

**Proceedings of**

**THE SECOND NATIONAL CONFERENCE**

**ON WASTE EXCHANGE**

Sponsored by

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Edited by  
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## PREFACE

Most conference proceedings are either a collection of papers prepared by participants before the meeting or a lightly edited version of the transcripts of participants' presentations and remarks. These proceedings are slightly different from both of these typical approaches. Some participants submitted papers before the conference. These papers were edited and additional remarks made by participants during their presentations were incorporated. Contributions for participants who did not submit papers were written from the transcripts of the meeting. These sections are not intended as verbatim accounts of participants' presentations. The transcripts were modified to a more formal style and repetitious and extraneous material was eliminated. Drafts were then sent to participants for review, and in some cases clarification or additional information was requested. Final decisions on style and other editorial matters were made by the editors. Consistent with the participatory nature and intent of the conference, summaries of discussions following the individual presentations are included in the proceedings.

The contents of the proceedings generally follow the conference agenda (Appendix B). In addition there is an executive summary containing the main points and issues raised in the meeting sessions. Because of time constraints during the second day of the meeting, Sessions VII and VIII were combined into a single session. This change is reflected in the proceedings.

The cooperation and efforts of many people are necessary to make a conference of this type a success. Administrative and technical matters of seating, meals, and overall facilities planning were provided by the staff of the Center for Professional Development at Florida State University. Special appreciation is extended to Ms. Lori Cohen, Ms. Sheryl Grossman, and Ms. Susan Lampman for their flexibility, cooperation and guidance in all phases of the conference. The special efforts of Ms. Marie Haselton of the Tallahassee Hilton and Mr. John Gumm of Tallahassee Chrysler also helped make the conference a success. Preconference and postconference administrative and clerical assistance were provided by the staff of the Institute of Science and Public Affairs. Ms. Mary Melton deserves special mention for patiently typing the many drafts of the proceedings. Figures were prepared by Mr. Peter Krafft and typesetting was arranged through Mr. James Anderson of the Florida Resources and Environmental Analysis Center. Conference planning, registration, and preconference correspondence were carried out by Ms. Charlotte Miller, Mr. John Moerlins, Ms. Lucinda Peace, Mr. Gene Jones, and Ms. Susan Meigs.

Many of the conference participants generously gave of their time and energy in reviewing and commenting on the proceedings as they were developed. Their contributions are gratefully acknowledged.

Support for this conference, both financial and otherwise, was provided by the Waste Management Program of Florida State University, the Florida Chamber of Commerce, and the U.S. Environmental Protection Agency. Chemical Waste Management, Inc., hosted the conference hospitality hour. Special thanks and appreciation are extended to Mr. Mark Gregory and Ms. Kim Stegall of Chemical Waste Management, Inc.

Finally, our sincere appreciation is extended to the moderators, panelists, and participants who shared their experiences regarding waste exchange and resource reuse. It is through a continuous and open exchange of ideas that we will best be able to address and resolve our waste management problems.

*Roy C. Herndon  
Conference Chairman  
Florida State University*

## **EXECUTIVE SUMMARY**

On March 5 and 6, 1985, waste exchange administrators, recyclers, environmental engineers, consultants, private industry representatives, and government officials met in Tallahassee, Florida, for the Second National Conference on Waste Exchange. The first conference held in Tallahassee in 1983 began a spirit of cooperation among waste exchanges throughout the United States and Canada. Principal objectives of the second conference were to further promote and enhance communication and cooperation among those concerned with waste exchange and resource reuse, to encourage public agencies and industry to participate in waste exchanges and to reuse resources whenever possible, and to formalize people's commitment to waste exchange through establishment of the Association for Waste Exchange and Resource Reuse.

Waste exchanges are of two types: the more common clearinghouse, which provides information about materials and services, and the brokerage, which is typically involved with negotiations for waste transfer and often directly handles waste materials. As Roy Herndon, Conference Chairman, emphasized in his introductory remarks, the problems associated with the safe disposal of waste have grown increasingly complex, and a single approach to waste management is probably not feasible. It is important to remember that waste exchange and resource reuse are only part of the solution to the problem of safe and economical waste management. Waste exchange does not eliminate the need for treatment and disposal operations. Waste exchanges are, however, likely to become more significant in light of new federal and state legislation and regulations and increased public awareness of waste management issues.

Michael Cook, Deputy Director of the U.S. Environmental Protection Agency's Office of Solid Waste, described some of the major provisions of the amendments to the Resource Conservation and Recovery Act (RCRA) signed into law by President Reagan on November 8, 1984, and discussed their implications for the regulated community and for waste exchange and resource reuse. Over the next several years the RCRA amendments will radically change and increase the cost of waste management in the United States. The regulations promulgated under the original (1976) Resource Conservation and Recovery Act imposed a cost on the regulated community of \$1 to \$3 billion per year. EPA estimates that the new amendments, when they are fully implemented, will cost the regulated community \$20 billion per year.

One aspect of RCRA reauthorization that will affect large numbers of companies is regulation of leaking underground storage tanks. Under

this new program, many of the underground tanks containing hazardous substances (products) as defined by the Comprehensive Emergency Response and Compensation Liability Act (CERCLA) and many of the underground tanks containing petroleum products will be regulated. EPA estimates that 3 to 8 million tanks will be covered by this new program.

The 1984 RCRA amendments also require EPA to ban land disposal of hazardous waste, unless the agency is able to determine that land disposal of a particular waste is indeed safe. Effective May 8, 1985, land-filling of free liquid waste is prohibited. As part of its assessment of which wastes should be banned from land disposal, EPA is systematically compiling a list of waste treatment methods available in the United States. This list will be available to the regulated community and other interested parties such as waste exchanges. EPA is also instructed by the new regulations to consider the listing as hazardous of a series of different kinds of waste, primarily in the petrochemical industry. Through required use of a new extraction procedure and a new device, EPA plans to regulate as many as forty or fifty additional organic constituents. Under the 1984 amendments, EPA will also regulate the blending and burning of hazardous waste as fuel.

More stringent standards for nonhazardous solid waste facilities, including double liners and a leachate collection system, are required by the new amendments. Another major provision in the law is reduction of the small quantity generator exemption from 1000 to 100 kilograms per month. Those businesses that produce 100 or more kilograms per month of hazardous waste are, under the 1984 amendments, subject to regulation as hazardous waste generators. This provision will greatly increase the universe of regulated firms—by an estimated 100,000 to 130,000. More than half of the small quantity generators in the United States fall into five industrial categories: vehicle maintenance, metal manufacturing and finishing, printing, photography, and laundries and dry cleaning. The standards for small quantity generators, which EPA must promulgate by March 31, 1986, may vary from the Subtitle C (hazardous waste) regulations, but they still must protect human health and the environment.

As of September 1, 1985, hazardous waste generators (except small quantity generators) will have to certify that they have reduced waste generation and toxicity to the extent practicable. The certification requirement should be helpful to waste exchanges across the country. Waste that is transferred to another party for reuse or recycling is not being disposed and in many cases results in reduced toxicity in the sense Congress intended.



The thrust of many of the provisions of the RCRA amendments is to encourage generators to find and to use alternatives to land disposal of wastes, such as treatment, incineration, recycling, resource reuse, and resource recovery. Waste exchanges are certainly one means of facilitating use of some of these alternatives and as such should be favorably affected by the 1984 RCRA amendments. It should be noted that the 1984 amendments also place more restrictions on the handling of certain materials even if they are recycled. Several other trends should have positive effects on waste exchange. The cost of some raw materials, as well as the cost of waste disposal, is increasing. In addition, new technologies are being developed for recovery and reprocessing of waste.

Many states have passed or are considering legislation that either directly or indirectly encourages waste exchange. For example, as of January 1, 1987, landfills in Illinois will be prohibited from accepting hazardous waste unless the generator certifies that the waste has been considered for recycling or treatment. In Maryland, waste cannot be landfilled unless it has been rejected by a treatment unit or recycler. A bill before the Maryland legislature in 1985 would have required generators to list on a waste exchange any waste to be transported off the generator's premises. This bill passed the House of Delegates but was narrowly defeated in Senate committee.

Administrators from waste exchanges throughout the United States as well as from the Canadian Waste Materials Exchange described their exchanges' activities and discussed problems and opportunities for waste exchange. The development of the waste exchange concept has taken a different course in Canada than it has in the United States. In Canada, a single national exchange was established to serve the entire country. In the United States, waste exchanges have been established and have grown through a number of local initiatives. Although both approaches have been successful, Robert Laughlin from the Canadian Waste Materials Exchange believes that waste exchanges would be even more effective if there were strong local or regional exchanges linked by national or continentwide network exchanges, an approach that has been followed in France. This belief was based in part on analysis of transfers made by the Canadian exchange, which showed that distance is not as much of an impediment to exchange as previously thought. Canada has begun to develop regional waste exchange operations, which are linked to the national exchange.

The manager of the Canadian exchange, as well as several other waste exchange directors, called for continued development of computerized data bases that can be readily accessed by all exchanges as a means of increasing the scope of individual exchanges and of increasing the rates of waste transfer.

A persistent theme throughout the meeting was the need for waste exchanges to become more active. Reports by several exchange directors showed that this is already occurring and that the commonly used distinction between "passive" and "active" exchanges is no longer very useful. Many exchanges are doing a great deal more to facilitate the exchange and reuse of waste than simply publishing catalogs. For example, the Northeast Industrial Waste Exchange has developed a data base of listings that may be searched by a client for a specific material within a specific geographic area (such as a state or a U.S. EPA region). The Piedmont Waste Exchange actively markets its services, conducts workshop, and directs research. It also identifies and brings together companies seeking waste management services and companies that can provide them as well as identifying and bringing together industrial waste generators and users. The Great Lakes Regional Waste Exchange works closely with exchange participants, trade associations, and an advisory group of waste managers to identify and document problems that prevent exchanges from occurring. The exchange also notifies companies within selected industries of particular listings if there is a known potential use of a listing for those industries. To increase its rate of exchange, the California Waste Exchange, which is part of the California Department of Health Services, reviews manifests accompanying waste that is shipped off-site. From the manifests, waste exchange personnel can determine the type and amount of waste being generated and can then talk more knowledgeably to the generator about recycling. The Great Lakes Regional Waste Exchange, as well as other exchanges, provides technical and administrative assistance to small and intermediate-sized businesses and is advised by a group of engineers, manufacturers, lawyers, chemists, and other experts.

There is some uncertainty about whether waste exchanges will increase their potential liability by becoming more active agents in the transfer of waste. If waste exchanges do not take possession of the waste, then they are not subject to joint and several liability under Superfund. Transporters, however, are routinely regarded as responsible. Thus, if a waste exchange is involved in transportation in any way, then it may be liable. Other problems and issues facing waste exchanges include establishing long-term, reliable means of funding and regulatory problems in shipment of wastes for reuse.

