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The Current Status of Hazardous Solid Waste Management

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Growth of the population and of industrialization, and substandard disposal of the increased waste products thus generated, have resulted in numerous documented cases of harm to human, plant, and animal health. The Resource Conservation and Recovery Act (1976), its stated goals, and its intended means of implementation, are discussed relative to hazardous waste problems. Subtitle C of this Act, and the authority granted by it to the U. S. Environmental Protection Agency, are explained. Standards and regulations have been imposed upon those responsible for generating and transporting hazardous wastes, to ensure the ultimate safe disposal of such wastes in environmentally suitable, properly licensed facilities.

Introduction: The Resource Conservation and Recovery Act

In October 1976 Congress passed the Resource Conservation and Recovery Act. Congress intended the Act to address the following problems: the increasing amounts of waste material being generated as a result of national growth; the serious problems in solid waste collection, treatment, and disposal in urban areas; open dumping of solid waste which needlessly pollutes valuable land, air, and water resources; human health and environmental dangers resulting from improper disposal of solid waste and especially hazardous waste; increasing amounts of pollution control residuals; the wasteful burial of recoverable resources with attendant increases in dependence on foreign resources; and the need to continue the development of solid waste as an energy source to conserve and reduce dependence on alternate energy sources.

The stated objectives of the Resource Conservation and Recovery Act are "to promote the protection of health and the environment and to conserve valuable material and energy resources." The Act intends that these objectives be achieved by: providing technical and financial assistance to state and local governments for development and implementation of solid waste management plans; providing training grants in solid waste occupations; prohibiting future open dumping on land and requiring upgrading or closing of existing open dumps; regulating the treatment, storage, transportation, and disposal of hazardous wastes; promulgating guidelines for solid waste management practices and systems; conducting a research and development program for improved solid waste management and resource conservation techniques; demonstrating improved solid waste management and resource conservation and recovery systems; and establishing a cooperative effort among federal, state, and local governments and private enterprises.

The Act statutorily establishes the Office of Solid Waste within EPA to guide the implementation of the law, and establishes a federal–state–local government partnership to share the implementation. The major thrusts of the efforts that will be required by this partnership are: land protection through regulation and control of wastes and waste disposal operations; regulations and control of the hazardous waste stream "cradle to grave;" improvements in all aspects of waste management at the state, regional, and local levels; reduction of the waste stream through increased resource recovery and waste reduction efforts; broad public education programs with rapid dissemination of all types of solid waste management information materials; and broad public participation in the development of solid waste management throughout the nation.

The regulatory part of the Act, the part dealing

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with control of hazardous wastes, will be the subject of the remainder of this talk. But first, let us examine the problem of hazardous wastes.

The Hazardous Waste Problem

According to the results of fourteen recent EPA industry studies, an estimated 34 million metric tons (34 Tg) (wet basis) of potentially hazardous waste were generated in 1977. The amount generated is expected to increase to 38 million metric tons (38 Tg) per year by 1983. Approximately 80% of this waste is managed on-site by the generators, the remaining 20% being hauled off-site for disposal by contractors.

The method most used for disposal of hazardous industrial waste is lagooning in unlined surface impoundments, and accounts for nearly half of the total. The second most common practice is dumping in nonsecure landfills. Together, these receive almost 80% of all hazardous wastes. An additional 10% is accounted for by uncontrolled incineration. Thus 90% of the potentially hazardous wastes generated by the fourteen key industries are managed by practices which are not adequate for protection of human health and the environment.

The consequences of illegal or inadequate disposal can be quite harmful. Well documented cases of groundwater contamination by leachates, surface water contamination by runoff, direct contact poisoning, various forms of air pollution, and damage from fire and explosions have occurred and will continue to occur as long as unacceptable disposal practices are used. Most incidents result from open dumping of hazardous wastes on isolated tracts of land or from indiscriminate acceptance of all wastes, regardless of hazard, by municipal landfills.

For example, in 1971, one corporation contracted with a trucker to haul approximately 5,000 drums of petrochemical wastes to a landfill for disposal. Instead, the wastes were transported to an abandoned chicken farm in Dover Township, New Jersey, where they were stockpiled and subsequently dumped. Within two years the Cohansey Aquifer had become contaminated with the petrochemicals, resulting in condemnation of 148 private wells. Direct monetary cost (extending the public water supply into the area) was about $400,000. There is also a $14 million class action suit by local property owners against the corporation for compensatory and punitive damages for negligence in disposing of its chemical wastes.

