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National Priority Chemicals Trends Report (2004-2006)

Section 4 Trends Analyses for Specific Priority Chemicals (2004-2006): Mercury and Mercury Compounds (Mercury)

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Mercury and Mercury Compounds (Mercury)

Chemical Information

General Uses: Mercury is a metal used in chlor-alkali production, wiring devices, switching mechanisms, amalgam dental fillings, and measurement and control instruments. Industries also manufacture and process mercury reagents, catalysts, and medicinal chemicals. Secondary production of mercury involves the recovery of mercury from dismantled equipment and recovery from scrap and industrial wastes using a thermal or chemical extractive process. Major sources of recycled or recovered mercury include scrap from instrument and electrical manufactures (lamps and switches), wastes and sludge from laboratories and electrolytic refining plants, mercury batteries, and dental amalgams. Mercury is also found as a trace contaminant in fossil fuels and waste materials; mercury quickly volatilizes in combustion processes.

How Much Mercury Was Generated?

For 2006, 604 facilities reported approximately 74,000 pounds of mercury being generated. One facility accounted for approximately 29 percent of the national total quantity of this PC, while 11 facilities accounted for approximately 72 percent of this PC (please refer to Exhibit 3.4 to see the number of facilities that reported this PC within various quantity ranges). Compared to the total quantities of mercury reported for 2004 and 2005, the quantity increased by approximately 11,800 pounds and decreased by approximately 4,600 pounds, respectively (Exhibit 4.43).

Exhibit 4.43. National Generation of Mercury (2004–2006)

TRI Reporting Year	2004	2005	2006
Total Quantity of Mercury (pounds)	62,293	78,614	74,043
Number of TRI Facilities Reporting Mercury	594	598	604

Where Was Mercury Generated?

Since 2004, facilities in 53 states and territories reported generating mercury (Exhibit 4.44).

Exhibit 4.44. Location of Facilities that Generated Mercury (2006)

