



MANUFACTURING CHEMISTS ASSOCIATION

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August 6, 1973

TO: SOLID WASTES MANAGEMENT COMMITTEE

Subject: EPA Report to Congress
on Hazardous Waste Disposal

Gentlemen:

Enclosed are copies of the following excerpts from the subject report:

- . Title Sheet
- . Preface
- . Contents
- . Summary and Conclusions
- . Introduction

Under separate cover you have, or will receive, a copy of the complete report from EPA. By copy of this letter, all member companies and the Joint Subcommittee on Environmental Law are advised that the report is expected to be generally available by the end of September. Individuals desiring a copy may request same directly from EPA or through EPA.

Sincerely,

H. L. Slatin, Secretary
Solid Wastes Management Committee

HLS:mpc

Enclosures

cc: Solid Wastes Contacts
Joint Subcommittee on Environmental Law

CCR 000036786

REPORT TO CONGRESS
ON HAZARDOUS WASTE DISPOSAL

U.S. ENVIRONMENTAL PROTECTION AGENCY

June 30, 1973

CCR 000036787

PREFACE

Section 212 of the Solid Waste Disposal Act (P.L. 89-272) as amended requires that the U.S. Environmental Protection Agency (EPA) undertake a comprehensive investigation of the storage and disposal of hazardous wastes. This document represents EPA's Report to the President and the Congress summarizing the Agency's investigations and recommendations in response to the Congressional mandate.

The findings of this report are based on a number of contractual efforts and analyses by Agency staff carried out since the passage of the Resource Recovery Act of 1970.

The report is organized into a summary, five major sections, and appendices. The first section discusses the Congressional mandate and the Agency's response to it. Next, the public health, technological, and economic aspects of the hazardous waste disposal problem are reviewed. A section detailing the case for hazardous waste regulation follows. The report concludes with a discussion of implementation issues, and findings and recommendations.

CONTENTS

	<u>Page</u>
SUMMARY AND CONCLUSIONS	v
Section 1 INTRODUCTION	1
Section 2 IDENTIFICATION AND DISCUSSION OF THE PROBLEM	4
Section 3 THE CASE FOR HAZARDOUS WASTE REGULATION	23
Section 4 ISSUES OF IMPLEMENTATION	37
Section 5 FINDINGS AND RECOMMENDATIONS	62
REFERENCES	65
APPENDICES	
A. The Impact of Improper Hazardous Waste Management on the Environment	69
B. Hazardous Waste Stream Data	78
C. Decision Model for Screening, Selecting, and Ranking Hazardous Wastes	88
D. Summary of Hazardous Waste Treatment and Disposal Processes	93
E. Decision Map for On-Site Versus Off-Site Treatment/Disposal	108
F. Summary of the Hazardous Wastes National Disposal Sites Concept	119
G. The Proposed Hazardous Waste Management Act of 1973	143

SUMMARY AND CONCLUSIONS

- The management of the Nation's hazardous residues--toxic chemical, biological, radioactive, flammable, and explosive wastes--is generally inadequate; numerous case studies demonstrate that public health and welfare are unnecessarily threatened by the uncontrolled discharge of such waste materials into the environment.

- Based on surveys conducted during this program, it is estimated that the generation of non-radioactive hazardous wastes is taking place at the rate of approximately 10 million tons yearly. About 40 percent by weight of these wastes are inorganic materials, 60 percent are organics; about 90 percent of the waste occurs in liquid or semi-liquid form.

- Hazardous waste generation is growing at a rate of 5 to 10 percent annually as a result of a number of factors: increasing production and consumption rates, bans and cancellations of toxic substances, and energy requirements (which lead to radioactive waste generation at higher rates).

- Hazardous waste disposal to the land is increasing as a result of air and water pollution controls (which capture hazardous wastes from other media and transfer them to land) and denial of heretofore accepted methods of disposal such as ocean dumping.²

- Current expenditures by generators for treatment and disposal of such wastes are low relative to what is required for adequate treatment/disposal. Ocean dumping and simple land disposal costs are on the order of \$3 per ton³ whereas environmentally adequate management could require as much as \$60 per ton if all costs are internalized.

