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CLEAN AIR ACT

Preliminary Observations on the Effectiveness and Costs of Mercury Control Technologies at Coal-Fired Power Plants

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Highlights

Highlights of GAO-09-860T, testimony before the Subcommittee on Clean Air and Nuclear Safety, Committee on Environment and Public Works, U.S. Senate

Why GAO Did This Study

The 491 U.S. coal-fired power plants are the largest unregulated industrial source of mercury emissions nationwide, annually emitting about 48 tons of mercury—a toxic element that poses health threats, including neurological disorders in children. In 2000, the Environmental Protection Agency (EPA) determined that mercury emissions from these sources should be regulated, but the agency has not set a maximum achievable control technology (MACT) standard, as the Clean Air Act requires. Some power plants, however, must reduce mercury emissions to comply with state laws or consent decrees.

After managing a long-term mercury control research and development program, the Department of Energy (DOE) reported in 2008 that systems that inject sorbents—powdery substances to which mercury binds—into the exhaust from boilers of coal-fired power plants were ready for commercial deployment. Tests of sorbent injection systems, the most mature mercury control technology, were conducted on a variety of coal types and boiler configurations—that is, on boilers using different air pollution control devices.

This testimony provides preliminary data from GAO's ongoing work on (1) reductions achieved by mercury control technologies and the extent of their use at coal-fired power plants, (2) the cost of mercury control technologies in use at these plants, and (3) key issues EPA faces in regulating mercury emissions from power plants. GAO obtained data from power plants operating sorbent injection systems.

To view the full product, including the scope and methodology, click on GAO-09-860T. For more information, contact John Stephenson at (202) 512-3841 or stephensonj@gao.gov.

What GAO Found

Commercial deployments and 50 DOE and industry tests of sorbent injection systems have achieved, on average, 90 percent reductions in mercury emissions. These systems are being used on 25 boilers at 14 coal-fired plants, enabling them to meet state or other mercury emission requirements—generally 80 to 90 percent reductions. The effectiveness of sorbent injection is largely affected by coal type and boiler configuration. Importantly, the substantial mercury reductions using these systems commercially and in tests were achieved with all three main types of coal and on boiler configurations that exist at nearly three-fourths of U.S. coal-fired power plants. While sorbent injection has been shown to be widely effective, DOE tests suggest that other strategies, such as blending coals or using other technologies, may be needed to achieve substantial reductions at some plants. Finally, sorbent injection has not been tested on a small number of boiler configurations, some of which achieve high mercury removal with other pollution control devices.

The cost of the mercury control technologies in use at power plants has varied, depending in large part on decisions regarding compliance with other pollution reduction requirements. The costs of purchasing and installing sorbent injection systems and monitoring equipment have averaged about $3.6 million for the 14 coal-fired boilers operating sorbent systems alone to meet state requirements. This cost is a fraction of the cost of other pollution control devices. When plants also installed a fabric filter device primarily to assist the sorbent injection system in mercury reduction, the average cost of $16 million is still relatively low compared with that of other air pollution control devices. Annual operating costs of sorbent injection systems, which often consist almost entirely of the cost of the sorbent itself, have been, on average, about $640,000. In addition, some plants have incurred other costs, primarily due to lost sales of a coal combustion byproduct—fly ash—that plants have sold for commercial use. The carbon in sorbents can render fly ash unusable for certain purposes. Advances in sorbent technologies that have reduced sorbent costs at some plants offer the potential to preserve the market value of fly ash.

EPA's decisions on key regulatory issues will have implications for the effectiveness of its mercury emissions standard. For example, the data EPA decides to use will impact (1) the emissions reductions it starts with in developing its regulation, (2) whether it will establish varying standards for the three main coal types, and (3) how the standard will take into account a full range of operating conditions at the plants. These issues can affect the stringency of the MACT standard EPA proposes. Data from EPA's 1999 power plant survey do not reflect commercial deployments or DOE tests of sorbent injection systems and could support a standard well below what has recently been broadly achieved. Moreover, the time frame for proposing the standard may be compressed because of a pending lawsuit. On July 2, 2009, EPA announced that it planned to conduct an information collection request to update existing emission data, among other things, from power plants.