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

4.1 PRODUCTION

Titanium tetrachloride is a colorless-to-light-yellow watery liquid that is produced by the chlorination of titanium compounds by a continuous process in a fluid-bed reactor. Minerals with a high titanium content, such as beneficiated ilmenite, mineral r-utile, and leucoxene, are used in the production of titanium tetrachloride. Carbon (usually as coke) is also added during the chlorination process as a reducing agent because the titanium compounds contain oxygen (Whitehead 1983).

The estimated production of titanium tetrachloride in the United States in 1972 was at least 5,670,000,000 grams (12,474,000 pounds) (HSDB 1995); in 1975, it was at least 9,500,000,000 grams (20,900,000 pounds) (HSDB 1995); and in 1980, it was 2,500,000 tons (5,000,000,000 pounds) (Whitehead 1983). More recently, the aggregate production volume for titanium tetrachloride reported in the Toxic Substances Control Act Inventory for 1990 was 3,150,556,000 pounds (1,575,278 tons) (CICIS 1993).

A list of titanium tetrachloride production and processing facilities in the United States along with the production or processing volume for each facility are provided in Table 4-l (TR193 1995). Table 4-l lists the facilities in each state that manufacture or process titanium tetrachloride, the intended use, and the range of maximum amounts of titanium tetrachloride that are stored on site. The data listed in Table 4-l are derived from the Toxics Release Inventory (TR193 1995). The TRI data should be used with caution since only certain types of facilities are required to report. Therefore, this is not an exhaustive list.

4.2 IMPORT/EXPORT

No information on import or export volumes for titanium tetrachloride was located.

4.3 USE

Titanium tetrachloride is used as an intermediate in the manufacture of titanium metal, titanium dioxide, titanous chloride pigments, iridescent glass, artificial pearls, and as a starting material for a

Table 4-1. Facilities That Manufacture or Process Titanium Tetrachloride

Facility	Location[a]	Range of maximum amounts on-site in pounds	Activities and uses
DU PONT	AXIS, AL	100,000-999,999	As a reactant
DU PONT	ANTIOCH, CA	100,000-999,999	Produce; For on-site use/processing; As a reactant
PFIZER INC.	CT	10,000-99,999	As a reactant; As a chemical processing aid
DU PONT	EDGEMOOR, DE	1,000,000-9,999,999	Produce; For on-site use/processing; For sale/distribution; As a reactant
KEMIRA INC.	SAVANNAH, GA	1,000,000-9,999,999	Produce; For on-site use/processing; For sale/distribution; As a reactant
AMERICAN SYNTHETIC RUBBER	LOUISVILLE, KY	10,000-99,999	As a chemical processing aid
LOUISIANA PIGMENT CO. L.P.	WESTLAKE, LA	100,000-999,999	Produce; For on-site use/processing; As a reactant
HIMONT USA INC.	LAKE CHARLES, LA	100,000-999,999	As a reactant
SHELL NORCO MFG. COMPLEX	NORCO, LA	100,000-999,999	As a reactant
SCM CHEMICALS	BALTIMORE, MD	1,000,000-9,999,999	Produce; For on-site use/processing; As a reactant
AKZO CHEMICALS INC.	WESTON, MI	10,000-99,999	In repackaging
ANDERSON DEVELOPMENT CO.	ADRIAN, MI	10,000-99,999	As a reactant
DU PONT DELISLE	PASS CHRISTIAN, MS	1,000,000-9,999,999	Produce; For on-site use/processing; As a reactant
KERR-MCGEE CHEMICAL CORP.	HAMILTON, MS	1,000,000-9,999,999	Produce; For on-site use/processing; As a reactant
HUNTSMAN POLYPROPYLENE CORP.	WEST DEPTFORD TWP., NJ	10,000-99,999	As a chemical processing aid
AKZO NOBEL CHEMICALS INC.	EDISON, NJ	100,000-999,999	As a reactant
E. I. DU PONT DE NEMOURS & CO.	NJ	100,000-999,999	As a reactant
TITANIUM METALS CORP.	HENDERSON, NV	1,000,000-9,999,999	Produce; For on-site use/processing; For sale/distribution; As a reactant
TAM CERAMICS INC.	NIAGARA FALLS, NY	10,000-99,999	As a reactant
CORNING INC.	NY	10,000-99,999	As a reactant
SCM CHEMICALS	ASHTABULA, OH	1,000,000-9,999,999	Produce; For on-site use/processing; As a reactant
SCM CHEMICALS AMERICAS	ASHTABULA, OH	1,000,000-9,999,999	Produce; For on-site use/processing; As a reactant