- Federal, State, and local legislation and regulations dealing with the treatment and disposal of non-radioactive hazardous waste are generally spotty or nonexistent. At the Federal level, the Clean Air Act, the Federal Water Pollution Control Act, and the Marine Protection, Research and Sanctuaries Act provide control authority over the incineration, water and ocean disposal of certain hazardous wastes, but not over the land disposal of residues. Fourteen other Federal laws deal in a peripheral manner with the management of hazardous wastes, and approximately 25 States have limited hazardous waste regulatory authority.

- Given this permissive legislative climate, generators of waste are under little or no pressure to expend resources for the adequate management of their hazardous wastes. There are few economic incentives (given the high costs of adequate management compared to costs of current practice) for generators to dispose of wastes in adequate ways.

• Technology is available to treat most hazardous waste streams by physical, chemical, thermal and biological methods, and for disposal of residues. Use of such treatment/disposal processes is costly, ranging from a low of \$1.40/ton for carbon sorption, \$10/ton for neutralization/precipitation and \$13.60/ton for chemical oxidation, to \$95/ton for incineration.⁴ Several unit processes are usually required for complete treatment/disposal of a given waste stream. Transfer and adaptation of existing technology to hazardous waste management may be necessary in some cases. Development of new treatment and disposal methods for some wastes (e.g., arsenic trioxide and arsenites and arsenates of lead, sodium, zinc and potassium) is required.⁵ In the absence of treatment processes, interim storage of wastes on land is possible using methods that minimize hazard to the public and the environment (e.g., secure storage, membrane landfills, etc.).

• A small private hazardous waste management industry has emerged in the last decade, offering treatment/disposal services to generators. The industry currently has capital investments of approximately \$25 million and a capacity to handle about 2.5 million tons of hazardous materials yearly, or 25 percent of capacity required nationally. The industry's current throughput of hazardous waste is about 24 percent of installed capacity or 6 percent of the national total. The low level of utilization of this industry's services results from the absence of regulatory and economic incentives for generators to manage their hazardous wastes in an environmentally sound manner. This industry could respond over time to provide needed capacity if a national program for hazardous waste management, with strong enforcement capabilities, were created. This industry would, of course, be subject to regulation also.

• The chief programmatic requirement to bring about adequate management of hazardous wastes is the creation of demand and adequate capacity for treatment/disposal of hazardous wastes. A national policy on hazardous waste management should take into consideration environmental protection, equitable cost distribution among generators, and recovery of waste materials.

• A regulatory approach is best for the achievement of hazardous waste management objectives. A regulatory approach ensures adequate protection of public health and the environment. It will likely result in the creation of treatment/disposal capacity by the private sector without public funding. It will result in the mandatory use of such facilities. Costs of management will be borne by those who generate the hazardous wastes and their customers rather than the public at large and thus cost distribution will be equitable. Private sector management of the wastes in a competitive situation can lead to an appropriate mix of source reduction, treatment, resource recovery and land disposal.

• A regulatory program will not directly create a prescribed system of national disposal sites, however, due to uncertainties inherent in the private sector response. EPA believes that the private sector will respond to a regulatory program. However, full assurance cannot be given that treatment/disposal facilities will be available in a timely manner for all regions of the Nation nor that facility use charges will be reasonable in relation to cost of services. Also, private enterprise does not appear well suited institutionally to long term security and surveillance of hazardous waste storage and disposal sites.

• Based on analyses performed to date, EPA believes that no Government actions to limit the uncertainties in private sector response are appropriate at this time. However, if private capital flow were very slow and adverse environmental effects were resulting from the investment rate, indirect financial assistance in forms such as loans, loan guarantees or investment credits could be used to accelerate investment. If facility location or user charge problems arose, the Government could impose a franchise system with territorial limits and user charge rate controls. Long term care of hazardous waste storage and disposal facilities could be assured by mandating use of Federal or State land for such facilities.

