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Mercury Emissions Control - Regulatory Drivers

(Note: Several "multi-pollutant control" bills have recently been introduced into the U.S. Congress. Such legislation, if enacted, would significantly modify the driving forces behind the NETL Mercury Emissions Control Program. The information here is based on the regulatory framework that existed in July 2001.)

The 1990 Clean Air Act Amendments (CAAA) brought about new awareness regarding the overall health-effects of stationary source fossil combustion emissions. Title III of the CAAA identified 189 pollutants as potentially hazardous or toxic that required EPA to evaluate their emissions by source, health and environmental implications, and the need to control these emissions. These pollutants have collectively been referred to as air toxics or hazardous air pollutants (HAPs). The provisions in Title III specific to electric power generation units were comprehensively addressed by DOE's National Energy Technology Laboratory (NETL) and the Electric Power Research Institute (EPRI) in collaborative air toxic characterization programs conducted between 1990 and 1997.

This work provided most of the data supporting the conclusions found in EPA's Congressionally mandated reports regarding air toxic emissions from coal-fired utility boilers: the [Mercury Study Report to Congress \(1997\)](#) and the [Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units -- Final Report to Congress \(1998\)](#). The first report identified coal-fired power plants as the largest source of human-generated mercury emissions in the U.S. and the second concluded that mercury from coal-fired utilities was the HAP of "greatest potential concern" to the environment and human health that merited additional research and monitoring.

Subsequent to these findings, data was gathered during EPA's 1999/2000 Information Collection Request (ICR), in cooperation with NETL, to refine the total mercury emission inventory from coal-fired plants and ascertain the mercury control capabilities of existing and potential emission control technologies. Results of this work, and an independent evaluation of mercury health impacts by the National Academy of Sciences (NAS), finally culminated in [EPA's decision in December 2000 \[PDF-18KB\]](#) to regulate the mercury emissions of coal-fired power plants. In their regulatory determination, EPA concluded that there was a "plausible link" between emissions of mercury from coal-fired electric utility steam generating units and the bioaccumulation of methylmercury in fish and other animals that eat fish. Since human exposure to mercury occurs primarily through consumption of contaminated saltwater or freshwater fish, further control of coal- and oil-fired power plants was deemed necessary. EPA is now required to propose regulations by December 15, 2003 and issue final control regulations by December 15, 2004 that become effective in February 2005. Installation of mercury emission control technology will be required no later than three years after finalized regulations go into effect on February 2008. However, in the May 2001 National Energy Policy, the administration recommended a more flexible mercury control strategy that may not require maximum achievable control technology (MACT).

For control of HAPs, the CAAA require the maximum degree of reduction in emissions of the regulated pollutant. These controls, known as maximum available control technology (MACT standards), are based on the average emission level achieved by controls on the best performing 12 percent of existing sources, by category of industrial and utility sources. It is unclear to what extent MACT standards will influence HAP emission levels, including mercury, where controls are not currently in use. Recent estimates place the total annual mercury stack emissions from 464 coal-fired plants at approximately 43 tons, with specific emission levels dependent upon the quantity and type of coal consumed, as well as the particular types and combinations of technologies currently used to control criteria pollutants (particulate matter, NO_x and SO₂). Due to the significant variability of the fuels and design configurations, the equally significant variability associated with mercury's chemical forms (elemental versus oxidized species) as observed in NETL's characterization projects, and the relatively low inherent concentrations of mercury in power plant flue gas (1 to 30 mg per m³), the challenges of reducing mercury emissions are great.

[Background information on mercury sources and regulations](#) are available through the Environmental Protection Agency (EPA).

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