

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

4.1 PRODUCTION

Pyridine is produced either by isolation from natural sources such as coal, or through chemical synthesis (HSDB 1989). Pyridine is produced by the fractional distillation of coal-tar residues (HSDB 1989; NSC 1978; Santodonato et al. 1985) in which 1 ton of coal produces 0.07-0.21 pounds of pyridine bases of which 57% is pyridine (Santodonato et al, 1985). Synthetically produced pyridine is currently the more important source of pyridine for commercial uses (Santodonato et al. 1985). Small amounts of pyridine are synthesized from acetaldehyde, formaldehyde, and ammonia with a fluidized silica-alumina catalyst, followed by fractionation to isolate the pyridine (Harper et al. 1985; HSDB 1989; NSC 1978).

Pyridine is produced from natural sources by Crowley Tar Products of Stow, Ohio, and Oklahoma City, Oklahoma (Harper et al. 1985; HSDB 1989; SRI 1986, 1987, 1988). Pyridine is synthetically produced by two companies, the Nepera Chemical Co. of Harriman, New York and the Reilly Tar and Chemical Corporation of Indianapolis, Indiana (Harper et al. 1985; SRI 1986, 1987, 1988).

Current volumes of pyridine produced in the United States were not located (HSDB 1989). Production volumes steadily increased from 1945 (844 metric tons) through 1968 (3,366 metric tons), and the estimated 1985 production volume of pyridine was 6,800 metric tons (Santodonato et al. 1985). Production is expected to continue at a steady annual increase of 1-28 depending upon economic conditions (Santodonato et al. 1985). The U.S. production capacity for synthetic pyridines (pyridine and pyridine derivatives) is estimated to be 27,216 metric tons (Santodonato et al. 1985). Harper et al. (1985) estimated the 1982 consumption of pyridine in the United States at 5,400-7,500 metric tons. Facilities that manufacture or process pyridine are shown in Table 4-1.

4.2 IMPORT/EXPORT

No information was located regarding the current import volume of pyridine. The 1973 import volume was 4.5 metric tons (HSDB 1989). The United States exports 50% of the pyridines it produces (Harper et al. 1985). It is not clear whether this includes pyridine derivatives in addition to pyridine. In 1975, exports of pyridine were 341 metric tons (HSDB 1989). No data were located regarding current export volumes.

4.3 USE

Pyridine is used directly in the denaturation of alcohol (ACGIH 1986; HSDB 1989; NSC 1978) and as a solvent in paint and rubber preparation (ACGIH 1986; HSDB 1989; NSC 1978) and in research laboratories for functions such as extracting plant hormones (Santodonato et al. 1985). Half of the pyridine

TABLE 4-1. Facilities that Manufacture or Process Pyridine*

Facility	Location	Maximum Amount on site (lbs)	Use
Arkansas Eastman Company	Batesville, AR	10,000-99,999	As a processing aid
Pfizer Inc. Groton Site	Groton, CT	10,000-99,999	As a processing aid
Eli Lilly And Company Clinton Laboratories	Clinton, IN	100,000-999,999	As a processing aid
Reilly Tar & Chemical Corporation	Indianapolis, IN	1,000,000-9,999,999	Produce; for on-site use/processing; for sale/distribution; as a reactant; as a processing aid
Air Products & Chemicals, Inc.	Wichita, KS	100,000-999,999	As a reactant
Union Carbide Corporation Industrial Chemicals	Hahnville, LA	1,000-9,999	As a reactant
Olin Corporation Lake Charles Plant	Lake Charles, LA	100,000-999,999	As a processing aid
Dow Chemical Louisiana Division	Plaquemine, LA	100-999	Produce; as an impurity
The Upjohn Company Portage Site	Portage, MI	10,000-99,999	As a processing aid
Burroughs Wellcome Co.	Greenville, NC	100,000-999,999	As a processing aid
Kollman	Merrimack, NH	0-99	In ancillary or other uses
Hoffmann-La Roche Inc.	Nutley, NJ	10,000-99,999	As a processing aid
Nepera, Inc.	Harriman, NY	1,000,000-9,999,999	Produce; for sale/distribution
Eastman Kodak Company Kodak Park	Rochester, NY	100,000-999,999	As a reactant; in re-packaging; as a processing aid
Olin Corporation	Rochester, NY	100,000-999,999	As a reactant
The Wool Bureau, Inc.	Woodbury, NY	0-99	As a formulation component
Du Pont Circleville Plant	Circleville, OH	100,000-999,999	As a processing aid
Orsynex	Columbus, OH	1,000-9,999	As a processing aid
Bp Chemicals America, Inc.	Lima, OH	1,000-9,999	As a byproduct
American Cyanamid Company	Marietta, OH	10,000-99,999	As a reactant; as a processing aid
New Boston Coke Corporation	New Boston, OH	1,000-9,999	Produce; as a byproduct
The Upjohn Company	Barceloneta, PR	10,000-99,999	As a reactant; as a processing aid
Schering Industrial Development Corporation	Manati, PR	10,000-99,999	As a processing aid
Tennessee Eastman Company	Kingsport, TN	100,000-999,999	As a processing aid; in ancillary or other uses
Monsanto Company	Alvin, TX	10,000-99,999	In ancillary or other uses
Ici Americas Inc. Bayport Site	Pasadena, TX	1,000,000-9,999,999	As a reactant
Dan River Inc. Chemical Products Division	Danville, VA	1,000-9,999	As a reactant
Rhone-Poulenc Incorporated Ag Company	Institute, WV	100,000-999,999	As a processing aid

*Derived from TRI 1989

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

produced today is used as an intermediate in making various insecticides and herbicides for agricultural applications (ACGIH 1986; Harper et al. 1985; Santodonato et al. 1985). Approximately 20% goes into the production of piperidine (Harper et al. 1985; Santodonato et al. 1985) which is commercially significant in the preparation of chemicals used in rubber vulcanization and agriculture (NSC 1978). Pyridine is also used as an intermediate in the preparation of drugs (antihistamines, steroids, sulfa-type and other antibacterial agents) dyes, water repellents, and polycarbonate resins (ACGIH 1986; Harper et al. 1985; NSC 1978; Santodonato et al. 1985). Pyridine is also approved by the Food and Drug Administration (FDA) for use as a flavoring agent in the preparation of foods (Harper et al. 1985; HSDB 1989) (for additional information about pyridine in foods, see Chapter 5).

4.4 DISPOSAL

Waste pyridine, when present as a constituent of a commercial chemical product or chemical intermediate, is considered to be a hazardous waste, as is any residue, soil, water, or other debris resulting from the clean-up of this waste. Disposal of these materials must be managed according to state and federal regulations (HSDB 1989). Restrictions that apply to the disposal of waste pyridine are listed in Chapter 7.

Current practices for the disposal of waste pyridine include rotary kiln incineration at 820°-1,600°C (HSDB 1989). Waste pyridine is a potential candidate for liquid injection incineration (650° - 1,600°C) or fluidized bed incineration at a temperature range of 450°-980°C (HSDB 1989).

