Updated Supply Data and Sources of U.S. Mercury

September 20, 2007

Meeting of Commodity-Grade Mercury Stakeholder Panel

Outline of Presentation

- Purpose:

  To provide updated information about the U.S. supply of commodity mercury

  - Developed with a sub-panel of experts from the Stakeholder Panel

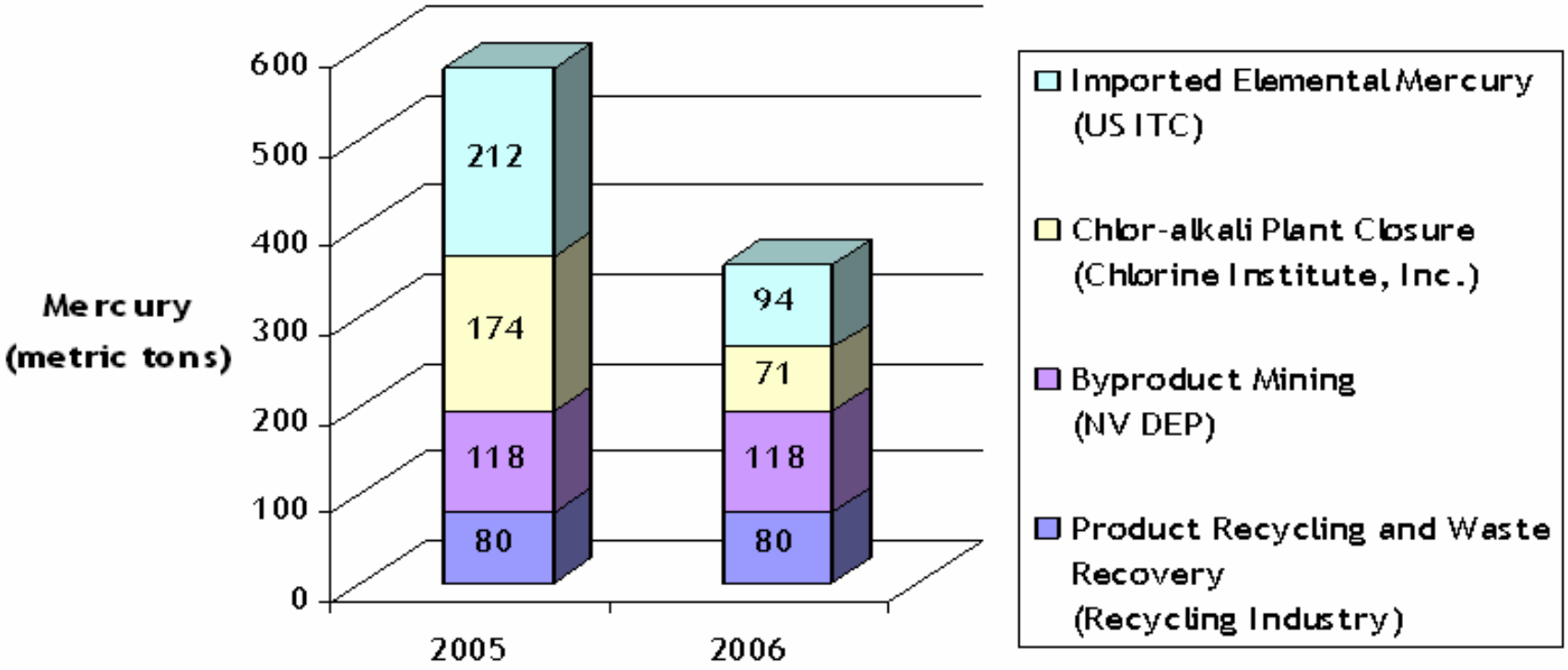
- Outline:
  - Current U.S. supplies of elemental mercury
    - Domestic supply sources
    - Imports
  - Reservoirs of elemental mercury
  - Future trends

Sources of Commodity Mercury in U.S.

