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National Priority Chemicals Trends Report (2000-2004)

Section 4
Chemical Specific Trends Analyses for Priority Chemicals (2000−2004): Naphthalene

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Naphthalene

Chemical Information:

CAS Number − 91−20−3

Alternate Names − naphthalin, tar camphor, white tar

General Uses − Naphthalene is used to make products like mothballs that repel and keep moths away. It is also used to make dyes, leather goods, and insecticide.

Potential Hazards − Naphthalene is flammable/combustible. In addition, exposure to large doses of naphthalene can damage or destroy red blood cells. The International Agency for Research on Cancer (IARC) has evaluated naphthalene and classified it as "possibly carcinogenic to humans (Group 2B)" (IARC Monographs Vol. 82, 2002). In addition, the National Toxicology Program (NTP) has recently evaluated naphthalene and classified it as "reasonably anticipated to be a human carcinogen" (Eleventh Report on Carcinogens; U.S. Department of Health and Human Services, Public Health Service, National Toxicology Program, 2004).

Summary Analysis:

- NATIONAL: In 2004, 638 facilities reported approximately 13.1 million pounds of naphthalene. Compared to the quantity reported in 2000, there was a decrease of approximately 1.3 million pounds, or approximately 9 percent, in 2004. However, compared to the amount reported in 2003, the quantity increased significantly, by approximately 2.8 million pounds.
- REGIONAL/STATES: In 2004, approximately 89 percent of the naphthalene was reported by facilities in Regions 3, 4, 5, and 6. Facilities in 10 states accounted for 85 percent of the total quantity of naphthalene in 2004; facilities in Texas, Louisiana, and West Virginia reported 52 percent of the total quantity.
- FACILITIES: Almost 200 more facilities reported naphthalene in 2004. Many of these facilities began reporting naphthalene in 2004 due to the lowering of the TRI de minimis level for naphthalene starting with the 2004 TRI reporting year. Of the 638 facilities that reported naphthalene in 2004, 38 facilities accounted for approximately 71 percent of the total quantity of this chemical.
- MANAGEMENT: Since 2000, facilities used treatment and energy recovery to manage most of the naphthalene. In 2004, these two methods were used to manage approximately 95 percent of the naphthalene. Land disposal has consistently been used for 4 to 5 percent of the total quantity.
- INDUSTRY SECTORS: Facilities in seven industry sectors accounted for 80 percent of the naphthalene in 2004. Facilities in three of these industry sectors: SIC 2911 (Petroleum Refining), SIC 2869 (Industrial organic chemicals, nec), and SIC 3479 (Metal coating and allied services) reported approximately 53 percent of the total quantity of naphthalene in 2004. Large increases in 2004 were attributed to compliance with air regulations (SIC 2911) and the shutdown of facilities in SIC 2865 (Cyclic crudes and intermediates) that caused increased quantities of naphthalene due to such activities as tank and process equipment cleanouts and processing of residuals, etc.

National Trends:

Exhibit 4.167 shows the number of facilities that reported naphthalene in 2000 to 2004 and the quantities that were managed via disposal, treatment, energy recovery, and recycling. In 2004, 638 facilities reported approximately 13.1 million pounds of naphthalene. Compared to the quantity reported in 2000, there was a decrease of approximately 1.3 million pounds or approximately 9 percent in 2004. However, compared to the quantity reported in 2003, the quantity increased significantly, by approximately 2.8 million pounds.

The number of facilities that reported naphthalene in 2004 increased significantly compared to prior reporting years. Almost 200 more facilities reported naphthalene in 2004. Many of these facilities began reporting naphthalene in 2004 due to the lowering of the TRI de minimis level for this chemical from 1.0 to 0.1 percent starting with the 2004 TRI reporting year. For example, approximately 50 more facilities in SIC 5171 (Petroleum bulk stations) began reporting naphthalene in 2004; off−spec fuel and/or tank cleanout wastes may be the source of the naphthalene.

Since 2000, facilities used treatment and energy recovery to manage most of the naphthalene. In 2004, these two methods were used to manage approximately 95 percent of the naphthalene. Land disposal has consistently been used for 4 to 5 percent of the total quantity. Compared to the quantity of naphthalene recycled in 2000, there was an increase of 7 million pounds or approximately 57 percent in recycling in 2004, including an increase of approximately 750,000 pounds compared to the quantity recycled in 2003.