• EPA studies indicate that treatment/disposal of hazardous wastes at central processing facilities is preferable to management at each point of generation in most cases due to economies of scale, decreased environmental risk, and increased opportunities for resource recovery. However, other forces may deter creation of the "regional processing facility" type of system. For example, the pending effluent limitation guidelines now being developed under authority of the Federal Water Pollution Control Act may force each generator to install water treatment facilities for both hazardous and nonhazardous aqueous waste streams. Consequently, the absolute volume of hazardous wastes requiring further treatment at central facilities may be reduced and the potential for economies of scale at such facilities may not be as strong as it is currently.

• Given these uncertainties, several projections of future events can be made. Processing capacity required nationally was estimated assuming complete regulation, treatment and disposal of all hazardous wastes at the earliest practicable time period. Estimates were based on a postulated scenario in which approximately 20 regional treatment/disposal facilities are constructed across the Nation. Of these, 5 would be very large facilities serving major industrial areas treating 1.3 million tons yearly each, and 15 would be medium size facilities each treating 160,000 tons annually. An estimated 8.5 million tons of hazardous wastes would be treated/disposed of away from the

point of generation (off-site); 1.5 million tons would be pre-treated by generators on-site, with 0.5 million tons of residues transported to off-site treatment/disposal facilities for further processing. Each regional processing facility was assumed to provide a complete range of treatment processes capable of handling all types of hazardous wastes, and, therefore, each would be much more costly than existing private facilities.

- Capital requirements to create the system described above are approximately \$940 million. Average annual operating expenditures (including capital recovery and operating costs) of \$620 million would be required to sustain the program. These costs are roughly estimated to be equivalent to 1 percent of the value of shipments from industries directly impacted. In addition, administrative expenses of about \$20 million annually for Federal and State regulatory programs would be necessary. For the reasons stated earlier, however, capacity and capital requirements for a national hazardous waste management system may be smaller than indicated above, and more in line with the capacity and capital availability of the existing hazardous waste management industry.

- In summary, the conclusions of the study are that (1) a hazardous waste management problem exists and its magnitude is increasing; (2) the technical means to solve the problem exist for most hazardous waste but are costly in comparison with present practices; (3) the legislative and economic incentives for using available technology are not sufficient to cause environmentally adequate treatment/disposal in most cases; (4) the most effective solution at least direct cost to the public is a program for the regulation of hazardous waste treatment/disposal; (5) a private hazardous waste management service industry exists and is capable of expanding under the stimulus of a regulatory program; (6) due to inherent uncertainties, private sector response cannot be definitely prescribed; (7) several alternatives for government action are available, but, based on analyses to date, EPA is not convinced that such actions are needed.

The Environmental Protection Agency has proposed legislation to the Congress which is intended to fulfill the purposes of Section 212 of the Solid Waste Disposal Act as amended, and to carry out the recommendations of this report. The proposed Hazardous Waste Management Act of 1973 would authorize a regulatory program for treatment/disposal of EPA-designated hazardous wastes; the States would implement the program subject to Federal standards in most cases. All studies performed in response to Section 212 will be completed in time to serve as useful input to Congressional consideration of our legislative proposal.

Section 1

INTRODUCTION

The Congressional Mandate

In 1970, Congress perceived hazardous waste storage and disposal to be a problem of national concern. Section 212 of the Resource Recovery Act of 1970 (P.L. 91-512--an amendment to P.L. 89-272), enacted on October 26, 1970, required that the U.S. Environmental Protection Agency (EPA) prepare a comprehensive report to Congress on storage and disposal of hazardous wastes. That section stated:

"The Secretary* shall submit to the Congress no later than two years† after the date of enactment of the Resource Recovery Act of 1970, a comprehensive report and plan for the creation of a system of national disposal sites for the storage and disposal of hazardous wastes, including radioactive, toxic chemical, biological, and other wastes which may endanger public health or welfare. Such report shall include: (1) a list of materials which should be subject to disposal at any such site; (2) current methods of disposal of such materials; (3) recommended methods of reduction, neutralization, recovery or disposal of such materials; (4) an inventory of possible sites including existing land or water disposal sites operated or licensed by Federal agencies; (5) an estimate of the cost of developing and maintaining sites including consideration of means for distributing the short- and long-term costs of operating such sites among the users thereof; and (6) such other information as may be appropriate."

