NATIONAL WILDLIFE FEDERATION®
NWF's mission is to inspire Americans to protect wildlife for our children's future.

2547

August 24, 2006

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

Re: Mercury Emission Reduction Requirements for Electric Generating Units (#7-405)

National Wildlife Federation (NWF) respectfully submits the attached technical report in support of the Pennsylvania Department of Environmental Protection's draft mercury rule for coal-burning power plants operating in the Commonwealth.

A recently completed analysis commissioned by NWF on the U.S. Environmental Protection Agency's Integrated Planning Model (IPM) illustrates that the federal Clean Air Mercury Rule will not deliver the level of mercury reductions at a pace necessary to halt and reverse the widespread mercury contamination problem that plagues every lake and stream in Pennsylvania. Therefore, a state rule that imposes realistic, technically feasible, enforceable, and environmentally-necessary mercury reduction targets is essential.

According to U.S. EPA's IPM, the federal rule would not impose a firm mercury pollution cap on power plants in Pennsylvania. In fact, according to EPA's projections, Pennsylvania's power plants' mercury emissions will be 45% higher than its allocated budget. In addition, only three out of 35 power plants are projected to invest in new technology to reduce its mercury emissions by 2020, and for those three, plans are to install commercially available technology that will simultaneously reduce smog-forming nitrogen oxide emissions. EPA's analysis underscores that power plants installing existing pollution control equipment to reduce sulfur dioxide, nitrogen oxides, and particulate pollution will likely capture 90 percent of its mercury emissions. In other words, commercially available technology exists today to address mercury pollution from coal burning power plants.

Unfortunately, given that EPA's Clean Air Interstate Rule and Clean Air Mercury Rule allow power plants the option of purchasing pollution credits in lieu of installing pollution controls, no projected mercury reductions under either rule are guaranteed to occur, and those that do will likely not occur in the projected timeframe, rather five or ten later (as late as 2030), as demonstrated in our analysis of the IPM data. For this reason, it is essential that the Pennsylvania Department of Environmental Protection finalize its

draft mercury rule. In doing so, the state guarantees its residents that mercury emissions will be reduced substantially within a decade.

We support the direction that the Pennsylvania DEP has taken with its mercury rule. The draft rule provides certainty that mercury reductions will occur on a manageable timeline while providing utilities ample flexibility to meet their mercury reduction targets. In the absence of federal leadership, it is essential that Pennsylvania moves forward to ensure that harmful mercury pollution ceases to pose a threat to people and wildlife in the Commonwealth.

Sincerely,

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Senior Manager, Mercury Campaign
National Wildlife Federation
202-797-6692

The Impact of Federal Clean Air Rules on Mercury Emissions at U.S. Coal-Fired Power Plants

July 2006

NATIONAL WILDLIFE FEDERATION

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In addition, projected mercury emissions following these installations were compared to the mercury emissions budget assigned to each state by EPA. This is useful for predicting whether a particular state will likely purchase credits rather than make the mercury emissions reductions necessary to meet its actual cap.

In reviewing the results of this analysis, it is important to note that these are *estimates produced from a computer model*. None of the projected installations or emissions reductions are in any way certain to occur. The structure of both the CAIR and CAMR programs provides flexibility to plants for achieving compliance. They can choose to purchase either pollution control technology or emission credits. There is no guarantee that the technology installations outlined in the following tables will, in fact, occur.

Summary Findings

- Under CAMR, by 2010 27 states are projected to be below their Phase I State Budget (based on the national cap of 38 tons). Plants are projected to "bank" their excess emissions allowances to comply with the second phase of the mercury rule. Between 2010 and 2017, **70.6 tons of mercury** allowances are projected to be banked nationally.

- In 2020, EPA projects that only 7 states will be below their Phase II CAMR Budget. In the 38 states with projected emissions above the CAMR budget, plants will buy pollution credits or use banked allowances for compliance.

- Under CAMR (which includes compliance with CAIR), national mercury emissions are projected to be 24.3 tons in 2020, higher than CAMR's actual emissions cap of 15 tons by 2018. Current emissions are 50 tons nationally, based on 2002 estimates.

- EPA's analysis predicts that the bank of mercury allowances will not run out until after 2026. Therefore, the final CAMR cap of 15 tons likely will not be achieved until 2026, if not later.

- In Phase I of the CAMR program, mercury emission reductions are projected to be made primarily through the use of pollution controls for nitrogen oxides (NOx) and sulfur dioxide (SO_2), e.g., selective catalytic reduction and wet scrubbers. Mercury reductions are also projected to be made through coal switching and dispatch changes. Some mercury reductions are projected through the use of activated carbon injection (ACI) (about 2 GW out of 305 GW coal-fired capacity will install ACI).

