Appendix B

Interim Response

Department of Energy
Washington, DC 20585

October 20, 2004

The Honorable James M. Inhofe
Chairman
Committee on Environment and Public Works
U.S. Senate
Washington, D.C. 20510-6175

Dear Mr. Chairman:

This is in response to your letter of September 14, 2004, which describes several different proposals for reducing power plant mercury emissions and requests that the Energy Information Administration (EIA) prepare an analysis of these different approaches. Your letter also asks that our analysis assume compliance with the sulfur dioxide (SO_2) and nitrogen oxide (NO_x) emission limits proposed in the Environmental Protection Agency's (EPA) Clean Air Interstate Rule (CAIR) and that only "commercially demonstrated technology or technology where the vendor provides financially backed guarantees indemnifying the purchaser for failure to control to expected levels" should be assumed.

While we will do our best to complete this work as expeditiously as possible, we cannot meet the requested delivery date. Because significant enhancements to EIA's modeling system are needed to address your request, we expect that we will not be able to respond in full until early February 2005. In recent discussions, your staff has indicated that you have a particularly urgent need for any preliminary insights we could offer regarding the status of mercury control technologies and the possible implications of establishing a 90-percent maximum achievable control technology (MACT) requirement for all coal-fired units. Pending completion of the full analysis, the remainder of this letter outlines our present understanding of these matters.

At this time, there are two main approaches being considered for controlling power plant mercury emissions; 1) reducing mercury emissions using technologies primarily designed to remove SO_2, NO_x, and particulate emissions (often called co-benefit reductions), and 2) reducing mercury emissions using technologies specifically designed to reduce mercury. The attached table provides the emissions modification factors (EMFs) used in recent EIA and EPA modeling work for different power plant configurations and coals. The percent of mercury removed is calculated by subtracting the EMFs from 1. For example, an EMF of 0.05 implies 95-percent mercury removal. As shown, for EIA, the assumed percentage of mercury removed varies from as low as 0 percent for many plant configurations using lignite coal to as high as 95 percent for several plant configurations using bituminous coals. Both sets of EMFs in the table show that

no coal plant configuration using subbituminous or lignite coals is assumed to be able to comply with a 90-percent MACT using SO_2, NO_x, or particulate control technologies (i.e., co-benefit reductions).

In order to continue to meet electric generating requirements and comply with a 90-percent mercury MACT at coal plants without using technologies specifically designed to reduce mercury, companies with plants that currently burn subbituminous or lignite coals would have to switch to bituminous coals and add any needed NO_x or SO_2 controls to reduce mercury emissions by 90 percent. This would require major changes in coal supply patterns, because subbituminous and lignite coals together accounted for roughly 50 percent of U.S. coal production in 2003. Alternatively, they could reduce their use of coal and increase their use of natural gas and renewable fuels or turn to mercury-specific control technologies.

While many approaches are being considered, the most common technology discussed to remove mercury from coal plants is activated carbon injection (ACI). ACI systems have been widely deployed in other industries, mainly in waste-to-energy plants (municipal solid waste (MSW) plants). In those applications they have achieved mercury removal rates in excess of 90 percent. However, ACI systems are only now being tested on U.S. coal plants, whose characteristics will tend to make mercury removal tougher than in MSW plants. For one thing, coal plants are typically much bigger with more flue gas to treat. They also have much lower concentrations of mercury in the untreated gas, and it is questionable whether similar removal levels will be achievable for all coals. Sulfur and trace elements in U.S. coals may also pose problems that will have to be resolved. Programs in the Department of Energy's Office of Fossil Energy are actively exploring these issues.

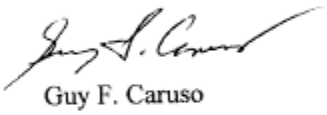
Because of these issues, the performance of these systems on coal plants and the guarantees that vendors would be willing to provide today are very uncertain. Vendors would likely be very conservative regarding guarantees until they have experience, and some problems could arise that limit the performance of these systems on particular plants or coals. As a result, depending on the stringency of the MACT standard imposed and when it is imposed, it might be hard or costly for some plants to get a guarantee that they could meet it.

