MERCURY WHITE PAPER

The Mercury Study

As required by the Clean Air Act Amendments of 1990, the Environmental Protection Agency (EPA) is issuing a Report to Congress on Mercury. The Mercury Study inventories the quantity of mercury emissions to the air from a number of sources related to human activity; estimates the health and environmental impacts associated with these emissions; and describes the technologies (and associated costs) available to control mercury emissions from these sources. Recent and planned EPA actions will greatly reduce releases of mercury to the environment and mercury exposures. Early in 1998, EPA will release, for public input, a draft comprehensive Action Plan describing EPA's continuing effort to reduce mercury pollution.

Sources of Mercury in the Environment

The same amount of mercury has existed on the planet since the Earth was formed. Mercury moves through the environment as a result of both natural and human activities. The human activities that are most responsible for causing mercury to enter the environment are burning mercury-containing fuels and materials and industrial processes. These activities produce emissions to the air that contain mercury. Mercury is transported through the air and deposited to water and land where humans and wild life are exposed. Based on the Mercury Study's emissions inventory, the highest emitters of mercury to the air include coal burning electric utilities, municipal waste combustors, commercial and industrial boilers, medical waste incinerators, chlor-alkali plants, hazardous waste combustors, and cement manufacturers. Mercury also can contaminate land and water when it is directly released in industrial waste waters, or when waste containing batteries and other sources of mercury are disposed of.

Health Effects and Exposure

Concentrations of mercury in air and water are usually low and of little direct concern, although accidental exposures to elemental mercury also can pose a threat. Once mercury enters waters, either directly or through air deposition, it can bioaccumulate in fish and animal tissue in its most toxic form, methylmercury. Bioaccumulation means that the concentration of mercury in predators at the top of the food web (for example, predatory fish and fish-eating birds and mammals) can be thousands or even millions of times greater than the concentrations of mercury found in the water.

Human exposure to mercury occurs primarily through eating contaminated fish. Exposure to high levels of mercury has been associated with serious neurological and developmental effects in humans. Depending on the dose, the effects can range from subtle losses of sensory or cognitive ability to tremors, inability to walk, convulsions, and death.

Mercury is the most frequent basis for fish advisories, represented in 60% of all water bodies with

advisories. Advisories for mercury are increasing faster than for any other pollutant. They increased 28% from 1995 to 1996 (from 1,308 to 1,675). Thirty-nine states have advisories for mercury in one or more water bodies, and nine States have issues statewide mercury advisories.

The magnitude of exposure to mercury (especially methylmercury) and degree of risk from fish consumption depends on two things: the level of mercury in the fish consumed and the amount of fish an individual consumes. People who consume average amounts of a variety of commercially available fish as part of a balanced diet are not likely to consume harmful amounts of mercury. Moreover, fish is an excellent source of proteins, vitamins and minerals and including a variety of fish in the diet is a healthy dietary practice.

The greatest exposure and risk exist for those persons who regularly eat large amounts of fish from a single location which has been impacted by mercury pollution, particularly for women of child-bearing age, because the fetal nervous system is more sensitive to mercury toxicity than is that of adults. Everyone, including pregnant and childbearing-age women, should follow established guidelines in accordance with existing state and tribal advisories on locally caught fish in order to obtain the benefits of fish consumption while reducing the potential risk of mercury exposure.

Recent and Ongoing Actions to Reduce Mercury Pollution

A number of recent actions by EPA will help to reduce mercury pollution. These include issuing stringent regulations for industries that significantly contribute to mercury pollution. These actions, once fully implemented will reduce mercury emissions caused by human activities by over 50% from 1990 levels.

♦ Actions to reduce mercury releases:

- The Mercury Report estimates that municipal waste combustors emitted 18.7 percent of total national mercury emissions into the air. EPA issued final regulations for municipal waste combustors on October 31, 1995. When fully implemented, in the year 2000, these regulations will reduce mercury emissions from these facilities by about a 90 percent, from 1990 emission levels.

- The Mercury Report estimates that medical waste incinerators emitted 10.1 percent of total national mercury emissions into the air. EPA issued emission standards for medical waste incinerators on August 15, 1997. When fully implemented, in 2002, EPA's final rule will reduce mercury emissions from medical waste incinerators by 94 percent from 1990 emission levels.

- The Mercury Report estimates that hazardous waste combustors emitted 4.4 percent of total national mercury emissions. In April 1996, EPA proposed

emission standards for these facilities, which includes incinerators, cement kilns, and light weight aggregate kilns that burn hazardous waste. This proposal, which EPA plans to finalize late in 1998, would require these sources to control mercury emissions as well as emissions of other hazardous air pollutants.

- Data from the Mercury Study indicate that industrial manufacturers are shifting away from mercury use As a result, domestic demand for mercury decreased more than 75 percent between 1988 and 1996. EPA believes this shift is largely a result of Federal bans on mercury additives in paint and pesticides; industry efforts to reduce mercury in batteries; increasing state regulation of mercury emissions and mercury in products; and state-mandated recycling programs.

- EPA supports the efforts of State and local governments to achieve mercury discharge reductions through outreach and technical assistance for mercury pretreatment programs at sewage treatment plants. EPA also assists States and Tribes develop innovative regulatory approaches, such as a market-based emissions reduction program for the State of Minnesota.