Exhibit 4.167. National Management Methods for Naphthalene, 2000−2004

Management Methods for Naphthalene and Number of Facilities	2000	2001	2002	2003	2004	Percent Change (2000−2004)	Management Method −− Percent of Quantity This PC (2004)
Number of Facilities	417	415	422	449	638	53.0%	-
Disposal Quantity (pounds)	619,269	481,138	467,568	545,366	645,508	4.2%	4.9%
Energy Recovery Quantity (pounds)	4,949,512	5,534,195	5,012,871	4,195,410	5,496,651	11.1%	42.0%
Treatment Quantity (pounds)	8,856,797	3,979,180	5,548,040	5,553,696	6,939,616	−21.6%	53.0%
Priority Chemical Quantity (pounds)	14,425,578	9,994,513	11,028,479	10,294,471	13,081,776	−9.3%	100%
Recycling Quantity (pounds)*	12,247,468	6,330,744	25,698,374	18,495,108	19,249,442	57.2%	-

*Note: Waste minimization is the emphasis of this Report. As such, we primarily focus on quantities of PCs that are managed via onsite/offsite disposal, treatment, or energy recovery because we believe these PC quantities offer the greatest opportunities for waste minimization. Because recycled quantities of PCs are already directed to their best uses, they are considered separate and distinct from the quantities of PCs not recycled. Throughout this section, the recycled quantity is presented to provide some perspective regarding the quantity of this PC already recycled compared to the quantities that are managed via disposal, treatment, and energy recovery and thus potentially available for waste minimization.

Exhibit 4.168 shows the number of facilities that reported naphthalene within various quantity ranges. Of the 638 facilities that reported naphthalene in 2004, 38 facilities accounted for approximately 71 percent of the total quantity of this chemical. Approximately 21 percent or 135 of the facilities reported 95 percent of the total quantity of naphthalene in 2004.

Exhibit 4.168. Distribution of Quantities by Facilities Reporting Naphthalene, 2004

Naphthalene (13,081,776 pounds)		
Quantity Reported	**Number of Facilities Reporting This Quantity (2004)**	**Percent of Total Quantity of This PC (2004)**
up to 10 pounds	102	less than 0.1%
11 − 100 pounds	90	less than 0.1%
101 − 1,000 pounds	155	0.5%
1,001 − 10,000 pounds	156	4.6%
10,001 − 100,000 pounds	97	23.8%
100,001 − 1 million pounds	37	58.4%
> 1 million pounds	1	12.8%

EPA Regional Trends:

Exhibits 4.169 and 4.170 show the quantity of naphthalene reported by facilities in each EPA Region in 2000 to 2004. In 2004, approximately 89 percent of the naphthalene was reported by facilities in Regions 3, 4, 5, and 6.

Some additional observations concerning increases and decreases include:

- Compared to quantities reported in 2000, facilities in six of the ten EPA regions reported larger quantities of naphthalene in 2004. The largest increase of approximately 1 million pounds was reported by Region 3 facilities; one facility, located in West Virginia, accounted for approximately 483,000 pounds of this increase.
- Compared to quantities reported in 2000, facilities in Region 6 reported a decrease of approximately 3.2 million pounds in 2004.
- Compared to 2003 quantities, facilities in seven of the 10 EPA regions reported an increased quantity of naphthalene, including increases of 1.6 million pounds in Region 6; 722,000 pounds in Region 4; and 391,000 pounds in Region 3.
- Compared to 2003 quantities, facilities in Region 5 reported a decrease of approximately 376,000 pounds in 2004.

Exhibit 4.169. Regional Quantity of Naphthalene, 2000−2004

EPA Region	2000 (pounds)	2001 (pounds)	2002 (pounds)	2003 (pounds)	2004 (pounds)	Percent Change in Quantity (2000−2004)	Percent of Total Quantity of This PC (2004)
1	98,486	84,422	65,479	50,171	66,146	−32.8%	0.5%
2	378,957	344,184	467,921	442,270	617,285	62.9%	4.7%
3	727,688	2,224,159	1,184,495	1,328,025	1,719,079	136.2%	13.1%
4	1,322,322	1,173,147	1,125,888	1,023,018	1,744,989	32.0%	13.3%
5	2,366,556	1,817,819	3,230,936	2,743,833	2,367,760	0.1%	18.1%
6	9,023,112	3,990,653	4,508,993	4,216,149	5,851,732	−35.1%	44.7%
7	176,702	141,198	155,030	158,280	207,469	17.4%	1.6%
8	81,252	15,841	6,249	8,187	22,991	−71.7%	0.2%
9	207,186	146,215	201,672	231,506	206,754	−0.2%	1.6%
10	43,317	56,875	81,817	93,034	277,570	540.8%	2.1%
Total	**14,425,578**	**9,994,513**	**11,028,479**	**10,294,471**	**13,081,776**	**−9.3%**	**100.0%**

Exhibit 4.170. Distribution of Facilities Reporting Naphthalene in 2004 and the Quantities of Naphthalene Reported in 2004, by EPA Region

