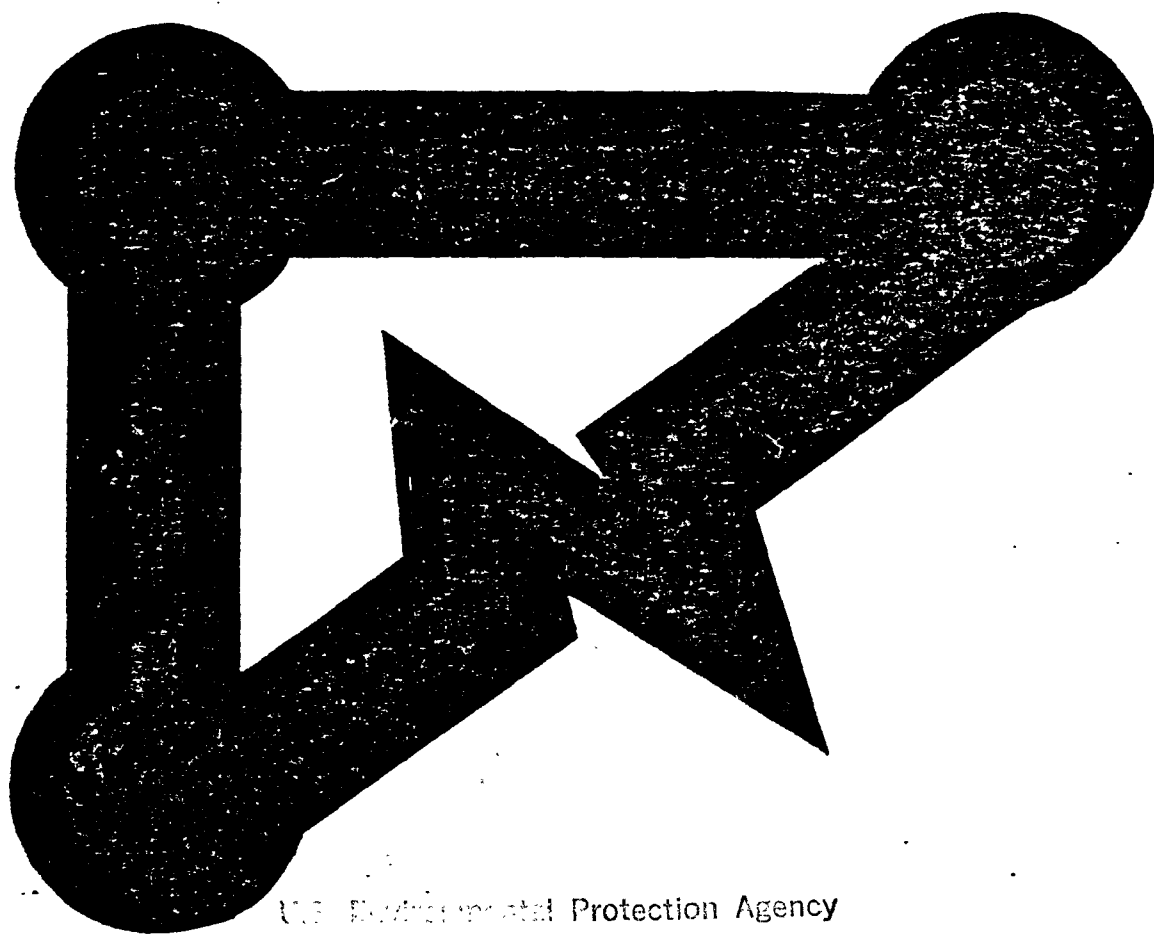


Solid Waste



INDUSTRIAL WASTE EXCHANGES

Recovery and Reuse of Solid and Hazardous Wastes



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U.S. Environmental Protection Agency

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Congress has enacted in recent years a comprehensive series of laws that direct the U.S. Environmental Protection Agency (EPA) to safeguard the Nation's land, air, and water resources. One such law--the Resource Conservation and Recovery Act (RCRA)--is intended to preserve land resources by terminating the indiscriminate dumping of municipal and industrial wastes and to stimulate the recovery and reuse of both materials and energy. Thus, during the coming years EPA will increase its efforts to promote resource recovery from hazardous industrial wastes, which will, of course, reduce the potential environmental problems associated with the disposal of such materials and help conserve virgin resources. One facet of this effort is a technical assistance program to encourage the establishment of waste exchanges.