Although many waste exchanges are more active in 1985 than they were in 1983, there are still ways for waste exchanges to improve their services. There is a need to further educate generators, particularly the many thousands of newly defined small quantity generators, of their waste management obligations and options. There was also discussion of the usefulness of waste exchanges to public agencies and high-tech in-

dustries, both of which generate large quantities of waste. To most beneficially assist these sectors, waste exchanges must be able to respond quickly to their needs. Waste exchanges should also employ or have access to people with the necessary technical backgrounds to locate markets for hard-to-place materials.

A number of other factors hamper waste exchange activities including transportation costs, costs of laboratory analysis of listed materials, the fact that new materials may be less costly, and generators' fears of future liability. Companies are also reluctant to accept materials that are less pure than those they are accustomed to using. High-tech companies in particular have extremely high standards for raw materials.

In spite of these problems there are tremendous opportunities for waste exchanges to take an even more active role in education, service, and marketing. Waste exchange directors can also increase the effectiveness of their operations by encouraging qualified brokers and consultants to use waste exchange listings for business leads.

Several state and federal programs relating to waste management and resource reuse were discussed during the conference. Raymond Moreau from the Florida Department of Environmental Regulation (DER) discussed Florida's Used Oil Program, proposed EPA used oil regulations, and their impacts on the used oil industry. As a result of the new regulations, the cost of doing business in the used oil fuel industry will increase.

Florida Representative Michael Friedman discussed Florida's 1983 Water Quality Assurance Act, which requires each county in the state to assess all hazardous waste generators, including small quantity generators, within its boundaries. After these local assessments are completed, waste exchanges as well as industry will have access to an in-depth marketing study on the amounts and types of hazardous waste generated in Florida. Florida, as well as other states, needs to assure small quantity generators that proper means of waste management exist for them at a reasonable cost. There is a further need for the state, in cooperation with other governmental levels, industry, and citizen groups, to work for the siting of multipurpose hazardous waste management facilities.

The Florida Water Quality Assurance Act also established the Amnesty Days program, which was described by Senator George Kirkpatrick of the Florida legislature and James Hattler of GSX Services. Amnesty Days is a state-sponsored program designed to provide an environmentally sound alternative to landfill disposal while at the same time creating public awareness of the waste types that constitute hazardous waste. Mobile collection centers are set up in shopping centers and mall parking lots on a pre-arranged basis for a specified amount of time. The state of Florida pays for the packaging, labeling, transporta-

tion, and disposal of up to one drum per household or generator. Amnesty Days, or a similar program, would be an effective vehicle for waste exchanges to relay their message to members of the public and to small quantity generators. One of the most significant benefits of a program like Amnesty Days is a change in public perception, which is essential for the siting of needed facilities. Through Amnesty Days members of the public become aware that they are part of the problem.

Mahlon White from the Department of Defense Environmental Policy Directorate provided an overview of the department's hazardous waste management program. Proper management of DoD waste is challenging not only because of its volume and characteristics but also because it is generated in numerous and diverse locations. Most of DoD's 911 major installations are generators of hazardous materials as well as hazardous waste. Excess hazardous materials include solvents, adhesives, petroleum products, acids, bases, and other "hardware store" items. Approximately 50 percent of these excess materials are paints. DoD prefers to manage its waste through in-house treatment. When this is not possible, materials are disposed through contractual arrangements with outside facilities.

The Department of Defense recently developed several new programs to improve hazardous waste management, including a used solvent elimination program, a landfill ban on certain hazardous wastes, and incentives to decrease generation and to increase recycling and reuse. Additional programs under investigation include industrial process modification, regional waste treatment, and treatment using mobile incinerators. Department policy emphasizes waste minimization, recycling, and reuse prior to treatment.

The meeting concluded with a session on establishment of the Association for Waste Exchange and Resource Reuse. The need for such an association, first expressed at the 1983 conference, was reaffirmed. The association would have several functions. Among these functions would be:

- To promote resource conservation through waste exchange and resource reuse.
- To promote communication, understanding, and cooperation among its members.
- To inform members of innovations in the waste industry.
- To inform members of federal and state legislation and regulations, and, through lobbying, to have some influence on legislation and regulations.
- To promote research and development relating to waste exchange and resource reuse.

It was agreed that several people would continue to work toward the establishment of the Association for Waste Exchange and Resource

Reuse. Any materials prepared by these people, such as by-laws or membership forms, will be distributed to the participants of the 1985 National Conference on Waste Exchange.



## INTRODUCTION

### CONFERENCE OVERVIEW, *Roy C. Herndon, Florida State University*

Two years ago, on March 8-9, 1983, the first National Conference on Waste Exchange was held in Tallahassee, Florida. The purposes of this second National Conference on Waste Exchange and Resource Reuse are:

- To identify ways to promote resource conservation through waste exchange and resource reuse;
- To determine the best ways to promote cooperation among waste exchange programs in private industry, nonprofit organizations, and government agencies;
- To encourage information exchange and technical assistance which promote resource reuse and waste exchange;
- To provide information on waste exchange and resource reuse.

A resolution was made at the conclusion of the 1983 conference to form a national association "for waste exchange and resource reuse." This second conference has been called, in part, to report and to discuss the progress that has been made towards establishing such an association.

Most participants are probably already familiar with the basic concepts of waste exchange, and so these ideas will not be presented in detail during this conference. (Participants interested in this topic or in the history of the development of waste exchanges in the United States and Europe should refer to the *1983 Proceedings of the National Conference on Waste Exchange*. Copies are available from the Institute of Science and Public Affairs, Florida State University.) During the first conference, the expectations of industry and commerce regarding waste exchanges and cooperation among exchanges were discussed, and some of these topics will be revisited during this conference. The Resource Conservation and Recovery Act (RCRA) was amended in November 1984, and Michael Cook, Deputy Director of the Office of Solid Waste, U.S. Environmental Protection Agency, will discuss the new RCRA amendments and their implications for the regulated community and for waste exchange and resource reuse.

During the first conference incentives and barriers to successful exchange were identified. These issues will also be discussed during this conference, especially in connection with Mr. Cook's remarks concerning the new RCRA amendments. Other topics of continuing interest are strategies to encourage and facilitate waste exchange operations, legal

considerations and legislative trends, and the need for a national association.

The problems associated with the safe disposal of waste have grown increasingly complex. A single approach to disposal or to waste management is probably not feasible, and in this context it is important to remember that waste exchange and resource reuse are only part of the solution. Dealing effectively with waste management problems requires understanding and use of a number of waste management options.

It must be emphasized that waste exchanges need to be very active organizations in order to be successful; they must have contacts with other exchanges, with industry, and with technical people who can readily answer questions and solve problems. During the first conference industry representatives talked about their expectations regarding waste exchange and resource reuse. Industry wants participation in a waste exchange to be uncomplicated and cost-effective. The industry perspective will also be an important aspect of the 1985 conference.

The need for and significance of cooperation among exchanges cannot be overstated. Through cooperation, it is clear that waste exchanges can better serve their clients by broadening the available market of materials as well as broadening their participant base. This conference will provide a forum to continue the discussions begun at the 1983 conference to encourage cooperation among exchanges in order to establish better opportunities for waste exchange and resource reuse.

**FEDERAL REGULATORY PERSPECTIVE, Michael Cook, U.S. Environmental Protection Agency**

The new RCRA amendments, signed into law by President Reagan on November 8, 1984, are going to be extremely important to the future of waste exchanges. They are going to be central to the way waste is managed, particularly hazardous waste, but also other types of solid waste.

RCRA is the first of the EPA statutes to be reauthorized recently. EPA is currently operating under several statutes, all of which have expired except for CERCLA (Superfund), which is about to expire, and RCRA, which was just reauthorized. RCRA is to some extent setting a precedent for reauthorization of the other environmental laws.

The RCRA amendments are an extraordinary piece of legislation—because of their potential impact on waste management, because of their cost to the regulated community, because of the level of detail contained in the amendments, and because of the short deadlines required. The RCRA amendments over the next several years will radically change and increase the cost of waste management in the United States. There will be a series of fundamental changes in the way industry views



waste management. I hope that these changes will promote the use of waste exchanges.

The RCRA amendments have their roots in three recent historical trends in waste management. First is public concern over the pace of hazardous waste regulation. The 1976 amendments to the Solid Waste Act established the basic regulatory programs for hazardous waste. These were relatively straightforward, performance type amendments although they did contain some deadlines and some requirements for regulations. EPA missed most of the deadlines and did not complete the first major set of regulations until 1980. Subsequently, EPA did promulgate a number of major regulations, but the general view on the part of Congress and the public was that EPA had been responding slowly and had not displayed the sense of urgency necessary to deal with the emerging problem.

The second major trend is the dramatic increase in public concern over hazardous waste management since the late 1970s when Love Canal began to get nationwide publicity. In the wake of Love Canal there was a series of revelations about other sites across the nation. People became concerned that waste had not been managed well in the past and was not currently being managed well. This growing concern was greatly accelerated by the Superfund program, when the nation began for the first time to look systematically for hazardous waste sites and found them scattered throughout most of the populated United States. Hazardous waste sites have become viewed as a problem on a national basis only in the last five or six years.

The third historical trend is the perception, which was correct to a substantial degree, that the new EPA management did not have an interest in energetically implementing the Superfund law, but was primarily interested in simplifying the new RCRA requirements for industry. In 1981, when the new management arrived, EPA had just promulgated regulations under RCRA. These regulations were high on industry's list of concerns, and the new management immediately set out on a program to simplify and clarify those regulations and gave less emphasis to filling in regulatory gaps and implementing the Superfund program. Meanwhile the Superfund program became the subject of much controversy. The consequence was a change in EPA administration.

There was another trend, which has been around for some time, that was definitely a thread through the RCRA reauthorization process: that is, the widespread desire to encourage reduction of waste generation and to promote recycling and reuse of waste. This was relatively a far more important factor in 1976 than it was in 1984. In 1976 the original amendments to the Solid Waste Act were called the Resource Conservation and Recovery Act. There was not the same kind of emphasis in either name

or content in the 1984 amendments to RCRA. There was just as much interest as before in waste reduction and recycling, but these interests were overridden by the much more fundamental interest in trying to get the waste that was generated to be managed properly and to get that proper management into place quickly and efficiently.

One of the results of the residual interest in recycling and reuse is an amendment that requires those who manage hazardous waste to certify that they have reduced waste generation and toxicity to the extent practicable. This certification has to accompany the manifest for all hazardous waste that is shipped off-site, and it has to accompany all applications for permits for treatment, storage, and disposal facilities. Along with this amendment is legislative assurance, in the legislative history, that no one will ever look behind the certification to determine whether the certification has been done in an appropriate, honest, and straightforward way. EPA was instructed not to second guess industry. EPA is, however, expected to look and make sure that there is a certification.

Much of industry is going to take the certification seriously. The certification requirement should be helpful to waste exchanges across the country. Waste that is transferred to another party for reuse or recycling is not being disposed and in many cases results in reduced toxicity in the sense Congress intended; therefore, those generators who participate in waste exchanges can consider their participation one good reason to sign the certification with a clear conscience.