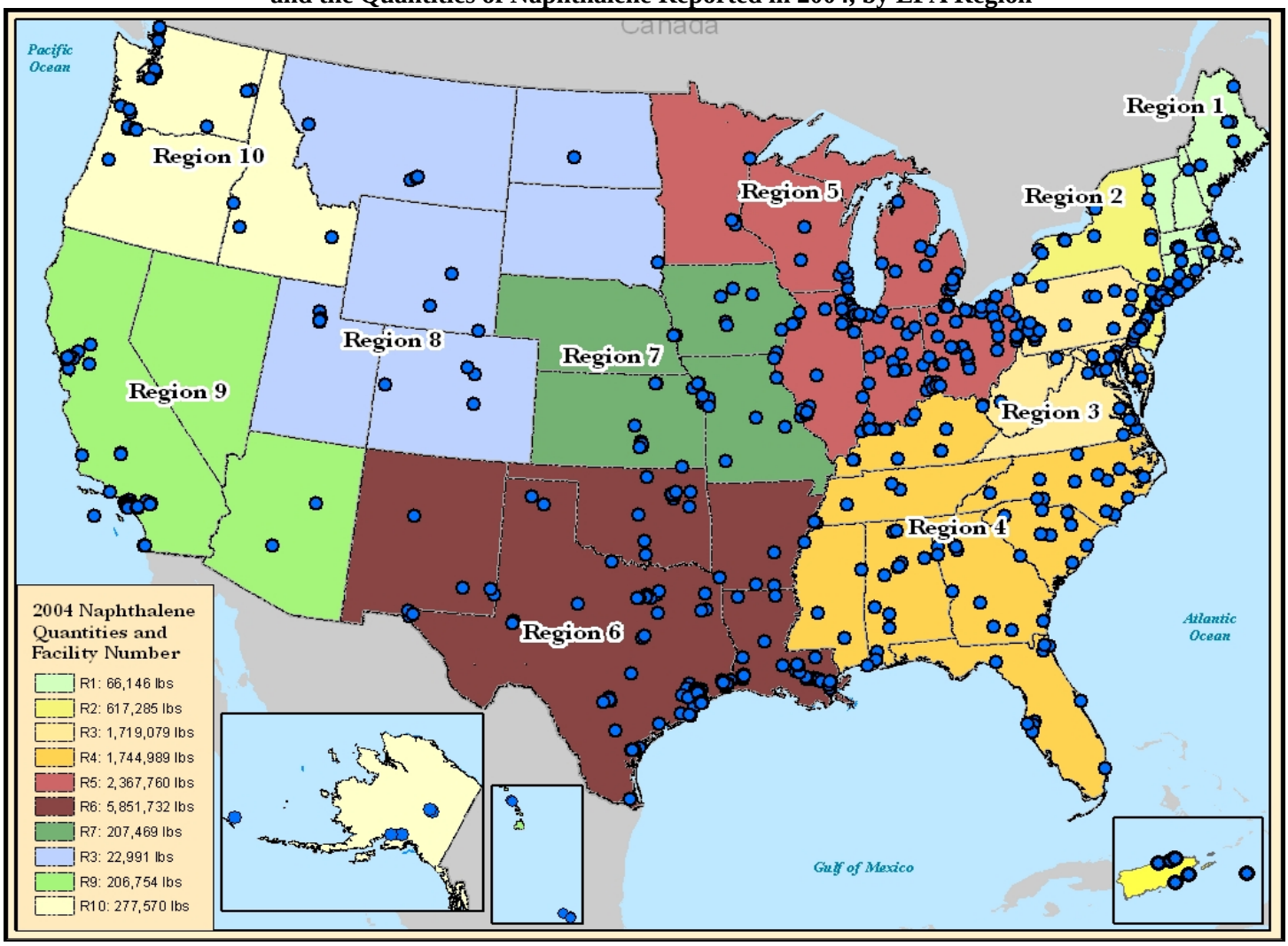


Exhibit 4.171 shows how facilities managed naphthalene, by EPA region, in 2004. Approximately **7** million pounds, or approximately 53 percent, of the naphthalene was treated, primarily onsite. Energy recovery (both onsite and offsite) was used for approximately 5.5 million pounds, or 42 percent, of the total quantity of naphthalene. Region 6 facilities reported 80 percent of the recycling of naphthalene in 2004.

