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Chemicals from Waste Dumps

Health Aspects of the Disposal of Waste Chemicals,* a document prepared by a group of academic scientists representing ten major disciplines of biology, engineering, and medicine, is a wide-ranging introduction to the topic. It is the first comprehensive survey of the literature concerning chemicals in abandoned waste dumps and their health effects. The bibliography contains about 1000 references. The report names the chemicals and the number of sites where they have been found and lists their occurrence in the air, surface water, and ground water near the dumps. The available data on the health effects of these chemicals are also reviewed. These data were derived from studies in industrial situations as well as from assessments by epidemiologic and laboratory methods. Reports of health effects associated with dumps were surveyed and evaluated.

The Environmental Protection Agency has responsibility for designating priorities in the cleanup of abandoned dump sites. In mid-1984, it had designated 546 sites for its National Priority List (NPL). This report lists 229 different items found at one or more of the 546 NPL sites. The most frequently identified component is trichlorethylene, found at 129 sites. Others among the top five were toluene at 95 sites, benzene at 94, lead at 93, and chloroform at 68. Twenty-five components accounted for more than two-thirds of the observed occurrences. These included 11 chlorinated hydrocarbons, 4 hydrocarbons, and 7 heavy metal elements. With the exception of heavy metals, the majority of the material leached from the dumps consisted of chemicals that are liquids at ambient temperatures or that can be readily distilled. The group is also characterized by substantial solubility in water. For example, the solubility of trichlorethylene is 1.11 grams per liter at 25°C; that of benzene is 1.78 grams per liter at 25°C; and that of chloroform, 8.22 grams per liter at 20°C. All the halogenated compounds listed have densities greater than water. Once released in a dump, they would fall by gravity or be carried by leaching water to the bottom of the dump and toward ground water. If the dump is located on a thick bed of clay that contains organic matter, the movement is slow, and chlorinated hydrocarbons may be attacked by anaerobes. However, many dumps have been poorly located

In compiling the report, the panel of scientists made a determined effort to locate literature concerning pathology associated with waste dumps. They were able to find reports on only 21 sites. The lack of information was explained by the fact that litigation is in progress involving some of the sites. Another factor handicapping the study was a paucity of items in the peer-reviewed literature. A bibliography about Love Canal cited more than 500 documents. Of these, only three that dealt with health effects were to citations in peer-reviewed journals.

On the basis of available evidence, the panel concluded, "To date epidemiological studies have shown very little evidence of a hazard to human health resulting from exposures to chemical disposal sites." However, they point out that delayed effects may yet appear.

One of the potential sources of problems later could be ground water. As chemicals are leached from dumps, they enter aquifers serving as sources of potable water. Movement of pollutants is often slow, and we probably have not guessed the magnitude of the ultimate difficulties. In addition to solvents from abandoned dumps, there will be solvents from new regulated sites, although disposal of liquids will be phased out in the next year or so. Municipal dumps are also a source of pollution.

Since each dump is different and information about health effects is sketchy and uncertain, this report leaves many questions unanswered. However, it will serve to emphasize the need for better epidemiological information, and it will be a benchmark for reports that come later.

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**Health Aspects of the Disposal of Waste Chemicals* (Universities Associated for Research and Education in Pathology, Bethesda, Md., 1985).