylvania. The Petitioners articulated six reasons for the regulatory program including that mercury threatens public health and the environment in Pennsylvania, Pennsylvania's electric utility industry emits significant quantities of mercury emissions, EPA's final rulemaking Clean Air Mercury Rule (CAMR) does not make the necessary mercury emission reductions needed in Pennsylvania, the Department has stated publicly that EPA's action is inadequate, other states have also found EPA's action to be inadequate and promulgated state regulations to regulate

mercury emissions and the Pennsylvania Air Pollution Control Act authorizes the EQB to adopt regulations regarding utility mercury emissions.

The Petitioners also submitted suggested regulatory language adapted from a January 5, 2004, New Jersey Department of Environmental Protection (NJDEP) proposed rulemaking to reduce mercury emissions from coal-fired boilers. Subsequently, New Jersey promulgated its final rule on December 6, 2004.

### **III. FEDERAL REGULATION OF HAZARDOUS AIR POLLUTANTS**

#### **A. EPA reversal of “Necessary and Appropriate” finding on control of mercury emissions from coal-fired electric generating facilities**

On March 29, 2005, EPA published a final rule entitled “Revision of December 2000 Regulatory Finding on the Emissions of Hazardous Air Pollutants From Electric Utility Steam Generating Units and the Removal of Coal- and Oil-Fired Electric Utility Steam Generating Units From the Section 112(c) List.” 70 Fed. Reg. 15993. EPA reportedly now believes that it is not appropriate to regulate mercury from these units under Section 112 for the following reasons: the December 2000 finding was overbroad to the extent it hinged on environmental effects; the December 2000 finding lacked foundation because EPA did not fully consider the mercury reductions that would result from the installation of selective catalytic reduction to comply with new source performance standards for NO<sub>x</sub> and the “NO<sub>x</sub> SIP Call”; and new information reveals that the level of mercury emissions remaining after the imposition of the requirements of the Clean Air Interstate Rule (CAIR) to further control SO<sub>2</sub> and NO<sub>x</sub> through flue gas desulfurization and selective catalytic reduction (SCR) technology does not cause hazards to public health.

As a result of this conclusion, EPA removed coal- and oil-fired utility units from the Section 112(c) list. This final action means that EPA does not have to promulgate maximum achievable control technology (MACT) standards for the control of mercury emissions from utility units. This action also clears the way for EPA to regulate these emissions under a Section 111 cap-and-trade approach. As of the date of this report, EPA has not published in the *Federal Register* its final rule for regulating mercury emissions from coal-fired electric generating units.

#### **B. EPA’s Clean Air Mercury Rule**

On March 15, 2005, EPA finalized its “Clean Air Mercury Rule” (CAMR). The final rulemaking promulgated on May 18, 2005 established standards of performance for mercury for new and existing coal-fired electric utility steam generating units (Utility Units), as defined in Section 111 of the federal Clean Air Act (CAA). 70 Fed. Reg. 28606, May 18, 2005. This rule establishes a “cap-and-trade” program by which mercury emissions from new and existing coal-fired Utility Units are capped at specified, nation-wide levels. The phase I cap of 38 tons per year (tpy) becomes effective in 2010, and the phase II cap of 15 tpy becomes effective in 2018. Facility owners and operators must demonstrate compliance with the standard by holding one “allowance” for each ounce of mercury emitted in any given year. Allowances will be readily transferable among all regulated facilities under the Section 111 trading scheme.

EPA believes that an added benefit of the cap-and-trade approach is that it dovetails well with the sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) emission caps under the final Clean Air Interstate Rule (CAIR) that was signed on March 10, 2005. CAIR establishes a cap-and-trade program that significantly limits SO<sub>2</sub> and NO<sub>x</sub> emissions from the power sector. EPA further believes the advantage of regulating mercury at the same time and using the same regulatory mechanism as for SO<sub>2</sub> and NO<sub>x</sub> emissions is that significant mercury emissions reductions, especially reductions of oxidized mercury, can and will be achieved by the air pollution controls designed and installed to reduce SO<sub>2</sub> and NO<sub>x</sub> emissions. Significant mercury emission reductions can be obtained as a “co-benefit” of controlling SO<sub>2</sub> and NO<sub>x</sub> emissions. Thus, the coordinated regulation of Hg, SO<sub>2</sub>, and NO<sub>x</sub> emissions allows mercury reductions to be achieved in a cost-effective manner. While EPA believes that after implementation of the CAIR remaining utility mercury emissions will not pose hazards to public health, it also believes that it is appropriate to establish national, uniform mercury emission standards for new and modified coal-fired utilities.