U.S. domestic supply sources:

- Closing/retrofitting chlor-alkali plants
- By-product from gold mining
- Product recycling and waste recovery
- Import of commodity-grade mercury
- Import of calomel (mercury chloride)

Estimated Quantities of Commodity-Grade Mercury in the U.S. in 2005 and 2006



U.S. Domestic Supply Source: Chlor-alkali Plants

- **Sources:** Elemental mercury released to market upon closure of plants or conversion to mercury-free technology
- **Mercury recently made available for sale from two recent closures**
  - One plant closure resulted in 174 metric tons sold in 2005 and 71 metric tons in 2006
  - Second plant closure in June/July 2007 resulting in ~400 metric tons
- **Mercury to become available in near future**
  - ~650 metric tons from two plants planning to close by end of 2008
  - ~300 metric tons from plant which announced it will close by 2009
- **Mercury remaining in use**
  - Four plants continue to operate
  - Approximately 1,000 metric tons elemental mercury remain in use

U.S. Domestic Supply Source: Byproduct Mining

- **Total Annual Supply: ~118 metric tons of commodity-grade mercury in 2006**
  - Extraction will occur until 2015; processing will continue until 2029
- **Sources: Mercury is captured in air pollution control processes at Nevada gold mines**
- **Trend: Quantity may increase modestly over time**
  - Quantity dependent upon mine life and industry expansion
- **Regulatory Setting: Mercury captured through voluntary air emissions control devices**
  - Voluntary air emissions reduction soon to be mandated by State of Nevada

U.S. Domestic Supply Source: Product Recycling and Waste Recovery

- **Total Annual Supply:** Anecdotal evidence indicates that from 50 to 80 and up to 100-200 metric tons were recovered in 2006

- **Sources:** Retorting of end-of-life products, off-spec products, hazardous industrial waste, and contaminated soil from cleanup sites

- **Trend:** Quantity is assumed to remain the same in the short term (e.g. next decade), and then decline as mercury content of products decreases and waste streams get smaller.

U.S. Reservoirs of Mercury – Limited Recovery Potential

- **<u>Total Annual Supply:</u> ~2000 metric tons of mercury currently contained in dental amalgam and products; unknown amount in contaminated soil**

  - **Most is now being landfilled or otherwise released when discarded, including:**

    - discharges of dental amalgam to wastewater from dental offices and

    - air emissions of mercury from crematoria

  - **Small percentages of the mercury are recovered from reservoirs, e.g. from dental offices, auto switches and fluorescent lamps**

- **<u>Trend</u>: Unknown percentages may be recovered in the future**

U.S. Domestic Supply Source: Imports and Exports (Data from U.S. ITC, Metric Tons)

