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Waste Management

Our society generates an enormous amount of solid waste. Most of it is municipal in origin; a substantial part is industrial. For decades little thought was given to possible toxicity. Today, the public is increasingly concerned about danger to health, especially from contaminated drinking water.

In 1976, Congress passed a Resource Conservation and Recovery Act to regulate existing industrial waste dumps. This was followed by a Comprehensive Environmental Response, Compensation, and Liability Act in 1980 to provide for cleanup of abandoned dumps. Included was a tax on feedstocks that was designed to produce \$1.6 billion (Superfund) to be spent in the following 5 years and administered by the Environmental Protection Agency (EPA). In preparation for renewal of the Superfund Act, the House Energy and Commerce Committee and the House Science and Technology Committee requested that the Office of Technology Assessment (OTA) prepare a report on Superfund.*

The report takes the position that the magnitude of the cleanup that will be required is much greater than had been thought. Earlier EPA estimated that 2000 sites would ultimately be placed on a National Priorities List (NPL). The OTA asserts that at least 10,000 sites will eventually be on the NPL, but it includes in its total some sites that are not now under Superfund responsibility. Experience during the last 5 years indicates that the costs of cleanup will be enormous. The OTA estimates that it may be necessary to spend several hundred billion dollars in an effort requiring as long as 50 years.

The report criticizes the way that the EPA has operated. For the most part, toxic waste has merely been moved from one place to another. Landfills are known to be subject to leaching, and the EPA is said to have been slow to establish monitoring procedures. Little has been done to achieve permanent solutions to the toxic waste problems, and the EPA has only begun to foster innovative approaches.

The OTA has made a number of recommendations to Congress. One suggests a substantial research, development, and demonstration fund. Another is to create a well-funded, high-priority interagency program whose purpose would be to deal expeditiously with the problem of obtaining more complete information on the health effects of toxic wastes. The report also recommends a waste-end tax to provide funding to complement other sources. The tax would also be designed to slow the creation of still more uncontrolled waste sites.

One of the major chapters of the report is devoted to clean-up technologies. The present conventional techniques include capping the wastes with an impermeable layer and installing drains to monitor and recycle leachate. Some of the widely used processes for treating wastewater include carbon adsorption, flocculation, sedimentation, filtration, ion exchange, and reverse osmosis. More interesting are the innovative technologies designed to destroy wastes.

The major environmental toxic wastes are halogenated organic chemicals. These can be destroyed completely by incineration at high temperatures. The off-gas acids can be trapped. An interesting alternative is pyrolysis to form an insoluble char and harmless gases that can be burned. Another method, which seems quite attractive, is oxidation in supercritical water. Still another method, already in wide use in industry, is biological treatment followed if necessary by carbon adsorption. Altogether, 26 methods are described. Given encouragement and financial inducements, methods superior to landfill could be demonstrated. Their first cost might be higher than those of present methods, but they would not give rise to continuing costs and ineffective disposal or be a burden to future generations.—PHILIP M. ABELSON

*Office of Technology Assessment, *Superfund Strategy* (DTA-ITE-252, Washington, D.C., April 1985).