The new legislation imposes radical changes on waste management. Currently EPA regulations, not considering the new requirements, impose an estimated cost on the regulated community of \$1 to \$3 billion per year. The new amendments, when they are fully implemented (which will take several years), are going to cost the regulated community on the order of \$20 billion a year. The current cost of the air program is an estimated \$15 billion a year. The current cost of the water program is about \$20 billion per year. In essence the regulation of waste management is being equalized with the air and water programs, at least in terms of cost. More concern than ever before is going to be given to management of the waste residuals from the air and water programs.

There are about seventy-two requirements for EPA action under the new amendments.<sup>1</sup> Of these requirements, fifty-eight have deadlines of two and a half years or less. Most of those fifty-eight deadlines occur during the first year. A dozen of the requirements went into effect automatically on the date of enactment of the RCRA amendments. The new amendments contain a great deal of detail, considered by many to be equivalent to agency regulations. This is precedent setting and has implications for reauthorization of other environmental statutes. The

amendments also contain a number of "hammers;" that is, requirements that go into effect automatically by dates specified in the act if EPA fails to promulgate regulations within given time frames. The requirements in the "hammer" provisions are considered to be more stringent than EPA would ever promulgate in regulations, giving industry strong incentive to work closely with EPA to get these regulations out quickly.

Several amendments are of particular significance to the regulated community. The first deals with leaking underground storage tanks (LUST). The program that has been legislated covers all tanks containing hazardous substances (products) as defined under the Superfund Act. It also covers all underground storage tanks with petroleum products, which are currently beyond the authority of Superfund. Although there are tremendous numbers of tanks exempted by law from coverage, an estimated 3 to 8 million tanks are covered by this new regulatory program. Some requirements go into effect for new tanks six months from the date of enactment (that is, on May 8, 1985). In a couple of years there will be more detailed regulations covering new tanks, as well as existing tanks. When this program is fully implemented, it is going to place the regulation of underground storage tanks on the same level of importance with most of the other RCRA programs combined. For the first time, EPA is going to be regulating millions of tank owners and operators. In comparison EPA currently regulates about 5,000 hazardous waste treatment, storage, and disposal facilities and about 25,000 generators and transporters.

Another provision of the new law requires the banning of hazardous waste from land disposal. The law is structured with a presumption in favor of banning a waste from land disposal, and that presumption has to be overcome. EPA has to determine that land disposal is indeed safe—that it does protect human health and the environment—before a waste can be land disposed after dates specified in the act. EPA must work systematically through all listed hazardous wastes. If EPA fails to make a decision by the dates specified in the act for a waste, then the waste will automatically be banned from land disposal. EPA also has to decide on what level of treatment is necessary prior to land disposal of residuals. There is another provision allowing individuals with a specific waste to petition EPA to allow land disposal of the waste, but they must meet a very rigorous statutory test. EPA has to develop another set of rules to evaluate these petitions.

Another provision in the new amendments deals with nonhazardous solid waste management. EPA is to study its criteria for proper management of nonhazardous solid waste. At the conclusion of the study EPA will make recommendations on whether the criteria need to be changed. EPA is specifically instructed by statute to modify these criteria to re-

quire groundwater monitoring at nonhazardous-waste management facilities and to require corrective action for releases that come from these kinds of facilities. EPA is further instructed to focus on those facilities that are taking toxic household wastes and small quantity generator waste; that is, waste that is exempt from management as hazardous waste under the RCRA Subtitle C program, but that nonetheless has hazardous constituents. EPA is thus going to be focusing primarily on landfills and not as much on surface impoundments that are taking nonhazardous solid waste. According to EPA estimates, there are about 18,000 sanitary landfills taking solid waste across the nation.

The states are required under the law to adopt EPA's revised criteria and to impose those revised criteria through permit programs managed at the state level. If the states fail to do that by a date specified in the act, EPA, for the first time, has the authority to enforce its criteria directly against the regulated parties. (Currently EPA does not have the authority to enforce anything under Subtitle D of RCRA.) The nation thus will have a set of major new requirements for nonhazardous solid waste. These requirements will improve, and increase the costs, of solid waste management, which will in turn make reuse and recycling more attractive.

Another major provision in the law is the requirement to regulate certain small quantity generators as hazardous waste generators. Specifically the law requires those who generate between 100 and 1000 kilograms per month of hazardous waste to be regulated under Subtitle C. EPA is given some flexibility to modify its Subtitle C requirements for small quantity generators but not much. Basically the law has spelled out what regulations are to apply to these generators. Over twenty-five states already have requirements for small quantity generators, but little enforcement of these requirements has occurred. For at least half of the states in the nation, these new requirements are not really going to be that new, but there is going to be a new federal presence and not just the state presence.

Another aspect of the new amendments has to do with identifying new hazardous waste. EPA is instructed to consider the listing of new kinds of waste, primarily from the petrochemical industry. EPA's characteristic test for waste is to be evaluated, and EPA is to develop a scheme that is more aggressive and that works better for organic constituents. A new extraction procedure test is underway at EPA, and a new device in which the extraction procedure will take place has been designed. A description of the device has been distributed for public comment. With the new extraction procedure and the new device, EPA plans to generically regulate as many as forty or fifty additional organic constituents. If these organic constituents are found in the extract in amounts

that exceed certain levels, then the waste will automatically be considered a hazardous waste without having to be specifically listed as a hazardous waste. Industries will have to perform this new extraction procedure on their waste to determine whether they are producing a hazardous waste.

The new amendments require some change in the federal government's relationship with the states. EPA has authorized some states to assume responsibility in lieu of the federal government to manage the old RCRA program. The requirements under the new amendments go into effect automatically in every state at the same time regardless of whether the state is authorized in lieu of the federal government. There are going to be dual programs with the federal government administering the new part of the program and the state government administering the rest of the program. This will result in joint permit issuance. Virtually every permit that is issued from now on is going to be a joint federal/state permit until states are authorized for the new as well as the old program. The new requirements will have to be enforced through orders and court actions by the federal government until the states take on the authority. Dual programs in the RCRA area are going to last for at least the next decade and perhaps longer.

The consequence of the new amendments over the next several years is going to be a dramatic change in waste management practices across the country. Firms that generate waste are going to give much more attention to the way waste is generated and managed. It is hoped that one offshoot of these new considerations is going to be a steady increase in interest in waste exchange programs as a way to manage waste effectively and less expensively than treatment and disposal under the new amendments.

In sum, the new amendments will greatly increase the cost of waste management. EPA has instructions from Congress to do a tremendous amount of work, to do it all at once, and to do it very quickly. EPA did work very closely with Congress to help draft these provisions in a manner that could be implemented and fit with the current program. Many of the tasks required by the new legislation were already underway at EPA. EPA is optimistic about meeting a substantial number of the deadlines in the new regulations. Through a videotape EPA has attempted to convey the requirements that go into effect first, to analyze some of their implications, and to answer questions. (A copy of the videotape is available for \$375 from the National Audiovisual Center, Washington, D.C.-20409 (301)763-1896.) EPA has also scheduled in Washington a series of meetings with interested parties on specific aspects of the new regulations. There will also be public meetings or public hearings on formally proposed regulations. EPA maintains a mailing list of people interested in reviewing drafts of guidance documents and regulations.

Answers to questions regarding the new amendments may be obtained by calling the EPA hotline (800-424-9346). Complete text and congressional analysis of the RCRA reauthorization law (H.R. 2867—Hazardous and Solid Waste Amendments of 1984) are available free of charge from any member of the House or Senate. The law and congressional report is also in the Congressional Record for October 3, 1984 (Part 2) pp. H-11103 to H-11145. The Office of Solid Waste has also prepared a summary of the 1984 amendments.

<sup>1</sup>See Appendix A for deadlines imposed by the 1984 RCRA amendments on EPA and on industry

## **Discussion**

A participant raised the question of what effect the amendments would have on the regulation of recycled materials. Mr. Cook replied that the amendments require EPA to regulate the blending and burning of hazardous waste as fuel. Ninety days from the date of enactment, all invoices that accompany this waste must contain a warning notice stating that it is a hazardous waste. EPA is also required to prepare regulations for burning and blending of waste as fuel. The facilities that are burning these wastes will be subject to a permit program, which will probably be quite similar to the current permit program for incinerators, except EPA anticipates that in many cases test burns will not be necessary. If the boiler design is standard and known to achieve the required efficiency, then EPA may waive the test burn requirement, which is the most expensive part of the permitting process.

EPA is also systematically looking at waste treatment methods available across the country as part of its assessment of banning of wastes from land disposal. As this information is compiled, it will be provided to the regulated community and others.

The question was raised whether there is any evidence that the inclusion of small quantity generator hazardous waste to the waste stream of Subtitle D facilities makes the leachate from these facilities any worse than it would be without such waste. Data on this issue are not available, but one purpose of the amendments is to impose new management standards for solid waste facilities that take into consideration the fact that they can result in considerable problems for human health and the environment. About one-third of all facilities on the Superfund list are solid waste management facilities, although it must be remembered that many of those facilities date back to the time when there was no hazardous waste regulatory program. EPA is currently gathering information

about solid waste management facilities across the country. If there are gaps in this information that require original work, EPA will do it.

A participant asked for further explanation of the new certification process. According to the EPA spokesman, everyone who ships hazardous waste off-site must have a statement on their manifest form that they have reduced the amount and toxicity of the hazardous waste generated to the extent economically practicable. Everyone who is managing waste on-site when they apply for a RCRA permit has to put the same certification in their RCRA permit application. EPA is in the process of changing its manifest forms so that every manifest form will contain the certification. When you sign the manifest form, you will also be signing the certification. It may not be a very high priority for EPA enforcement, but those who falsely sign certifications may be making themselves vulnerable to certain forms of civil court action.

One participant expressed the belief that the estimated cost of \$20 billion a year to the regulated community as a result of the new amendments was a gross underestimate considering the tremendous number of small quantity generators subject to regulation under the new amendments. The EPA spokesman acknowledged that certain costs were not included in the EPA estimate and that the costs were based on the federal program and not on state programs, which may be more stringent than the federal program.

EPA's permitting program is currently stalled because of new requirements, including double liners for land disposal facilities and the need to address releases from solid waste management units at the same site. It is possible that states can issue a state permit, but those will not be considered final permits. Final RCRA permits will not be issued until EPA issues permits that address the double liner requirements for land disposal facilities and continuing releases from other solid waste management units.

EPA has just completed a survey on small quantity generators. Based on the survey, EPA estimates that in the United States there are about 100,000 firms that generate between 100 and 1000 kg per month of hazardous waste and several hundred thousand that generate between 0 and 100 kg per month. It is estimated that the firms that generate between 100 and 1000 kg per month account for less than 1 percent of the hazardous waste that is generated nationally. What is occurring is a huge increase in the size of the regulated universe but only a very small increase in the amount of waste that is managed under the new regulatory program. The thrust of the EPA program will be to educate small quantity generators. EPA will probably not put a large percentage of its resources into enforcement against small quantity generators because they manage such a small percentage of the waste.

