

4. PRODUCTION, IMPORT, USE, AND DISPOSAL

4.1 PRODUCTION

N-Nitrosodiphenylamine is not known to occur naturally in the environment (IARC 1982a). However, there is evidence to indicate that microorganisms produce the chemical under laboratory conditions (Ayanaba and Alexander 1973). It is possible that this may take place under environmental conditions also. *N*-Nitrosodiphenylamine has been produced by reacting diphenylamine and sodium nitrite in water that has been acidified with sulfuric acid (NIOSH 1983). The *N*-nitrosodiphenylamine is then separated from the aqueous layer, drained, dried on hot rollers, and packed as the final product into drums.

N-Nitrosodiphenylamine had been produced commercially in the United States since 1945 (IARC 1982a). U.S. production volumes peaked in 1974 at 3.2 million pounds and gradually declined to 0.4 million pounds in 1980. The decline in production was due to the availability of new and more efficient chemicals for its applications in the rubber-processing industry (Taylor 1982). Production volumes are not available after 1980 (USITC 1985, 1986, 1987, 1988).

According to the Toxics Release Inventory (TRI), the two facilities in the United States that manufactured or processed *N*-nitrosodiphenylamine in 1988 were Arkansas Eastman Company (Batesville, Arkansas) and Uniroyal Chemical Company, Inc. (Geismar, Louisiana) (see Table 4-1) (TRI88 1990). The data listed in the TRI should be used with caution since only certain types of facilities are required to report. This is not an exhaustive list. In 1990, however, Uniroyal Chemical Company, Inc., was reportedly the only facility in the United States producing *N*-nitrosodiphenylamine (SRI 1990).

4.2 IMPORT/EXPORT

Imports of *N*-nitrosodiphenylamine through principal U.S. customs districts increased from 52,000 pounds in 1977 to 110,000 pounds in 1982 (USITC 1978a, 1983). Current import and export data for *N*-nitrosodiphenylamine are not available.

4.3 USE

N-Nitrosodiphenylamine was primarily used as a retardant in the rubber-processing industry (HSDB 1990). Retardants are chemicals that prevent the premature vulcanization of rubber compounds during certain rubber-processing steps such as mixing and calendaring. *N*-Nitrosodiphenylamine was generally used with the sulfenamide accelerators in tire compounds. The use of *N*-nitrosodiphenylamine as a retardant had the following undesirable side effects: gaseous decomposition products of *N*-nitrosodiphenylamine during vulcanization cause porosity in thick cross-section extrusions; *N*-nitrosodiphenylamine is a nitrosating agent of secondary amines, which are suspected to be animal carcinogens; it is slightly staining; and it is not efficient in the presence of alkyl-aryl or dialkyl-substituted *p*-phenylenediamine antidegradants (Taylor 1982).

N-Nitrosodiphenylamine was also used as an intermediate in the manufacture of *p*-nitrosodiphenylamine. *p*-Nitrosodiphenylamine can be reduced to *N*-phenyl-*p*-phenylenediamine, which is also a rubber-processing chemical and an intermediate in the production of other rubber-processing chemicals (OHM/TADS 1990).

4.4 DISPOSAL

Product residues and sorbent media containing *N*-nitrosodiphenylamine can be packaged in 17H epoxy-lined drums and disposed of at an EPA-approved site. The compound can be destroyed by high-temperature

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rotary kiln or fluidized bed incineration with scrubbing equipment (NO_x scrubber) or acid hydrolysis (HSDB 1990).

TABLE 4-1. Facilities That Manufacture or Process N-Nitrosodiphenylamine^a

Facility	Location ^b	Range of maximum amounts on site in pounds	Activities and uses
Arkansas Eastman Co.	Batesville, AR	1,000-9,999	Produce; for on-site use/processing; as a reactant
Uniroyal Chemical Co. Inc.	Geismar, LA	10,000-99,999	Produce; for on-site use/processing

^aDerived from TRI88 (1990)

^bPost office state abbreviations used

