



# Environmental Update #24

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## Environmental Hazards of the Textile Industry

The Southeast and Northeast United States once enjoyed a thriving textile manufacturing industry. Although approximately 6,000 textile mills continue to operate in the U.S., many historic textile mills are inactive, creating threats to the surrounding communities' health and economic vitality. While abandoned textile mills may contain residual contamination, active mills continue to produce noxious byproducts that may be legally or illegally released into the environment. Textile manufacturing, for the purposes of this fact sheet, includes woven fabric and wool processing, knitting, dyeing and finishing, and floor covering operations.

Air quality, water quality, and solid waste generation are affected greatly by the textile industry, and employees of textile mills are also subjected to indoor air quality issues. Not all textile manufacturing industries produce hazardous waste; however, contaminants of concern generated by many textile manufacturing plants include spent solvents and surfactants, polychlorinated biphenyls (PCBs) from transformers and other machinery, asbestos from spinning machines or structures, bleaching products such as hydrogen peroxide, phosphates from detergents or water softeners, insecticides, phenol (a manmade substance used to make synthetics such as nylon), underground storage tank contents, waste oil, and other petroleum products. Solvents comprise the majority of hazardous waste generated by textile mills. Spent solvents are used to clean machinery and for dyeing, finishing, dry-cleaning, and other specialty operations, and they include tetrachloroethylene (PCE), trichloroethylene (TCE), benzene, and ethylene dichloride (1,2-dichloroethane). When released into soil or water or evaporated into the air, these substances can be harmful to humans. Health effects due to overexposure by inhalation, ingestion, or contact with these solvents include dizziness, headache, nausea, lung effects, liver and kidney diseases, unconsciousness, and even death. PCE and TCE have the potential to cause cancer based on laboratory testing. For more information on the effects of specific contaminants, please visit the Envirotools website at [www.envirotools.org/pollutantsoverview.shtml](http://www.envirotools.org/pollutantsoverview.shtml).

Other contaminants of concern are produced during the dyeing of fabrics or other fibers. Dyebath effluents may contain heavy metals, ammonia, alkali salts, toxic solids, and large amounts of pigments. Additionally, extremely hot water is often discharged into nearby bodies of water. Salt is the most destructive byproduct of the dyeing process, as it contaminates water and destroys fish, native plants, and crops. Wastewaters are subject to the Toxicity Characteristic Leaching Procedure (TCLP) tests to determine the effects on human health and the environment. Any waste that results in a TCLP leachate containing a toxicity characteristic constituent equal to or above regulatory levels is considered hazardous.

Textile mills that produce hazardous waste are subject to U.S. Environmental Protection Agency (EPA) standards for handling and disposal of these materials. The Resources Conservation and Recovery Act (RCRA), the Toxic Release Inventory (TRI) Program, the Clean Water Act, the Safe Drinking Water Act, and the Clean Air Act regulate active textile mills to ensure that human and environmental health is protected. Table 1 lists facility activities that use hazardous materials and

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might generate hazardous waste. Table 2 lists a number of regulated wastes that are potentially generated during textile mill operations. Neither table is a comprehensive list of all contaminants of concern. The TRI Explorer website (<http://www.epa.gov/triexplorer/>) can be used to generate reports or maps of chemical releases from all monitored facilities by state, county, or ZIP code. Using the Facility link, this website will list all facilities in a given industry by Standard Industrial Classification (SIC) code by geographic area. The SIC code for the textile industry is 22.

**Table 1: Typical Textile Manufacturing Operations, Materials Used, and Hazardous Wastes that Might be Generated**

<b>Process/Operation</b>	<b>Materials Used</b>	<b>General Types of Waste Generated</b>
Wool Scouring	Disinfectants, Insecticides, Solvents	Spent Solvents, Toxic Wastes
Fabric and Floor Covering Finishing	Dyes, Solvents, Lacquers, Bleaches, Finishing Agents, Adhesives	Spent Solvents, Toxic Wastes, Wastewaters and Wastewater Treatment Sludges with Toxic Constituents
Stock and Yarn Processing, Dyeing, and Finishing	Solvents, Dyes	Spent Solvents, Toxic Wastes

**Table 2: Controlled Textile Manufacturing Wastes**

**Waste Solvent: Still Bottom Residues and Other Toxic Wastes**

- Tetrachloroethylene or Perchloroethylene
- Trichloroethylene
- Dichloromethane or Methylene chloride
- 1,1,1-Trichloroethane
- Chlorobenzene
- Toluene or Toluol
- Benzene or Benzol
- Xylene (Xylol)
- Ethylene Dichloride
- Naphtha (Varsol)
- White Spirits
- Mineral Spirits

**Other Wastes**

- Ignitable Flammable Liquids Not Otherwise Specified
- Ignitable Combustible Liquids Not Otherwise Specified
- Ignitable Flammable Solids Not Otherwise Specified
- Hazardous Waste, Liquids or Solids Not Otherwise Specified

Many defunct textile mills have been successfully redeveloped, suggesting that the cost of cleanup is not prohibitive to a site's economic viability. Bates Mill in Lewiston, Maine, helped to revitalize a stagnant downtown and combat high unemployment. A similar redevelopment is planned for the Burlington Mill in Mooresville, North Carolina. South Carolina recently initiated the Textiles Communities Revitalization Act to stimulate redevelopment of its many defunct mills. Fortunately, abandoned mills are increasingly seen as historic assets worthy of redevelopment rather than toxic eyesores.

### **Sources**

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