♦ Actions to provide information to the public;

- Until we can eliminate the need for fish consumption advisories, Federal, State and Tribal governments will continue to assure the public's right to know about whether and which fish are safe and in what amounts. The States and Tribes are usually in the best position to give advice about whether fish from local waters are safe to eat. EPA works with States and Tribes in all aspects of developing advisories to assure that scientifically sound methods are used in developing, issuing and communicating consumption advisories. This includes giving scientific and technical advice and providing grants for monitoring efforts and chemical analysis. An important result of this effort has been that the majority of States now use a commonly accepted scientific method for setting these advisories. EPA also is working with States and Tribes to assure that the nation’s rivers and lakes are accurately assessed to determine if they contain fish that should be consumed in limited quantities or not at all.

Planned Actions Concerning Mercury Pollution

A number of sources of mercury pollution still need to be addressed. EPA is developing a draft Action Plan for mercury pollution. The draft Action Plan will consider actions to respond to the public’s right to know about sources mercury emissions, better integrate EPA’s actions under its various programs to address mercury, emphasize pollution prevention and efficient use of resources to control mercury emissions, and foster communication and cooperation among all stakeholders in developing strategies to control mercury. The draft Action Plan, which will provide information on the following and additional actions, will be available to the public early in 1998. EPA hopes to receive input from the public on the draft Action Plan and will hold public workshops for interested parties.

In addition, the Clean Water Action Plan called for by the Vice President on October 18, 1997 and currently in preparation, will include Federal Agency actions to focus pollution prevention, source control, and remediation on eliminating the sources of bioaccumulative pollutants, including mercury, with a goal of eventually removing fish advisories.

♦ Planned actions to reduce mercury releases:

- Actions to control air emissions of other pollutants will also reduce mercury emissions. With implementation of the new National Ambient Air Quality Standards for fine particulate matter and ozone, and the second phase of the acid rain program EPA expects to see a reduction of mercury emissions from utility boilers. Actions to reduce emissions of the greenhouse gases that are responsible for climate change, could also reduce mercury emissions from utilities and other industrial boilers.

- EPA is concerned that the current treatment standard for wastes containing high levels of mercury, which based on recycling, may not be the best way to reduce releases of mercury into the environment. In 1998, EPA will begin reviewing alternative treatment technologies. In 1999, EPA is planning to issue an Advanced Notice of a Proposed Rulemaking to revise its current treatment standards for wastes containing high levels of mercury.

- On April 7, 1997, the United States and Canada signed the Great Lakes Binational Toxics Strategy. Although both the United States and Canada have domestic strategies to reduce mercury pollution, a coordinated strategy is necessary for the greatest reduction in toxic substances throughout the Great Lakes Basin. The goal of the strategy is to seek, by 2006, a 50 percent reduction in the deliberate use of mercury and a 50 percent reduction in the release of mercury caused by human activity. The goal for releases will apply to all sources of mercury emissions to the air nationwide as well as to all sources that directly discharge mercury to the water within the Great Lakes Basin. At the present time, the USEPA and Environment Canada are working with all industrial sectors that releases mercury, States, Tribes, environmental groups and the public, to help identify and undertake specific mercury reduction activities.

♦ Further assessment activities:

- The Clean Air Act Amendments of 1990 require EPA to conduct a study (The Utility Air Toxics Report to Congress) to evaluate the public health impacts of emissions of hazardous air pollutants, including mercury, from power plants. The Report will incorporate the analyses and findings from the Mercury Study and will provide an assessment of the health effects of air toxics emitted by power plants. EPA is scheduled to issue this Report in early 1998.

- EPA will evaluate the impacts of mercury emissions from industrial sources, including commercial/industrial boilers, mercury-cell chlor-alkali plants, and portland cement kilns. EPA is required under the air toxics provision of the Clean Air Act Amendments of 1990 to evaluate industrial sources that account for at least 90 percent of emissions of seven specific pollutants, including mercury. Further, the Act requires EPA to subject these sources to technology-based standards (known as maximum achievable control technology or MACT) or determine that their emissions do not violate established health thresholds.

- EPA will also evaluate whether secondary mercury production should be added to the

list of industrial sources to be regulated under the air toxics provision of the Clean Air Act. These facilities recover mercury by recycling mercury-containing items, such as industrial wastes and some consumer products (e.g., fluorescent lamps).

♦ Planned research activities:

- EPA will evaluate control technologies to support development of regulatory options and pollution prevention strategies for various emission sources, including coal-fired utilities.

- EPA will develop an improved prediction model to estimate stack-emitted mercury concentrations in the air, water and soil, and in the food web, considering bioaccumulation; and methods for improved monitoring of mercury in various media.

- EPA will complete an assessment of a number of studies that examine health and environmental effects of mercury exposure to support risk-based decision-making.

- EPA is participating in international fora to encourage the cooperative development and use of relevant scientific information concerning mercury. For example EPA has chaired the North American Task Force on Mercury (pursuant to the North American Commission on Environmental Cooperation established under NAFTA) and has participated in negotiations under the U.N. Economic Commission for Europe Convention on Long- Range Transboundary Air Pollution.

- EPA is developing a Mercury Research/Monitoring Strategy to facilitate coordination and communication with regard to planning mercury-related research.

EPA is making significant progress in addressing the mercury pollution problem in the United States. The Agency expects to identify additional actions as it develops its Action Plan for mercury. EPA is committed to action to ensure public health and protect the environment.