Senate Democratic Policy Committee Hearing

"An Oversight Hearing on the Administration's Mercury Emissions Proposal"

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July 9, 2004

I testify today in support of health protective standards to control emissions of mercury from power plants. I am a pediatrician and an environmental epidemiologist. Between 1985 and 1993, I served in various positions in the California Department of Health Services, most recently as Chief of the Division of Environmental and Occupational Disease Control. There I conducted a number of epidemiological investigations, including one of exposures to Native Americans eating mercury-contaminated fish.(*1*)

From 1993-98, I served as Assistant Administrator for Prevention, Pesticides and Toxic Substances at the US Environmental Protection Agency (EPA). In January 1999 I left the EPA and joined the Johns Hopkins University where I presently am a Professor of Environmental Health Sciences at the Bloomberg School of Public Health. I also serve as chair of the Board for the Children's Environmental Health Network and member of the Board of Trustees of Environmental Defense. This testimony reflects my views and not necessarily those of any of the above organizations.

Mercury is ubiquitous in our environment. It naturally occurs at low levels in soils but most of the mercury in the environment today is due to human activity. It can travel in air for long distances and, when deposited into water bodies, is transformed by bacteria into methylmercury, an organic compound. Methylmercury is persistent and accumulates in the food chain. Fish at the top of the food chain from mercury contaminated waters have the highest concentrations in food.(*2*)

Mercury health effects

Children are more at risk than adults from methylmercury and are exposed during a particularly vulnerable time when methylmercury is passed from mother to baby during pregnancy. This was discovered in the 1960's epidemic of birth defects in the Japanese fishing village of Minimata. Minimata disease was severe cerebral palsy and mental retardation due to very high levels of methylmercury in fish. Affected children were exposed in utero; mothers did not show the symptoms of Minimata disease. A later outbreak of mercury poisoning from contaminated seed grain in Iraq served as the basis for regulatory standards adopted by the EPA and the FDA in the 1980s.(*3, 4*)

More recently, scientific studies have demonstrated more subtle neurological impacts on children exposed in utero at much lower doses. In 2000 the National

Academy of Sciences (NAS) published a report "Toxicological Effects of Methylmercury" that documented the risks of methylmercury to children. They identified three studies of children in New Zealand, the Faroe Islands, and the Seychelles Island, that could serve as the basis for a mercury standard. They recommended a "safe" level (or reference dose) of 5.8 parts per billion and concluded that every year in the US there are 60,000 children born with levels of mercury in their blood above that level.(*5*) With more precise data collected through the National Health and Nutrition Examination Survey (NHANES), the CDC and the EPA later revised that estimate upward to some 300,000 children and a researcher at the EPA has suggested that the number may be closer to 630,000 children.(*6, 7*) Clearly, the data indicate that the impacts in the population are extensive, and need to be addressed.

Since the time of the NAS review in 2000, follow-up studies of the Faroe Islands cohort indicate fetal exposure to methylmercury is associated with detectable neurological impairments in children at age 14 years, that is, abnormal cardiac autonomic activity and abnormal brainstem evoked responses (*8, 9*). While follow-up studies of the Seychelles cohort continue to show little or no effect,(*10*) a new study of Greenland children found neuropsychological impacts of prenatal exposure to methylmercury.*(11)* Another new study of a group of children in Oswego New York was "positive" among 3 year olds but not 4 ½ year olds.(*12*) Although the studies have produced mixed findings, as a whole they substantiate the occurrence of adverse neurotoxic effects at lower and lower levels of exposure.

Moreover, it is clear that the toxicity of methylmercury is not limited to the nervous system of the fetus. Additional adverse effects include increased risk of heart attacks*(13)* and decreased growth.*(14)* A study published just this year indicates that low level mercury exposure may also cause neurological toxicity to adults.*(15)* None of the government risk assessments have factored in these additional health effects.

Emissions of mercury by coal-fired utilities

According to the EPA, coal-fired power plants account for about 40% of the mercury emissions in the United States and today are the largest single source. Despite this, no limits exist on mercury pollution from power plants. While other industries have achieved considerable reductions in mercury emissions, mercury pollution from electric utilities is predicted to increase with increased electrical demand. National policies have been successful at reducing mercury emissions from medical waste incinerators and municipal waste incinerators by over 90% since 1990, while emissions of mercury from electric utilities have remained constant. Modeling shows that significant amounts of mercury in waters across the nation come from pollution sources within the United States. Local emissions of mercury are largely responsible for mercury deposition hot spots, providing an excellent opportunity for effective reductions. At hot spots across the United States, local sources often account for 50% to 80% of the mercury deposition, contributing more than 50% of the pollution to sites in the top 8 worst hot spot states.(*16*)

EPA's proposed rule

As a hazardous air pollutant, the Clinton Administration in December 2000 determined that mercury should be regulated under the CAA § 112. The Clean Air Act requires that emission standards for existing sources be no less stringent that the "average emission limitation achieved by the best performing 12 percent of the existing sources (for which the Administrator has emissions information)" [CAA § 112(d)(3)]. This is known as the "MACT floor" for existing sources. To produce such a standard, the EPA collected mercury emissions data for about 80 coal-fired power plant units. Based on the top 12% of existing units, the MACT floor emission rate should reflect about 91% mercury control.(*17*) Unfortunately, the first phase of EPA's 2003 proposed rule would attain only a 30% reduction in mercury by 2010. Moreover, this reduction will be achieved as a collateral benefit from EPA's proposed Clean Air Interstate Rule. EPA's proposed 70% reduction by 2018 for Phase II is still too modest. With no direct investments required to reduce mercury emissions until 2018, a new generation of children will needlessly be exposed to high levels of mercury pollution even though solutions are readily available today.

In addition, as noted above, a significant amount of mercury pollution creates pollution hot spots, which put local populations at risk of exposure. With a trading approach, it is quite conceivable that some power plants upwind from bodies of water with contaminated fish would never cut pollution and may even increase their mercury pollution in the future. Thus, the local communities surrounding these sources may not benefit from any reduction in mercury emissions and could conceivably suffer increased emissions. Cap-and-trade programs for other pollutants (sulfur dioxides and No_x) have safeguards in place to protect the public health. There are no similar protections for mercury emissions. Unlike these pollutants, methylmercury biomagnifies and bioaccumulates in fish and becomes more concentrated as it moves up the food chain to humans and other animals that consume fish and thus is likely to persist in the environmental for a long time, once a hot spot has been created.

Conclusion

Along with Environmental Defense and many others, I believe that the evidence supports a single MACT standard to reduce emissions by 90% in 2007. Also, EPA should eliminate its proposed cap-and-trade program and implement a single MACT standard to reduce mercury emissions at power plants. EPA itself has found that an activated carbon injector with an electrostatic precipitator and a retrofit fabric filter, or a fabric filter alone, have the potential to achieve 90% reduction in mercury emissions.(*18*) Such a standard would be consistent with similar requirements for municipal and medical waste combustors, which have successfully reduced mercury pollution from these sources by 90%. This proposal is both feasible and in the best interest of our nation's children.

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