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## **National Priority Chemicals Trends Report (2004-2006)**

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

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# Cadmium and Cadmium Compounds (Cadmium)

## Chemical Information

**General Uses:** Cadmium is used in metal plating and to make pigments, batteries and plastics. It is obtained as a byproduct from melting zinc, lead, or copper ores.

## How Much Cadmium Was Generated?

For 2006, 63 facilities reported generating approximately 953,000 pounds of cadmium. Two facilities reported approximately 63 percent of the national total quantity of this PC; 11 facilities reported approximately 90 percent (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 cadmium reported for 2004 and 2005, the quantity increased by approximately 88,000 pounds and 342,000 pounds, respectively (Exhibit 4.12).

**Exhibit 4.12. National Generation of Cadmium (2004–2006)**

TRI Reporting Year	2004	2005	2006
Total Quantity of Cadmium (pounds)	865,619	611,375	953,335
Number of TRI Facilities Reporting Cadmium	65	65	63

## Where Was Cadmium Generated?

For 2006, two facilities reported a total of approximately 600,000 pounds of cadmium, representing approximately 63 percent of the total quantity generated (Exhibit 4.13). One facility, an inorganic chemical manufacturing facility, located in Caribou County, Idaho (EPA Region 10), reported a decrease of approximately 78,000 pounds for 2005, followed by an increase of approximately 238,000 pounds for 2006. This facility's cadmium is an impurity in phosphate ores from which nodules are made for use in EAFs for the production of 99% pure phosphorous. The quantity of reported cadmium is determined by the concentration of cadmium in the ore and the production rate. The second facility, a secondary smelting and refining facility, located in Washington County, Oklahoma (EPA Region 6), extracts lead and zinc from electric arc furnace dusts. This facility's quantity of cadmium correlates to the variability of the electric arc furnace dusts processed.

For 2006, several facilities reported cadmium for the first time. A steel foundry in Franklin County, Ohio (EPA Region 5) reported approximately 86,000 pounds of cadmium. An overhead traveling crane, hoist, and monorail system manufacturing facility, located in Anson County, North Carolina (EPA Region 4), noted that the product composition changed as a result of changing vendors. A manufacturer of bolts, nuts, screws, rivets, and washers in Orange County, California (EPA Region 9) reported approximately 9,600 pounds of cadmium.

**Exhibit 4.13. Quantity of Cadmium, for Facilities Reporting 95 Percent of Total Quantity, by County (2006)**

EPA Region	State	County	Quantity (pounds) of Cadmium			Percent of Total Quantity (2006)
			2004	2005	2006	
10	ID	Caribou	146,000	68,005	306,044	32.1%
6	OK	Washington	386,377	287,766	293,666	30.8%
5	OH	Franklin	0	0	86,140	9.0%
4	AL	Pike	26,636	39,608	39,514	4.1%
4	NC	Anson	0	0	35,788	3.8%
7	NE	Jefferson	37,000	22,400	30,000	3.1%
1	MA	Bristol	3,621	6,355	20,063	2.1%
4	TN	Madison	14,014	15,114	16,549	1.7%
6	AR	Mississippi	5,201	7,444	12,288	1.3%
4	NC	Catawba	18,017	5,891	12,205	1.3%
2	NJ	Cumberland	8,600	6,105	11,293	1.2%
4	AL	Tuscaloosa	3,818	128	10,802	1.1%
9	CA	Orange	0	0	9,576	1.0%
4	AL	Morgan	29,769	40,789	9,141	1.0%
6	TX	Harris	5,061	6,341	8,810	0.9%
<b>Total</b>			<b>684,114</b>	<b>505,946</b>	<b>901,879</b>	<b>94.6%</b>

## Which Industries Generated Cadmium?

For 2006, eight facilities in two NAICS codes reported approximately 71 percent of the cadmium generated (Exhibit 4.14). Two of these facilities, one each in NAICS code 331492 (Secondary smelting, refining, and alloying of nonferrous metal (except copper and aluminum)) and in NAICS code 325188 (All other basic inorganic chemical manufacturing) reported approximately 63 percent of the national total quantity of cadmium generated for 2006.

