

## 4. PRODUCTION, IMPORT, USE, AND DISPOSAL

### 4.1 PRODUCTION

The domestic production of thallium ceased in 1981. Prior to this, thallium had been recovered as a byproduct from the flue dust and residuals that resulted from the smelting of zinc, copper, and lead ores through treatment by electrolysis, precipitation, or reduction (HSDB 1989; Sax and Lewis 1987; U.S. Bureau of Mines 1983, 1988). Based upon the estimated thallium content of zinc ores, United States mine production of thallium was 0.45 metric tons in 1986 and 1987 and 14.06 metric tons in the rest of the world (U.S. Bureau of Mines 1983, 1988). No data were located regarding the production of thallium acetate, thallium nitrate, thallium chloride, thallium sulfate or thallium oxide.

There are six facilities in the United States that either import thallium, use thallium and its compounds in manufacturing processes, or produce them as byproducts. These facilities are listed in Table 4-1.

### 4.2 IMPORT/EXPORT

Currently all thallium used in the United States is obtained from thallium reserves or is imported. The combined import of thallium and thallium compounds ranged from 1.27 metric tons in 1983 to 2.04 metric tons in 1987. Between 1983-1986 the countries from which thallium and thallium compounds were imported were Belgium (54%), the Netherlands (16%), the Federal Republic of Germany (14%), the United Kingdom (6%), and other sources (10%) (U.S. Bureau of Mines 1988).

No information was located regarding the export of thallium or thallium compounds.

### 4.3 USE

Today's primary user of thallium is the semiconductor industry which in 1987 used 60%-70% of total U.S. thallium imports in its production of switches and closures. The remainder of thallium used was in the pharmaceutical industry to produce thallium for cardiac imaging, and to manufacture highly refractive optical glass (HSDB 1989; U.S. Bureau of Mines 1988; Windholz 1983).

Thallium compounds have a variety of uses. Thallium sulfate is used in the semiconductor industry and in low range thermometers, optical systems, and photoelectric cells, and as a chemical intermediate for other thallium compounds and thallium metals (HSDB 1989). Thallium acetate is used to prepare solutions of high specific gravity for use in separating ore constituents by flotation (HSDB 1989). Thallium chloride is used as a catalyst in chlorination (Windholz 1983). Thallium nitrate is used with other

TABLE 4-1. Facilities That Manufacture or Process Thallium and Compounds\*

Facility	Location	Maximum Amount on site (lbs)	Use
Philips Industries, Inc., Dexter Axle Div	Albion, IN	10,000-99,999	Import; as a manufacturing aid
Tenneco Oil Company	Chalmette, LA	0-99	As a processing aid
Koch Refining Company	Saint Paul, MN	1,000-9,999	As an impurity
River Cement Company	Festus, MO	100,000,000-499,999,999	As a reactant
Sohio Oil Company Toledo Refinery	Oregon, OH	100-999	As an impurity
Dana Corporation	Reading, PA	0-99	As an impurity

\*Derived from TRI 1989

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compounds and resins for use as signals at sea. It is also used in the production of low melting glass, photocells, fireworks and as an oxidizing agent in organic syntheses (HSDB 1989; Weast 1985). Thallium oxide is used in the manufacture of highly refractive glass and for the production of artificial gems (Windholz 1983). Thallium and compounds were once used as a pesticide for control of rodents and insects, but the use of thallium as a pesticide was banned in 1972 (EPA 1985b).

##### **4.4 DISPOSAL**

Thallium is listed as a hazardous substance, therefore, disposal of waste thallium is controlled by a number of federal regulations, including land disposal restrictions (see Chapter 7). Industries producing or using thallium reported off-site waste transfers of about 40,000 pounds of thallium in 1987 (TRI 1989). Land disposal restrictions were implemented by EPA in 1987. Prior to this time disposal of pesticides had been to municipal and industrial landfills. Since thallium is relatively stable in the environment, we can assume that landfills, as well as other superfund sites, contain thallium or thallium-containing products.