Under the new amendments it is going to be relatively less expensive to manage wastes in some ways than in others, and it is hoped that the services of waste exchanges will be among the less expensive alternatives.



## SESSION I. NORTH AMERICAN WASTE EXCHANGES

### INTRODUCTION, *Robert Laughlin, Canadian Waste Materials Exchange*

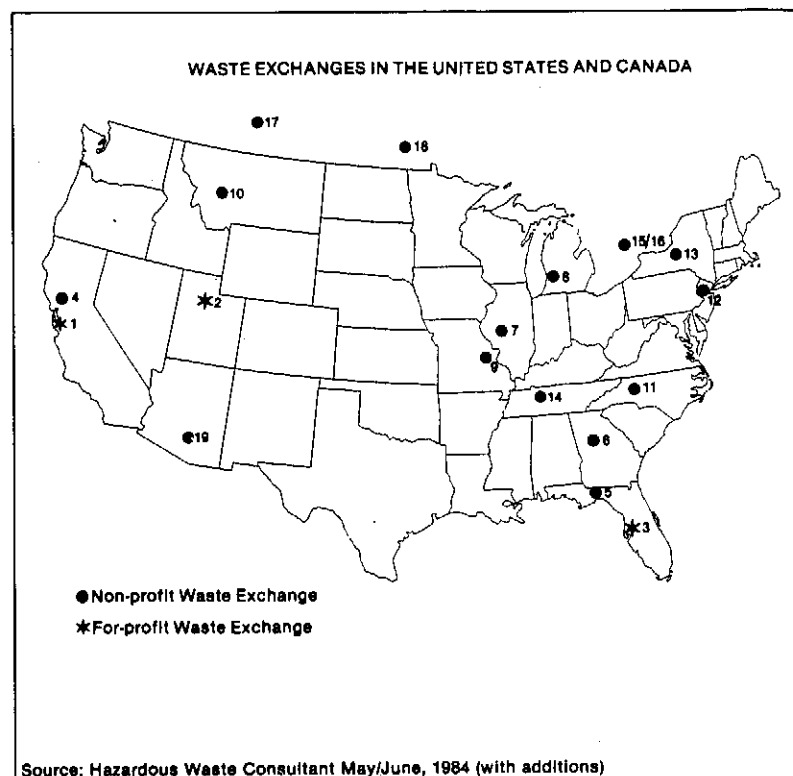
This session will concentrate on the activities of "information clearinghouse" type waste exchanges. All of the panelists for this session except Trevor Pitts from Zero Waste Systems, Inc., are from this type of exchange. Panelists may wish to comment, in their presentations, on how they interact with the more active brokerage type exchanges. In Canada, some of the most active participants in the information clearinghouse exchange are the waste brokers, who use the exchange's listings for business leads.

The concept of "waste exchange" is relatively simple. In many cases, someone out there really is looking for what someone else is about to throw out. The main function of waste exchanges is making sure that potential users know what waste is being generated and when and where it is available.

The map (Figure 1) shows the location of the nineteen waste exchanges in North America. These are also listed in the Table 1. The Midwest Industrial Waste Exchange (formerly the St. Louis Industrial Waste Exchange), established in January 1976, was the first North American Exchange. The Canadian Waste Materials Exchange was established in 1978. Several other exchanges have been formed and gone out of business between 1976 and 1985. For-profit exchanges have experienced a higher rate of failure, as indicated by going out of business, than not-for-profit exchanges. Some exchanges have become a part of the large regional exchanges such as the Pennsylvania and Maryland exchanges which have become part of the Northeast Industrial Waste Exchange. The Louisville Area Industrial Waste Exchange and the Chemical Recycle Information Program have become part of the Georgia Waste Exchange, and the Virginia Waste Exchange has become part of the Southern Waste Information eXchange. Since the history of waste exchanges in North America and elsewhere is well covered in the proceedings of the 1983 National Conference on Waste Exchange, it is not necessary to repeat these details in 1985.

The development of the waste exchange concept has been different in Canada than it has been in the United States. In Canada, a single national exchange was established to serve the entire country. In the United States, waste exchanges have been established and have grown through a number of local initiatives. Both approaches have been quite successful, but it is time to try to better understand these two alternative approaches in order to make waste exchange even more effective in promoting the

**FIGURE 1**



reuse of industrial waste in North America. Some of the data collected by the Canadian Exchange illustrate the direction in which North American waste exchanges should be collectively heading. There is a need for strong local or regional exchanges linked by national or continentwide network exchanges.<sup>1</sup>

Table 2 summarizes the activities of the Canadian Waste Materials Exchange over the seven-year period, January 1978 to January 1985. The exchange has been quite active over that period and has achieved a reasonable level of success in promoting waste transfers. Table 3 shows the geographic distribution of activity, and it is this information which leads to the conclusion that we need regional exchanges. The concentration of activity in Ontario is probably largely due to the fact that the exchange is located in Ontario. There is now a movement to establish regional exchanges, which are linked to the Canadian Exchange, to

**TABLE 1****NORTH AMERICAN WASTE EXCHANGES****FOR PROFIT**

1	ZERO WASTE SYSTEMS	CA
2	INTERMOUNTAIN WASTE EXCHANGE	UT
3	RESOURCE RECOVERY OF AMERICA	FL

**NOT FOR  
PROFIT**

4	CALIFORNIA WASTE EXCHANGE	CA
5	SOUTHERN WASTE INFORMATION EXCHANGE	FL
6	GEORGIA WASTE EXCHANGE	GA
7	INDUSTRIAL MATERIAL EXCHANGE SERVICE	IL
8	GREAT LAKES REGIONAL WASTE EXCHANGE	MI
9	MIDWEST INDUSTRIAL WASTE EXCHANGE	MO
10	MONTANA INDUSTRIAL WASTE EXCHANGE	MT
11	PIEDMONT WASTE EXCHANGE	NC
12	INDUSTRIAL WASTE INFORMATION EXCHANGE	NJ
13	NORTHEAST INDUSTRIAL WASTE EXCHANGE	NY
14	TENNESSEE WASTE EXCHANGE	TN
15	CANADIAN WASTE MATERIALS EXCHANGE	ONT
16	ONTARIO WASTE EXCHANGE	ONT
17	ALBERTA WASTE EXCHANGE	ALTA
18	MANITOBA WASTE EXCHANGE	MAN
19	WESTERN WASTE EXCHANGE	AZ

**TABLE 2****OPERATIONS OF THE  
CANADIAN WASTE MATERIALS EXCHANGE****January 1, 1978 to January 1, 1985**

NUMBER OF PARTICIPATING COMPANIES	3,700
NUMBER OF WASTES LISTED	2,194
NUMBER OF WASTES INQUIRED ABOUT	1,987 (90% of listings)
NUMBER OF INQUIRIES	15,560 (7.5 per listing)
NUMBER OF WASTES TRANSFERRED	446 (20.3% of listings)
ANNUAL TONNAGE OF WASTES TRANSFERRED	217,000 tons
VALUE OF WASTES TRANSFERRED	\$6.85 million per year

**TABLE 3****GEOGRAPHICAL BREAKDOWN OF LISTINGS,  
INQUIRIES, AND TRANSFERS. (BULLETINS 1-41)**

	LISTINGS		INQUIRIES		TRANSFERS	
		%		%		%
WEST	310	14.1	1,639	10.5	44	9.9
ONTARIO	1,240	56.5	9,563	61.4	315	70.6
QUEBEC	581	26.5	3,995	25.7	75	16.8
EAST	63	2.9	370	2.4	12	2.7
	<hr/>		<hr/>		<hr/>	
	2,194	100.0	15,560	100.0	446	100.0

stimulate waste exchange activity in the regions farther away from Ontario. Alberta and Manitoba are the first of these regional operations.

Table 4 shows the distances which exchanged wastes have travelled. As might be expected, a large proportion of the wastes has travelled less than 50 miles. A significant amount, however, has travelled over 500 miles. These longer distance exchange opportunities would have been missed by a strictly local or regional exchange. This illustrates a need for a linking of these regional exchanges through a sharing of listings for publication or through the sharing of uniform data bases. Consistent with this rationale, it may be that the Canadian Exchange would go out of business in favor of a North American network of strong regional exchanges.

There are several issues that exchanges throughout North America need to address. Each of the representatives of the U.S. exchanges in this session will describe his or her program and address some of these issues, which include:

- Advantages and disadvantages of regional, national, and continent-wide exchanges.
- How active should "information clearinghouse" exchanges become in matching wastes? When do they begin to become brokers?
- The need for a commonality of data bases which can be readily accessed by all exchanges.
- Confidentiality problems in accessing other exchanges' listings.
- Problems of establishing a long-term reliable method of funding waste exchange.
- Regulatory problems in transboundary shipment of wastes for reuse.

<sup>1</sup>French waste exchanges essentially conform to this model. See discussion on page 76.

**TABLE 4****DISTANCE TRAVELLED BY WASTES TRANSFERRED**

	<u>NUMBER OF TRANSFERS</u>	<u>PERCENTAGE OF THOSE STATING DISTANCE</u>
< 50 miles	129	35.4
50-100 miles	36	9.9
100-200 miles	34	9.3
200-500 miles	136	37.4
500-1000 miles	13	3.6
> 1000 miles	16	4.4
DID NOT STATE	82	—
	<hr/> 446	<hr/> 100.0

**NORTHEAST INDUSTRIAL WASTE EXCHANGE, *Walker Banning***

The Northeast Industrial Waste Exchange is a nonprofit waste information exchange serving industry primarily in the twelve northeastern states. Four times a year the exchange mails its catalog to about 8500 companies, some of which are located in other parts of the United States, Canada, and Puerto Rico. The Northeast Exchange was established in 1981. During its first three years of operation, the exchange transferred an estimated \$1 million worth of material, representing about 15 to 20 percent of the listings in the catalog.

Including the Northeast Industrial Waste Exchange, there are about a dozen nonprofit waste information exchanges in North America publishing and distributing periodic catalogs. With a publication frequency varying from 6 to 3 times per year, these exchanges all face a common problem: new listings may not be published for 2 to 4 months after they are received by an exchange.

An obvious solution to this problem is to develop a computer data base of listings that can be accessed by anyone with a microcomputer and a modem. Such a data base could be updated immediately whenever a new listing is received by an exchange. The data base could be searched by a client for specific material that may be of interest. It could be used to locate all material within a specific geographic area (such as state or

U.S. EPA region). A user could print a copy of the data base and have, in effect, a current catalog whenever one is desired.