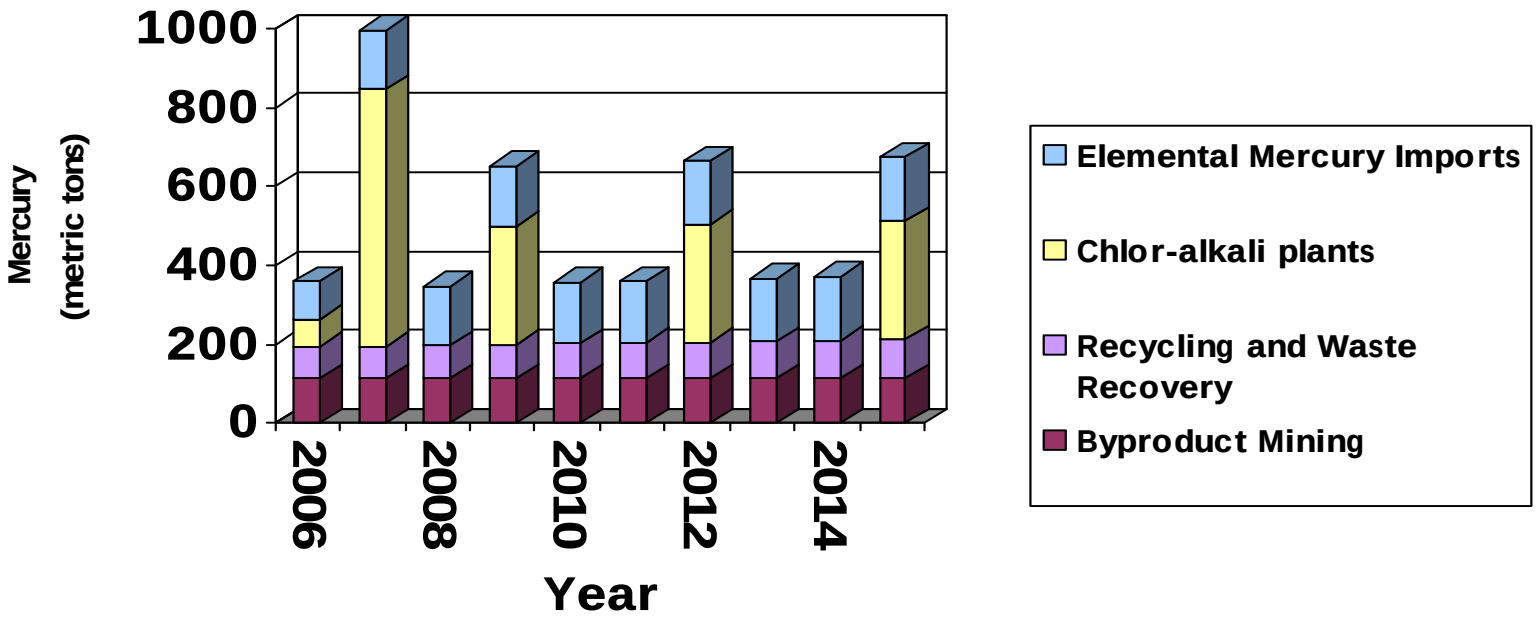
Year	*Mercury Equivalents of Calomel Imports*	*Imports of Elemental Mercury*	*Total Imports*	*Total Exports*	*Net Exports*
2002	27	210	237	324	87 - 114
2003	11	46	57	287	230 - 241
2004	207	92	299	279	-21 - 187
2005	328	212	540	319	-221 - 107
2006	58	94	152	390	238 – 296
Average	126	131	257	320	63 - 189

- **Nearly all calomel imports since 2004 have been from Chile; we assume calomel is 50 percent mercury by weight (Reported imports of elemental mercury in 2006 were predominantly from Russia (51 metric tons), Peru (22 metric tons), Germany (14 metric tons), and Canada (eight metric tons) whereas 2005 imports were predominantly from Peru (128 metric tons), Chile (31 metric tons), Israel (29 metric tons), Canada (13 metric tons), and Germany (11 metric tons)).**
- **Net exports = total exports minus total imports; second number in range excludes mercury from imported calomel due to uncertainty of calomel estimates.**
- **Average annual net exports may be closer to 140, based on a separate estimate of 50 tons of mercury per year from calomel imports.**

Expected Future Trends

- **U.S. domestic supply: ~200 metric tons per year (from byproduct mining and recycled from products and waste) + releases from chlor-alkali plants**
  - Secondary recovery growing slowly, but will ultimately be limited by size of reservoir
  - May decline with demand (with or without a time lag), and with closure of all mercury cell chlor-alkali plants
- **Imports for processing: ~257 metric tons per year**
  - Expected to continue as long as global demand continues; generally re-exported
  - Actual imports will reflect global market conditions and trade policies
- **Reservoirs potentially recoverable:**
  - Uncertain – driven by recovery efforts
  - Reservoirs growing at a rate consistent with import of products and manufacturing of products for domestic uses, minus any mercury recovered via recycling, chlor-alkali closures (what do we mean by reservoirs here)
  - Significant portion of product, amalgam reservoirs is not economically recoverable; unclear whether technological, voluntary or state regulatory changes will affect this

Summary of U.S. Mercury Supplies



- Releases from chlor-alkali plants are "lumpy."
  - 2006 data reflects the scheduled closure of two chlor-alkali plants
  - We assume a plant releases 300 metric tons every three years after 2009
- Recycling of products and waste may also be "lumpy"-- we assume a slight increase over time in recycling and waste recovery rates.
- We assume continuing trends in imports based on a linear extrapolation of historical data from US ITC from 1989 through 2006.
- This benchmark does not reflect any controls on exports or domestic supplies.