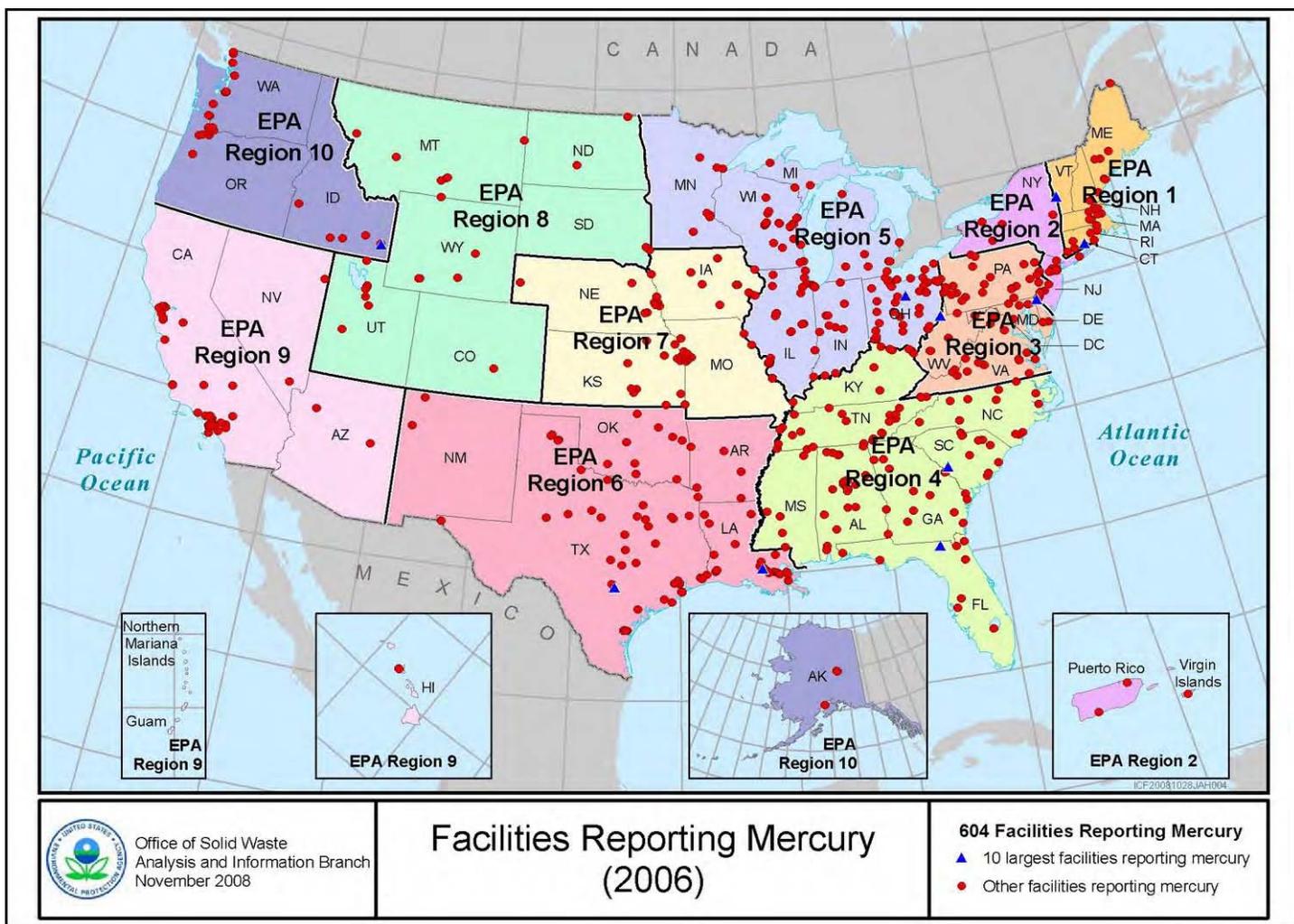


Exhibit 4.45 shows the counties in which facilities reported approximately 80 percent of the total quantity of mercury generated. Some observations concerning the quantity of mercury reported by the facilities in these counties are:

- An organic chemical manufacturing facility in New Haven County, Connecticut reported 21,405 pounds of mercury for 2006—this was the first time this facility submitted a TRI report. Prior to the 2006 TRI reporting year, the facility did not report mercury because it did not exceed the 20,000-hour full-time employee threshold for reporting to TRI.
- An alkalis and chlorine manufacturing facility in Iberville County, Louisiana reported an increase of approximately 8,600 pounds for 2006 due to the de-oiling of tanks from which it removed mercury contaminated mud from the bottom of the tanks.
- A pump and pumping equipment manufacturing facility in Carroll County, Maryland reported an increase of approximately 1,100 pounds for 2005. The source of mercury was mercury seals on water pumps, including from pumps that were serviced or reconditioned. The facility plans to stop selling water pumps with mercury seals; however, older pumps returned for servicing or reconditioning will likely continue to be a source of mercury.
- A federal (Department of Defense) facility in Kern County, California reported an increase of approximately 18,600 pounds for 2005, followed by a decrease of approximately 30,500 pounds for 2006. The mercury is a by-product from a geothermal energy plant. The geothermal stream is passed through carbon beds to absorb the mercury. When differential pressure in a carbon bed reaches a certain point, the carbon bed is replaced with new carbon; contaminated carbon bed material (containing mercury) is disposed of. The large increase in mercury for 2005 was due to changing out all of the carbon beds; for 2006, the quantity of mercury decreased because only a limited number of the carbon beds were changed.