The Northeast Industrial Waste Exchange has developed such an on-line data base. Access to the system is obtained by contacting the exchange and being assigned a unique password. After logging on the system and correctly entering the password, the user chooses from a menu of data options. The entire file can be viewed, or just the available materials listings, or just the wanted materials listings, or just the surplus materials listings. In addition, any one of the eleven standard waste material categories into which the catalog of the Northeast Industrial Waste Exchange is subdivided may be viewed independently. For example, if a user is interested only in acids, the entire acids file may be displayed. A search may also be made for a specific kind of material simply by entering a generic name. For example, if a user were interested in sulfuric acid, the procedure would be to first select "acids" and then to ask for a search for "sulfuric." Searches can also be made by state and by U.S. EPA region. For example, a user can quickly locate all the material in New Jersey or all the sulfuric acid in New Jersey. The same can be done for any U.S. EPA region, if the user wishes to search a multi-state area.

The primary disadvantage of the system is that the computer can be used by only one person at a time. To help solve this problem and to make the listings accessible to a larger number of people, the Northeast Industrial Waste Exchange has arranged to share computer services with the Environmental Recovery Systems Division of Chem Sources, Inc., located in Mission Hills, California. Chem Sources operates a time-sharing computer service that is accessible 24 hours a day and maintains other data files of interest to chemical recyclers. The combination of services on the East and West coast should offer significantly new marketing opportunities for firms interested in waste recycling and reuse.

Development of NIWE computerized listings service was made possible by grants from the New York State Environmental Facilities Corporation and the Maryland Hazardous Waste Facilities Siting Board.

#### **PIEDMONT WASTE EXCHANGE, *Mary A. McDaniel***

The Piedmont Waste Exchange (PWE) is a nonprofit information clearinghouse sponsored by the Urban Institute and The Department of Civil Engineering of the University of North Carolina at Charlotte (UNCC). The main purposes of the PWE are:

- To identify and bring together industrial waste generators and potential users, and

- To identify and bring together companies seeking waste management services and those companies that can provide them.

Most of the exchange's marketing activities have been in North Carolina, but the exchange has recently received EPA funds, through the state of South Carolina, to study South Carolina's waste streams to determine their potential for reuse and recycling. The exchange plans to market its services and to conduct workshops and educational programs in South Carolina.

The exchange started in Mecklenburg County, the largest county in North Carolina, in 1978, largely as a means of effecting the transfer of nonhazardous materials such as paper and aluminum. The exchange was transferred to UNCC in 1981 in order to serve other counties in North and South Carolina. Due to the continued expansion of its service area, the exchange is now considering a name change to reflect this expansion.

The Piedmont Waste Exchange was aided by the 1981 North Carolina Waste Management Act, which said in effect that prevention, recycling, detoxification, and reduction of hazardous waste should be encouraged and promoted. Landfilling would be permitted only when clearly appropriate and after other avenues had been explored. This act also created the Governor's Waste Management Board consisting of people from state agencies, industry, and local government. One of the tasks of the board was to promote research and development and to disseminate information on state-of-the-art means of handling and disposing of hazardous waste. The board was authorized to establish a waste information exchange for the state. Instead of establishing an additional exchange the board made the decision to support the PWE. The PWE itself has established an advisory board consisting of representatives from industry, trade associations, government, and environmental groups. As funding and support for the exchange have been secured, more time is being spent on the activities of the waste exchange in terms of transfer of materials.

Each quarter the PWE publishes a catalog, the *Waste Watcher*, which includes listings of materials, products, or services available or wanted. A "Notes" section includes information on PWE services and activities, current federal, North Carolina, and South Carolina legislation related to waste, successful recovery and recycling, upcoming conferences and workshops, and other items of interest. More frequent publication of the catalog is needed and has been requested by industry. The Piedmont Waste Exchange supports the idea of a data base and shared listings with other exchanges. Since the PWE plays no part in the negotiating and actual transfer of materials, it has been difficult to compile statistics on the percentage and amounts of successful transfers. The exchange is working on a better system for collecting this kind of information. The exchange

does have examples of some of the successful exchanges it has facilitated. These include:

- A chemical company in Piedmont, North Carolina, established an on-going relationship with another firm for dispensing 3,300 gallons of chemical wastes at an earnings of \$3,600 per quarter.
- Another chemical company is selling 5,000 gallons of hydrochloric acid per week and earns \$70,000 per year.
- A manufacturing company in Piedmont, North Carolina, has a buyer for polyethylene wastes and is earning \$10,000 per year.
- A carbon/graphite products manufacturer in eastern South Carolina sold 1,600 gallons of spent naptha/MEK for an earnings of approximately \$650.
- A solvent recycling firm in the Southeast established an on-going relationship with a bearings manufacturer to recycle their solvents for an earnings of \$1,000 per month.

In addition to publishing the *Waste Watcher*, the PWE's educational activities include preparing and disseminating educational literature, sponsoring industry-specific workshops, and making presentations at industrial meetings, workshops, and conferences.

Another important function of the PWE is in the area of research. Research needs in the area of industrial waste reduction and management are identified. Research teams composed of University of North Carolina faculty, staff, students, and outside consultants work on a wide variety of waste management related topics. Examples of current and past PWE research projects are a survey of small quantity hazardous waste generators in Mecklenburg and Gaston counties; examination of the chemodynamics of mercury in biological waste water treatment systems; and a study to identify potential waste generator and user pairs.

Some of the factors the PWE has found to hamper waste exchange are transportation costs, cost of analysis of materials listed, the fact that raw materials may be less costly, lack of awareness of uses for wastes in other operations, changes in laws for disposal and storage, and liability questions.

Many factors, however, are increasing the potential for industrial recycling through waste exchanges. The cost of waste disposal is increasing as well as the cost of some raw materials. New technologies are being developed for recovering and reprocessing industrial wastes. The waste exchange can be an important link in this industrial resource recovery process with more publicity to potential users and continued cooperation with industry, governmental agencies, and citizen groups.



## INDUSTRIAL MATERIAL EXCHANGE SERVICE, *Margo Ferguson*

The Industrial Material Exchange Service works in conjunction with eight other agencies to expand its services. From all indications the exchange is significantly improving its services. Defining success for waste exchanges is fairly simple. How many transfers are occurring? How much is industry saving? How much material is being rerouted from disposal into usage? Waste exchanges are by nature informational pools. Like matchmakers of earlier years, they must do everything they can to determine what each party has to offer the other and what problems are likely to occur. Too often waste exchanges are forced to focus on activities not directly related to transfers: fund-raising, counting the number of people who respond to listings, and worrying about other exchanges taking over their territories. The fact that the federal government does not support funding waste exchanges is unfortunate. The state of Illinois, however, has been instrumental in securing funding for the Industrial Material Exchange Service, allowing the management of the exchange to spend its energies facilitating transfers instead of trying to stay in business.

Counting the number of respondents to listings is an invalid, but commonly used, index of an exchange's success. If a listing receives twenty letters and does not result in a transfer, the exchange operator should ask why. Adoption of the standardized listing form with its detailed questionnaire will allow exchanges to provide better and more complete information. Many more waste streams could be transferred if exchange operators knew and could publicize all the materials that were in them. It is preferable to forward one response letter to a listing that will result in a transfer than fifty that will not.

Exchanges that place territorial expansion of the exchange ahead of networking with other exchanges are making a grave mistake. Fortunately, the majority of the North American exchanges are working together. Many times the ability of an exchange operator to find a market for a material rests in the hands of the managers of other waste exchanges.

Waste exchanges must remember that they are a service, and if they are not meeting the needs of their clients, then they are not meeting their goals. Three crucial things that waste exchange operators must do are to listen, to be responsive, and to network. Listen and ask questions. If an exchange operator thinks more information is needed, it probably is. Be responsive. Exchanges should keep detailed files of the general and specific needs of their clients and should be prepared to give people information over the phone rather than forcing them to wait several months before a new catalog is published. Network: every contact made

can lead to another. Trade associations, the press, and the public sector can all help spread the word about waste exchanges, but the most important network one can build is through the other waste exchanges.

In April 1983 four waste exchange managers met in Chicago to develop a standardized listing form. The state of Illinois was sought as a host for the national data base. If this fails to become a reality, I may develop the data base as a commercial investment within about a year.

Although the final figures are not yet available, the Industrial Material Exchange Service provided over \$1 million in cost savings to industry during 1984 (double the rate for 1983). The Industrial Material Exchange Service counts the cost savings to industry differently than some of the other exchanges, which estimate the value of the materials transferred. Included in the Industrial Material Exchange Service's benefits to industry are costs saved in disposal, costs saved in transport, costs saved in laboratory analysis, costs saved in raw material costs, and money paid for transferred materials.

## **Discussion**

Ms. Ferguson was asked how the classification system used by the Industrial Material Exchange Service compares with the EPA classification. She responded that it is far simpler and includes eleven broad categories: acids, alkalis, other inorganic chemicals, solvents, other organics, oils and waxes, plastics and rubber, textiles and leather, wood and paper, metal and metal sludges, and miscellaneous. In response to Ms. Ferguson's contention that more wastes could be transferred if their constituents were described more specifically, one panelist felt that being too specific about your materials may hinder exchange. Ms. Ferguson replied that there are certain materials that no one wants, for example, oils containing PCBs. If one of these materials is present in a waste stream, people should be informed immediately. A contaminant like platinum, however, can generate enormous response.

## **GREAT LAKES REGIONAL WASTE EXCHANGE,** *William A. Stough*

The Great Lakes Regional Waste Exchange (GLRWE) was established by the Waste Systems Institute of Michigan, a nonprofit research and communication center. In the past the institute has conducted such studies as an analysis of small quantity generator waste in Michigan and has identified types of small generators (by SIC codes) that will probably be subject to regulation under the new RCRA cutoff of 100 kg per month.

Until July 1984 the institute published the *Great Lakes Waste and Pollution Review Magazine*. The goal of the institute was to make a passive or information clearinghouse exchange—the Great Lakes Regional Waste Exchange—financially self-supporting by combining a traditional waste exchange catalog with a magazine that contained articles for executives on policy level issues. The institute believed that it could obtain enough subscribers in addition to advertising revenues to entirely support the waste exchange operation. Start-up costs were paid by grants from several large midwestern foundations. The magazine was well received but did not attract enough subscribers among small and medium-sized companies.

In March 1985, Waste Systems Institute officially restarted operation of the Great Lakes Regional Waste Exchange, which had been discontinued when the institute ceased publication of the *Great Lakes Waste and Pollution Review Magazine*. The Great Lakes Regional Waste Exchange (GLRWE) proposes to go beyond the typical “passive” waste exchange “listing” service by providing increased follow-up and involvement in an effort to increase exchange opportunities and resolve barriers to potentially successful exchanges. GLRWE will work closely with exchange participants, trade associations, and an advisory group of waste managers to identify and document problems which inhibit exchanges. Efforts to improve the exchange service and to overcome those problems will be made. GLRWE will continue to coordinate its activities, share its listings, and cooperate extensively with other waste exchanges operating in the Great Lakes area and in Canada.

A bi-monthly “Exchange Newsletter,” distributed to between 5,000 and 7,000 businesses primarily in Michigan, will be the principal forum for communicating the listings of the waste exchange. It is the institute’s intention to work closely with the Michigan Manufacturers Association and other trade associations on the distribution of the exchange newsletter. GLRWE also intends to work on improved response techniques to listings and to investigate better computerized management of listings. It will also experiment with the idea of notifying selected industries of particular listings if there is a known potential use of a listing by that industry group.

