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Waste Management

Humans fear the unknown, and when it seems to pose dangers of uncertain dimensions people tend to overreact. Modern intensive communications foster this trend. The so-called hazardous wastes and the attendant publicity about them are an example. Those people who depend on the media for information and guidance have been frightened, some to the point of hysteria. The reality is that the hazard to public health from the waste sites is trivial in comparison to the danger from cigarettes.

That is not to say that toxic wastes do not exist. They are a problem now and will continue to be for a decade or more. Until the public feels that its health is being safeguarded, chemical industry and to a lesser degree chemists will be suspect. Part of the problem is a great increase in sensitivity for detection of contaminants. At one time, parts per million was the limit. Today measurements are in parts per billion, trillion, or even parts per quadrillion. To the average person 300 parts per quadrillion is far more alarming than 0.0000003 part per million.

An essential step in the long-term control of wastes is to minimize their amount and toxicity. For this purpose, major chemical companies have redesigned processes and are capturing and using by-products. Industry has improved methods of waste handling, including incineration and microbiological treatment of dilute waste streams. Better techniques for use of landfill have been developed. Of particular interest are the chemical capabilities of microorganisms. For example, strains have been isolated that can use some of the PCB's as carbon and energy sources.

The really vexing problems are those of the orphan waste sites. The Environmental Protection Agency has identified about 15,000 of them, of which about 419 have been classified as especially hazardous. The overall task of minimizing the potential dangers from them is difficult and complex. No two sites are alike. In many instances the sites include what an EPA administrator has described as an alphabet soup of substances. The various components differ by many orders of magnitude in solubility in water, volatility, adsorption by soils, and toxicity. In some instances, the wastes are present in steel drums. In others, they have become disseminated in soils. Some of the sites are located on relatively impervious clay; others are on or close to aquifers. The costs of moving steel drums are small, though few communities are willing to serve as hosts to them. The big costs, as much as a billion dollars per site, would come if large quantities of soil were to be processed. A basic consideration is that a substance must be ingested, inhaled, or absorbed through the skin in order to harm health. The principal hazard is ingestion either through drinking water or in food.

At many sites the hazards could be controlled. The wastes could be covered with an impervious layer and entry from the sides minimized. If there is no inflow of water there will be no outflow. Methods of this kind have been employed at Love Canal. The dump site has been covered by a compacted thick layer of clay. Above the clay is a layer of topsoil with grass. Some water leaks in from the sides, but this will be curtailed when impervious walls are installed. Drainage from the site is passed through activated charcoal and the effluent is clean. The quantities of chemicals collected on the charcoal are small. New York health authorities have continued a follow-up of former residents of the area, including most of those who resided there after 1940. No chemically mediated health effects have been established.

Techniques used in control of leaching from Love Canal are applicable in some but not all of the waste sites. In any event, the chemical and geologic conditions at each site must be evaluated and a plan for meeting the situation engineered before the hazard can be completely controlled. The hazards must and will be minimized, but there will be few quick fixes. Drastic action may be required at a few sites, but more harm is likely to come from hysteria than from chemicals.—PHILIP H. ABELSON