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

4.1 PRODUCTION

Chlordane is produced by chlorinating cyclopentadiene to form hexachlorocyclopentadiene and condensing the latter with cyclopentadiene to form chlordene. The chlordene is further chlorinated at high temperature and pressure to chlordane (Dearth and Hites 1991c; Whetstone 1964). EPA (1987g) estimated that ≈3.5-4.0 million pounds of chlordane were distributed in 1986. Table 4-1 lists the facilities that manufacture or process chlordane according to the 1990 Toxic Chemical Release Inventory. Velsicol Chemical Company in Memphis, Tennessee, is presently the only U.S. manufacturer of chlordane; between 100,000 and 1 million pounds of chlordane is produced (SRI 1990; TRI90 1992). It was the only domestic manufacturer of chlordane at the time that the EPA canceled its registration for commercial production, delivery, sale, and use in the United States (EPA 1988c; SRI 1988). This cancellation became effective April 14, 1988 (EPA 1988c). Technical heptachlor contains 20-22% *trans*-chlordane (Kutz et al. 1991). The registration of heptachlor was also canceled by EPA.

4.2 IMPORT/EXPORT

Chlordane is not imported into the United States (EPA 1988c). Chlordane is still produced for export, but is no longer used in the United States. No data on export volumes are available.

4.3 USE

As of April 14, 1988, all commercial use of chlordane in the United States was canceled (EPA 1988c). Between July 1, 1983 and April 14, 1988 the sole use for chlordane was to control subterranean termites (EPA 19878). For this purpose, chlordane was applied primarily as a liquid that was poured or injected around the foundation of a building (Wallace 1991). Chlordane, in conjunction with heptachlor, was at one time widely used as a pesticide for the control of insects on various types of agricultural crops and vegetation. The use pattern for chlordane in the mid 1970s was as follows: 35% used by pest control operators, mostly on termites; 28% on agricultural crops, including corn and citrus; 30% for home lawn and garden use; and 7% on turf and omamentals (HSDB 1988). On

TABLE 4-1. Facilities that Manufacture or Process Chlordane[a]

Facility	Location[b]	Range of maximum amounts on site in pounds	Activities and uses
Stennis Space Center	Stennis Space Cen, MS	0-99	In ancillary or other uses
Velsicol Chemical Corp.	Memphis, TN	100,000-999,999	Produce; for sale/distribution

[a]Derived from TRI90 (1992)
[b]Post Office state abbreviations

March 6, 1978 a final cancellation notice was issued which called for the suspension of the use of chlordane except for subsurface injection to control termites and for dipping roots and tops of nonfood plants. Minor use of chlordane for treating nonfood plants was canceled by 1983 (EPA 1987g). The use of chlordane decreased drastically in the 1970s when EPA moved to cancel all uses other than subterranean termite control (Kutz et al. 1991).

4.4 DISPOSAL

According to TRI90 (1992), 99 pounds of chlordane was disposed of in publicly operated treatment plants (POTWs) and 523 pounds were transferred to off-site facilities. Chlordane may be disposed of by dissolving it in a flammable solvent and incinerating it under controlled conditions. The incinerator should be equipped with an afterburner and an acid scrubber to remove halo acids from the effluent gas, and adequate ash disposal procedures should be followed (EPA 1991; HSDB 1988; OHM-TADS 1988). Before disposing waste residue containing chlordane (including waste sludge) on land, environmental regulatory agencies should be consulted for guidance on acceptable disposal practices (HSDB 1988). EPA has promulgated standards for *the* disposal of waste chlordane in sewage sludge (EPA 1993).

In situ vitrification is a thermal treatment technology in which substantial quantities of energy are introduced into contaminated soil, thereby destroying organic compounds and immobilizing inorganic compounds (Dragun 1991). This technology has been applied to chlordane-contaminated soils.