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National Priority Chemicals Trends Report (2004-2006)

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

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Naphthalene

Chemical Information

Alternate Names: naphthalin, tar camphor, white tar

General Uses: Naphthalene is used to make products, such as mothballs, dyes, leather goods, and insecticides.

How Much Naphthalene Was Generated?

For 2006, 632 facilities reported approximately 13.8 million pounds of naphthalene being generated. Two facilities accounted for approximately 20 percent of the national total quantity of this PC, while 32 facilities accounted for approximately 69 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 naphthalene reported for 2004 and 2005, the quantity increased by approximately 829,000 pounds and decreased by approximately 3.5 million pounds, respectively (Exhibit 4.51).

Exhibit 4.51. National Generation of Naphthalene (2004–2006)

TRI Reporting Year	2004	2005	2006
Total Quantity of Naphthalene (pounds)	12,926,957	17,217,979	13,755,764
Number of TRI Facilities Reporting Naphthalene	642	631	632

Where Was Naphthalene Generated?

For 2006, facilities in 52 states and territories reported naphthalene being generated. Exhibit 4.52 shows the counties in which facilities reported approximately 80 percent of the total quantity of naphthalene generated. Some observations concerning the quantity of naphthalene reported by facilities in these counties are:

- Facilities in Jefferson County, Texas (EPA Region 6) reported an increase of approximately 2.7 million pounds for 2005 followed by a decrease of approximately 2.7 million pounds for 2006. Two facilities primarily accounted for these significant changes in 2005 and 2006: 1) a petroleum refinery reported an increase of approximately 2.4 million pounds for 2005 due to changes in how the material sent to the flare was calculated and the need to include material destroyed in the flare as on-site treatment. The facility attributes the decrease of approximately 2.4 million pounds for 2006 to a project that recycles dewatered wastewater sludge, containing naphthalene, into coke drums rather than land dispose of the sludge and 2) an inorganic chemical manufacturing facility that sells excess incinerator capacity to offsite generators notes that quantities of naphthalene reported are due to the variability in the concentration of this PC in wastes received from offsite generators.
- A cyclic crude and intermediate manufacturing facility in Harris County, Texas (EPA Region 6) reported an increase of approximately 1.6 million pounds for 2005 as the result of demolition and tank/releases cleanup, followed by a decrease of approximately 517,000 pounds for 2006 that likely resulted from substituting with a cleaner feedstock.
- A pesticide and other agricultural chemical manufacturing facility in Kanawha County, West Virginia (EPA Region 3) reported an increase of approximately 229,000 pounds for 2006.
- A metal coating facility in Hancock County, Indiana (EPA Region 5) reported an increase of approximately 620,000 pounds for 2006. This facility's naphthalene is from paints used to paint steel coils. The increase in naphthalene was directly related to the chemical composition of the paints used. The paint formulation was developed by the paint vendor per the end users specifications.
- Facilities in Brazoria County, Texas (EPA Region 6) reported an increase of approximately 244,000 pounds for 2006. An alkalies and chlorine manufacturing facility accounted for approximately 77 percent of this increase by reporting an increase of approximately 189,000 pounds.
- A metal coating facility in Hancock County, Kentucky (EPA Region 4) reported an increase of approximately 354,000 pounds due to increased production and the formulation of paints.

- A cyclic crude and intermediate manufacturing facility in Jefferson County, Kentucky (EPA Region 4) reported a decrease of approximately 497,000 pounds for 2006 as it neared completing the clean-up and cleanout of tanks in advance of demolishing the facility.