As the term indicates, these exchanges function as the intermediary between generators of waste and potential users of waste. They are founded on the assumption that one industry's waste can be another industry's feedstock.

Numbers and Types of Exchanges

The world's first waste exchange was established in the Netherlands in 1972. Today there are 35 major exchanges in the United States and at least 17 in other countries.

Waste exchanges can be divided into two types: information exchanges or clearinghouses--by far the most prevalent--and materials exchanges. Both types deal with all kinds of wastes, hazardous and nonhazardous.

Information exchanges put generators of waste and potential users of waste in touch with one another. The process usually begins when the exchange actively seeks general information on wastes available from generators and on the needs of potential users. Such information, which includes volume and composition of waste and location of the generator, is incorporated into a list that is distributed periodically. Should possible users of a waste see it listed, they notify the exchange, which forwards the inquiry to the lister.

The identity of those included in the list is normally kept confidential. This is done for a number of reasons. First, industry has traditionally kept its trade and manufacturing processes a secret. By analyzing a company's wastes, a competitor could learn much about the product. Second, most companies have attempted to prevent regulatory agencies from finding out the contents of their wastes, particularly if those wastes are hazardous. Third, those who list do not want to be bothered by unsolicited inquiries; in the waste exchange system, they take the initiative in contacting those who have expressed interest.

When discussions begin between the two parties, the exchange has completed its service. Subsequent negotiations between generator and user concern the requirements for an actual transfer--acceptable purity level of the waste,

price, cost of transportation, and mutual confidence. If these conditions prove satisfactory, the generator transfers the waste to the user.

The functions of the materials exchange are more complex. It buys or accepts wastes, analyzes their properties, reprocesses if necessary, identifies potential uses, and sells at a profit. Such exchanges transfer information only as a courtesy to clients or as part of their paid consulting services. Whereas an information exchange may need only a part-time staff and limited office space, the materials exchange requires highly competent technical, managerial, and marketing personnel and facilities for storage and processing.

Of the 35 exchanges in the United States, 25 are information exchanges, 9 are materials exchanges or brokers, and 1 is an in-house exchange. While materials exchanges are run by profit-oriented private concerns, information exchanges are typically nonprofit operations supported by the private sector, perhaps because generators and users are reluctant to give information on industrial processes to public agencies. As a result, several exchanges originally established by local and State governments have, in recent years, been transferred to private sponsors.

Exchanging Wastes

Chemical engineers have long exchanged wastes on an informal basis. But the quantities involved have constituted only a fraction of the 344 million metric tons of wastes produced each year by American industry. A study conducted in 1976 estimated that about 6 million metric tons of industrial waste were available annually for reuse--an amount worth approximately \$300 million on today's market. The costs of both materials and of waste management are rising; industries are, therefore, increasingly interested in making use of wastes.

RCRA provides an added incentive to reuse wastes. Under the hazardous waste regulatory program, EPA or the States will strictly control the 10 to 25 percent of all industrial wastes from generation through disposal. As a result of this control system, the costs of waste management will increase, and, of course, there will be a new interest in reducing and recycling wastes.

Users of Exchanges

Industries routinely seek uses for their residues, and large companies with many processes and skilled engineers continue to find new opportunities for recycling or selling their wastes. Even large national concerns may not, however, recognize all possibilities for transferring wastes outside their own industry, and smaller companies often lack the time and skill to find uses for their wastes. In addition, the value and usefulness of residual materials change, reflecting economic and technological developments.

The waste exchange, serving both generators and potential users in the shifting area between true wastes and by-products, helps to identify economic value in materials previously regarded as trash. It does not, however, interfere in commercially established flows of by-products.

Transfers of wastes are usually made between firms using continuous processes and smaller operations using batch processes, between basic chemical manufacturers and formulators, and between industries that require high purity (such as pharmaceutical firms) and those whose needs for purity are lower (such as manufacturers of paint.) In addition, almost any industry that requires fuels or cleaning solvents is a potential user of waste, and all that manufacture chemicals or use chemicals as raw materials are potential clients of an exchange.

Once an initial match has been made between the generator of a regular or continuous waste stream and a user of that waste, the services of the exchange are no longer needed. On the other hand, the exchange will have a long-term business finding users for episodic or irregular wastes or for wastes resulting from new products or technologies.