Table 4-1. Facilities That Manufacture or Process Titanium Tetrachloride (continued)

Facility	Location[a]	Range of maximum amounts on-site in pounds	Activities and uses
PHILLIPS RESEARCH CENTER	BARTLESVILLE, OK	10,000-99,999	As a reactant; Ancillary uses
OREGON METALLURGICAL CORP.	ALBANY, OR	1,000,000-9,999,999	As a reactant
PFIZER INC.	PR	10,000-99,999	As a reactant
DU PONT	NEW JOHNSONVILLE, TN	1,000,000-9,999,999	Produce; For on-site use/processing; As a reactant
AMOCO CORP.	TX	10,000-99,999	As a chemical processing aid
SOLVAY AMERICA INC.	TX	10,000-99,999	As a chemical processing aid
CATALYST RESOURCES	PASADENA, TX	10,000-99,999	As a reactant
ETHYL CORP.	PASADENA, TX	10,000-99,999	As a chemical processing aid
CHEVRON CORP.	TX	10,000-99,999	As a chemical processing aid
NA	TX	10,000-99,999	As a reactant
TEXAS EASTMAN DIV.	LONGVIEW, TX	10,000-99,999	As a reactant; Ancillary uses
GOODYEAR TIRE & RUBBER CO.	CHEEK, TX	10,000-99,999	As a chemical processing aid
OCCIDENTAL CHEMICAL CORP.	WADSWORTH, TX	10,000-99,999	As a chemical processing aid
OCCIDENTAL PETROLEUM CORP.	TX	10,000-99,999	As a chemical processing aid
E. I. DU PONT DE NEMOURS & CO.	TX	10,000-99,999	As a chemical processing aid
AKZO NOBEL CHEMICALS INC.	GALLIPOLIS FERRY, WV	10,000-99,999	As a chemical processing aid

Source: TRI93 1995

[a] Post office state abbreviation used

variety of organic and inorganic titanium compounds. It is also used as a mordant dye, a polymerization catalyst, and as a catalyst in many organic syntheses in the chemical industry (Chitkara and McNeela 1992; EPA 1985b; Merck 1989; Nordman and Berlin 1986; OHM/TADS 1992; Stokinger 1981; Whitehead 1983).

Titanium tetrachloride was formerly used with potassium bitartrate as a mordant in the textile industry, with dyewoods to dye leather, and as a smoke-producing screen with ammonia for the military (Merck 1989; Whitehead 1983).

4.4 DISPOSAL

The recommended disposal methods for titanium tetrachloride (including its container) include disposal in a landfill or by incineration (IRPTC 1985; OHM/TADS 1992). Small spills or leaks of titanium tetrachloride should be covered with a sufficient amount of sodium bicarbonate. The mixture should be removed and placed in an appropriate container such as a fiber drum, plastic bag, or carton, and then incinerated (IT11 1984; OHM/TADS 1992). Alternatively, titanium tetrachloride spills may be spread in a thin layer on the ground and dispersed by large amounts of water into a sewer. Spill areas should be washed thoroughly. The local waste water treatment authority should be notified of any discharge (IT11 1984).

No additional information on disposal methods for titanium tetrachloride was located.