The EPA Response

This document represents EPA's Report to the President and the Congress summarizing the Agency's investigations and recommendations

* The Secretary of Health, Education and Welfare; Reorganization Plan Number 3 of 1970 transferred authority to the Administrator, Environmental Protection Agency.

† EPA requested and received a time extension for submission of this report until June 30, 1973, since appropriation of funds to implement the Resource Recovery Act of 1970 was delayed for 8 months after enactment.

concerning hazardous wastes in response to the Congressional mandate. All information required by the mandate is included in the report and its appendices. This report provides a definition of current status, issues and options. It does not purport to provide a complete solution to the hazardous waste management problem.

Section 212 requires an evaluation of a system of national disposal sites (NDS) for the storage and disposal of hazardous wastes as a solution to the hazardous waste problem. To evaluate the NDS concept properly, it is necessary to view it in the context of the total problem. On probing the problem, EPA determined that several means of accomplishing the NDS objective exist. To provide the Congress with maximum flexibility of action, EPA elected to investigate and evaluate several alternative solutions.

A series of interrelated contractor and in-house studies was undertaken for the specific purpose of complying with Section 212 of the Resource Recovery Act of 1970:

- The first study, upon which subsequent efforts were based, quantified the hazardous waste problem.⁶ From a thorough literature survey and contacts with various trade and technical associations, government agencies, and industry, a list of hazardous materials was compiled, and each candidate substance on this list was rated according to the nature and severity of its hazardous properties. In addition, volume and distribution data (both by geography and by industry groups) was gathered, and current hazardous waste handling and disposal practices were surveyed. It was found that the magnitude of the hazardous waste problem was larger than originally anticipated, and that current disposal practices are generally inadequate.
- Next, a more detailed technical study on the properties of these materials and their treatment and disposal methods was conducted.⁷ A "profile report" was written on each listed substance summarizing its physical, chemical, and toxicological properties, its industrial uses, and the hazards associated with proper handling and disposal methods. Each "profile report" incorporated a critical evaluation of currently used and available technology for the handling, storage, transport, neutralization, detoxification, reuse, and disposal of the particular substance. Also, advanced methods of hazardous waste treatment were surveyed, and research and development needs were formulated. The study showed that treatment and disposal technology is available for most hazardous wastes.
- A favorable public attitude is essential for the successful implementation of any nationwide hazardous waste management

program. Therefore, a third study was undertaken to determine citizen awareness and attitudes regarding the hazardous waste problem, and reaction to the possibility of having a treatment and disposal facility located in the vicinity.⁸ The majority of citizens sampled were found to be in favor of regional processing facilities for hazardous wastes since such facilities would increase environmental protection and stimulate the economy of the region.

- A fourth study analyzed and compared alternative methods of hazardous waste management.⁹ It was concluded that there are three basic approaches: (a) process hazardous wastes "on-site," i.e., at the plant where they are generated; (b) process "off-site" at some regional facility (either public or private); (c) combine "on-site" pretreatment with "off-site" treatment and disposal. These basic alternatives were evaluated with respect to economics, risk, and legal and institutional issues. The study indicated that option (b) is preferable for most hazardous waste streams* and option (c) is preferable for dilute aqueous toxic metal wastes.
- A fifth comprehensive study examined the feasibility of a system of national disposal sites (NDS) for hazardous wastes.¹⁰ Potential locations for regional processing and disposal sites were identified. Conceptual designs of hazardous waste treatment and disposal facilities were developed based on multi-component waste streams characteristic of industry. Capital and operational costs estimates were made, and funding and cost distribution mechanisms were examined.
- Lastly, a strategy analysis was performed, based on information from the previous studies. It was concluded that a regulatory program is the best approach to the hazardous waste problem.

The case for hazardous waste regulation is discussed in Section 3. Issues of implementation are evaluated in Section 4 and findings and recommendations are given in Section 5. A review of the hazardous waste disposal problem precedes these discussions.

* In this report the term "waste stream" refers to mass flow in the engineering process sense, and not necessarily to a liquid stream.