Exhibit 4.171. Regional Management Methods for Naphthalene, 2004

EPA Region	Quantity (pounds) of Naphthalene (2004)	Percent of Naphthalene (2004)	Disposal (pounds)		Energy Recovery (pounds)		Treatment (pounds)		Recycling (pounds)	
			Onsite Disposal	Offsite Disposal	Onsite Energy Recovery	Offsite Energy Recovery	Onsite Treatment	Offsite Treatment	Onsite Recycling	Offsite Recycling
1	66,146	0.5%	2	954	45,877	6,800	9,551	2,961	0	4,023
2	617,285	4.7%	35	9,659	60,739	211,289	219,771	115,793	64,101	2,134
3	1,719,079	13.1%	9	60,182	902,086	125,514	581,470	49,818	1,075,276	69,652
4	1,744,989	13.3%	272	53,945	282,479	674,639	721,951	11,705	852,094	94,384
5	2,367,760	18.1%	2,337	276,385	435,417	535,508	1,082,215	35,898	1,522,400	43,783
6	5,851,732	44.7%	150,299	68,137	882,499	870,604	3,376,601	503,591	7,145,938	8,172,816
7	207,469	1.6%	1,182	16,707	60,173	8,696	97,447	23,264	8,832	2,519
8	22,991	0.2%	31	126	21	9,441	11,686	1,686	20,532	107
9	206,754	1.6%	72	4,780	142,399	8,577	40,410	10,517	14,253	2,732
10	277,570	2.1%	295	98	232,565	1,330	37,816	5,465	143,369	10,497
Total	**13,081,776**	**100.0%**	**154,534**	**490,974**	**3,044,255**	**2,452,397**	**6,178,918**	**760,699**	**10,846,795**	**8,402,647**

State Trends:

Exhibit 4.172 shows the quantity of naphthalene that was reported between 2000 and 2004 in the 10 states where facilities accounted for 85 percent of the total quantity of naphthalene in 2004. Facilities in Texas, Louisiana, and West Virginia reported 52 percent of the total quantity.

Some additional observations concerning increases and decreases include:

- Compared to quantities reported in 2000, facilities in six of these 10 states reported a larger quantity of naphthalene in 2004, including increases of 843,000 pounds in West Virginia, 649,000 pounds in Alabama, and 413,000 pounds in Louisiana. One facility in West Virginia accounted for 53 percent of the total increase reported by West Virginia facilities. This facility incinerated larger quantities of naphthalene in 2004 due to difficulties encountered in trying to separate the naphthalene for recovery.
- Compared to quantities reported in 2000, facilities in Texas reported a decrease of approximately 3.5 million pounds in 2004. Indiana facilities reported a decrease of approximately 253,000 pounds or 21 percent.
- Compared to quantities reported in 2003, facilities in nine of these 10 states reported an increased quantity in 2004, including increases of 1.2 million pounds in Texas, 680,000 pounds in Alabama, 400,000 pounds in Louisiana, and 269,000 pounds in Michigan. The pending shutdown of two facilities – one in Alabama and one in Michigan, accounted for most of the increased quantity in these states; the increased naphthalene is due to such activities as cleanout of tanks, processing of residuals, cleanups, etc. Compared to quantities reported in 2003, Indiana facilities reported a decrease of 864,000 pounds in 2004. One facility accounted for most of this decrease; in 2004 this facility used considerably less paint (containing naphthalene) to paint steel coils.

Exhibit 4.172. State Quantity Trends for Naphthalene (Facilities Reporting 85 Percent of the Total Quantity), 2004

State	Total Quantity (pounds) of Naphthalene					Change in Quantity (2000−2004)	Percent Change in Quantity (2000−2004)	Percent of Total Quantity of This PC (2004)
	2000	2001	2002	2003	2004			
TX	8,240,904	3,282,625	3,602,391	3,454,587	4,691,688	−3,549,216	−43.1%	35.9%
LA	695,668	629,883	798,615	708,621	1,109,004	413,336	59.4%	8.5%
WV	184,046	1,529,958	463,919	683,120	1,027,079	843,033	458.1%	7.9%
IN	1,220,382	843,409	1,521,948	1,831,284	967,201	−253,182	−20.7%	7.4%
AL	162,031	149,150	150,950	130,511	810,775	648,744	400.4%	6.2%
PA	482,895	514,200	513,066	505,740	645,350	162,455	33.6%	4.9%
NJ	372,436	334,688	458,297	432,447	549,524	177,088	47.5%	4.2%
IL	537,601	528,898	502,868	474,777	530,708	−6,893	−1.3%	4.1%
OH	479,469	320,800	1,003,435	185,250	465,946	−13,523	−2.8%	3.6%
MI	98,716	104,159	187,468	241,542	367,474	268,758	272.3%	2.8%
Total	**12,474,148**	**8,237,770**	**9,202,957**	**8,647,879**	**11,164,748**	**−1,309,400**	**−10.5%**	**85.3%**

Exhibits 4.173 and 4.174 show the trends for the quantities of naphthalene for the five top states with facilities that reported this PC in 2004.

