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

5.1 PRODUCTION

Vulcan Chemicals, a division of Vulcan Materials Company (Wichita, Kansas), is the only current domestic manufacturer of pentachlorophenol (SRI 1998). Pentachlorophenol is produced by the stepwise chlorination of phenols in the presence of catalysts (anhydrous aluminum chloride or ferric chloride). Outside of the United States, it is also produced by the alkaline hydrolysis of hexachlorobenzene. Typically, commercial grade pentachlorophenol is 86% pure. Contaminants generally consist of other polychlorinated phenols, polychlorinated dibenzo-*p*-dioxins, and polychlorinated dibenzofurans, which are formed during the manufacturing process (see Table 3-2). Pentachlorophenol has also been marketed in the past as a water-soluble sodium salt, a 5% emulsifiable concentrate, or a 3–40% solution in formulation with other chlorophenols, methylene bisthiocyanate, or copper naphthenate (IARC 1979). Production volumes for 1983–1986 were as follows: 45 million pounds in 1983; 42 million pounds in 1984; 38 million pounds in 1985; and 32 million pounds in 1986 (Mannsville 1987). About 24 million pounds were manufactured in 1987 by Vulcan Materials (HSDB 2001). More recent production data are not available. For further information on facilities in the United States that manufacture or process pentachlorophenol, refer to Table 5-1. Table 5-1 is derived from Toxics Release Inventory (TRI) data and reports only those facilities that release pentachlorophenol.

5.2 IMPORT/EXPORT

The U.S. consumption of pentachlorophenol for 1986 was reported to be 28 million pounds (CMR 1987). In 1982, 121,000 pounds of pentachlorophenol were imported to the United States (328,000 pounds were imported in 1980). In 1985, 3 million pounds of pentachlorophenol were exported, and in 1986, 2 million pounds were exported (Mannsville 1987). More recent data on the import/export volumes of pentachlorophenol are not available.

5.3 USE

Pentachlorophenol was one of the most widely used biocides in the United States. It was registered for use by EPA as an insecticide (termiticide), fungicide, herbicide, molluscicide, algicide, disinfectant, and as an ingredient in antifouling paint (Cirelli 1978a), but it has been a restricted-use pesticide since July 1984 (CELDS 1992; EPA 1984a). The principal use of pentachlorophenol is as a wood preservative

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

State[a]	Number of facilities	Minimum amount on site in pounds[b]	Maximum amount on site in pounds[b]	Activities and uses[c]
AL	2	10,000	999,999	9
AR	2	1,000	999,999	9, 13
CA	1	100	999	13
GA	1	10,000	99,999	9
ID	1	10,000	99,999	13
IL	1	1,000	9,999	13
KY	1	10,000	99,999	13
LA	2	10,000	999,999	9
MD	1	10,000	99,999	1, 5
MN	1	10,000	99,999	8
MO	1	100,000	999,999	9
MS	4	10,000	9,999,999	9, 12
NC	2	10,000	999,999	8, 9
NE	1	10,000	99,999	9
NJ	1	1,000	9,999	13
NV	1	10,000	99,999	9
OH	1	1,000	9,999	13
OR	3	10,000	99,999	9, 12, 13
SC	2	10,000	999,999	9, 13
SD	1	100,000	999,999	9
TX	2	1,000	99,999	13
UT	2	1,000	99,999	13

Source: TRI99 2001

[a]Post office state abbreviations used
[b]Amounts on site reported by facilities in each state
[c]Activities/Uses:

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

(registered by EPA for power-line poles, cross arms, fence posts, and the like). The treatment of wood for utility poles represents 80% of the U.S. consumption of pentachlorophenol (CMR 1987). However, pentachlorophenol is no longer contained in wood preserving solutions or insecticides and herbicides available for home and garden use since it is a restricted-use pesticide. Pentachlorophenol is used for the formulation of fungicidal and insecticidal solutions and for incorporation into other manufactured pesticide products. These nonwood uses account for no more than 2% of U.S. pentachlorophenol consumption (Mannsville 1987). This wide spectrum of uses was partially attributed to the solubilities of the nonpolar pentachlorophenol in organic solvents, and the sodium salt in water.

5.4 DISPOSAL

After treatment with sodium bicarbonate or a sand-soda ash mixture, pentachlorophenol can be incinerated. Incineration of pentachlorophenol is one of the most important sources of polychlorinated dibenzo-*p*-dioxins and dibenzofurans, so care must be taken during this process (Karasek and Dickson 1987). Pentachlorophenol has been designated as a hazardous substance, a hazardous pollutant, a toxic pollutant, and a hazardous waste by EPA. Disposal of pentachlorophenol is subject to EPA restrictions (EPA 1991, 1992).