The 15-tpy emissions cap established for 2018 reflects a level of mercury emissions reduction that exceeds the level that would be achieved solely as a co-benefit of controlling SO<sub>2</sub> and NO<sub>x</sub> emissions under the CAIR. The EPA concludes that this approach is warranted because it finds that mercury-specific air pollution control technologies such as Activated Carbon Injection (ACI) have been adequately demonstrated for use by 2018, allowing for their deployment across the field of units to comply with the Phase II cap in 2018.

Section 111(c) and (d) of the CAA requires each state to develop and submit to the U.S. EPA Administrator a procedure for implementing and enforcing the new source performance standards for new sources and emission guidelines for existing sources. Specifically, EPA authorizes states, under the CAMR, to adopt the mercury cap-and-trade program whether by incorporating by reference the CAMR cap-and-trade rule that will be codified in 40 CFR Part 60, Subpart HHHH, or by codifying the provisions of the CAMR cap-and-trade rule, in order to participate in the EPA-administered mercury cap-and-trade program. The final CAMR establishes Pennsylvania’s 2010-2017 mercury emissions budget as 1.78 tons and the 2018 budget as 0.702 tons.

Each State participating in the EPA-administered cap-and-trade programs must develop a method for allocating (i.e., distributing) an amount of allowances authorizing the emissions tonnage of the State’s CAMR budget. Each State has the flexibility to allocate its allowances however they choose, so long as certain timing requirements are met. States may elect to participate in the EPA-managed cap-and-trade program for coal-fired utility units. However, state participation in this program is voluntary. For states that elect not to participate in the EPA-administered mercury cap-and-trade program, methodology must be established by the states to meet the CAMR mercury emission budgets by reducing mercury emissions.

By September 2006, States must submit a plan to EPA that meets the requirements of the CAMR. If a State fails to submit a State plan, as required in the final rule, EPA will prescribe a Federal plan for that State, under Section 111(d)(2)(A) of the CAA. EPA would propose the model rule as that Federal plan. However, EPA has indicated in the preamble to the final rule



that states are free to develop a more stringent mercury control program than the one set forth in the final rule.

**IV. GENERAL LEGAL AUTHORITY UNDER THE PENNSYLVANIA AIR POLLUTION CONTROL ACT**

The Pennsylvania Air Pollution Control Act (APCA), 35 P.S. §4001 *et seq.*, declares it to be the policy of the Commonwealth of Pennsylvania to protect the air resources of the Commonwealth to the degree necessary for, among other things, the protection of public health, safety, and well-being of its citizens. 35 P.S. §4002. As a result, the EQB has the power and duty to adopt rules and regulations, for the prevention, control, reduction, and abatement of air pollution in the Commonwealth. 35 P.S. §4005(a)(1).

In addition to these legal requirements, new sources must demonstrate that emissions will be the minimum attainable through the use of the best available technology. See 35 P.S. §4006.6(c) and 25 Pa. Code §127.12(a)(5). Best available technology is defined as “equipment, devices, methods or techniques as determined by the Department which will prevent, reduce or control emissions of air contaminants to the maximum degree possible and which are available or may be available.” 25 Pa. Code § 121.1. Therefore, as an air contaminant, mercury emissions from “new sources” must be controlled through the use of best available control technology.

The federal New Source Performance Standards and Emission Guidelines (for existing sources) are adopted and incorporated by reference in their entirety in 25 Pa. Code § 122.3. These standards, once effective, are independently enforceable by the Department. Therefore, the federal CAMR will apply to affected units in Pennsylvania unless the EQB adopts requirements that can be demonstrated to be at least as stringent as the federal requirements.

**V. ANALYSIS OF THE PETITIONERS’ REQUEST FOR RULEMAKING AND OTHER ALTERNATIVE CONTROL MEASURES**

**A. Analysis of New Jersey’s Mercury Control Rule**

As noted, the Petitioners submitted suggested regulatory language adapted from a January 5, 2004, NJDEP proposal to reduce mercury emissions from coal-fired boilers. These regulations, promulgated as a final rulemaking on December 6, 2004, provide that on and after December 15, 2007, each owner or operator of a coal-fired boiler of any size shall operate the coal-fired boiler in accordance with the provisions specified in either condition outlined below:

- 1) The emissions of mercury from any coal-fired boiler shall not exceed 3.00 mg/MW-hr, based on an annual weighted average of all valid stack emission tests performed for four consecutive quarters weighted by megawatt hours produced each quarter; or
- 2) The reduction efficiency for control of mercury emissions of the air pollution control apparatus for control of mercury of any coal-fired boiler shall be at least 90 percent,

based on the annual weighted average of all valid stack emissions tests performed for four consecutive quarters weighted by megawatt hours produced each quarter.