**Exhibit 4.14. Industry Sectors Quantities of Cadmium, for Facilities Reporting 95 Percent of Total Quantity (2006)**

Primary NAICS code	NAICS Code Description	Facilities Reporting (2006)	Quantity (pounds) of Cadmium			Percent of Total Quantity (2006)
			2004	2005	2006	
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	5	430,646	364,161	344,408	36.1%
325188	All Other Basic Inorganic Chemical Manufacturing	3	252,337	109,966	336,053	35.3%
331513	Steel Foundries (except Investment)	1	5	0	86,140	9.0%
331111	Iron and Steel Mills	9	30,747	36,941	46,076	4.8%
333923	Overhead Traveling Crane, Hoist, and Monorail System Manufacturing	1	0	0	35,788	3.8%
335931	Current-Carrying Wiring Device Manufacturing	1	3,621	6,355	20,063	2.1%
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	4	13,214	12,379	16,606	1.7%
335921	Fiber Optic Cable Manufacturing	1	18,017	5,891	12,205	1.3%
327212	Other Pressed and Blown Glass and Glassware Manufacturing	2	13,042	8,473	11,293	1.2%
<b>Total</b>		<b>27</b>	<b>761,629</b>	<b>544,166</b>	<b>908,632</b>	<b>95.3%</b>

## How Did Facilities Manage Cadmium?

Exhibit 4.15 shows how facilities, by industry, managed cadmium in 2006.

**Land Disposal:** Facilities disposed of 100 percent of the cadmium generated; approximately 60 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 103,000 pounds of cadmium in 2006. Facilities in NAICS code 331111 (Iron and steel mills) reported approximately 86 percent of the quantity recycled, while a facility in NAICS code 335921 (Fiber optic cable manufacturing) also recycled a significant quantity of its cadmium.

Many facilities reported they only used recycling to manage their cadmium wastes. For 2006, 15 facilities, in ten different industries, reported only recycling approximately 391,000 pounds of cadmium. Exhibits 4.16 and 4.17 show the industries and the quantities for those facilities that accounted for approximately 95 percent of the cadmium wastes that were managed only by recycling.

**Exhibit 4.15. Management Methods for Cadmium in Industry Sectors (2006)**

Primary NAICS Code	NAICS Code Description	Total PC Quantity* Reported	Quantity (pounds) of Cadmium								
			Disposal		Energy Recovery		Treatment		Recycling		
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	
331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	344,408	39,542	304,866	0	0	0	0	0	0	544
325188	All Other Basic Inorganic Chemical Manufacturing	336,053	306,044	30,009	0	0	0	0	0	0	0
331513	Steel Foundries (except Investment)	86,140	0	86,140	0	0	0	0	0	0	0
331111	Iron and Steel Mills	46,076	14,737	31,339	0	0	0	0	0	0	88,629
333923	Overhead Traveling Crane, Hoist, and Monorail System Manufacturing	35,788	0	35,788	0	0	0	0	0	0	0
335931	Current-Carrying Wiring Device Manufacturing	20,063	0	20,063	0	0	0	0	0	0	17
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	16,606	0	16,606	0	0	0	0	0	0	0
335921	Fiber Optic Cable Manufacturing	12,205	0	12,205	0	0	0	0	0	0	13,530
327212	Other Pressed and Blown Glass and Glassware Manufacturing	11,293	0	11,293	0	0	0	0	0	169	0
	<b>Total</b>	<b>908,632</b>	<b>360,323</b>	<b>548,309</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>169</b>	<b>102,720</b>

\*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 4.16. Industries in Which Facilities Only Recycled Cadmium, Reporting 95 Percent of the Cadmium Managed Only By Recycling (2006)**

Primary NAICS Code	NAICS Code Description	Recycled Only Quantity (2006)	Percent of Recycled Only Quantity (2006)
336611	Ship Building and Repairing	110,000	28.2%
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing	89,000	22.8%
331111	Iron and Steel Mills	82,619	21.2%
928110	National Security	40,923	10.5%
331316	Aluminum Extruded Product Manufacturing	32,000	8.2%
331314	Secondary Smelting and Alloying of Aluminum	12,858	3.3%
326199	All Other Plastics Product Manufacturing	12,208	3.1%
339999	All Other Miscellaneous Manufacturing	9,528	2.4%
336214	Travel Trailer and Camper Manufacturing	755	0.2%
325510	Paint and Coating Manufacturing	633	0.2%
<b>Total</b>		<b>390,524</b>	<b>100.0%</b>