- In Phase II of the CAMR program, again mercury emission reductions are projected to be made primarily through the use of NOx and SO_2 pollution controls. Additional mercury reductions are projected to be made through coal switching and dispatch changes. Mercury reductions using ACI are projected to increase to about 13 GW of coal-fired capacity using ACI by 2020 and beyond.

- EPA analysis projects that after 2026 about 43 GW of ACI will be used nationally to comply with the final mercury cap of 15 tons, 14% of coal capacity. This technology is proven, affordable, and available today. However, given how CAMR is structured, no substantial installations of ACI are expected for another 20 years.

Data Sources:

- Data on plant controls and emissions in 2015 and 2020 obtained from EPA's Integrated Planning Model Parsed files: CAIR – Final – 2015; CAIR – Final – 2020; and CAMR – Option 1- 2020.
- 2002 plant-level mercury emissions data obtained from EPA's National Emissions Inventory (NEI)[1]. 2002 NEI represents EPA's most recent emissions estimate for coal-fired power plants and may differ from TRI estimate. EPA reviews TRI data in making its NEI estimate and may make further adjustments to the data to develop its NEI estimate, which the Agency believes to be the better estimate. Also, note that the NEI estimate may differ from a state Hg emissions inventory, especially if a state has gathered emission test data from its plants.
- EPA's Standalone Documentation for EPA's Basecase 2004 (V.2.1.9) Using the Integrated Planning Model, US EPA, September 2005, Chapter 5[2].

Analysis Assumptions:

- IPM parsed files contain fuel use data (TBtu) at the unit level, and not generation data (GWh) at the unit level. Therefore, emission rates were calculated using fuel use data (lb/TBtu) and converted to output format (lb/GWh) using the following assumption: For a typical coal power plant, 10 million BTU's of heat energy generates one megawatt-hr of electricity.
- During EPA's 1999 Hg ICR it was determined that FBC units burning waste coal achieve a 99% control of mercury emissions, measured from the mercury content of coal burned. EPA's IPM mercury emissions modification factors do not reflect this 99% control level. In this analysis, IPM outputs for FBC are flagged in states with FBC units. For Pennsylvania, where several FBC plants exist, it was assumed that all FBC units will continue to be well controlled for mercury, so 2002 emissions data are used for 2020 projections under CAIR and CAMR.

[1] NEI data can be found at www.epa.gov/ttn/chief/net. Analyst contacted EPA directly for 2002 Hg emissions for power plants, since they were not yet available on website.
[2] IPM documentation and parsed output files can be found at: www.epa.gov/airmarkets/epa-ipm.

State Summary Tables

State Summary Table Key*

Plant	Includes all coal-fired power plants in the state
2002 Hg Plant-Level Emissions	Estimated emissions (from EPA's 2002 National Emissions Inventory)
No. of Units	Total number of units (boilers), in operation in 2002
Current PM, NOx, SO2 Controls	Pollution controls currently installed (or under construction) in 2002
CAIR Installations Planned	Projected installations found in EPA's Integrated Planning Model (IPM), last updated in 2004
Hg control after CAIR**	Estimated mercury capture measured from coal across pollution control device to stack; if no CAIR installations are planned, estimated mercury control reflects capture across currently-installed pollution control devices
Plant emissions under CAIR & CAMR	Projected emissions after compliance with CAIR & CAMR
Plant emission rates under CAIR & CAMR	Projected emissions calculated as a rate based standard (input and output-based)
Additional CAMR Installations	Projected installations or other modifications due to CAMR compliance; includes changes in fuel use, changes in operation, installation of conventional and mercury-specific controls
Hg control after CAMR**	Estimated mercury capture, measured from coal across pollution control device to stack, after installation of all projected pollution control devices, or other plant- or unit-specific modifications

*Alaska and Hawaii are not included because their power plants are not in EPA's Integrated Planning Model. Idaho, Rhode Island, Vermont, and Washington DC, are not included because they do not have coal-fired power plants. These states have a zero mercury emissions budget under CAMR.

**IPM uses Emission Modification Factors (EMFs) to estimate the mercury reductions attributable to a specific boiler type, coal type, and configuration of SO2, NOx, and particulate matter control devices at an electric generating unit. In IPM, the EMF is applied to the mercury content in the coal to determine the final projected mercury emissions. EPA's EMFs can be found in table 5.10 starting on page 12 at: http://www.epa.gov/airmarkets/epa-ipm/bc5emission.pdf

Pennsylvania

How the federal mercury rule would look in Pennsylvania:

- 2020 projected emissions are 45% higher than allocated budget of 1,404 pounds
- 2020 estimated emissions will be a 79% reduction from 2002 estimated emissions
- State will be a net buyer of mercury allowances or user of banked allowances from excess emission reductions made in first phase of CAMR.

