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Title: *Mercury Product Life Cycle Tool: Uses & Results*

Mercury Product Life Cycle Tool: Uses & Results

Session 3, Setting Mercury Priorities: What Do We Know About Sources of Mercury & Releases to the Environment, at the Conference on Achieving Mercury Reduction in Products & Waste: Coordinating National & Local Government Initiatives

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Emissions controls placed on incinerators and reductions in the use of mercury in products such as batteries and thermometers have reduced mercury-releases caused by mercury-containing products. As a result, it is reasonable to ask whether products are still significant sources of mercury to the environment, and whether the efforts of government agencies would be better directed towards reducing other sources of mercury emissions, such as coal combustion, rather than towards reducing mercury content of products and better managing mercury wastes.

In order to address this question, Barr Engineering Company and the U.S. Environmental Protection Agency, Region 5, building on previous similar efforts for the states of Minnesota and Wisconsin, created a tool to quantify U.S. mercury releases over the full life-cycle of mercury-containing products. Nine products were analyzed in depth: dental amalgam, lamps, bulk liquid mercury, automobile switches, thermostats, fever thermometers, and other relays and switches and measurement and control devices. While a full analysis of batteries was not conducted, a quick evaluation of releases caused by batteries is presented also. This tool utilizes quantitative flow diagrams and linked spreadsheets estimating the releases of mercury to air, water and land during product manufacture, distribution, use and disposal. This approach results in an improved estimate of mercury releases, and shows that mercury-containing products result in significant releases of mercury to the environment.

The results of the study provide insights into the potential magnitude of mercury air emissions associated with products and the product categories and pathways that potentially result in the most significant releases. Air emissions in 2000 related to mercury-containing products, according to this analysis, are roughly equivalent to estimated mercury air emissions from coal combustion at electric utilities in the United States (within 25 percent). While product related emissions continue to decline, mercury releases in the 2005 are estimated to be approximately 25 metric tons per year, or approximately 25 percent of total U.S. mercury emissions.

Switches and relays and measurement and control devices are the products responsible for the most mercury air releases and the iron and steel recycling system may be the most significant disposal pathway for releases of mercury from products to the air. In addition, while emissions controls on waste incinerators have significantly reduced product-related mercury air emissions, results produced by the life-cycle tool suggests that there may still be significant releases from other components of the waste management system.

The life cycle tool is also useful for estimating the likely impacts on mercury releases of options that would decrease mercury use or improve management of mercury-containing wastes. For instance, a program that increased the recycling rate for mercury-containing auto switches from 20 percent to 80 percent nationwide would reduce mercury releases to air could be reduced by nearly three metric tons, according to an analysis performed using the life-cycle tool. A program that

increased lamp recycling from 25 percent to 75 percent would reduce mercury emissions by more than 600kg, according to an analysis performed using the life-cycle tool.

Persons interested in utilizing the mercury product life-cycle tool should contact Alexis Cain at cain.alexis@epa.gov.