**Exhibit 4.17. Facilities That Only Recycled Cadmium, Reporting 95 Percent of the Cadmium Managed Only By Recycling (2006)**

Primary NAICS Code	NAICS Code Description	EPA Region	State	County	Onsite Recycling (pounds)	Offsite Recycling (pounds)	Total Recycling (pounds)
336611	Ship Building and Repairing	6	LA	St Mary	0	110,000	110,000
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing	4	TN	Shelby	0	89,000	89,000
331111	Iron and Steel Mills	6	OK	Tulsa	0	41,690	41,690
928110	National Security	6	TX	Bowie	0	40,923	40,923
331111	Iron and Steel Mills	6	TX	Ellis	12,455	21,001	33,456
331316	Aluminum Extruded Product Manufacturing	2	NY	Ulster	0	32,000	32,000
331314	Secondary Smelting and Alloying of Aluminum	6	OK	Muskogee	0	12,858	12,858
326199	All Other Plastics Product Manufacturing	6	TX	Tom Green	0	12,208	12,208
<b>Total</b>					<b>12,455</b>	<b>359,680</b>	<b>372,135</b>

## Data Derived From Hazardous Waste Biennial Reports for Cadmium

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. We present these data in order to provide another perspective on hazardous wastes that might contain this PC.

Exhibit 4.18 shows the estimated quantity of cadmium 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 12.8 million pounds of cadmium. Waste streams classified as non-wastewaters contained approximately 96 percent of the cadmium. Facilities in two industries: NAICS code 332813 (Electroplating, Plating, Polishing, Anodizing, and Coloring) and NAICS code 331111 (Iron and Steel Mills) accounted for approximately 73 percent of the total estimated quantity of cadmium in the hazardous waste streams.

**Exhibit 4.18. Estimated Quantity of Cadmium 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 Cadmium			Percent of Total Quantity
			Non-wastewaters	Wastewaters	Total Quantity	
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	725	8,285,811	61,281	8,347,092	58.9%
331111	Iron and Steel Mills	88	2,005,140	1,483	2,006,623	14.2%
334412	Bare Printed Circuit Board Manufacturing	182	645,130	876	646,006	4.6%
334417	Electronic Connector Manufacturing	22	37,459	193,521	230,980	1.6%
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing	49	132,856	75,686	208,542	1.5%
33633	Motor Vehicle Steering and Suspension Components (except Spring) Manufacturing	11	17,877	138,055	155,932	1.1%
334413	Semiconductor and Related Device Manufacturing	48	133,820	178	133,999	0.9%
336399	All Other Motor Vehicle Parts Manufacturing	26	116,758	101	116,860	0.8%
332111	Iron and Steel Forging	8	13,437	94,753	108,189	0.8%
336412	Aircraft Engine and Engine Parts Manufacturing	49	101,386	1,110	102,496	0.7%
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	168	95,933	3,146	99,079	0.7%
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	78	91,579	316	91,894	0.6%
331112	Electrometallurgical Ferroalloy Product Manufacturing	7	90,584	82	90,665	0.6%
332913	Plumbing Fixture Fitting and Trim Manufacturing	13	86,376	677	87,053	0.6%
33251	Hardware Manufacturing	26	79,614	178	79,792	0.6%
314992	Tire Cord and Tire Fabric Mills	1	79,242	0	79,242	0.6%
331221	Rolled Steel Shape Manufacturing	23	70,907	101	71,007	0.5%
92811	National Security	214	53,134	3,747	56,881	0.4%
33637	Motor Vehicle Metal Stamping	4	53,328	10	53,338	0.4%
<b>Total</b>		<b>1,742</b>	<b>12,190,371</b>	<b>575,301</b>	<b>12,765,670</b>	<b>90.1%</b>