As previously indicated, GLRWE proposes to go beyond the typical “passive” waste exchange service. Typically, a “passive” waste exchange would simply forward inquiries to the company that placed the coded listing in its exchange newsletter. No other activity would typically take place. If the original lister responded to the inquiry or if a new inquirer responded to the listing, both companies might be able to negotiate an actual waste exchange.

GLRWE proposes to pursue the waste exchange concept much more aggressively. In essence the "passive" exchange concept would only be the first step. For example, when the exchange receives the inquiry, it would forward it to the original lister, but in addition the exchange would search its listings and the listings of other waste exchanges for similar wastes of interest to the inquirer. By letter, the exchange would notify the inquirer of any similar listings and provide information on how to respond. Additionally, the exchange would create a "tickler file" on inquiries and periodically check them to determine whether the original lister did in fact contact the inquirer after the exchange forwarded the inquiry. This will also serve to provide a check on the actual effectiveness of the exchange.

In the case of a lister of available materials, GLRWE would list the waste in its exchange newsletter; however, the exchange would also immediately search its materials wanted listings and those of other exchanges to see if any of these matched the available material listing. If there were any potential matches, the exchange would notify the original lister and inform him or her how to pursue these other listings.

GLRWE also proposes, on an experimental basis, to contact various inquirers and listers and to gather information from them on possible production of or need for certain available or wanted materials as well as information on company type, industry class (SIC), number of employees, and other characteristics. This effort should help GLRWE identify the types of companies that may produce or that may be able to use a particular waste. GLRWE would then notify these companies when a particular waste becomes available or desired.

GLRWE will also experiment with various types of technical and administrative assistance that may be necessary for small and intermediate-sized businesses to participate more actively in the waste exchange. It is GLRWE's belief that only the more progressive companies that have an environmental manager or another employee with similar responsibilities are now participating in the waste exchange. In general, it is suspected that in many companies the "business as usual" approach may appear to be easier (even though perhaps more costly) than dealing with a waste exchange and the associated paperwork, phone calls, and concerns about transportation, liability, and material sampling. GLRWE will attempt to assess and where appropriate develop methods to overcome these barriers.

In the development of these more aggressive methods GLRWE sees many opportunities for computer applications for data and information management and will be experimenting with these applications as time and funding permit. This is one area where there are some very exciting program expansion opportunities.

GLRWE does not claim to have all of the various professionals "in-house" who will be necessary for assistance on this project. For this reason, GLRWE will organize an advisory group of engineers, manufacturers, lawyers, chemists and others, drawn primarily from industry, to provide voluntary assistance on technical matters when needed.

GLRWE also envisions the need to develop an effective communications network in order to solicit participation of various waste generators in the waste exchange project and to notify them of exchange opportunities, success stories, and other program-related opportunities. The exchange will attempt to work closely with the state and local Chambers of Commerce, Manufacturers Association, and other specialized trade associations to develop this important communications network.

Passive waste exchanges cannot be financially self-sufficient. Waste exchanges are typically dependent on a variety of organizations for their funding—trade associations, chambers of commerce, state organizations, and private foundations. The GLRWE needs to establish funding beyond the two-year commitment that the exchange currently has from a private foundation. GLRWE will initiate a program to convince industry that it is in their best interest to support waste exchanges.

The new RCRA amendments should have a tremendously positive impact on waste exchanges. Small quantity generators may find waste exchanges to be a low—or even a no—cost way of complying with RCRA regulations. Waste exchanges can help by identifying small, diffuse waste streams that need to be consolidated before they can be treated or reused.

All of the above discussion is provided to give an indication of the potentially broad scope of waste exchange program enhancements and developments that GLRWE would like to pursue. There are other opportunities as well, and further ideas will develop as the exchange becomes involved in these various activities. Obviously, the exchange will not be able to pursue all of the activities immediately. There are many waste exchange opportunities that have never been explored, and over the next few years the Great Lakes Regional Waste Exchange intends to experiment and test some of these ideas and as a result provide a much improved waste exchange service.

## **Discussion**

A comment was made concerning potential liability as waste exchanges become more active. If waste exchanges do not take possession of the material, then they are not considered subject to joint and several liability under Superfund. There is however a possibility that they could be included under a tort, but to date this has not occurred and is unlikely. Transporters, however, are routinely regarded as responsible parties. If a

waste exchange is involved in transportation in any way, then it may be liable. There is a great deal of case law on transporters but none on waste exchanges. Generators are liable if their waste is subsequently mismanaged, regardless of whether they use the services of a waste exchange. Those who give up waste should carefully investigate those parties that are receiving the waste. This practice should be routine, but unfortunately it is not. (See, for example, Edward J. Shields, "Guidelines for Selecting a TSD Facility," *Hazardous Materials and Waste Management* January-February 1985: 30-33.)

#### **CALIFORNIA WASTE EXCHANGE, Robert McCormick**

California has been regulating waste since 1973 when two separate departments were established, the California Waste Management Board, which has sole jurisdiction for solid or nonhazardous waste, and the Department of Health Services, which has sole jurisdiction for hazardous waste. The California Waste Exchange, established in 1976, is part of the Department of Health Services and thus only concerned with hazardous waste. The exchange began informally when one of the field inspectors, an industrial chemist, reported to the regional administrator that industry was disposing of a great deal of material that could be recycled. Within a few short months, the field inspector was spending all his time helping industry find ways to recycle waste. For example, he helped one large company recycle tailings from gypsum board manufacturing, and he managed to get truckloads of cornflakes with past expiration dates recycled as poultry feed. Such examples were enough to demonstrate a need for a recycling program.

The California Waste Exchange was basically an informal one-man operation until 1981. One of the things the California Waste Exchange does to increase its rate of exchange is to review manifests. Generators are required to send copies of their manifests to the Department of Health Services. From the manifests the department can determine exactly what waste is being generated and then can talk to the generator about recycling his specific waste. The department sends letters to generators requiring them to tell the department why the waste was not recycled. The department also sends generators a list of recyclers and asks the generators to contact them.

The department produces a newsletter catalog, which contains up-to-date information on California regulations as well as waste listings. The California Waste Exchange is funded by the \$22-a-ton California hazardous waste disposal tax. There are no fees for subscribing or listing a waste in the catalog. Forty percent of the material, about 4,000 tons of hazardous waste, listed in the first catalog was recycled.

## **ZERO WASTE SYSTEMS, INC., *Trevor Pitts***

The California hazardous waste disposal tax, which has increased 50 percent since last year, is a tremendous incentive to recycling. In addition, as Mr. McCormick pointed out, the California Department of Health Services requires generators to explain why they do not recycle their waste. Furthermore generators who do not comply with requirements to recycle may be subject to large fines.

Zero Waste Systems, Inc., founded in 1973, is the oldest active hazardous waste exchange in the United States and the fourth oldest in the world. The company specializes in organizing recycling for large or small generators of hazardous or nonhazardous waste. Local recycling centers also frequently refer hazardous waste to Zero Waste. A full range of services are offered by Zero Waste, including buying and selling of surplus chemicals, especially laboratory chemicals, and transportation of materials to landfills and treatment facilities. It should be pointed out that transportation costs are not as high as people think. A 47,000 lb. load of material, for instance, can be shipped from California to most of the United States for less than \$.06 a pound if the material is surplus. If it is waste, the costs are a little higher. Zero Waste helps people who are responsible for hazardous waste law violations by cleaning up their property, recycling their waste, and drawing up corrective action plans. Consultation on waste reduction and writing of training documents and hazardous material management plans for generators are available through the company. In the past Zero Waste reprocessed chemicals but in the future will be subcontracting all processing and will be substantially increasing its traditional waste exchange and chemical brokerage activities. Zero Waste actively solicits business through use of sales people, advertising, and direct mail. By acting as a broker in a transaction or by directly handling the material the company makes a profit. If it is determined that the transaction will not yield a profit or if the company is too busy, the person will be referred to organizations that can handle the waste, including waste exchanges. It should be noted that if Zero Waste were not paid by the generators, it could not profitably survive as a waste exchange.

Zero Waste works with established chemical brokers throughout the United States. These people have tremendous sales contacts and large files of chemical usage data. In 1984 Zero Waste's throughput was about 750 tons, of mostly hazardous waste, approximately two-thirds of which was recycled. During the first two months of 1985 Zero Waste has handled about 250 tons of nonhazardous liquid waste.

Zero Waste believes that in most waste sites, including Superfund sites, not enough of the material is recycled. At least a third of the waste

from a program like Amnesty Days could be recycled, but there are serious problems resulting from the types of contracts offered by local governments. These contracts sometimes impose all liabilities on the contractor. They often make no exceptions for types of waste that may be extremely expensive to deal with, and they do not provide for contractor input in advertising. When the new RCRA landfill bans are completely in place a program like Amnesty Days may be prohibitively expensive.

Zero Waste expects to become more active in facilitating waste exchanges in the future. Chemists previously involved with the actual reprocessing of waste will be available to participate more actively in waste exchange activities.

#### **SOUTHERN WASTE INFORMATION EXCHANGE, *Gene B. Jones***

In 1979 the Florida Department of Environmental Regulation realized it would be necessary to have a Hazardous Waste Management Program in order to meet both federal requirements and state needs. To assist in getting the proper legislation passed Florida needed to know three things:

- Whether significant quantities of hazardous waste were being generated in the state and of what types;
- Whether accidents or incidents in Florida had already taken place which were a result of improper management techniques;
- What the economic impact on Florida would be if the legislation proposed to manage hazardous wastes were implemented.

All three of these research efforts were conducted by the Institute of Science and Public Affairs at Florida State University in cooperation with the United States Environmental Protection Agency and the Florida Department of Environmental Regulation. As a result of these efforts it became clear that the solution to Florida's problems would probably require a number of waste management options rather than a single one.

One of the waste management options that has been tried both in North America and Europe is the waste exchange concept, and it was determined that this option should be implemented in Florida as well. In 1980, the Florida Chamber of Commerce, in conjunction with the Waste Management Program of Florida State University, established the Florida Waste Information eXchange (FWIX). FWIX was operated as a nonprofit service to promote cost-effective recycling and reuse of waste materials among firms. Because of a growing interest in the exchange, not only within the state of Florida but from other states as well, FWIX regionalized its operations in 1982 and became the Southern Waste Information eXchange (SWIX), offering its services to firms in other states, specifically those in the southern region of the United States.



The first FWIX catalog contained 52 listings and had a distribution of about 2,500. Since FWIX regionalized its operations, its listings have increased to over 150 and its distribution has reached approximately 10,000. The publication of the SWIX Catalog is an important tool for providing the necessary means for firms to explore the opportunities that exist in the area of waste management and to take advantage of these opportunities in a cost-effective, and, if desired, confidential manner.