Plant	2002 Hg Plant-Level Emissions (lbs)	Total Plant Capacity (MW)	No. of Units	Current PM Controls	Current NOx & SO2 Controls	CAIR Installations Planned by 2015 (Projected Installations by 2020)	Hg control after CAIR	Plant 2020 Hg (lbs) under CAIR	Plant 2020 Hg (lbs) under CAMR	Plant CAMR 2020 Hg (lb/ TBtu)	Plant CAMR 2020 Hg (lb/ GWh)	Additional CAMR Installations/ Modifications Projected (by 2020)	Hg control after CAMR
AES BV Partners Beaver Valley	28.15	127	2		wet scrubber	none	66%	107.60	57.00	5.6537	0.0565	Hg coal content higher under CAIR	66%
					wet scrubber	none	66%						66%
ARMSTRONG	330.99	336	2	CS-ESP	SNCR	wet scrubber	66%	96.97	96.97	3.7715	0.0377		66%
				CS-ESP	SNCR	wet scrubber	66%						66%
BRUCE MANSFIELD	1,338.54	2,371	3	CS-ESP	SCR & Wet scrubber	none	90%	176.65	170.45	1.0702	0.0107	Hg coal content higher under CAIR	90%
				CS-ESP	SCR & Wet scrubber	none	90%						90%
				CS-ESP	wet scrubber	SCR	90%						90%
BRUNNER ISLAND	557.76	1,404	3	FF		SCR & wet scrubber	90%	115.11	187.17	1.8023	0.0180	Unit 1 installs Scrubber only under CAMR	66%
				CS-ESP		SCR & wet scrubber	90%					Hg coal content lower under CAIR	90%
				CS-ESP		SCR & wet scrubber	90%						90%
Cambria CoGen	73.06	87	1	FF	SNCR - FBC	none	99%	73.06	73.06	1.2429	NA		99%
CHESWICK	293.04	550	1	CS-ESP	SCR	wet scrubber	90%	43.60	42.60	1.0046	0.0100	Hg coal content higher under CAIR	90%
Colver Power Project	77.15	114	1			none	0%	133.80	0.00		0.0000	plant idle under CAMR	0%
CONEMAUGH	510.29	1,700	2	CS-ESP	wet scrubber	SCR	90%	345.20	221.40	1.8426	0.0184	Hg coal content higher under CAIR	90%
				CS-ESP	wet scrubber	SCR	90%						90%
CROMBY	12.04	144	1		wet scrubber-SNCR	none	66%	120.80	49.00	4.6691	0.0467	Fuel use/Hg coal content higher under CAIR	66%
Ebensburg Power Company	0.48	51	1	FF	dry scrubber - FBC	none	99%	0.48	0.48	1.8662	NA		99%
EDDYSTONE	49.63	581	2	HS-ESP	wet scrubber	none	42%	497.60	85.80	1.8421	0.0184	SCR installed on units 1 & 2	90%
				HS-ESP	wet scrubber	none	42%						90%
ELRAMA	75.52	474	4	HS-ESP	wet scrubber-SNCR	none	42%	250.20	116.40	2.9428	0.0294	Fuel use higher under CAIR	42%
				HS-ESP	wet scrubber-SNCR	none	42%					Hg coal content higher under CAIR	42%
				HS-ESP	wet scrubber-SNCR	none	42%						42%
				HS-ESP	wet scrubber-SNCR	none	42%						42%
Foster Wheeler Mt Carmel Incorporated	0.22	40	1		dry scrubber - FBC	none	99%	0.22	0.22	1.8550	NA		99%

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Plant	2002 Hg Plant-Level Emissions (lbs)	Total Plant Capacity (MW)	No. of Units	Current PM Controls	Current NOx & SO2 Controls	CAIR Installations Planned by 2015 (Projected Installations by 2020)	Hg control after CAIR	2020 Hg (lbs) under CAIR	2020 Hg (lbs) under CAMR	Plant CAMR 2020 Hg (lb/ TBtu)	Plant CAMR 2020 Hg (lb/ GWh)	Additional CAMR Installations/ Modifications Projected (by 2020)	Hg control after CAMR
SUNBURY	297.59	362	6	FF		early retirement	NA	21.56	25.71	3.3079	0.0331	Fuel use lower under CAIR	NA
				FF		early retirement	NA						NA
				FF		early retirement	NA						NA
				FF		early retirement	NA						NA
				CS-ESP		early retirement	NA						NA
				CS-ESP		none	36%						36%
TITUS	96.24	241	3	CS-ESP		early retirement	NA	0.00	0.00				NA
				CS-ESP		early retirement	NA						NA
				CS-ESP		early retirement	NA						NA
Wheeler Frackville Energy Company Inc	0.37	43	1	FF	dry scrubber - FBC	none	99%	0.37	0.37	1.2655	NA		99%
TOTAL	9,493.16	18,054						2894.68	2029.28				

In IPM FBC Hg may not reflect 1999 Hg ICR— unit should achieve high Hg removal; used 2002 emissions for FBC plants.