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National Priority Chemicals Trends Report (2004-2006)

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

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Hexachloroethane (HCE)

Chemical Information

Alternate Names: carbon hexachloride, ethane hexachloride, perchloroethane

General Uses: HCE is used by the military to make weapons that produce smoke, such as smoke pots and grenades used during training. It is also used to remove air bubbles in melted aluminum. HCE may be present as an ingredient in fungicides, insecticides, lubricants and plastics.

How Much Hexachloroethane Was Generated?

For 2006, seven facilities reported approximately 2.1 million pounds of hexachloroethane being generated; one facility reported approximately 53 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 hexachloroethane reported for 2004 and 2005, the quantity increased by approximately 1.4 million pounds and decreased by approximately 1.3 million pounds, respectively (Exhibit 4.30).

Exhibit 4.30. National Generation of Hexachloroethane (2004–2006)

TRI Reporting Year	2004	2005	2006
Total Quantity of HCE (pounds)	775,987	3,413,266	2,139,851
Number of TRI Facilities Reporting HCE	8	8	7

Where Was Hexachloroethane Generated?

Facilities in Louisiana and Texas (both in EPA Region 6) reported approximately 96 percent of the HCE being generated for 2006 (Exhibit 4.31).

Some observations concerning trends for the reported quantity of HCE include:

- An alkalies and chlorine manufacturing facility in Ascension County, Louisiana (EPA Region 6) reported an increase of approximately 1.4 million pounds for 2005 followed by a decrease of approximately 310,000 pounds for 2006. The facility attributed these fluctuations to analytical variability and production activity.
- Two organic chemical manufacturing facilities (same company) in Harris County, Texas (EPA Region 6) reported significant decreased quantities for 2005 followed by large increases for 2006. One of the facilities noted that heavy ends from cracking of ethylene dichloride contain HCE, which was incinerated onsite. The quantity of HCE depends on the purity of the feedstock mixture; increased quantity for 2006 also was caused by operational issues. The second facility attributed the increased quantities in 2006 to operational issues—the facility had to transfer material off-site due to a by-product reactor being down. This material typically would have been recycled and reused in their process.
- An alkalies and chlorine manufacturing facility in Brazoria County, Texas (EPA Region 6) reported an increase of approximately 1.5 million pounds for 2005 followed by a decrease of approximately 1.3 million pounds for 2006.
- A plastics material and resin manufacturing facility in Lenawee County, Michigan (EPA Region 5) reported an increase of approximately 82,000 pounds for 2006. At this facility, HCE is the primary component of three separate waste streams. The facility reviewed its waste characterization profiles for the waste streams containing HCE and the waste shipments sent off-site in 2006 and noted there is some variability with these waste streams.
- A federal facility (Department of Defense) in Umatilla County, Oregon (EPA Region 10) reported an increase of approximately 83,000 pounds for 2005 followed by reporting 0 pounds for 2006. This facility had used HCE as a “surrogate” in trial burns to ensure their incinerators are properly operating prior to introducing chemical weapon materials.

Exhibit 4.31. Quantity of Hexachloroethane, for Facilities Reporting 99.9 Percent of Total Quantity, by County (2006)

EPA Region	State	County	Quantity (pounds) of HCE			Percent of Total Quantity (2006)
			2004	2005	2006	
6	LA	Ascension	165,210	1,436,915	1,126,704	52.7%
6	TX	Harris	232,816	38,316	440,307	20.6%
6	TX	Brazoria	167,233	1,641,075	292,794	13.7%
6	LA	Calcasieu	180,640	188,874	191,720	9.0%
5	MI	Lenawee	11,529	5,356	87,177	4.1%
9	CA	Contra Costa	0	1,611	1,149	0.1%
10	OR	Umatilla	17,867	101,119	0	0.0%
4	AL	Calhoun	0	0	0	0.0%
7	KS	Sedgwick	693	0	0	0.0%
Total			775,987	3,413,266	2,139,851	100.0%

Which Industries Generated Hexachloroethane?

For 2006, seven facilities in three NAICS codes reported HCE being generated (Exhibit 4.32). Facilities in NAICS code 325181 (Alkalies and chlorine manufacturing) accounted for approximately 75 percent of the national total quantity of HCE being generated for 2006, with one of these facilities reporting approximately 53 percent of the national total quantity.

