

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

4.1 PRODUCTION

Hexachloroethane is usually produced commercially by the chlorination of tetrachloroethylene in the presence of ferric chloride at 100-140°C. It may also be obtained as a co-product in the production of tetrachloroethylene by pyrolysis of carbon tetrachloride at 800-900°C or by passing a mixture of ethylene and chlorine over charcoal at 300-350°C. Small amounts of high purity hexachloroethane may be prepared by the action of chlorine on barium carbide (Dacre et al. 1979; Gordon et al. 1991; IARC 1979; Santodonato et al. 1985).

Hexachloroethane is not currently produced for commercial distribution in the United States. It is a by-product in the industrial chlorination of saturated and unsaturated C, hydrocarbons by several U.S. companies, including Dow Chemical, PPG Industries, and Occidental Petroleum Corporation. The product may be used captively in-house or recycled in feedstock to produce tetrachloroethylene or carbon tetrachloride. Estimates of current production volumes were not located (Gordon et al. 1991; Santodonato et al. 1985; TRI93 1995).

Hexachloroethane was produced in the United States for commercial distribution from 1921 to 1967. Hummel Chemical Company, Inc., South Plainfield, New Jersey, and the Nease Chemical Company (location not provided) produced hexachloroethane at one time. In the 1970s there were 14 producers and distributors of hexachloroethane in the United States. The producers reported that the product was not distributed; it was used in-house or recycled. The distributors were importers of hexachloroethane (see Section 4.2). Estimated production volume of hexachloroethane in 1977 was about 2-20 million pounds (Gordon et al. 1991; HSDB 1995; IARC 1979; Kitchens et al. 1978; Santodonato et al. 1985; SRI 1977).

Table 4-1 lists information on U.S. companies that reported the manufacture and processing of hexachloroethane in 1993 (TRI93 1995). The Toxics Release Inventory (TRI) data should be used with caution since only certain types of facilities are required to report. This is not an exhaustive list.

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Table 4-1. Facilities That Manufacture or Process Hexachloroethane

State ^a	Number of facilities	Range of maximum amounts on site in thousands of pounds ^b	Activities and uses ^c
CA	2	0-100	1, 5, 6, 7, 11
IL	3	0-10000	2, 3, 4, 8, 9
IN	1	1-10	11
KS	1	100-1000	1, 5
LA	5	1-100	1, 3, 5, 6, 7, 11, 13
MI	1	10-100	7
MO	1	1-10	11
MS	1	10-100	12
NJ	2	10-100	2, 4, 9, 10
OH	3	1-1000	2, 3, 8, 9, 11
TX	4	0-100	1, 5, 6, 10, 12

Source: TRI93 1995

^a Post office state abbreviations used^b Data in TRI are maximum amounts on site at each facility^c Activities/Uses:

- | | |
|-------------------------------|----------------------------------|
| 1. Produce | 8. As a formulation component |
| 2. Import | 9. As a product component |
| 3. For on-site use/processing | 10. For repackaging only |
| 4. For sale/distribution | 11. As a chemical processing aid |
| 5. As a by-product | 12. As a manufacturing aid |
| 6. As an impurity | 13. Ancillary or other uses |
| 7. As a reactant | |

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4.2 IMPORT/EXPORT

Quantities of hexachloroethane imported into the United States increased from the 1970s to the 1980s. Imports were about 1.6 million pounds (730,000 kg) in 1976 (mainly from France and the United Kingdom), more than 2 million pounds in 1977, approximately 2.5 million pounds (1,124,000 kg) in 1985, and approximately 4.5 million pounds in 1986. In 1978, all hexachloroethane distributed commercially in the United States was imported by Rhodia, Inc., Monmouth, New Jersey. Current information on importers and import quantities was not located (ACGIH 1991; Gordon et al. 1991; HSDB 1995; IARC 1979; Kitchens et al. 1978; Santodonato et al. 1985).

No data were located on export quantities, but exports are not expected, since hexachloroethane is not produced for commercial distribution.

4.3 USE

Prior to 1979, 50% of the hexachloroethane distributed was used by the military for hexachloroethane smoke pots and grenades, 30-40% for the manufacture of degassing pellets to force air bubbles out of molten ore in aluminum foundries, and 10-20% as an anthelmintic to control sheep flukes. It has also been used as a moth repellent, a plasticizer for cellulose esters in place of camphor, a polymer additive, a component of fungicidal and insecticidal formulations, in the formulation of extreme pressure lubricants, and in the manufacture of fire extinguishing fluids. Currently, large amounts of hexachloroethane are still used by the military for hexachloroethane smoke and pyrotechnic devices. Hexachloroethane is probably not used any longer as an anthelmintic, since approval of the Food and Drug Administration (FDA) for this use of hexachloroethane was withdrawn in 1971 (ACGIH 1991; HSDB 1995; IARC 1979; Kitchens et al. 1978; Santodonato et al. 1985).

Pine Bluff Arsenal in Arkansas was reported to be the major facility manufacturing smoke and pyrotechnic devices containing hexachloroethane for the military (Gordon et al. 1991). It was estimated that between 1966 and 1977 this facility used an average of 192,802 pounds of hexachloroethane annually (Kitchens et al. 1978). Data on quantities of hexachloroethane currently consumed for military and civilian uses were not located.

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4.4 DISPOSAL

Hexachloroethane and waste containing hexachloroethane are classified as hazardous wastes by EPA. Generators of waste containing this contaminant must conform to EPA regulations for treatment, storage, and disposal (see Chapter 7). Rotary kiln or fluidized bed incineration methods are acceptable disposal methods for these wastes. Underground injection may also be used (HSDB 1995).

According to the TRI, approximately 92,755 pounds of hexachloroethane were transferred to landfills and/or treatment/disposal facilities by industrial manufacturers or processors in 1993 (see Section 5.2) (TRI93 1995). No hexachloroethane was discharged to publicly owned treatment works (POTW), but 1,081 pounds were disposed of by underground injection. These data do not include disposal of hexachloroethane-containing wastes by the military.