The NJDEP final rulemaking for reducing mercury emissions from coal-fired utilities is not appropriate for Pennsylvania for a number of reasons. The New Jersey regulatory language has one emission standard for both new and existing sources. The Department believes there should be separate emission standards for new and existing coal-fired boilers. Emission standards for new sources should be more stringent and held to a higher control technology standard because these new sources are designed prior to construction and must, at a minimum, install the best available control technology. This approach is also consistent with the APCA and its regulations, which require that emissions from new sources be the minimum attainable through the use of the best available technology. 25 Pa. Code §127.12(a)(5).

The State of New Jersey has a limited number of coal-fired utility units (5 facilities, with at least one scheduled to be shut down by 2008) which are not representative of the significantly varied boiler types in Pennsylvania. Many of the existing utility units in Pennsylvania were built and designed decades ago and may be operationally incapable of achieving the mercury emission standards set by New Jersey coal-fired boilers. Moreover, even if an existing unit is operationally capable of controlling to the most stringent emission level, it may be cost prohibitive to do so. As a result, the Department believes it is more appropriate to establish a cost effective level of control that is reasonably achievable taking into consideration various factors including source configurations.

The Petitioners' suggested regulatory language, which mirrors language in the NJDEP rule, also does not provide for any "hotspot" backstop review to ensure there is no residual health risk after mercury controls have been applied. It may be necessary to develop additional standards and operating practice requirements for a hazardous air pollutant, like mercury. PADEP believes that it is critical with pollutants like mercury to provide for an additional assessment of residual risk to the public health, welfare, and the environment after the application of BAT-type controls. The criteria for such an assessment should include, but not be limited to, the actual health effects with respect to persons living in the vicinity of those sources, review of the technologically and commercially available methods and costs of reducing such risks, and available epidemiological or other health studies.

## **B. Analysis of EPA's Mercury Regulatory Approach**

As noted in the petition, the Department has consistently said that EPA's cap-and-trade approach action is inadequate and illegal. Moreover, the implementation of a national market-based trading approach would significantly delay the control of mercury emissions from the utility sector and would also create 'hot spots' of mercury exposure with no statutory requirement to assure protection to the public from under-controlled sources under a cap-and-trade program. In addition, the Department is also on record that EPA's final mercury rulemaking inappropriately establishes emission standards based on the type of coal instead of the class, type or size of the source of emissions. This ranking of coal creates a market advantage for the owners and operators of units combusting lignite and sub-bituminous coals.

Although Pennsylvania has been a leader in implementing market-based trading programs, EPA's national "cap-and-trade" program is an unreasonable interpretation of its statutory authority under Section 111 and Section 112 of the CAA. The fact that Congress chose to list specific hazardous air pollutants (HAP) under Section 112 indicated that Congress believed that these pollutants required more stringent measures than those permitted under Section 111. Moreover, regulation under Section 112 has been historically and consistently interpreted as requiring HAPs to be controlled through installation and operation of maximum achievable control technology. A cap-and-trade approach under Section 111 was never contemplated as a control technology. As a result, EPA is now acting contrary to Congressional intent by attempting to regulate mercury HAP sources under a less stringent standard than the framers of the CAA desired. This arbitrary approach will result in numerous legal challenges and additional delay in achieving the reductions necessary to protect public health and the environment. Therefore, prior to finalizing CAMR, we urged EPA to abandon the proposed national mercury emissions cap and trade program to ensure that the integrity of existing innovative and cost-effective trading programs is maintained.

The Congressional intent related to the regulation of mercury is clear and unambiguous – it must be regulated under Section 112 of the CAA. Mercury is explicitly identified as a hazardous air pollutant under Section 112(b). For sources other than coal-fired units, EPA must list source categories under Section 112(c) and then set emission standards for those categories under Section 112(d). While the statutory scheme for regulating mercury from coal-fired units is under Section 112(n), the Congressional intent is the same – mercury emissions from these units must be regulated under the Section 112 MACT approach. See, *Chevron, U.S.A., Inc. v. Natural Resources Defense Council, Inc.*, 467 U.S. 837 (1984) (where if the intent of Congress is clear, that is the end of the matter; for the court, as well as the agency, must give effect to the unambiguously expressed intent of Congress.)