Exhibit 4.52. Quantity of Naphthalene, for Facilities Reporting 80 Percent of Total Quantity, by County (2006)

EPA Region	State	County	Quantity (pounds) of Naphthalene			Percent of Total Quantity (2006)
			2004	2005	2006	
6	TX	Jefferson	1,871,846	4,545,791	1,864,797	13.6%
6	TX	Harris	1,387,951	2,339,697	1,697,917	12.3%
3	WV	Kanawha	775,857	703,295	932,598	6.8%
5	IN	Hancock	132,774	85,682	705,338	5.1%
6	LA	Calcasieu	352,455	359,426	492,707	3.6%
6	TX	Brazoria	219,997	201,657	445,898	3.2%
4	KY	Hancock	128,697	163,970	444,903	3.2%
3	PA	Allegheny	523,682	403,823	422,033	3.1%
4	AL	Jefferson	687,796	833,300	358,989	2.6%
3	WV	Brooke	250,922	345,363	342,355	2.5%
10	WA	Spokane	196,913	342,070	338,374	2.5%
4	MS	Hinds	229,605	275,740	333,802	2.4%
6	TX	Galveston	639,540	664,105	267,797	1.9%
6	TX	Ector	214,976	662,994	253,210	1.8%
5	IL	Madison	239,747	180,456	222,678	1.6%
4	KY	Jefferson	11,760	7,603	186,321	1.4%
3	VA	Buckingham	0	21,360	172,364	1.3%
5	IL	Cook	280,964	218,349	171,921	1.2%
5	IN	Marion	346,476	237,319	166,741	1.2%
2	NJ	Middlesex	342,169	234,010	163,278	1.2%
4	KY	Boyd	11,358	47,585	162,855	1.2%
6	TX	Harrison	180,200	164,068	145,235	1.1%
5	IL	Grundy	42,304	21,638	138,668	1.0%
5	MI	Midland	108,352	189,130	137,420	1.0%
4	AL	Morgan	57,478	67,350	132,000	1.0%
5	IN	Porter	82,846	106,096	123,272	0.9%
7	IA	Scott	119,231	119,482	119,252	0.9%
6	LA	St Bernard	85,466	79,659	114,165	0.8%
Total			9,523,366	13,623,022	11,058,893	80.4%

Which Industries Generated Naphthalene?

For 2006, facilities in 71 different NAICS codes reported naphthalene being generated. Facilities in six NAICS codes accounted for approximately 70 percent of the total quantity of naphthalene generated (Exhibit 4.53).

Exhibit 4.53. Industry Sectors Quantities of Naphthalene, for Facilities Reporting 90 Percent of Total Quantity (2006)

Primary NAICS code	NAICS Code Description	Facilities Reporting (2006)	Quantity (pounds) of Naphthalene			Percent of Total Quantity (2006)
			2004	2005	2006	
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	35	2,014,071	2,133,973	2,931,264	21.3%
324110	Petroleum Refineries	111	2,653,262	5,375,996	2,393,048	17.4%
325192	Cyclic Crude and Intermediate Manufacturing	4	974,076	2,641,912	1,650,297	12.0%
325110	Petrochemical Manufacturing	34	1,263,257	1,726,853	1,190,021	8.7%
325320	Pesticide and Other Agricultural Chemical Manufacturing	9	824,849	737,713	946,212	6.9%
325199	All Other Basic Organic Chemical Manufacturing	23	1,488,722	707,484	559,913	4.1%
325188	All Other Basic Inorganic Chemical Manufacturing	7	165,825	609,018	453,985	3.3%
325181	Alkalies and Chlorine Manufacturing	3	285,514	97,145	446,124	3.2%
331210	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	2	215,260	202,946	396,808	2.9%
325211	Plastics Material and Resin Manufacturing	22	665,471	955,939	362,724	2.6%
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	2	196,909	342,052	338,447	2.5%
331315	Aluminum Sheet, Plate, and Foil Manufacturing	4	212,296	203,922	276,118	2.0%
212399	All Other Nonmetallic Mineral Mining	1	0	0	172,364	1.3%
333994	Industrial Process Furnace and Oven Manufacturing	1	346,451	237,049	165,905	1.2%
325510	Paint and Coating Manufacturing	21	102,937	95,245	145,602	1.1%
Total		279	11,408,898	16,067,247	12,428,831	90.4%

How Did Facilities Manage Naphthalene?