Exhibit 4.32. Industry Sectors Quantities of Hexachloroethane (2004–2006)

Primary NAICS code	NAICS Code Description	Facilities Reporting (2006)	Quantity (pounds) of HCE			Percent of Total Quantity (2006)
			2004	2005	2006	
325181	Alkalies and Chlorine Manufacturing	3	513,776	3,266,864	1,611,218	75.3%
325199	All Other Basic Organic Chemical Manufacturing	3	232,816	39,927	441,456	20.6%
325211	Plastics Material and Resin Manufacturing	1	11,529	5,356	87,177	4.1%
928110	National Security	0	17,867	101,119	0	0.0%
Total		7	775,987	3,413,266	2,139,851	100.0%

How Did Facilities Manage Hexachloroethane?

Exhibit 4.33 shows how facilities, by industry, managed HCE in 2006.

Land Disposal: Facilities disposed of only 55 pounds or less than 0.1 percent of the HCE generated.

Energy Recovery: Facilities used energy recovery to manage approximately 8 percent of the HCE generated. One facility (NAICS code 325211—Plastics Material and Resin Manufacturing) reported using energy recovery for almost all of its non-recycled HCE.

Treatment: Facilities treated (incinerated), mostly onsite, approximately 82 percent of the HCE generated. Facilities in two of the three industries used treatment as their primary method for managing this PC.

Recycling: Facilities recycled approximately 3.4 million pounds of HCE in 2006; two facilities in NAICS code 325181 (Alkalies and Chlorine Manufacturing) reported approximately 99 percent of the total quantity of HCE recycled.

Exhibit 4.33. Management Methods for Hexachloroethane in Industry Sectors (2006)

Primary NAICS Code	NAICS Code Description	Total PC Quantity* Reported	Quantity (pounds) of HCE							
			Disposal		Energy Recovery		Treatment		Recycling	
			Onsite	Offsite	Onsite	Offsite	Onsite	Offsite	Onsite	Offsite
325181	Alkalies and Chlorine Manufacturing	1,611,218	52	0	109,840	0	1,488,097	13,230	3,343,049	0
325199	All Other Basic Organic Chemical Manufacturing	441,456	0	3	0	0	221,153	220,300	3,094	124
325211	Plastics Material and Resin Manufacturing	87,177	0	0	0	86,875	0	302	0	19,321
Total		2,139,851	52	3	109,840	86,875	1,709,250	233,831	3,346,143	19,445

*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.

Data Derived From Hazardous Waste Biennial Reports for Hexachloroethane

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 4.34 shows the estimated quantity of HCE 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 1.1 million pounds of HCE. Waste streams classified as non-wastewaters contained approximately 99.9 percent of the HCE. Facilities in three industries: NAICS code 325199 (All Other Basic Organic Chemical Manufacturing), NAICS code 424610 (Plastics Materials and Basic Forms and Shapes Merchant Wholesalers), and NAICS code 325181 (Alkalies and Chlorine Manufacturing) accounted for 99 percent of the total estimated quantity of HCE in the hazardous waste streams.

Exhibit 4.34. Estimated Quantity of Hexachloroethane in Primary Generation Hazardous Waste for Facilities Reporting 99.9 Percent of the Total Priority Chemical Quantity, by NAICS Code (2005)

Primary NAICS Code	NAICS Code Description	Number of Facilities	Quantity (pounds) of HCE			Percent of Total Quantity
			Non-wastewaters	Wastewaters	Total Quantity	
325199	All Other Basic Organic Chemical Manufacturing	6	436,292	147	436,439	40.3%
424610	Plastics Materials and Basic Forms and Shapes Merchant Wholesalers	1	383,325	125	383,449	35.4%
325181	Alkalies and Chlorine Manufacturing	4	251,584	0	251,584	23.2%
325110	Petrochemical Manufacturing	3	6,283	0	6,283	0.6%
325211	Plastics Material and Resin Manufacturing	3	4,906	0	4,906	0.5%
Total		17	1,082,390	272	1,082,661	99.9%