Wastes Being Transferred

Similarities exist between the wastes being transferred in this country and in Europe. The most frequently listed categories include: organic chemicals and solvents; oils, fats, and solvents; metal containing sludges or slags; textiles, leather, and rubber; wood and paper products; spent catalysts; acids; alkalis; inorganic chemicals; metals; and plastics. Some materials, though listed to a lesser extent, are, nevertheless, significant. Among them are glass, food-processing wastes, minerals, waste containers, paints, and salts.

Success of Exchanges

It is difficult to evaluate the success of waste exchanges, partly because corporate confidentiality impedes access to pertinent facts. Furthermore, criteria used to evaluate success vary widely. They include: financial profit, volume of wastes transferred, number of listings, number of matches between wastes generated and wastes used, ratios between listings and matches, number of industries and companies served, improved public image, conservation of energy and material, diversion of hazardous waste from disposal in landfills, and avoidance of costs that are passed on to the consumer.

One measure of success goes beyond profits, listings, cost savings, and public image--the number of exchanges that have started operation over the last few years in the United States. In 1976, the first U.S. waste exchange was established in St. Louis. Within a year, about half a dozen exchanges had developed. By 1981, over 35 exchanges (ranging from information exchanges, to brokers, to materials exchanges) began operations.

Another measure matches wastes listed and wastes used. Information exchanges in the United States are, on the average, able to match about 10 percent of their listings. European exchanges have a much higher rate--between 30 and 40 percent. Political, demographic, and transportation differences are all factors in relative rates of success. The Environmental

Protection Agency views reducing this difference in successful matches between U.S. exchanges and foreign exchanges as a goal the Nation should achieve.

The performance of materials exchanges depends directly upon technical expertise and aggressive marketing. Information exchanges all seem to follow a standard pattern of development: a difficult start-up period while lines of communication are established with industry, a sharp increase in activity as the "easy" wastes are placed, and, finally, a time of stabilized listings. The full potential of waste exchanges may not be realized, however, until the Federal and State programs established under RCRA have become completely effective. This is particularly true in regard to hazardous waste.

EPA, Resource Recovery, and Waste Exchanges

The first generation of hazardous waste management regulations promulgated by EPA is designed primarily to deal with the long-term containment and destruction or treatment of wastes. They do not set standards for the reuse, recycling, or reclamation of such wastes though they direct EPA to promote resource conservation and recovery. This may be achieved in part by regulation. Certain hazardous wastes are already exempted from control under RCRA when they are reused, recycled, or reclaimed. Other regulations now being developed are intended to help promote the reuse of waste oil.

Regulatory incentives alone are not, however, sufficient. EPA has attempted through conferences, seminars, and other information services to promote industrial resource recovery and conservation. The Agency is also encouraging the establishment of more waste exchanges and is supporting their operation as a national network. Finally, EPA, through the Office of Research and Development, has selected the Illinois Institute of Technology to operate an "Ultimate Waste Elimination Research Center." The purpose of the center is to discover new ways to eliminate, reduce, and reuse hazardous waste.

EPA expects the concept of exchanging wastes to gain acceptance as new laws are enacted, technology develops, regulations change, and the economy evolves. Waste exchanges could, indeed, prove to be the transition from the tragic beginnings at Love Canal to the ultimate goal of total reuse of wastes in America.

The Future

In order to expand the geographic area presently receiving exchange services, more waste exchanges must be established in the United States. So long as wastes are perceived to have little economic value, few industries are likely to pay the costs of transporting them long distances. National waste exchanges--sometimes with regional affiliates--have been successful elsewhere (Canada, United Kingdom, and Israel). This suggests that exchanges here might find it beneficial to operate less independently than at present.

A nationwide coordinating and information system, a common code, and standardized operating procedures all might help expedite recovery and reuse of wastes in the United States.

It is ironic that if the concept of exchanging wastes is completely successful—if generators can find uses for all their wastes—then waste exchanges have only a limited future. The services performed by them are not required once the link between the generator and the user has been forged. At this point, however, only a fraction of all industrial wastes generated is recovered and reused. Comparison with the success of foreign exchanges indicates room for improvement. Furthermore, the development of new products often creates new wastes—and the need for industry's and government's involvement in the waste exchange concept.

WASTE EXCHANGES IN 1981 IN THE UNITED STATES

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