Most waste exchange catalogs use a coding system for their listings. The coding of waste listings was established to provide confidentiality to the listers and to facilitate data handling. A coding system becomes just as important for management of data as for confidentiality. SWIX continues to code waste listings even if the need for confidentiality is not specified by the lister.

The SWIX Catalog is divided into several categories. There is a Materials Available section, which is designed for those who have waste materials that they are trying to dispose of. There is a Materials Wanted section, which is designed for those who wish to acquire a specific waste stream for process purposes. A Services Available section is provided for firms that offer a service in the area of hazardous waste management such as consulting, transporting, or drum cleaning. A Waste Management Notes section is placed at the end of every catalog to inform listers and subscribers of regulatory information, and upcoming meetings and events.

SWIX has experienced an average annual successful transfer rate between 15 to 20 percent of the materials listed as available. This rate is increasing with each year of operation. This increase is attributed to the fact that the southern United States has a relatively high growth rate and attracts large numbers of new businesses, many of which are high-tech. As a result there is an increasing need for the services of SWIX. Due to this high demand, SWIX is attempting to broaden its range of services to other areas of the nation through shared listings with other exchanges. SWIX is also in the process of establishing a direct on-line computer capability.



## SESSION II. LEGISLATION AND REGULATIONS

### **REGULATORY INCENTIVES FOR RECYCLING, *William M. Sloan,*** *Maryland Hazardous Waste Facilities Siting Board*

Waste exchange and recycling are generally economically sound ways to manage industrial waste and should be major components of any state's or province's industrial and hazardous waste program. Recycling is not always superior to neutralization, detoxification, or other treatment, although it is often the safest method and typically produces less residue for disposal. Recycling is also normally one of the most cost-effective means of waste management, and this relative cost advantage is a powerful incentive to recycle rather than to dispose of waste.

In this presentation, I will comment on regulatory measures to promote industrial waste reduction and resource recovery. I will also describe two pieces of Maryland legislation designed to promote recycling.

The Maryland Hazardous Waste Facilities Siting Board is not a regulatory agency. The Siting Board has the authority to override local government if that becomes necessary for a needed facility. The regulatory agency in Maryland is the Department of Health and Mental Hygiene. The Siting Board's involvement in waste reduction and recycling comes via its obligation to consider alternative methods of meeting the state's waste treatment and disposal needs. My remarks are made as an observer, which I have been for many years, rather than as a representative of a state government. My views are not the official views or policies of the Siting Board or the Maryland government.

Many people accept questionable assumptions about industry and recycling. One such assumption is that an executive will destroy the environment for a competitive edge. I believe our society is stronger than that. Another assumption is that every industrial manager is alert to every variable that might affect his or her operation. I have seen dozens of cases, mainly in small and mid-sized plants, where industrial waste could be reduced or reused at a profit—with little investment and with a payoff typically within a year—with the help of an outside consultant or a waste exchange. The failures to do so need to be examined. There is strong evidence to undercut the assertion that "industry knows what affects costs." Industry needs more incentives to examine all available options, not only those it knows about.

The usual incentives for waste reduction or recycling are subsidies in the form of low-cost loans or tax credits for capital equipment. I am told by economists that tax credits exist in the form of accelerated depreciation and investment credit provisions; it is debatable whether these are

effective incentives. Subsidies for specialized investments often increase costs by biasing decisions in less than efficient ways by attracting investment dollars that might go elsewhere for more efficient uses. These are well-developed arguments made by experienced economists. Yet any incentive except investment subsidy is dismissed as a policy option.

The only aspect of the 1984 RCRA amendments that encourages reduction or recycling of waste is the requirement that the generator certify on the manifest form that he or she has a waste management plan. No specific, readily verifiable checks are required (although a mandatory waste exchange listing has recently been suggested). Without specific checks, the regulator will generally rubber-stamp the certification. It is not realistic to think that many state regulatory agencies—there may be exceptions—can call for and evaluate plans from more than a few generators out of hundreds. Even given specific checks, effective follow-up requires prompt processing of the manifest. This has typically not been a high priority item for federal or state governments.

There are measures that regulators could implement to encourage waste reduction and waste exchange. For example, two pieces of Maryland legislation were designed to promote recycling. One, House Bill 1446, was signed into law in 1984. It states that no generator can have a waste landfilled in Maryland unless the waste has been rejected by a treatment unit or a recycler. This requirement has nothing to do with the risk involved in landfilling the waste. Even if the waste could in theory be safely landfilled, the generator would still first have to contact a treatment unit. Currently there are no commercially available landfills in Maryland, but the law does establish the context in which any future landfills would have to be established. The law takes away the least-cost option—landfilling—unless the generator has no other option.

The other bill, House Bill 244, introduced in 1985, is directly applicable to waste exchanges. The bill, as originally drafted, would have required generators to list on a waste exchange any waste to be transported off the generator's premises. That an exchange be made is not required. Behind this bill is the belief that generators are not aware of, and not using to their full capacity, available options. For example, currently on the Northeast Industrial Waste Exchange there are only 108 wastes available and 37 wastes wanted for the twelve-state marketing area. The bill would certainly increase the number of listings. A specific verification check is written in the bill so it will be possible to determine whether in fact generators are listing their wastes on waste exchanges.

The arguments against the bill are that most industrial wastes have little reuse value and that the bill is going to be a paperwork burden on industry. There is also a liability involved, but liability exists with any option chosen by the generator. Most of the arguments against the bill were

arguments against recycling, not against the mandatory provision. Certainly, however, the need for a statutory provision is debatable, and that point was also made. It was not argued that waste exchanges did not need more promotion to be effective.

The future of the bill is unclear. It may be amended to House Bill 1446, and would then only apply to waste destined for Maryland landfills. The bill in current form does permit the Health Department to make some judgments about the effectiveness of the exchange. The department can exempt a generator from listing for one of three reasons: economic hardship, disclosure of a trade secret, or if the waste has no potential for recycling. The third is legitimate issue for the exchange to determine and not an issue for a regulatory agency to predetermine.

House Bill 244 passed the House of Delegates but was narrowly defeated in Senate committee.

**FLORIDA'S USED OIL PROGRAM, PROPOSED EPA USED OIL REGULATIONS, AND THEIR IMPACTS ON USED OIL MANAGEMENT**, *Raymond L. Moreau, Florida Department of Environmental Regulation*

The Florida Department of Environmental Regulation assists industry, local governments, and private individuals to determine the best ways to deal with various wastes. The specific subject of this presentation is Florida's new Used Oil Program, which is only one aspect of DER's total program. Pending or proposed EPA regulations that will affect the used oil industry will also be discussed.

In 1984, the Florida legislature passed the Florida Used Oil Recycling Act (Chapter 403.75-403.759, Florida Statutes). This act prohibits the collection, transport, storage, recycling, use, or disposal of used oil in any manner that endangers the public health or welfare. It also prohibits the discharge of used oil into sewers, drainage systems, surface or ground waters, water courses, or marine waters. The act does not, however, prohibit the burning of used oil as a fuel, nor does it prohibit its use for road oiling, weed abatement, or dust control, except in areas designated as sole source aquifers.

The act requires the Florida Department of Environmental Regulation (DER) to inform the public of the need for and benefits of used oil collection and recycling, including encouraging the establishment of voluntary used oil collection centers and recycling programs. DER has prepared a "how-to" manual on establishing a community used oil recycling program, which is available from the department's waste management section. Currently there are only two voluntary programs in Florida, one in the Tampa Bay area and one in the Miami area.

posed range, a much larger amount of total used oil now generated in Florida would be considered off-specification and would be subject to EPA's proposed new regulations.

For further information on the EPA proposed rule, consult the January 11, 1985, Federal Register (40 CFR, Part 266). For more information concerning Florida's Used Oil Program, contact Waste Management Section, Florida Department of Environmental Regulation (904)488-0300.

#### **IMPORTANCE OF ASSOCIATIONS IN THE CONTEXT OF FEDERAL AND STATE LEGISLATION AND REGULATIONS,**

*Faith Gavin Kuhn, the Hazardous Waste Services Association and the  
National Association of Solvent Recyclers*

The Hazardous Waste Services Association (HWSA) was established in 1980 and represents generators, transporters, and treatment, storage, and disposal facility owners and operators. The main function of HWSA is to keep its members informed about what is occurring in the waste industry in the legislative and regulatory arena at the federal, state, and local level and to have some influence in that arena. Located in Washington, the association has easy access both to EPA and to Congress. HWSA was very involved with the 1984 RCRA amendments and provided testimony to Congress on numerous occasions.

The National Association of Solvent Recyclers (NASR) was also established in 1980 and represents about 60 solvent recyclers across the country. Solvent recycling entails taking solvents that are used or spent in a manufacturing process, removing the impurities by distillation, and reusing the reclaimed solvent as a new material. Solvent recyclers serve these industries that use solvents in their manufacturing processes (for example, the automotive, chemical, coatings, electronic, glass, ink, metal finishing, petrochemical, photographic, plastics, printing, soap, and steel industries). The members of NASR have many of the same interests as the members of HWSA, but the concerns of this association are much more focused on reuse, recycling, and reclamation. The solvent recyclers are currently very active in the reauthorization of Superfund. A waste end tax has been proposed that may adversely affect them.

The cover story in this month's (March 1985) *National Geographic* is about hazardous waste. According to this article, "in 1981 U.S. industry recycled barely 4 percent of its toxic byproducts, partly through waste exchanges, organizations that transfer one firm's waste to another firm as raw material. Despite the potential of waste trading, since 1979 EPA has spent almost no money and assigned only one man part-time to promote it" (p. 332). That part-time man is no longer there. At the national level

waste exchanges have not been given the recognition they deserve, but this is changing with new federal and state regulations and legislation. Federal and state regulations and legislation are indirectly supporting waste exchange and resource reuse. Although the regulations and legislation do not specifically say, "use waste exchanges" or "reuse hazardous waste," they do say "minimize waste disposal, avoid landfilling, and find new treatment methods."

The 1984 amendments to RCRA were the first environmental legislation passed in four years. The amendments can be referred to as a call for "alternative technologies" when managing hazardous wastes. Many current waste treatment and disposal methods may be banned by the new regulations. The new regulations also require waste minimization certification by generators.

The amendments require studies by the EPA to review implementing land disposal bans on all federally listed hazardous wastes. Within the next 24 months, EPA must publish a schedule for determining whether to ban the land disposal of all EPA-identified hazardous wastes. Wastes that are not banned will be subject to new minimum technology requirements. These minimum requirements call for two liners and a leachate collection system above the top liner of surface impoundments and two leachate collection systems for landfills.

Because the majority of hazardous waste in the United States is disposed of on the surface of the land, these new rules should have a disruptive effect on the present-day hazardous waste industry. A few land disposal statistics will show how sharp the impact will be. According to EPA's Office of Solid Waste, each year about 133 million metric tons are put in surface impoundments, 30 million metric tons are disposed of by injection into deep underground wells, and 5 million metric tons are placed in landfills, land treatment facilities, waste piles, and other types of land disposal facilities.