Exhibit 4.173. Texas, Louisiana, and Alabama Trends for Naphthalene, 2000–2004

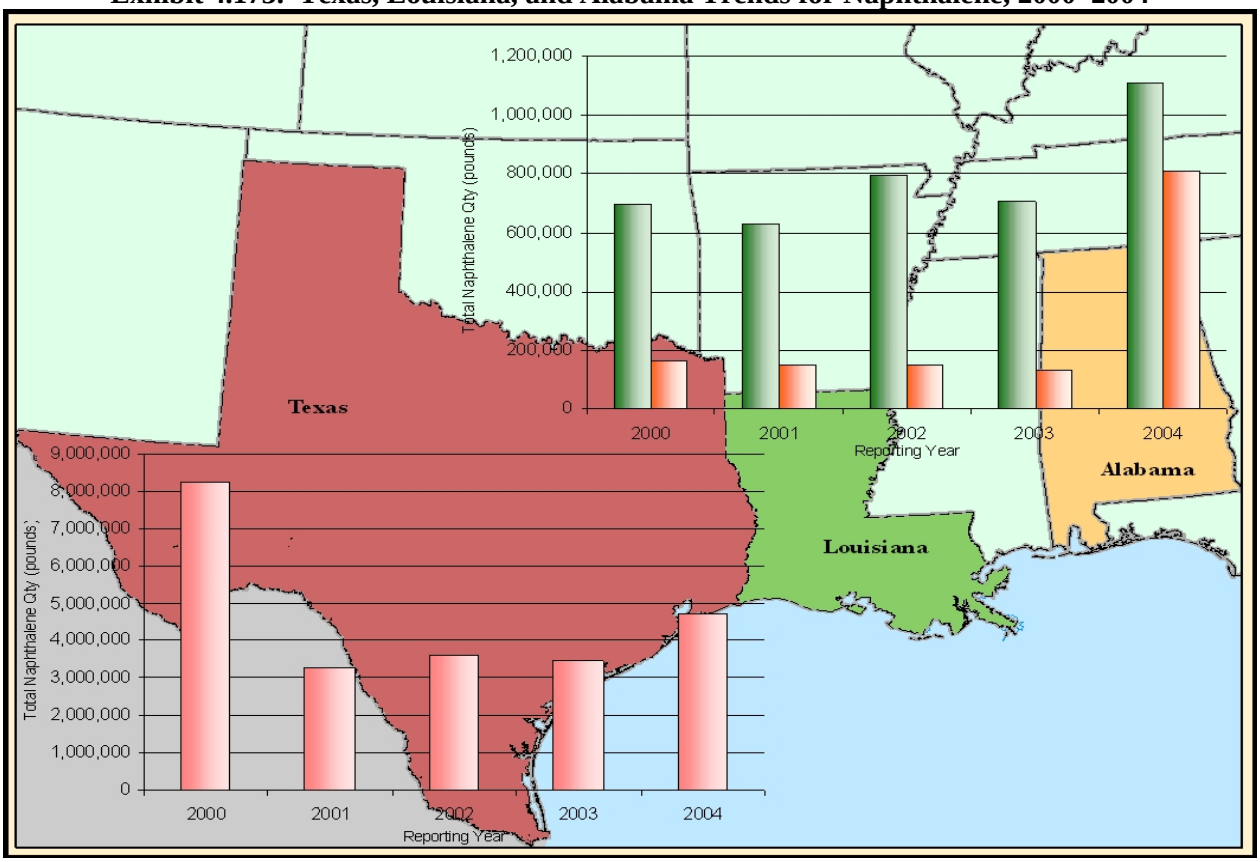
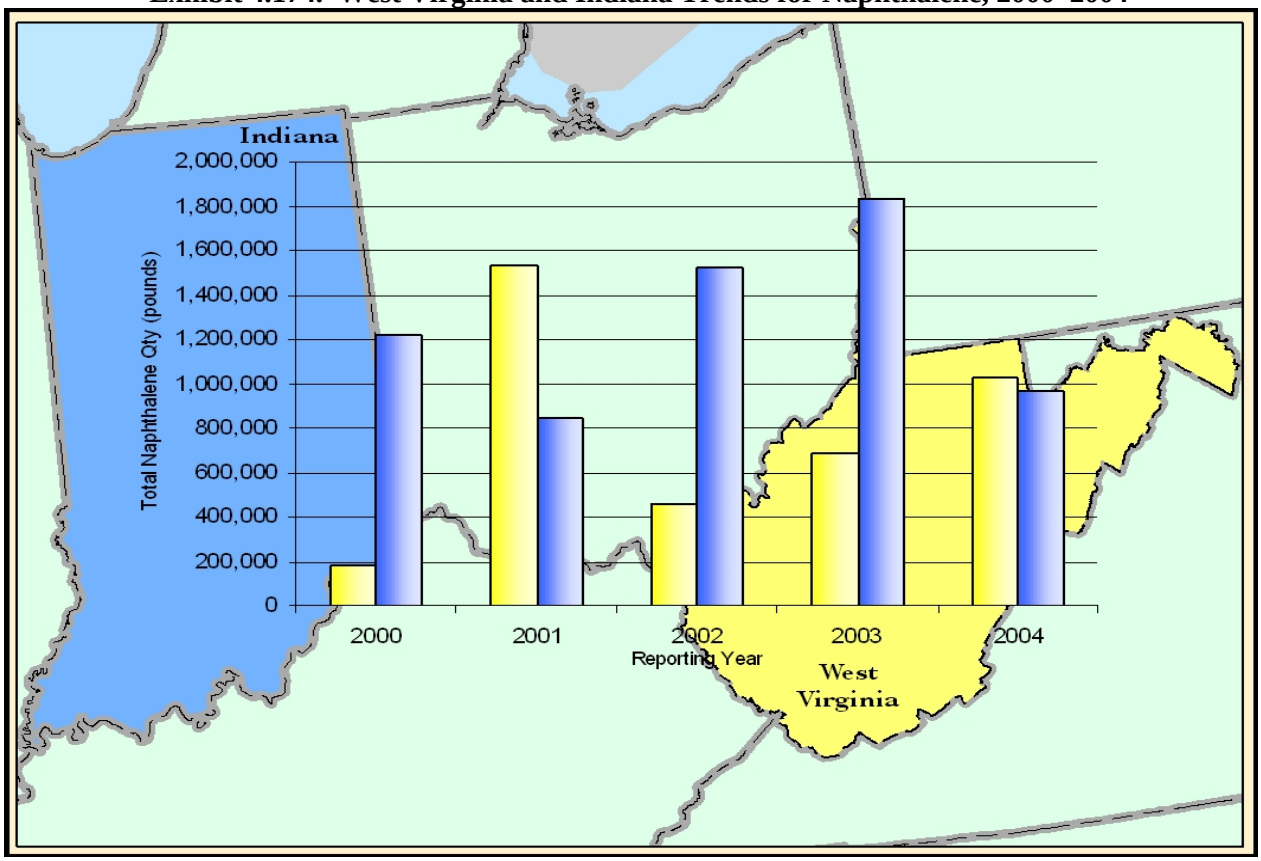