Exhibit 4.54 shows how facilities, by industry, managed naphthalene in 2006.

Land Disposal: Facilities disposed of approximately 2 percent of the naphthalene generated. Facilities in NAICS code 325192 (Cyclic Crude and Intermediate Manufacturing) accounted for approximately 62 percent of the naphthalene disposed of.

Energy Recovery: Facilities used energy recovery for approximately 44 percent of the naphthalene generated; facilities in many of the industries used energy recovery as their primary method of managing naphthalene.

Treatment: Facilities used treatment, mostly onsite, for approximately 53 percent of the naphthalene generated.

Recycling: Facilities recycled approximately 16.3 million pounds of naphthalene in 2006. Facilities in three industries: NAICS code 324110 (Petroleum Refineries), NAICS code 325199 (All Other Basic Organic Chemical Manufacturing), and NAICS code 325192 (Cyclic Crude and Intermediate Manufacturing) accounted for approximately 94 percent of the total quantity of naphthalene recycled.

Many facilities reported they only used recycling to manage their naphthalene. For 2006, 41 facilities, in 14 different industries, reported only recycling approximately 1.4 million pounds of naphthalene. Exhibits 4.55 and 4.56 show the industries and the quantities for those facilities that accounted for more than 99 percent of the naphthalene that were managed only by recycling. A petroleum refinery in Harris County, Texas accounted for approximately 91 percent of the total quantity recycled.

Exhibit 4.54. Management Methods for Naphthalene, by Industry (NAICS Code) in 2006

Primary NAICS Code	NAICS Code Description	Total PC Quantity* Reported	Quantity (pounds) of Naphthalene							
			Disposal		Energy Recovery		Treatment		Recycling	
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	2,931,264	224	1,140	549,892	95,039	2,277,197	7,772	4,239	83,411
324110	Petroleum Refineries	2,393,048	6,447	30,740	29,229	13,705	2,114,001	198,927	8,085,834	23,853
325192	Cyclic Crude and Intermediate Manufacturing	1,650,297	101,234	86,124	0	1,249,130	18,021	195,788	1,390,917	162,560
325110	Petrochemical Manufacturing	1,190,021	456	55,812	8,014	239,476	467,633	418,630	247,362	114,628
325320	Pesticide and Other Agricultural Chemical Manufacturing	946,212	5	0	928,411	0	5,583	12,213	1,008	0
325199	All Other Basic Organic Chemical Manufacturing	559,913	2,992	1,282	97,283	91,804	285,927	80,625	792,373	4,883,440
325188	All Other Basic Inorganic Chemical Manufacturing	453,985	170	3	382,814	1,083	54,116	15,799	8,944	0
325181	Alkalies and Chlorine Manufacturing	446,124	103	0	392,327	0	53,293	401	0	0
331210	Iron and Steel Pipe and Tube Manufacturing from Purchased Steel	396,808	0	0	172,915	0	217,733	6,160	108,369	0
325211	Plastics Material and Resin Manufacturing	362,724	0	9,319	1	343,833	4,651	4,920	1	7,812
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	338,447	0	0	337,916	340	0	191	0	0
331315	Aluminum Sheet, Plate, and Foil Manufacturing	276,118	0	0	125,130	4,783	146,206	0	0	0
212399	All Other Nonmetallic Mineral Mining	172,364	0	0	172,364	0	0	0	0	0
333994	Industrial Process Furnace and Oven Manufacturing	165,905	0	3,636	0	155,737	6,496	36	88,033	0
325510	Paint and Coating Manufacturing	145,602	0	140	0	112,903	23,857	8,702	302,273	12,969
332812	Metal Coating, Engraving (except Jewelry and Silverware), and Allied Services to Manufacturers	2,931,264	224	1,140	549,892	95,039	2,277,197	7,772	4,239	83,411
Total		12,428,831	111,631	188,196	3,196,296	2,307,833	5,674,714	950,163	11,029,353	5,288,673