Exhibit 4.45. Quantity of Mercury, for Facilities Reporting 80 Percent of Total Quantity, by County (2006)

EPA Region	State	County	Quantity (pounds) of Mercury			Percent of Total Quantity (2006)
			2004	2005	2006	
1	CT	New Haven	155	123	21,536	29.1%
6	LA	Iberville	269	632	9,259	12.5%
5	OH	Richland	5,000	5,900	5,460	7.4%
1	VT	Rutland	9,357	5,510	4,886	6.6%
3	DE	New Castle	1,048	932	3,710	5.0%
4	FL	Hamilton	3,085	2,426	2,244	3.0%
4	SC	Aiken	3,035	824	1,799	2.4%
10	ID	Caribou	1,415	1,548	1,375	1.9%
6	TX	Guadalupe	2,702	1,284	1,355	1.8%
3	WV	Marshall	1,145	657	1,131	1.5%
3	MD	Carroll	0	1,112	1,121	1.5%
4	AL	Morgan	34	34	919	1.2%
10	ID	Power	800	910	739	1.0%
3	PA	Beaver	132	101	703	0.9%
3	MD	Baltimore	8	430	640	0.9%
9	CA	Kern	12,431	31,041	566	0.8%
4	NC	Beaufort	435	687	559	0.8%
9	CA	Contra Costa	885	657	540	0.7%
5	WI	Racine	201	360	528	0.7%
7	IA	Dubuque	0	313	500	0.7%
Total			44,140	57,485	61,578	80.5%

Which Industries Generated Mercury?

For 2006, facilities in 101 different NAICS codes reported mercury. Facilities in five NAICS codes accounted for approximately 79 percent of the total quantity of mercury generated (Exhibit 4.46).

Exhibit 4.46. Industry Sectors Quantities of Mercury, for Facilities Reporting 90 Percent of Total Quantity (2006)

Primary NAICS code	NAICS Code Description	Facilities Reporting (2006)	Quantity (pounds) of Mercury			Percent of Total Quantity (2006)
			2004	2005	2006	
325199	All Other Basic Organic Chemical Manufacturing	14	1,316	175	22,462	30.3%
325181	Alkalies and Chlorine Manufacturing	10	4,401	4,491	15,997	21.6%
331111	Iron and Steel Mills	51	10,337	9,227	9,201	12.4%
335110	Electric Lamp Bulb and Part Manufacturing	13	9,941	6,171	5,863	7.9%
325312	Phosphatic Fertilizer Manufacturing	6	5,888	5,629	4,767	6.4%
324110	Petroleum Refineries	90	2,726	2,037	2,449	3.3%
928110	National Security	6	12,709	31,769	2,404	3.2%
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	2	582	1,301	1,197	1.6%
333911	Pump and Pumping Equipment Manufacturing	2	0	1,112	1,121	1.5%
335912	Primary Battery Manufacturing	4	202	620	759	1.0%
325211	Plastics Material and Resin Manufacturing	12	1,365	708	692	0.9%
Total		210	49,466	63,238	66,912	90.4%

How Did Facilities Manage Mercury?

Exhibit 4.47 shows how facilities, by industry, managed mercury in 2006.

Land Disposal: Facilities disposed of 100 percent of the mercury; approximately 91 percent was disposed of offsite.

Energy Recovery: Energy recovery is not applicable to this PC.

Treatment: No facilities reported treating this PC.

Recycling: Facilities recycled approximately 462,000 pounds of mercury in 2006. Facilities in two industries: NAICS code 325181 (Alkalies and Chlorine Manufacturing) and NAICS code 331492 (Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum) accounted for approximately 98 percent of the total quantity of mercury recycled.

Many facilities reported they only used recycling to manage their mercury. For 2006, 90 facilities, in 54 different industries, reported only recycling approximately 24,000 pounds of mercury. Exhibits 4.48 and 4.49 show the industries and the quantities for those facilities that accounted for approximately 90 percent of the mercury that were managed only by recycling.

