

5. PRODUCTION, IMPORT/EXPORT, USE, AND DISPOSAL

5.1 PRODUCTION

Heptachlor was first registered for use in the United States as an insecticide in 1952 and commercial production began the following year (EPA 1986a). Nearly all registered uses of heptachlor were canceled in 1974 by EPA because of its potential cancer risk and its persistence and bioaccumulation throughout the food chain (EPA 1986a). The sale of heptachlor was voluntarily canceled in 1987 by its sole U.S. manufacturer, the Velsicol Chemical Corporation. The sale, distribution, and shipment of existing stocks of all canceled chlordane and heptachlor products were prohibited in the United States as of April 1988 (EPA 1990a; SRI 1990). Heptachlor is a constituent of technical-grade chlordane, approximately 10% by weight (HSDB 2007a). Heptachlor epoxide is an oxidation product of heptachlor and of chlordane; it is not produced commercially in the United States (IARC 1979).

Crown chemical company, the last company in the United States reported to have manufactured heptachlor, transferred its registry to Wood Protection Products, Inc. on October 8, 1985. Since 1985, heptachlor use in the United States has been limited to treatment of fire ants in power transformers. All other heptachlor uses have been banned in the United States.

Table 5-1 summarizes the facilities in the United States that manufacture or process heptachlor. It also lists the maximum amounts of heptachlor that are allowed at these sites and the end uses of the heptachlor. This information is based on the release data reported to the Toxics Release Inventory (TRI) in 2004 (TRI04 2006). The majority of facilities that reported heptachlor release in 2004 were hazardous waste treatment plants that processed heptachlor for safe disposal.

Heptachlor is produced commercially by the free-radical chlorination of chlordene in benzene containing 0.5–5.0% of fuller's earth. The reaction is run for up to 8 hours. The chlordene starting material is prepared by the Diels-Alder condensation of hexachlorocyclopentadiene with cyclopentadiene (Sittig 1980). Technical-grade heptachlor usually consists of 72% heptachlor and 28% impurities such as *trans*-chlordane, *cis*-chlordane, and nonachlor (HSDB 2007a).

The U.S. International Trade Commission (USITC) did not report the domestic production volume of heptachlor separately for the years 1981–1985 (USITC 1982b, 1983b, 1984b, 1985, 1986). Only yearly totals were reported for all cyclic insecticides. The USITC reports production volume data only for

5. PRODUCTION, IMPORT/EXPORT, USE, AND DISPOSAL

Table 5-1. Facilities that Produce, Process, or Use Heptachlor

State ^a	Number of facilities	Minimum amount on site in pounds ^b	Maximum amount on site in pounds ^b	Activities and uses ^c
AR	3	0	99,999	7, 12
CA	1	0	99	12
FL	1	10,000	99,999	7
GA	1	1,000	9,999	7
IL	3	0	9,999	12
KY	2	100	9,999	12
LA	2	0	9,999	12
MI	1	0	99	12
MS	1	0	99	12
NE	2	100	9,999	12
NJ	2	0	9,999	12
NV	1	100	999	2, 3, 12
OH	3	100	99,999	12
OR	2	100	9,999	12
PA	1	0	99	12
SC	1	100,000	999,999	12
TN	4	10,000	999,999	1, 4, 7
TX	5	0	999,999	12
UT	3	0	9,999	12

^aPost office state abbreviations used

^bAmounts on site reported by facilities in each state

^cActivities/Uses:

- | | | |
|--------------------------|--------------------------|-----------------------------|
| 1. Produce | 6. Impurity | 11. Chemical Processing Aid |
| 2. Import | 7. Reactant | 12. Manufacturing Aid |
| 3. Onsite use/processing | 8. Formulation Component | 13. Ancillary/Other Uses |
| 4. Sale/Distribution | 9. Article Component | 14. Process Impurity |
| 5. Byproduct | 10. Repackaging | |

Source: TRI04 2006 (Data are from 2004)

5. PRODUCTION, IMPORT/EXPORT, USE, AND DISPOSAL

chemicals for which three or more manufacturers report volumes that exceed certain minimum output levels.

5.2 IMPORT/EXPORT

The USITC did not report separate import data for heptachlor for the years 1981, 1982, or 1983 (USITC 1982a, 1983a, 1984a). The sale, distribution, and shipment of existing stocks of all canceled heptachlor products were prohibited by EPA in 1988 (EPA 1990a). According to the USITC, heptachlor has not been imported into the United States from 1986 to 2007 (USITC 2007).

No information was located regarding the exportation of heptachlor or heptachlor epoxide.

5.3 USE

Heptachlor is a persistent insecticide that kills insects by both ingestion and dermal contact. It is nonphytotoxic at insecticidal concentrations (Worthing and Walker 1987). Heptachlor was used extensively from 1953 to 1974 as a soil and seed treatment to protect corn, small grains, and sorghum from pests. It was used to control ants, cutworms, maggots, termites, thrips, weevils, and wireworms in both cultivated and uncultivated soils. Heptachlor was also used nonagriculturally during this time period to control termites and household insects (EPA 1986a; Worthing and Walker 1987).

EPA proposed cancellation of nearly all registered uses of heptachlor in 1974 because of its potential cancer risk and its persistence and bioaccumulation throughout the food chain. The few agricultural uses that were not canceled in 1974, treatment of field corn, seed (for corn, wheat, oats, barley, rye, and sorghum), citrus, pineapple, and narcissus bulbs, were phased out gradually over a 5-year period ending on July 1, 1983 (EPA 1986a). By April 1988, heptachlor could no longer be used for the underground control of termites. That same year, EPA prohibited the sale, distribution, and shipment of existing stocks of all canceled chlordane and heptachlor products. Subsequently, virtually all uses of heptachlor products were voluntarily canceled by the registrant, Velsicol Chemical Corporation (EPA 1990a). The only current use of heptachlor is in the treatment of fire ants in underground power transformers. This use was specifically exempted from EPA's suspension and cancellation actions because it was believed to result in insignificant exposure and, consequently, insignificant risk. It is unclear whether or not this exempted use is currently supported since Velsicol voluntarily chose not to renew their registration for technical-grade heptachlor in 1999 (EPA 1999a). A search of the National Pesticide Information Retrieval System, which

5. PRODUCTION, IMPORT/EXPORT, USE, AND DISPOSAL

lists all of the labels for currently registered pesticides, produced no active labels for heptachlor (NPIRS 2007).

5.4 DISPOSAL

Heptachlor and heptachlor epoxide are Resource Conservation and Recovery Act (RCRA) hazardous wastes and hazardous constituents (EPA 1986b); as such, they must be disposed of in secure landfills in compliance with all federal, state, and local regulations. They may also be incinerated at 1,500 °F for 0.5 seconds for primary combustion and at 3,200 °F for 1 second for secondary combustion, with adequate scrubbing of incinerator exhaust and disposal of ash (Sittig 1985).