While the Department recognizes that, under Section 112(d)(1) of the CAA, it is within the discretion of the EPA Administrator to "distinguish among classes, types and sizes within a category or subcategory" in establishing emission limits for MACT standards, this discretion does not extend to distinctions based on coal types. Sub-categorization leads to a direct bias against eastern bituminous and anthracite coals. Mercury is a health hazard regardless of where it is emitted and from what type of coal. The overall goal of EPA's mercury rule should be to greatly reduce the emission of hazardous mercury. However, the control levels for sub-bituminous and lignite coals will require no, or very minimal, mercury reductions from the electric utility units burning these types of coal. As a result of this inequity, Pennsylvania would continue to be impacted adversely by mercury emissions transported from areas requiring little or no reduction in mercury emissions.

In addition to the Department's concerns, and in response to a Congressional request, the U. S. EPA Office of Inspector General (OIG) published on February 3, 2005, an Evaluation Report: Additional Analyses of Mercury Emissions Needed Before EPA Finalizes Rules for Coal-Fired Electric Utilities Report No. 2005-P-00003, which analyzes the EPA's development of the proposed rule for regulating mercury emissions from coal-fired steam generating electric utility units.

The OIG found that EPA's rule development process did not comply with certain Agency and Executive Order requirements, including not fully analyzing the cost-benefit of regulatory alternatives and not fully assessing the rule's impact on children's health. The OIG also concluded that EPA did not fully analyze the potential for hot spots (i.e., areas of elevated pollutant concentrations) to occur under the proposed cap-and-trade option.

In regards to the hotspot issue, the OIG report states that "EPA's Clean Air Markets Division conducted a Proximity Analysis to determine where, in relation to water bodies, emissions would occur" under the mercury emissions trading provision of the Clean Air Interstate Rule. However, as noted in the analysis, the issue of hot spots was not fully analyzed. "This examination of projected mercury emissions has significant limitations and does not constitute an analysis of 'hotspots.' Such an analysis of hotspots would, in part, necessitate detailed assessments of the atmospheric fate, transport, and deposition of mercury from power generating sources, and assessments of the potential population exposure to mercury contaminated fish in water bodies due to generating and other sources."

The OIG also found that EPA did not fully analyze the potential for hot spots to occur under its proposed cap-and-trade option. The potential for hot spot formation under the proposed cap-and-trade rule has generated a great deal of concern and debate among various stakeholders. Modeling and projecting the likelihood of hot spots under the proposed rule is made difficult by the relatively high degree of uncertainty involved with mercury transport and deposition patterns (i.e., when the airborne mercury is deposited onto the ground or into water bodies), particularly local or near-field deposition.

Further complicating efforts to use computer models to determine where mercury deposition will occur is the fact that three different chemical forms of mercury are emitted by utility units and each has varying deposition patterns. For example, oxidized and particulate mercury are more likely to deposit locally or regionally, while elemental mercury travels and is more global in nature. Although air emission-related hot spots are generally thought of in terms of high ambient air concentrations near a source, this is not the only consideration with mercury. The main health risk associated with mercury is not its ambient concentrations, but rather its deposition into water bodies and resulting bioaccumulation in fish. However, the connection between air emissions and levels of mercury ultimately found in fish tissue is not yet fully understood.

Although EPA did not conduct the detailed assessment of hot spots described previously, EPA stated in the preamble to the proposed rule that it does not expect hot spots to occur for the following reasons:

1. Modeling suggests that the largest emitters, which are more likely to produce local deposition, will be the first to implement control technology under a cap-and-trade approach and will reduce emissions by the largest amount.
2. CAIR would result in implementation of control technologies for SO<sub>2</sub> and NO<sub>x</sub> that also provide the co-benefit of reducing emissions of the types of mercury (oxidized and particulate) that are likely to deposit locally.

3. The Acid Rain program has not resulted in the formation of hot spots.
4. States have “the ability to address local health-based concerns separate from the mercury cap-and-trade program requirements,” and under the proposed State-administered program would “retain the power . . . to adopt stricter regulations to address local hot spots or other problems.”
5. The proposed final cap would be a 70-percent reduction in mercury emissions from current uncontrolled levels (from 48 to 15 tons).

However, the Department believes there are potential problems with EPA’s reasoning. For example, the Acid Rain program controls for SO<sub>2</sub> emissions are primarily deposited regionally and globally, not locally; while mercury can deposit locally as well as regionally and globally. Trading programs are generally thought to be most effective for pollutants that do not deposit locally. Further, the Acid Rain program co-exists with the National Ambient Air Quality Standards program, which has established a minimum level of air quality for SO<sub>2</sub>, while no such minimum standards exist as a back-stop in the mercury cap-and-trade proposal (i.e., there is no National Ambient Air Quality Standard for mercury). In addition, the Acid Rain program contains a provision stipulating that, in the case of delayed implementation due to litigation, a more conventional command-and-control approach would take effect, but the proposed cap-and-trade rule for mercury lacks a similar provision.

