

4 PRODUCTION, IMPORT, USE, AND DISPOSAL

4.1 PRODUCTION

Nitrobenzene is produced commercially by the exothermic nitration of benzene with fuming nitric acid in the presence of a sulfuric acid catalyst at 50 to 65°C. The crude nitrobenzene is passed through washer-separators to remove residual acid and is then distilled to remove benzene and water.

There has been a gradual increase in nitrobenzene production volume in the United States from 73,600 metric tons (kkg) in 1960 to 434,900 kkg in 1986. Based on increased production capacity and increased production of aniline (the major end-product of nitrobenzene) in 1987, it is likely that nitrobenzene production volume will continue to increase (Collins et al. 1982; Dunlap 1981; EPA 1985a; SRI 1985, 1986, 1987, 1988; USITC 1987, 1988).

Currently, there are four United States producers of nitrobenzene: E. I. DuPont de Nemours & Company, Inc., Beaumont, Texas; Mobay Corporation, New Martinsville, West Virginia; First Chemical Corporation, Pascagoula, Mississippi; and ICI Americas, Inc., Geismar, Louisiana (SRI 1988; USITC 1988).

4.2 IMPORT

No recent data documenting import or export volumes of nitrobenzene were located. However, it is estimated that these quantities are negligible, based on the 1978 import volume of 38 kkg and 1980 export volume of 36 kkg, which represent less than 1% of United States production during those years (Collins et al. 1982).

4.3 USE

The primary use of nitrobenzene is in the captive production of aniline, with about 97.5% of nitrobenzene production consumed in this process. The major use of aniline is in the manufacture of polyurethanes. Nitrobenzene is also used as a solvent in petroleum refining, in the manufacture of cellulose ethers and acetate, and in Friedel-Crafts reactions to hold the catalyst in solution. It is also used in the synthesis of other organic compounds including acetaminophen, which is an over-the-counter analgesic commonly known as Tylenol®.

Nitrobenzene is used as a flavoring agent, a perfume for soaps and as a solvent for shoe dyes (Collins et al. 1982; Dunlap 1981; EPA 1985a; HSDB 1988).

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4.4 DISPOSAL

Because nitrobenzene is listed as a hazardous substance, disposal of waste nitrobenzene is controlled by a number of federal regulations (see Chapter 7). Land disposal restrictions (treatment standards) apply to wastes containing nitrobenzene. These wastes may be chemically or biologically treated or incinerated by the liquid injection or fluidized bed methods (EPA 1988a, 1989; HSDB 1988). No data were located on the amounts of nitrobenzene disposed of by any of these methods. The EPA does not believe that releases of nitrobenzene to the environment are substantial (EPA 1984).