It should be pointed out that the understanding of this technology is changing rapidly. EIA normally assumes that this technology will be available in the mid-term as might be required to comply with the 2010 or 2018 mercury emission caps called for in the Clear Skies Act of 2003. Whether current ACI systems for coal plants would meet the analysis request requirement for a "commercially demonstrated technology" with performance guarantees for deployment in the 2007 timeframe is questionable. The status of ACI technology together with many other factors will influence the performance guarantees that vendors might be willing to offer. These factors include the contract terms of the guarantee (i.e., the potential liability on the vendor) as well as the existence of other control technologies that would lower the percentage reduction needed from ACI. These issues, which depend on individual plant characteristics, are very difficult to address.

Under the "worst case" scenario in which no ACI systems for coal plants are commercially available by 2007, it would be very difficult for coal plant operators using subbituminous or lignite coals to comply with a 90-percent MACT that takes effect at that time. The imposition of such a MACT would be expected to lead to a significant shift towards higher-priced bituminous coals and shift from coal to natural gas and renewable fuels. Because coal plants currently supply over 50 percent of the electricity generated in the United States, these shifts could lead to significant costs to the industry and higher electricity prices to consumers. The large and rapid shifts expected in markets for coal and natural gas in this scenario create modeling challenges that will need to be analyzed and resolved in order to produce reportable model runs.

If you have any further questions, please do not hesitate to contact me on (202) 586-4361. Alternatively, your staff can contact John J. Conti, Acting Director, Office of Integrated Analysis and Forecasting, at (202) 586-2222.

Sincerely,



Guy F. Caruso
Administrator
Energy Information Administration

Attachment

cc: The Honorable George V. Vionovich

Table 1. Mercury Emission Modification Factors Used in Recent EIA and EPA Modeling Work

Configuration			EIA EMFs			EPA EMFs		
SO_2 Control	Particulate Control	NO_x Control	Bit Coal	Sub Coal	Lignite Coal	Bit Coal	Sub Coal	Lignite Coal
None	BH	---	0.11	0.27	1.00	0.11	0.27	1.00
Wet	BH	None	0.05	0.27	0.64	0.03	0.27	1.00
Wet	BH	SCR	0.10	0.27	0.64	0.10	0.15	0.56
Dry	BH	---	0.05	0.75	1.00	0.05	0.75	1.00
None	CSE	---	0.64	0.97	1.00	0.64	0.97	1.00
Wet	CSE	None	0.34	0.73	0.58	0.34	0.84	0.56
Wet	CSE	SCR	0.10	0.73	0.58	0.10	0.34	0.56
Dry	CSE	---	0.64	0.65	1.00	0.64	0.65	1.00
None	HSE/Oth	---	0.90	0.94	1.00	0.90	0.94	1.00
Wet	HSE/Oth	None	0.58	0.80	1.00	0.58	0.80	1.00
Wet	HSE/Oth	SCR	0.42	0.76	0.64	0.10	0.75	1.00
Dry	HSE/Oth	---	0.60	0.85	1.00	0.60	0.85	1.00

Notes: SO_2 Controls – Wet = Wet Scrubber and Dry = Dry Scrubber, Particulate Controls, BH = fabric filter/baghouse, CSE = cold side electrostatic precipitator, HSE = hot side electrostatic precipitator, NO_x Controls, SCR = selective catalytic reduction, --- = not applicable, Bit = bituminous coal, Sub = subbituminous coal. The NO_x control system is not assumed to enhance mercury removal unless a wet scrubber is present, so it is left blank in such configurations.

Sources: EPA EMFs, http://www.epa.gov/clearskies/technical.html. EIA EMFs not from EPA: Lignite EMFs, Mercury Control Technologies for Coal-Fired Power Plants, presented by the Office of Fossil Energy on July 8, 2003. Bituminous coal mercury removal for a Wet/ HSE/Oth /SCR configured plant, Table EMF1, Analysis of Mercury Control Cost and Performance, Office of Fossil Energy & National Energy Technology Laboratory, U.S. Department of Energy, January 2003, Washington, DC.