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Remediation of Hazardous Waste Sites

Projected costs of remediation of hazardous waste sites continue to mount and now range in the neighborhood of a trillion dollars or more, not counting legal fees.* Even with such expenditures it is unlikely that most sites will be restored to pristine conditions. Many sites may not even be returned to a status suitable for unrestricted public access.†≠ Effectiveness of expenditures on waste sites has been questioned. In one instance, the cost per cancer avoided has been estimated to exceed $15 billion.§

Projected costs have increased for two major reasons: More sites have been discovered, and the costs of treating them have mounted. The universe of hazardous waste sites being considered for Superfund sites now numbers more than 32,000. An ultimate total of 75,000 has been estimated.* In addition, under the Resource, Conservation and Recovery Act (RCRA), there are at least 37,000 sites where corrective action may be required. A Department of Energy (DOE) report‖ states, "Between 1982 and 1989 the cost associated with remediating a given amount of contaminated media increased by more than a factor of 10."

During the past 10 years there has been considerable experience in assessing the need for and the conduct of remediation work. It is now possible to project ultimate costs: Available data have been carefully analyzed by a team of 22 researchers and staff.* They have estimated costs of remediating Superfund, RCRA, Underground Storage Tank, DOE, and Department of Defense sites. They provide numbers corresponding to three levels of approach—a "current policy" case, "less stringent" case, and "more stringent" case. The estimated cost of the more stringent approach is over $1 trillion dollars. Remediation would not achieve a pristine environment and indeed would not render all areas fit for unrestricted public access. Despite the cost, it likely would not have beneficial health effects beyond those achieved by less than half the expenditures incurred in a less stringent approach.

The costs of managing and remediating DOE waste sites will be huge, and the full magnitude is as yet uncertain. They are now estimated at about $100 billion, but could rise as high as $360 billion.* The major problems are contamination of soils and ground water. In addition to dealing with radioactivity and heavy metals, remediation must cope with organic solvents. Trichloroethylene (TCE) and perchloroethylene (PCE) are present beneath the surface of the soil and usually in the ground water at virtually every one of the many DOE sites. The cost of dealing with organic solvents could be the largest factor in the DOE remediation.

At the Savannah River Site,≠ a plume of ground water of area greater than a square mile contains total TCE and PCE at various levels, some on the order of 30,000 parts per billion (ppb). Remediation is proceeding with a pump and treat technology. Already more than a billion gallons of water have been treated. About 230,000 pounds of volatile organics have been removed. However, those familiar with the site are doubtful whether the maximum concentration level (MCL) of 5 ppb mandated by the Environmental Protection Agency could ever be achieved with the current technology.

Dealing with carbon tetrachloride is a major problem at Hanford.≠ An area of 7 square miles is contaminated by the chemical. During the period 1955 to 1973, more than 1 million pounds of CCl_4 were discharged to three disposal sites. Much of it is in soil above the water table, but some has reached ground water, and concentrations there of 8000 ppb have been detected. The MCL is 5 ppb. The contamination is at a well-guarded barren site far from human habitation. How much money should be spent on it?

At one time a common view was that big industry rather than the public would pay for cleanups. But it is now increasingly apparent that small businesses and municipalities will bear a substantial fraction of the costs at Superfund and RCRA sites. The federal budget will be tapped for DOE sites. A possible effect of this is a questionable distribution of funds between cleanups and research designed to meet future energy needs and the greenhouse effect. For example, the new 1993 DOE budget proposal calls for an expenditure of $5.3 billion on waste remediation, an increase of 24% over 1992. The funds to be devoted to renewable energy are listed at $209 million.—PHILIP H. ABELSON

*M. Russell, E. W. Colglazier, M. R. English, *Hazardous Waste Remediation: THE TASK AHEAD* (University of Tennessee, Waste Management Research Institute, Knoxville, 1991). †*Complex Cleanup: The Environmental Legacy of Nuclear Weapons Production*, Congress of the United States (Office of Technology Assessment, Washington, DC , 1991). ≠*Final Report on DOE Nuclear Facilities* (Advisory Committee on Nuclear Facility Safety to the U.S. Department of Energy, Washington, DC, 1991). §R. B. Belzer, paper presented at the Department of Energy 1990 Remedial Action Conference, Albuquerque, NM, 17 April 1990. ‖*Environmental Restoration and Waste Management, Five-Year Plan* (U.S. Department of Energy, Washington, DC, 1991).