Exhibit 4.174. West Virginia and Indiana Trends for Naphthalene, 2000–2004



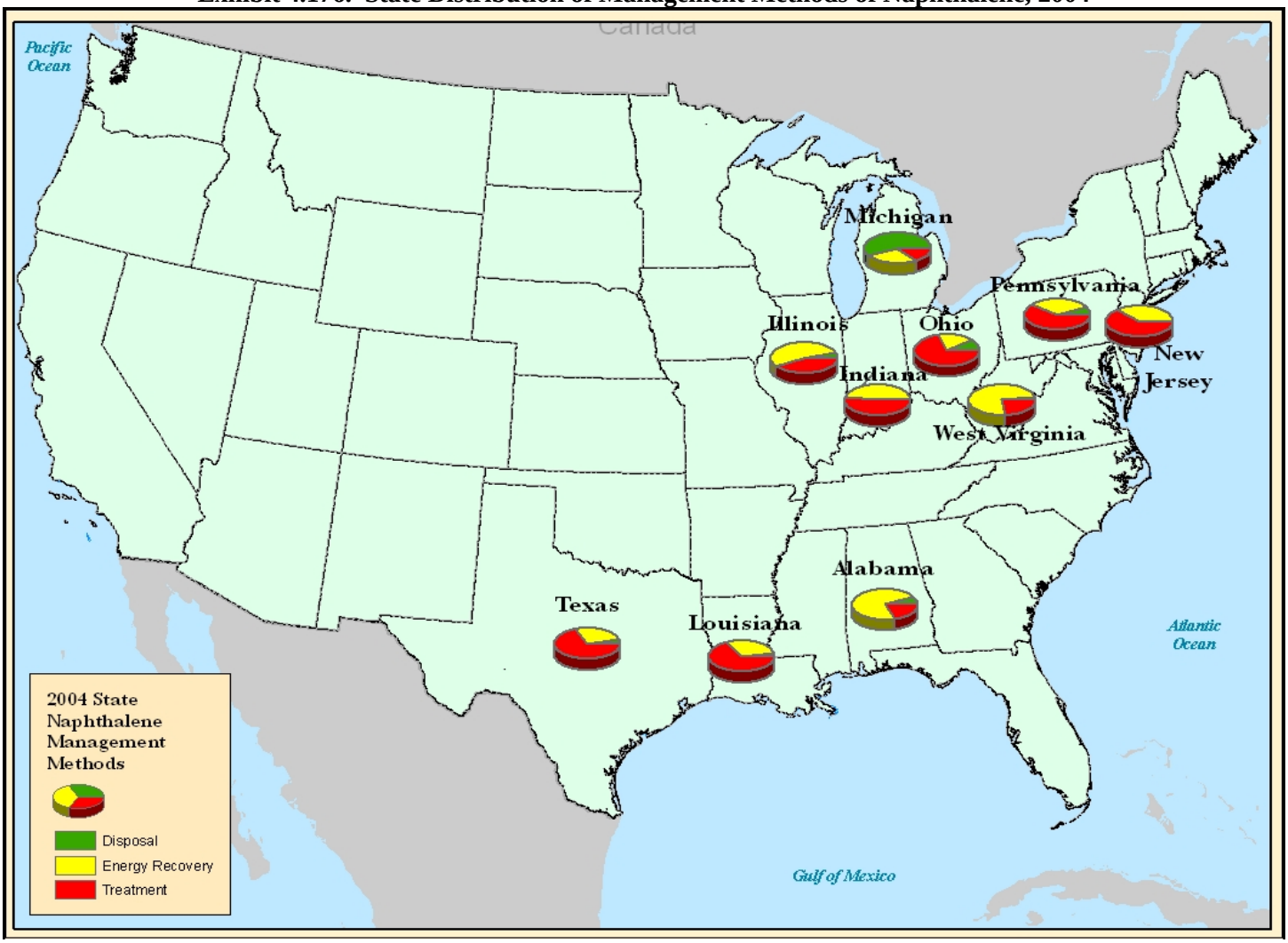
Exhibits 4.175 and 4.176 show how facilities managed naphthalene in the 10 states from which facilities reported 85 percent of this PC in 2004. Facilities in most of these states used either treatment or energy