*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 4.55. Industries in Which Facilities Only Recycled Naphthalene Reporting 99.9 Percent of the Naphthalene Managed Only By Recycling (2006)

Primary NAICS Code	NAICS Code Description	Recycled Only Quantity (2006)	Percent of Recycled Only Quantity (2006)
324110	Petroleum Refineries	1,295,345	91.1%
488119	Other Airport Operations	99,572	7.0%
424710	Petroleum Bulk Stations and Terminals	9,473	0.7%
331421	Copper Rolling, Drawing, and Extruding	7,606	0.5%
336211	Motor Vehicle Body Manufacturing	2,756	0.2%
321114	Wood Preservation	2,542	0.2%
325510	Paint and Coating Manufacturing	1,536	0.1%
336411	Aircraft Manufacturing	1,486	0.1%
Total		1,420,315	99.9%

Exhibit 4.56. Facilities That Only Recycled Naphthalene, Reporting 99.7 Percent of the Naphthalene Managed Only By Recycling (2006)

Primary NAICS Code	NAICS Code Description	EPA Region	State	County	Recycling (pounds)		
					Onsite	Offsite	Total
324110	Petroleum Refineries	6	TX	Harris	1,290,379	5	1,290,384
488119	Other Airport Operations	4	FL	Miami-Dade	0	99,572	99,572
331421	Copper Rolling, Drawing, and Extruding	4	KY	Metcalfe	0	7,606	7,606
424710	Petroleum Bulk Stations and Terminals	8	CO	Adams	7,316	0	7,316
324110	Petroleum Refineries	6	LA	St Charles	0	3,893	3,893
336211	Motor Vehicle Body Manufacturing	5	IN	St Joseph	0	2,749	2,749
321114	Wood Preservation	5	WI	La Crosse	2,542	0	2,542
325510	Paint and Coating Manufacturing	6	AR	Pulaski	1,516	0	1,516
336411	Aircraft Manufacturing	9	AZ	Pima	0	1,456	1,456
Total					1,301,753	115,281	1,417,034

Data Derived From Hazardous Waste Biennial Reports for Naphthalene

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 4.57 shows the estimated quantity of naphthalene 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 666,000 pounds of naphthalene. Waste streams classified as non-wastewaters contained approximately 86 percent of the naphthalene. Facilities in four industries: NAICS code 325199 (All Other Basic Organic Chemical Manufacturing), NAICS code 321114 (Wood Preservation), NAICS code 324110 (Petroleum Refineries), and NAICS code 324199 (All Other Petroleum and Coal Products Manufacturing) accounted for approximately 94 percent of the total estimated quantity of naphthalene in the hazardous waste streams.

Exhibit 4.57. Estimated Quantity of Naphthalene in Primary Generation Hazardous Waste for Facilities Reporting 98 Percent of the Total Priority Chemical Quantity, by NAICS Code (2005)

Primary NAICS Code	NAICS Code Description	Number of Facilities	Quantity (pounds) of Naphthalene			Percent of Total Quantity
			Non-Wastewaters	Wastewaters	Total Quantity	
325199	All Other Basic Organic Chemical Manufacturing	9	240,510	13,406	253,917	37.3%
321114	Wood Preservation	52	164,610	21,967	186,577	27.4%
32411	Petroleum Refineries	137	66,034	59,164	125,198	18.4%
331111	Iron and Steel Mills	5	77,583	0	77,583	11.4%
324199	All Other Petroleum and Coal Products Manufacturing	4	13,395	30	13,425	2.0%
325181	Alkalies and Chlorine Manufacturing	3	5,781	0	5,781	0.8%
32511	Petrochemical Manufacturing	6	3,464	0	3,464	0.5%
Total		216	571,377	94,567	665,945	97.7%