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National Priority Chemicals Trends Report (2004-2006)

Section 4 Trends Analyses for Specific Priority Chemicals (2004-2006): Anthracene

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Anthracene

Chemical Information

Alternate Names: paraNaphthalene, anthracin, anthracene

General Uses: Anthracene is used to make dyes, plastics, and pesticides. It has also been used to make smoke screens and scintillation counter crystals.

How Much Anthracene Was Generated?

For 2006, 42 facilities reported generating approximately 2.4 million pounds of anthracene; one facility reported generating approximately 85 percent of the national total quantity 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 anthracene reported for 2004 and 2005, the quantity increased by approximately 1.9 million pounds and 1.8 million pounds, respectively (Exhibit 4.6).

Exhibit 4.6. National Generation of Anthracene (2004–2006)

TRI Reporting Year	2004	2005	2006
Total Quantity of Anthracene (pounds)	520,978	601,973	2,374,123
Number of TRI Facilities Reporting Anthracene	41	44	42

Where Was Anthracene Generated?

For 2006, facilities in 20 states reported generating anthracene. Exhibit 4.7 shows the counties in which facilities reported 99.9 percent of the total quantity of anthracene. Some observations concerning trends for the reported quantity of anthracene include:

- An alkalies and chlorine manufacturing facility in Brazoria County, Texas (EPA Region 6) reported an increase of approximately 2 million pounds for 2006. This quantity represented approximately 85 percent of the total quantity of anthracene generated for 2006
- A primary aluminum production facility in Hancock County, Kentucky (EPA Region 4) reported a decrease of approximately 135,000 pounds for 2006. This facility is a primary aluminum smelter and uses coal tar pitch and coke to produce carbon rods (anodes) for aluminum smelting. Anthracene is contained in the coal tar pitch. Quantities of anthracene reported correlate with the production of carbon rods.

Two facilities (same company) reported anthracene generated from shutdown activities of the facilities, including the clean-up and cleanout of tanks and processing of residuals. One of the facilities, a cyclic crude and intermediate manufacturing facility, located in Jefferson County, Alabama (EPA Region 4), reported an increase of approximately 32,000 pounds for 2005 followed by a decrease of approximately 43,000 pounds for 2006; shutdown activities were expected to be completed in 2007. The second facility, a petrochemical manufacturing facility, located in Wayne County, Michigan (EPA Region 5), reported an increase of approximately 83,000 pounds for 2005 and no anthracene for 2006; shutdown activities were completed in 2006.

Exhibit 4.7. Quantity of Anthracene, for Facilities Reporting 99.9 Percent of Total Quantity, by County (2006)

EPA Region	State	County	Quantity (pounds) of Anthracene			Percent of Total Quantity (2006)
			2004	2005	2006	
6	TX	Brazoria	26,362	0	2,022,653	85.2%
4	KY	Hancock	292,467	275,700	141,100	5.9%
4	AL	Jefferson	96,000	128,243	85,122	3.6%
6	TX	Galveston	41,262	52,246	82,833	3.5%
3	WV	Brooke	8,297	8,430	11,021	0.5%
5	IL	Cook	12,807	10,060	7,364	0.3%
6	LA	East Baton Rouge	2,833	2,834	7,265	0.3%
6	TX	Harris	3,376	2,300	5,506	0.2%
5	IL	Madison	4,944	3,662	2,310	0.1%
6	TX	Jefferson	40	14	1,433	0.1%
3	PA	Allegheny	4,746	2,284	1,238	0.1%
5	MI	Wayne	23,466	106,245	1,236	0.1%
4	KY	Boyd	909	922	1,227	0.1%
5	IN	Marion	136	2	789	<0.1%
Total			517,645	592,942	2,371,097	99.9%

Which Industries Generated Anthracene?

For 2006, 42 facilities in 13 NAICS codes reported anthracene (Exhibit 4.8). One facility in NAICS code 325181 (Alkalies and chlorine manufacturing) reported generating approximately 85 percent of the national total quantity of anthracene for 2006.

Exhibit 4.8. Industry Sectors Quantities of Anthracene (2004–2006)

Primary NAICS code	NAICS Code Description	Facilities Reporting (2006)	Quantity (pounds) of Anthracene			Percent of Total Quantity (2006)
			2004	2005	2006	
325181	Alkalies and Chlorine Manufacturing	1	26,362	0	2,022,651	85.2%
331312	Primary Aluminum Production	1	292,696	276,200	141,100	5.9%
325110	Petrochemical Manufacturing	5	65,916	156,364	92,384	3.9%
325192	Cyclic Crude and Intermediate Manufacturing	2	108,601	137,311	91,139	3.8%
325199	All Other Basic Organic Chemical Manufacturing	7	17,223	20,138	15,278	0.6%
324110	Petroleum Refineries	15	3,405	5,914	4,914	0.2%
424690	Other Chemical and Allied Products Merchant Wholesalers	1	4,829	3,603	2,170	0.1%
327390	Other Concrete Product Manufacturing	1	212	998	1,347	0.1%
327999	All Other Miscellaneous Nonmetallic Mineral Product Manufacturing	2	420	550	1,321	0.1%
333994	Industrial Process Furnace and Oven Manufacturing	1	136	2	789	<0.1%
324199	All Other Petroleum and Coal Products Manufacturing	2	576	618	743	<0.1%
331111	Iron and Steel Mills	2	122	144	177	<0.1%
321114	Wood Preservation	2	97	115	111	<0.1%
325211	Plastics Material and Resin Manufacturing	0	134	16	0	0.0%
325510	Paint and Coating Manufacturing	0	250	0	0	0.0%
Total		42	520,978	601,973	2,374,123	100.0%

How Did Facilities Manage Anthracene?