recovery to manage naphthalene. Michigan facilities primarily used land disposal. In 2004, approximately 97 percent of recycled naphthalene was reported by facilities in Texas, Louisiana, Illinois, and Pennsylvania.

Exhibit 4.175. Management Methods for Naphthalene, Facilities in States With 85 Percent of the Total Quantity, 2004

State	Total Quantity (pounds) of Naphthalene (2004)	Onsite Disposal (pounds)	Offsite Disposal (pounds)	Onsite Energy Recovery (pounds)	Offsite Energy Recovery (pounds)	Onsite Treatment (pounds)	Offsite Treatment (pounds)	Onsite Recycling (pounds)	Offsite Recycling (pounds)
TX	4,691,688	139,232	35,905	516,321	857,952	2,669,911	472,366	4,036,668	8,162,003
LA	1,109,004	1,794	25,382	354,075	7,622	689,203	30,928	2,796,230	10,811
WV	1,027,079	0	21,141	765,647	2,700	233,833	3,758	320,002	5,304
IN	967,201	21	247	190,881	276,622	497,684	1,745	110,896	3,391
AL	810,775	0	49,312	30,099	583,802	145,961	1,601	58,966	86,551
PA	645,350	9	36,186	113,130	118,504	335,320	42,199	739,422	64,336
NJ	549,524	22	5,732	0	209,327	218,920	115,523	1,162	1,148
IL	530,708	759	18,703	113,487	166,260	212,275	19,225	1,323,520	2,606
OH	465,946	1,268	41,949	37,894	61,549	308,970	14,315	10,549	16,081
MI	367,474	200	204,308	93,155	24,602	44,915	294	65,760	21,110
Total	**11,164,748**	**143,305**	**438,866**	**2,214,689**	**2,308,940**	**5,356,993**	**701,955**	**9,463,175**	**8,373,342**

Exhibit 4.176. State Distribution of Management Methods of Naphthalene, 2004



Industry Sector (SIC) Trends:

Exhibit 4.177 shows the quantity of naphthalene reported in the seven industry sectors where facilities accounted for 80 percent of this chemical in 2004. Facilities in three of these industry sectors: SIC 2911 (Petroleum Refining), SIC 2869 (Industrial organic chemicals, nec), and SIC 3479 (Metal coating and allied services) reported approximately 53 percent of the total quantity of naphthalene in 2004.

Some additional observations concerning increases and decreases include:

- Compared to quantities reported in 2000, facilities in four of these seven industry sectors reported a significantly larger quantity of naphthalene in 2004. Increases of nearly 1 million pounds were reported by facilities in SIC 2869 (Industrial organic chemicals, nec) and SIC 2865 (Cyclic crudes and intermediates).
- Compared to quantities reported in 2000, facilities in three of these seven industry sectors reported a decreased quantity of naphthalene in 2004; the largest decrease of 2.7 million pounds was reported by facilities in SIC 2911 (Petroleum Refining).
- Compared to quantities reported in 2003, facilities in five of these seven industry sectors reported an increase; most notably, facilities in SIC 2911 (Petroleum Refining) reported an increase of approximately 1.3 million pounds in 2004. The facility that accounted for most of this increase attributed this increase to compliance with air regulations.
- Facilities in three other industry sectors: SIC 2865 (Cyclic crudes and intermediates), SIC 2879 (Pesticides and agricultural chemicals, nec), and SIC 2869 (Industrial organic chemicals, nec) also reported large increases, ranging from 433,000 pounds to 745,000 pounds, in 2004. One facility in SIC 2879 accounted for much of the total increase reported by facilities in this industry sector; this facility incinerated larger quantities of naphthalene in 2004 due to difficulties encountered in trying to separate the naphthalene for recovery. The ongoing shutdown of a couple of facilities in SIC 2865 accounted for most of the increase for this sector; increased quantities of naphthalene were due to such activities as the clean−out of tanks and process equipment, processing of residuals, etc. A facility in SIC 2869 reported a large increase in 2004 due to the purchase of fuel oil (as an alternative to natural gas) from a waste broker that contained significant quantity of naphthalene.
- Compared to quantities reported in 2003, facilities in SIC 3479 (Metal coating and allied services) reported a significant decrease of approximately 646,000 pounds. One facility accounted for most of this decrease; in 2004 this facility used considerably less paint (containing naphthalene) to paint steel coils.

Exhibit 4.177. Industry Sectors With Facilities Reporting Naphthalene (Facilities Reporting 80 Percent of the Total Quantity), 2004

Primary SIC	SIC Description	Number of Facilities That Reported Naphthalene (2004)	2000 (pounds)	2001 (pounds)	2002 (pounds)	2003 (pounds)	2004 (pounds)	Change in Quantity (2000−2004)	Percent of Total Quantity of This PC (2004)
2911	Petroleum refining	107	5,412,818	1,254,939	1,319,374	1,345,053	2,683,990	−2,728,828	20.5%
2869	Industrial organic chemicals, nec	44	1,362,180	1,126,888	2,003,084	1,882,383	2,315,835	953,655	17.7%
3479	Metal coating and allied services	35	1,772,408	1,582,663	2,344,524	2,580,483	1,934,195	161,787	14.8%
2865	Cyclic crudes and intermediates	11	786,566	592,369	1,549,766	1,002,559	1,747,572	961,006	13.4%
2879	Pesticides and agricultural chemicals, nec	14	92,901	1,382,053	143,629	330,346	825,149	732,248	6.3%
2821	Plastics materials and resins	29	662,107	398,380	635,225	605,237	557,612	−104,495	4.3%
4925	Gas production and/or distribution	1	628,055	270,467	197,741	324,962	346,451	−281,604	2.6%
	Total	**241**	**10,717,035**	**6,607,759**	**8,193,343**	**8,071,023**	**10,410,804**	**−306,231**	**79.6%**

Exhibit 4.178 shows how facilities managed naphthalene in these seven industry sectors in 2004. Facilities in these industry sectors used a mix of energy recovery and treatment to manage naphthalene. Facilities in SIC 2865 (Cyclic crudes and intermediates) reported most of the naphthalene that was land disposed. Facilities in SIC 2911 (Petroleum refining), SIC 2869 (Industrial organic chemicals, nec), and SIC 2865 (Cyclic crudes and intermediates) reported approximately 97 percent of the naphthalene recycled in 2004.

Exhibit 4.178. SIC Management Methods of Naphthalene (Facilities Reporting 80 Percent of the Total Quantity), 2004

Primary SIC	SIC Description	Total Quantity of Naphthalene (2004)	Percent of Total Quantity (2004)	Disposal (pounds)		Energy Recovery (pounds)		Treatment (pounds)		Recycling (pounds)	
				Onsite Disposal	Offsite Disposal	Onsite Energy Recovery	Offsite Energy Recovery	Onsite Treatment	Offsite Treatment	Onsite Recycling	Offsite Recycling
2911	Petroleum refining	2,683,990	20.5%	5,877	14,744	3,033	27,019	2,600,901	32,417	7,251,192	19,603
2869	Industrial organic chemicals, nec	2,315,835	17.7%	584	28,295	516,099	601,232	785,090	384,535	945,521	8,121,729
3479	Metal coating and allied services	1,934,195	14.8%	0	0	536,167	100,749	1,286,251	11,029	3,614	10,759
2865	Cyclic crudes and intermediates	1,747,572	13.4%	131,295	237,327	162,391	904,586	103,708	208,266	1,208,469	86,550
2879	Pesticides and agricultural chemicals, nec	825,149	6.3%	5	10	765,647	700	32,303	26,484	319,952	0
2821	Plastics materials and resins	557,612	4.3%	9	9,161	103,890	359,007	61,321	24,225	25,309	14,886
4925	Gas production and/or distribution	346,451	2.6%	0	47	0	259,653	85,958	793	105,058	0
	Total	**10,410,804**	**79.6%**	**137,770**	**289,583**	**2,087,227**	**2,252,945**	**4,955,531**	**687,749**	**9,859,115**	**8,253,527**