In December 1971, at a chemical plant site in Florida, a waste pond dike ruptured and released about 2 billion gallons (2.1 hm^3) of toxic slime into a nearby river. No living organisms were found in the creek downstream of the spill for a distance of 8 miles (13 km). Similar incidents have produced similar scenes across the entire United States.

A waste pile from the manufacturing of construction materials in Pennsylvania contains asbestos fibers which, if inhaled, have been found to have a long-term carcinogenic effect. Wind-blown material from a nearby playground was found to contain large amounts of the potentially dangerous asbestos fibers.

In 1972, 11 people in Perham, Minnesota, were stricken with the symptoms of arsenic poisoning. Upon investigation it was discovered that they had been drinking water from a new well that had been drilled near a 30-year-old deposit of unused pesticide. Water samples from the well were found to contain more than 400 times the amount of arsenic maximally allowable in drinking water in the United States.

A disposal company in Southern California disposed of unidentified toxic residues by simply dropping the drums and tanks into an open dump, with the resulting pollution of local streams and emission of small quantities of poisonous gas.

EPA's Office of Solid Waste has compiled over 400 case studies of such incidents, primarily from data gathered by state environmental regulatory agencies. It is clear that open environmental abuses occur more frequently in states without such programs and without adequate documentation of damages. To this extent the cases can be said to understate the problem.

Subtitle C

Subtitle C of the Resource Conservation and Recovery Act gives EPA authority to set standards for generators and transporters of hazardous waste and the hazardous waste management industry.

Subtitle C takes a pathways or "cradle-to-grave" approach to regulating hazardous waste. This means regulation of generation and transportation of hazardous waste as well as of its ultimate disposition. For example, each hazardous waste load must be accompanied by a manifest, filled out by the generator of the waste. On this manifest, the generator designates the facility to which the waste must be taken. The manifest goes with the load to the facility and a copy of it is returned to the generator by the facility. This returned manifest closes the loop of responsibility to the generator. The generator is responsible for maintaining these manifests as evidence that he has properly managed his hazardous waste. In addition to the manifest system, national standards will be set for generators, transporters and facilities to ensure

proper handling at each stage, and to adequately control final disposition and prevent unsound management, the facilities for treatment, storage and disposal of hazardous waste must acquire permits.

The manifest system, the national standards, and the permit system should halt dumping in isolated fields, drainage ditches, or municipal sewer systems, because the generator of the hazardous waste must be able to show that he sent it to an acceptable, permitted facility. If he attempts to falsify returned manifests, a crosscheck with the designated facility should quickly show that his load never reached that facility. The facilities receiving hazardous wastes must meet certain criteria for technical soundness and financial responsibility if they are to obtain permits. This prevents designation of simple pits or fields as disposal sites on manifests because such sites could never obtain permits. The national standards assure proper labeling and handling of hazardous waste loads to minimize both the possibility of spills and the difficulty of emergency responses.

Currently many sites legally accepting hazardous wastes are not environmentally suitable. Such sites include open dumps and municipal and sanitary landfills as well as "secure" landfills which were not adequately located or constructed. Under the Resources Conservation and Recovery Act, open dumps must be upgraded to the standards of sanitary landfills or must shut down. Only chemical landfills, other land disposal techniques, and treatment facilities may be permitted to manage hazardous wastes.

Taken together, the manifest and permitting requirements should force most hazardous wastes into hazardous waste management facilities at the same time that they close environmentally unsound facilities, which will decrease current capacity. It is estimated that current off-site capacity will be cut by about 25% while at the same time hazardous waste volumes requiring adequate facilities will be tripled. This should substantially increase demand for acceptable management of hazardous waste.

With such significantly higher demand for adequate capacity, the rates of utilization of individual facilities and the prices paid for hazardous waste management services should increase, and both will work to improve earnings in the industry. Improved earnings in the industry, along with greater certainty about the shape of regulation, will attract capital that will foster expansion of needed capacity.