Exhibit 4.47. Management Methods for Mercury, by Industry (NAICS Code) in 2006

Primary NAICS Code	NAICS Code Description	Total PC Quantity* Reported	Quantity (pounds) of Mercury								
			Disposal		Energy Recovery		Treatment		Recycling		
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	
325199	All Other Basic Organic Chemical Manufacturing	22,462	11	22,451	0	0	0	0	0	0	834
325181	Alkalies and Chlorine Manufacturing	15,997	302	15,695	0	0	0	0	185,990	165,781	
331111	Iron and Steel Mills	9,201	126	9,075	0	0	0	0	52	3,949	
335110	Electric Lamp Bulb and Part Manufacturing	5,863	0	5,863	0	0	0	0	0	2,760	
325312	Phosphatic Fertilizer Manufacturing	4,767	4,767	0	0	0	0	0	0	0	
324110	Petroleum Refineries	2,449	334	2,115	0	0	0	0	321	546	
928110	National Security	2,404	368	2,035	0	0	0	0	0	231	
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	1,197	0	1,197	0	0	0	0	101,495	0	
333911	Pump and Pumping Equipment Manufacturing	1,121	0	1,121	0	0	0	0	0	0	
335912	Primary Battery Manufacturing	759	0	759	0	0	0	0	0	98	
325211	Plastics Material and Resin Manufacturing	692	373	319	0	0	0	0	0	171	
	Total	66,912	6,283	60,629	0	0	0	0	287,858	174,371	

*Note: The recycled quantity is presented to provide some perspective regarding the quantity of this PC already recycled compared to the quantities that are not recycled. In this Report, we primarily focus on non-recycled quantities of PCs (PC quantity) that offer the greatest opportunities for waste minimization. The term "PC Quantity", as used in this Report, refers to quantities of PCs that are managed via disposal, treatment, and energy recovery and thus potentially available for waste minimization.

Exhibit 4.48. Industries in Which Facilities Only Recycled Mercury, Reporting 95 Percent of the Mercury Managed Only By Recycling (2006)

Primary NAICS Code	NAICS Code Description	Recycled Only Quantity (2006)	Percent of Recycled Only Quantity (2006)
331111	Iron and Steel Mills	6,627	27.7%
335912	Primary Battery Manufacturing	5,225	21.9%
339114	Dental Equipment and Supplies Manufacturing	3,835	16.0%
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	997	4.2%
325320	Pesticide and Other Agricultural Chemical Manufacturing	862	3.6%
327211	Flat Glass Manufacturing	598	2.5%
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	558	2.3%
334519	Other Measuring and Controlling Device Manufacturing	557	2.3%
334412	Bare Printed Circuit Board Manufacturing	427	1.8%
325188	All Other Basic Inorganic Chemical Manufacturing	395	1.7%
335314	Relay and Industrial Control Manufacturing	386	1.6%
325132	Synthetic Organic Dye and Pigment Manufacturing	381	1.6%
335110	Electric Lamp Bulb and Part Manufacturing	343	1.4%
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	333	1.4%

Exhibit 4.49. Facilities That Only Recycled Mercury, Reporting 95 Percent of the Mercury Managed Only By Recycling (2006)

Primary NAICS Code	NAICS Code Description	EPA Region	State	County	Recycling (pounds)		
					Onsite	Offsite	Total
335912	Primary Battery Manufacturing	1	VT	Bennington	0	5,225	5,225
331111	Iron and Steel Mills	3	MD	Baltimore	0	3,600	3,600
331111	Iron and Steel Mills	6	TX	El Paso	0	2,703	2,703
339114	Dental Equipment and Supplies Manufacturing	5	MI	Wayne	0	1,980	1,980
339114	Dental Equipment and Supplies Manufacturing	3	DE	Sussex	0	1,855	1,855
325320	Pesticide and Other Agricultural Chemical Manufacturing	3	WV	Kanawha	0	862	862
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	5	IN	White	0	727	727
327211	Flat Glass Manufacturing	5	OH	Wood	0	598	598
334412	Bare Printed Circuit Board Manufacturing	2	PR	Aguadilla	0	427	427
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	9	CA	Santa Barbara	0	399	399
335314	Relay and Industrial Control Manufacturing	5	MI	Cass	233	153	386
325132	Synthetic Organic Dye and Pigment Manufacturing	3	PA	Allegheny	0	381	381
325188	All Other Basic Inorganic Chemical Manufacturing	6	TX	Harris	0	373	373
335110	Electric Lamp Bulb and Part Manufacturing	5	OH	Cuyahoga	0	325	325
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	5	MN	Washington	0	300	300
336411	Aircraft Manufacturing	7	MO	St Louis	0	300	300
332993	Ammunition (except Small Arms) Manufacturing	3	PA	Lancaster	0	290	290
334519	Other Measuring and Controlling Device Manufacturing	4	TN	Blount	0	281	281
334519	Other Measuring and Controlling Device Manufacturing	1	MA	Norfolk	0	276	276
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	3	PA	Bucks	0	270	270
Total					233	21,325	21,557