Exhibit 4.9 shows how facilities, by industry, managed anthracene for 2006.

Land Disposal: Facilities disposed of only approximately 82,000 pounds or 3 percent of the anthracene generated. Nonetheless, facilities in 8 of the 13 industries used disposal for all or at least a significant portion of their anthracene.

Energy Recovery: Facilities used energy recovery, mostly onsite, to manage 87 percent of the anthracene generated. One facility in NAICS code 325181 (Alkalies and chlorine manufacturing) reported using energy recovery for approximately 2 million pounds—nearly all the anthracene sent to energy recovery.

Treatment: Facilities treated, mostly onsite, approximately 10 percent of the anthracene generated. Facilities in four industries used treatment as their primary method for managing this PC.

Recycling: Facilities recycled approximately 388,000 pounds of anthracene in 2006; two facilities in NAICS code 325192 (Cyclic crude and intermediate manufacturing), accounted for approximately 65 percent of the anthracene that was recycled. One of the facilities, located in Alabama, was being shutdown and used offsite recycling. The second facility, located in Illinois, recycled its anthracene onsite.

Many facilities reported they only used recycling to manage their anthracene. For 2006, five facilities, in five different industries, reported only recycling approximately 108,000 pounds of anthracene (Exhibit 4.10).

Exhibit 4.9. Management Methods for Anthracene in Industry Sectors (2006)

Primary NAICS Code	NAICS Code Description	Total PC Quantity* Reported	Quantity (pounds) of Anthracene								
			Disposal		Energy Recovery		Treatment		Recycling		
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	
325181	Alkalies and Chlorine Manufacturing	2,022,651	0	0	2,022,651	0	0	0	0	0	0
331312	Primary Aluminum Production	141,100	0	1,100	0	0	140,000	0	0	0	0
325110	Petrochemical Manufacturing	92,384	0	10,391	0	0	7,851	74,142	1,655	35,037	
325192	Cyclic Crude and Intermediate Manufacturing	91,139	0	63,222	0	27,331	582	4	121,207	129,390	
325199	All Other Basic Organic Chemical Manufacturing	15,278	9	25	10,058	3,957	610	619	71,200	0	
324110	Petroleum Refineries	4,914	1,457	538	4	874	666	1,374	671	332	
424690	Other Chemical and Allied Products Merchant Wholesalers	2,170	0	690	0	0	1,479	1	0	0	
327390	Other Concrete Product Manufacturing	1,347	0	1,347	0	0	0	0	0	0	
327999	All Other Miscellaneous Nonmetallic Mineral Product Manufacturing	1,321	0	1,236	0	0	0	85	0	0	
333994	Industrial Process Furnace and Oven Manufacturing	789	0	789	0	0	0	0	18,791	0	
324199	All Other Petroleum and Coal Products Manufacturing	743	0	547	170	0	21	5	0	0	
331111	Iron and Steel Mills	177	0	108	0	0	0	69	160	9,100	
321114	Wood Preservation	111	0	107	0	0	0	4	344	0	
	Total	2,374,123	1,466	80,100	2,032,883	32,162	151,209	76,303	214,028	173,859	

*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 4.10. Facilities That Only Recycled Anthracene in 2006

Primary NAICS Code	NAICS Code Description	EPA Region	State	County	Onsite Recycling (pounds)	Offsite Recycling (pounds)	Total Recycling (pounds)
324110	Petroleum Refineries	6	TX	Jefferson	93,263	0	93,263
331210	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	3	PA	Allegheny	8,853	0	8,853
324199	All Other Petroleum and Coal Products Manufacturing	2	NY	Erie	2,991	0	2,991
331111	Iron and Steel Mills	4	AL	Jefferson	2,400	0	2,400
325510	Paint and Coating Manufacturing	5	OH	Erie	19	0	19
Total					107,526	0	107,526

Data Derived From Hazardous Waste Biennial Reports for Anthracene

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 4.11 shows the estimated quantity of anthracene 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 158,000 pounds of anthracene. Waste streams classified as non-wastewaters contained approximately 80 percent of the anthracene. Facilities in two industries: NAICS code 321114 (Wood Preservation) and NAICS code 324110 (Petroleum Refineries) accounted for approximately 96 percent of the total estimated quantity of anthracene in the hazardous waste streams.

Exhibit 4.11. Estimated Quantity of Anthracene in Primary Generation Hazardous Waste for Facilities Reporting 99 Percent of the Total Priority Chemical Quantity, by NAICS Code (2005)

Primary NAICS Code	NAICS Code Description	Number of Facilities	Quantity (pounds) of Anthracene			Percent of Total Quantity
			Non-wastewaters	Wastewaters	Total Quantity	
321114	Wood Preservation	51	78,426	25,955	104,380	66.1%
324110	Petroleum Refineries	124	41,434	5,906	47,340	30.0%
321113	Sawmills	1	2,023	0	2,023	1.3%
331312	Primary Aluminum Production	13	1,256	0	1,256	0.8%
321110	Sawmills and Wood Preservation	1	938	0	938	0.6%
424710	Petroleum Bulk Stations and Terminals	1	654	0	654	0.4%
Total		191	124,731	31,861	156,591	99.1%