### **C. Mercury Control Technologies and Costs of Controls**

Effective mercury control technology exists and is presently being implemented in the field. This technology can be implemented in a cost effective manner and would likely be able to meet the timetables set forth by the final mercury regulations.

There are several facilities nationwide that have utilized control technology to demonstrate that it is technologically effective to reduce mercury from coal fired utility exhaust gas streams. In addition, there are a number of Pennsylvania utilities that have conducted mercury control studies. First Energy’s Bruce Mansfield Plant achieved 78% mercury removal using Flue Gas Desulfurization (FGD) combined with wet electrostatic precipitator (ESP) technology during a demonstration project. A CONSOL Corporation’s pilot project at Allegheny Energy’s Mitchell Power Plant utilized an air heat exchanger (or water spray) placed in front of an ESP to cool the mercury to promote mercury-particulate formation. They increased mercury capture from 25% to 50%. A control technique known as TOXECON, which involves injecting activated carbon upstream of a COHPAC filter, has achieved nearly 90% mercury reduction at Alabama Power’s E.C. Gaston Unit 3.

One concept that has been proven to effectively control mercury emissions in an economical fashion is based upon the injection of activated carbon into the gas stream before the particulate control device. This approach has proven effective for the various coal types including: bituminous, sub-bituminous, lignite, and blends of coal types. It has also been incorporated with numerous types of controls such as cold-side ESPs, hot-side ESPs, spray dryers, and fabric filters. The Department of Energy – National Energy Technology Laboratory (DOE-NETL) presentation in May of 2004, in Glasgow, Scotland, included a baseline, estimated cost for mercury removal. The cost ranged between \$50,000/lb to \$70,000/lb. An even more

cost effective mercury control has been demonstrated by Sorbent Technologies that utilizes brominated powdered activated carbon injection (B-ACI). The control cost for B-ACI ranges from \$2,000/lb to \$20,000/lb of mercury at removal efficiencies from 70% to 98%.

The owners and operators of several fully operational facilities have successfully utilized this B-ACI technology to reduce their mercury emissions. Wisconsin Electric Energy's Pleasant Prairie, Ohio University's Lausche Plant, Duke Energy's Cliffside Station, Detroit Edison's St. Clair Power Plant, and Great River Energy's Stanton Station and Pleasant Valley Station 10 are examples of facilities that effectively employed Sorbent Technologies' equipment and technology, and have achieved mercury reductions of as much as 90% and greater.

#### **D. Mercury Control Approaches for Pennsylvania**

The Department does not believe that the Petitioners' suggested regulatory language, which mirrors the NJDEP rule, or EPA's Section 111 approach to mercury control for the electric generating sector is best for Pennsylvania. However, the Department believes that a comprehensive approach to mercury control should be considered and recommends development of a regulatory approach to mercury emissions control that:

1. Examines mercury emission reduction strategies for electric generating units and other major emitter source categories.
2. Provides a mechanism for mercury "hotspot" impact assessment.
3. Encourages repowering with advanced clean-coal technologies by providing options for sources that could be so rebuilt.
4. Encourages the burning of cleaner PA coal and concomitantly discourages fuel switching to dirtier coal types.
5. Considers capacity and reliability concerns for delivery of power over the electric grid.

#### **VI. CONCLUSION**

Based on current scientific knowledge, mercury is a persistent, toxic, bio-accumulative pollutant, which can have adverse effects on human health and the environment. Effective mercury control technology does exist for EGUs and is presently being implemented at a number of facilities. Therefore, EPA's national cap-and-trade approach is inappropriate for regulating a potent neurotoxin like mercury and is also contrary to the statutory provisions of the Clean Air Act. The Department agrees with the petitioners that the provisions in EPA's final mercury rule for the utility sector that will be promulgated under Section 111 of the CAA are not adequate to ensure that the citizens of Pennsylvania and the environment are being protected from the harmful effects of mercury emissions.

It is undisputed that electric generating units are the largest sources of mercury emissions in the Commonwealth. However, the coal-fired units regulated under NJDEP's recently promulgated rule are not representative of the coal-fired boilers operating in Pennsylvania. Therefore, the Department will recommend the development of a proposed rulemaking for consideration by the EQB that effectively reduces the emissions of mercury in Pennsylvania.