Data Derived From Hazardous Waste Biennial Reports for Mercury

In this section, we present data on which facilities submitted information to the BR system. As discussed in Section 1, we caution readers against making casual one-to-one comparisons between the TRI and BR data. The differences between these two reporting systems can cause significant variation in the number of reporting facilities and quantities of chemicals reported.

Exhibit 4.50 shows the estimated quantity of mercury contained in hazardous wastes generated in 2005—derived from data reported by facilities on the BR. We estimate that hazardous wastes reported by facilities in these industries contained approximately 3 million pounds of mercury. Waste streams classified as non-wastewaters contained approximately 62 percent of the mercury. Overall, facilities in 425 industries reported hazardous waste streams containing mercury. Facilities in NAICS code 325181 (Alkalies and Chlorine Manufacturing) accounted for approximately 40 percent of the total estimated quantity of mercury in the hazardous waste streams.

Exhibit 4.50. Estimated Quantity of Mercury in Primary Generation Hazardous Waste for Facilities Reporting 90 Percent of the Total Priority Chemical Quantity, by NAICS Code (2005)

Primary NAICS Code	NAICS Code Description	Number of Facilities	Quantity (pounds) of Mercury			Percent of Total Quantity
			Non-wastewaters	Wastewaters	Total Quantity	
325181	Alkalies and Chlorine Manufacturing	17	292,256	1,059,395	1,351,651	39.7%
611310	Colleges, Universities, and Professional Schools	266	286,831	79	286,911	8.4%
325192	Cyclic Crude and Intermediate Manufacturing	11	242,586	420	243,006	7.1%
928110	National Security	188	175,992	978	176,971	5.2%
325320	Pesticide and Other Agricultural Chemical Manufacturing	18	118,353	<1	118,354	3.5%
327992	Ground or Treated Mineral and Earth Manufacturing	1	0	100,551	100,551	3.0%
331111	Iron and Steel Mills	25	93,431	<1	93,432	2.7%
325199	All Other Basic Organic Chemical Manufacturing	109	72,812	15,537	88,350	2.6%
324110	Petroleum Refineries	76	70,239	8	70,247	2.1%
325211	Plastics Material and Resin Manufacturing	70	62,606	71	62,677	1.8%
331419	Primary Smelting and Refining of Nonferrous Metal (except Copper and Aluminum)	10	58,003	9	58,011	1.7%
335110	Electric Lamp Bulb and Part Manufacturing	15	48,233	12	48,244	1.4%
325920	Explosives Manufacturing	11	44,282	1	44,283	1.3%
332322	Sheet Metal Work Manufacturing	2	43,533	0	43,533	1.3%
221210	Natural Gas Distribution	30	43,373	1	43,375	1.3%
325110	Petrochemical Manufacturing	21	37,051	<1	37,051	1.1%
336411	Aircraft Manufacturing	31	36,015	5	36,020	1.1%
325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	52	30,710	59	30,769	0.9%
321114	Wood Preservation	4	29,619	0	29,619	0.9%
486210	Pipeline Transportation of Natural Gas	69	28,669	3	28,672	0.8%
221121	Electric Bulk Power Transmission and Control	3	23,163	0	23,163	0.7%
325412	Pharmaceutical Preparation Manufacturing	133	22,739	135	22,875	0.7%
325414	Biological Product (except Diagnostic) Manufacturing	26	22,093	157	22,250	0.7%
Total		1,188	1,882,589	1,177,421	3,060,015	89.9%