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Binational Toxics Strategy Mercury Progress Report

DATE: March 16, 2006

SUBJECT: PROGRESS UPDATE: U.S. MERCURY RELEASE AND USE REDUCTION CHALLENGES

FROM: ALEXIS CAIN, USEPA, Region 5

TO: BINATIONAL TOXICS STRATEGY MERCURY WORKGROUP

The Binational Toxics Strategy sets the following mercury reduction challenge for the United States: *"Seek by 2006, a 50 percent reduction nationally in the deliberate use of mercury and a 50 percent reduction in the release of mercury from sources resulting from human activity. The release challenge will apply to the aggregate of releases to the air nationwide and of releases to the water within the Great Lakes Basin. This challenge is considered an interim reduction target and, in consultation with stakeholders, will be revised if warranted, following completion of the Mercury Study Report to Congress."*

This memo provides an update on the status of progress toward meeting the 50 percent release and use reduction challenges. Best available data indicates that both challenges have been met.

Trends in Mercury Releases

While the mercury release challenge refers to the aggregate of mercury emissions nationwide and mercury releases to water in the Great Lakes Basin, this memo will discuss mercury air emissions only, for two reasons. First, we lack trend data on mercury releases to water within the Great Lakes basin. Second, mercury water releases in the Great Lakes Basin are thought to be very small in comparison with nationwide mercury emissions, and therefore do not significantly impact the aggregate total. Thus, it is reasonable to assess progress through examination of national air emissions data only.

The baseline year for assessing reductions in mercury releases is 1990, the year of the most recent mercury emissions inventory available at the time the Binational Toxics Strategy was signed (the draft Mercury Report to Congress 1990 emissions inventory). The U.S. Environmental Protection Agency subsequently updated its 1990 inventory, and has also published emissions inventories for 1999 and 2002, through the National Emissions Inventory (NEI). The most recent data is summarized below.

U.S. National Air Emissions Inventory (tons)

| Source Category | 1990 Emissions Baseline NTI | 1999 Emissions Version 3.0 1999 NEI for HAPs | 2002 Emissions 2002 NEI for HAPS |
|---|-----------------------------|--|----------------------------------|
| Utility coal boilers | 51.1 | 47.9 | 50.3 |
| Medical waste incinerators | 49.7 | 1.6 | 0.3 |
| Municipal waste combustors | 56.7 | 4.9 | 4.2 |
| Industrial/commercial/institutional boilers and process heaters | 12 | 12 | 10 |
| Chlorine production | 10 | 6.5 | 5.4 |
| Electric Arc Furnaces | *** | *** | 10.7 |
| Hazardous waste incineration | 6.6 | 6.6 | 4.6 |
| Gold mining | ** | 11.5 | 6.5 |
| Other categories* | 23.5 | 22.2 | 19.7 |
| Total (all categories) | 209.6 | 113.2 | 111.4 |

* Data for Lime Manufacturing are not available for 1990.

** Gold mining data are not available for 1990.

*** Electric Arc Furnace Data not available for 1990 and 1999.

Total estimated emissions decreased 47 percent between 1990 and 2002. However, actual emissions reduction has likely been deeper than this estimate would indicate, because two of the biggest 2002 emissions source categories— electric arc furnaces and gold mining, are not included in the 1990 inventory. EPA is developing 1990 emissions estimates for these categories; when these estimates become available, it is likely that an updated trend evaluation will show emission reduction of more than 50 percent between 1990 and 2002. Moreover, it is likely that the chart understates total emissions reductions between 1999 and 2002, because the 1999 estimates do not include emissions from electric arc furnaces.

Trends in Mercury Use

Although it is clear that mercury use has decreased since 1995, the trend is difficult to quantify because the U.S. Geological Survey (USGS) stopped reporting estimated U.S. mercury consumption after 1997. However, on the basis of data reported by the chlor-alkali, lamp, and dental industries, it appears that mercury use declined more than 50 percent between 1995 and 2004, assuming that mercury use in other sectors has remained constant since 1997 (see Figure 1-2). The chlor-alkali

industry accounted for an estimated 35 percent of mercury use in 1995, and its total mercury use decreased 91 percent between 1995 and 2004 (including the impact of plant closures). The fluorescent lamp industry has reported that mercury use in 2003 was 6 tons, compared with 32 tons estimated by the USGS for 1997. These reductions are the result of reductions in the mercury content of lamps sold in the U.S., as well as an increase in lamp imports and a decline in U.S. fluorescent lamp production. Lamp manufacturers use mercury both in lamps themselves and in the production process. Recently-published research estimates that mercury use in dental amalgam has declined to approximately 35 tons per year.

It is likely that mercury use has declined even more than portrayed in the table below, because mercury use in categories other than chlor-alkali and lamps has also decreased. While these reductions have not been quantified, reductions have been achieved in the use of mercury in measurement and control devices, and switches and relays. These reductions are not captured in the table below.

U.S. Mercury Use (tons)

| Industry/Product Category | 1995* | 1997* | 2004* |
|---------------------------------|-------|-------|-------|
| Chlor-alkali Production** | 160 | 116 | 14 |
| Wiring Devices and Switches | 92 | 63 | 63 |
| Measurement and Control Devices | 47 | 26 | 26 |
| Dental*** | 35 | 44 | 35 |
| Lighting**** | 33 | 32 | 6 |
| Other | 102 | 40 | 40 |
| Total | 469 | 321 | 184 |

* Source for 1995 and 1997 (except chlor-alkali data)-- U.S. Geological Survey, *Minerals Yearbook*, 1995 and 1997-- converted to short tons. For 2004, assume that use has not changed, except for in chlor-alkali, lighting and dental categories.

** Chlorine Institute, *Eighth Annual Report to EPA*, May 13, 2005. Mercury "used" rather than mercury "purchased." Under this definition of "use," mercury purchased and placed in inventory or added to cells to increase working stock of mercury does not count as "use." Mercury purchases were estimated to average 141 tons between 1990 and 1995, and were 38 tons in 2004.

*** Vandeven J, McGinnis SL. An Assessment of Mercury in the Form of Amalgam in Dental Wastewater in the United States. *Water, Air and Soil Pollution* 2005; 164:349-366.

**** E-mail from Ric Erdheim, National Electrical Manufacturers Association, May 27, 2004.