On May 8, 1985, all bulk or noncontainerized liquid hazardous waste or hazardous waste containing free liquids will be prohibited from landfills. Four months later, all regulated generators of hazardous waste must certify on their manifests that their facilities have a program to minimize the amount and toxicity of wastes generated, and that the generator's proposed treatment, storage, or disposal methods minimize the threat to human health and the environment.

The 1984 legislation calls for a re-evaluation of hazardous waste management. Recently introduced 1985 legislation supports the 1984 "alternative technology" attitude. Representative George English of Oklahoma has introduced the "Land Disposal Amendments of 1985." Representative English's bill proposes to revise the 1984 amendments and immediately prohibit the land disposal of hazardous wastes listed in

Section 3001 of RCRA. In order to encourage alternative disposal methods, Representative English's proposed legislation includes allowing Superfund monies to be used to build new treatment facilities. (It would also be useful to have legislation that would allow Superfund monies or some other funding to be used to promote waste exchanges.)

Reauthorization of Superfund will, however, indirectly help waste exchanges. The Reagan Administration's Superfund reauthorization legislation includes taxes on the use of landfills, surface impoundments, waste piles, and land treatment units. These land-based taxes are higher than all other taxes for waste treatments. This, again, was done to promote alternative technologies and to preserve our nation's water supply from land treatment contamination.

Several states including California, Illinois, Massachusetts, Minnesota, Missouri, New York, Ohio, Rhode Island, and Wisconsin have taken legislative and regulatory action to restrict the disposal of hazardous waste onto the land.

In California in 1984, the Department of Health Services reports that 71,000 tons of hazardous wastes were recycled at off-site facilities with the help of California's waste exchange and positive recycling laws. California's hazardous waste laws clearly promote recycling as do the federal RCRA rules. EPA, in its latest definition of solid waste (issued January 4, 1985), still exempts recycling from regulation. (However, it should be noted that the recyclable material is regulated up to the actual time of recycling, and after recycling if the material is disposed of onto the land, burned for energy recovery, used to produce a fuel, reclaimed, or accumulated in a speculative way.)

Members of the waste exchange community are now in an influential position. Waste exchanges offer an alternative to landfilling. Through their listings of available and wanted reusable, recyclable, and reclaimable materials, waste exchanges in many cases can give would-be disposable waste a second life, a market value, and help to preserve human health and the environment. It is very important for Congress and EPA to recognize the economic and environmental benefits of recycling hazardous waste. Without the proper legislation and regulations to legitimize the solvent recycling industry, for example, land disposal problems will only increase.

NASR members and HWSA members are dependent upon federal legislation and regulations to stay in business. Within the next year all states must complete their application for RCRA Final Authorization, which allows each state to implement its own waste management programs so long as the state's rules are equivalent to federal standards. To date (February 25, 1985), half of the 50 states have Final Authorization.



States without Final Authorization by January 31, 1986, will automatically come under EPA's control.

As the federal rules become the "bottom line" of state regulations, the need for waste exchanges grows. Anti-land disposal, pro-waste minimization legislation, and pro-recycling regulations will become national rules. Such rules certainly meet the goals of the waste exchange community. The alternative technology that Congress emphasized in its 1984 RCRA amendments has already been developed, via waste exchanges. It is time for the concept of waste exchange to be nationally endorsed as a means of minimizing hazardous waste.

## **Discussion**

The issue of ocean disposal and incineration was raised. EPA's new proposed rules on ocean incineration were issued on February 12, 1985. Ocean incineration, like land disposal, would be taxed, but the tax would not be as high.

In 1984 the focus in Congress was on reauthorizing RCRA. In 1985 all other environmental legislation will be secondary to reauthorizing Superfund. Representative English's land disposal bill, for example, probably will not go anywhere. Until last week there were no Superfund bills, but once one is introduced other bills follow quickly. It is very helpful that 1985 is a nonelection year. In 1984 there were probably many more bills because it was an election year, and everyone likes to go back to their constituents and tell them about the bills they have introduced.

Waste exchanges need to have a voice at the federal level. They need to be presented in a positive light and not just as an outgrowth of negativism toward land disposal. EPA cannot be faulted for not promoting or spending money on waste exchanges since all their funding comes from Congress. Waste exchange directors need to convince members of Congress of the value of waste exchange operations. In turn, Congress needs to endorse the value of waste exchanges through legislation. For example, there is certainly always room for an amendment to RCRA recognizing the potential value of waste exchanges.

The issue was raised that although the 1984 RCRA amendments, through land disposal bans and other restrictions, do encourage alternate technologies, they also place more restrictions on the handling of certain materials even if they are recycled. The position was expressed that companies will be reluctant to deal with products that are under the watchful eye of a regulatory agency. Ms. Kuhn responded that the intent of EPA and Congress is not to overregulate; their concern is to protect the environment by forcing those generators who are not managing waste correctly to do so. These regulations do affect recyclers, but they are

necessary, especially in light of public outcry in instances such as Love Canal and Times Beach. A substantial issue surrounding Superfund reauthorization is whether there will be victims' compensation, whether the government will be responsible for paying people for hazardous waste problems caused by private industry. In tightening its regulations government is also trying to protect itself from liability.

#### **FLORIDA'S WATER QUALITY ASSURANCE ACT,**

*Representative Michael Friedman, Florida House of Representatives*

With the passage of the Water Quality Assurance Act of 1983, Florida took a giant first step toward insuring the proper management of its hazardous waste. For the first time, the state is specifically identifying its hazardous waste problem. The act mandates that each county, or the regional planning council in the area, perform an assessment, identifying all hazardous waste generators in the area, including small quantity generators. This procedure allows each county to know who the generators are, where they are located, and the amount and type of waste that is being produced. As of March 1985, over 58,000 surveys have been distributed to potential hazardous waste generators, and twenty counties have completed their assessments.

The act also initiated a small quantity generator notification program, whereby all small quantity generators are notified by mail of their legal responsibilities and are required to indicate to the county and the state how they intend to properly dispose of their wastes. Each county is required to audit twenty percent of all small quantity generators each year to verify that their wastes are being managed properly.

"Amnesty Days" were created by the act to heighten public awareness of the need for proper disposal of hazardous waste by allowing citizens to dispose of very small quantities of waste free of charge. Thanks to the efforts of my colleague, Senator George Kirkpatrick, who will speak later today, this program has been very successful. Amnesty Days generated public awareness and community support for appropriate waste management, including waste exchange and recycling of waste.

The act also mandates that each county select a site for a transfer facility, that each regional planning council select a regional site for a storage and treatment facility, and that the Environmental Regulation Commission designate a site for a multipurpose storage and treatment facility. Even though facility operators are not restricted in selecting their own sites, there is a greater chance of success for a facility operator at a publicly selected site. It is imperative that Florida be prepared to properly manage most of its waste at home. Someday Florida may be denied access to the facilities in Alabama and South Carolina.

If generators are not given any reasonably priced alternatives for disposal of their wastes, they are going to dispose of it on the ground. In many parts of Florida, including populous south Florida, what you put on or in the ground ends up in the ground water, the source of over 90 percent of Florida's drinking water. In order to remove waste from Dade County, you have to collect it, to reduce its volume, and to look for opportunities to recycle or redirect it. One way for generators to manage waste properly and cost-effectively and to reduce its volume is through a waste exchange.

The Water Quality Assurance Act provides numerous incentives to industry. The act allows facility operators to receive a tax credit from the state for all environmental studies performed in connection with a specific facility permit application. In addition, after the local assessments are completed, industry will have access to an indepth marketing study of the amount and types of hazardous waste generated in Florida without spending a penny. Finally, industry will be provided options by local, regional, and state government concerning possible site locations for management facilities. Under the old law if a county did not want a hazardous waste facility, the facility developer had to appeal to the regional planning body, which consists primarily of local officials. The law has now changed so that the appeal goes directly to the governor and the cabinet, which should increase the chances of siting these much needed facilities.

Even though Florida has made tremendous strides in the area of hazardous waste management with the passage of the Water Quality Assurance Act, more needs to be done, such as:

- Florida needs to assure small quantity generators that proper means of off-site management is available at a reasonable cost. The staff of the House Committee on Community Affairs of the Florida Legislature is contacting representatives of waste management companies to see what alternatives can be provided to these small quantity generators. During March 1985, two waste firms, Chemical Waste Management and GSX, Inc., will establish pilot programs in Florida, one in Alachua County and one in Dade County, because they believe it is profitable to do business here. If these programs prove successful, the legislature will do all it can to broaden the scope of these pilot programs to provide small quantity generators with these much needed services.
- The legislature needs to continue to push for the siting of multipurpose facilities in Florida. Florida must begin to take responsibility for the proper management of a major portion of its waste, although certainly much can be gained from learning about the programs

other states have developed. These facilities will take a minimum of five years to build and to become operational.

- More technical services need to be available for small quantity generators. The staff of the House Community Affairs Committee is currently examining a progressive program in Georgia through which small quantity generators are contacted personally and informed of ways in which they could reduce their waste stream and thus save dollars. Possibly a similar program could be instituted in Florida at a minimal cost. Government should not reprimand generators for generating waste, but should ensure that these generators are given information and proper management options so that the state's precious water supply does not become contaminated.

On a final note, if you have any recommendations or comments concerning Florida's hazardous waste program, please send them to the House Community Affairs Committee, 326 House Office Building, Tallahassee, Florida-32301. Florida still has much to learn and your input is invaluable.

## SESSION III. SERVING PUBLIC AGENCIES

### WASTE EXCHANGES AND STATE AGENCIES, *William Child*

Before the early 1970s there was little perceived need for waste exchanges in the United States. Most generators used the landfill for hazardous and nonhazardous waste. These wastes were then burned. You could tell where the landfills were by the black cloud of smouldering debris on the horizon, usually in a poor part of town, almost always in a river bottom. Around 1970 many people became concerned about disposing of all waste materials in that same open dump. Thus we saw the beginning of environmental protection agencies and solid waste enforcement acts.

The waste exchange principle was an outgrowth of the 1976 Resource Conservation and Recovery Act (RCRA) by which hazardous waste was defined and regulated by the federal government for the first time. Many states, for example, Illinois and California, had already started regulating hazardous waste. In the 1970s Illinois established its first waste exchange. This exchange was an outgrowth of the Missouri Waste Exchange. The name of the Illinois exchange was later changed to its current name—the Industrial Material Exchange Service.

With the passage of the Comprehensive Emergency Response and Compensation Liability Act in 1980 (CERCLA), waste exchanges became even more important. Under CERCLA all generators and transporters, as well as anyone who has had anything to do with a hazardous waste disposal site that is leaking, may be termed liable. Under this liability, these parties may be sued for triple damages if they do not clean up the sites.

About one-third of the current CERCLA (i.e., Superfund) facilities are municipal landfills. States that have not chosen to site hazardous waste management facilities within their state boundaries may also be affected by this liability. They, along with all other generators, could potentially be named as responsible parties for clean up of leaking sites that have received their wastes. Many of these sites, which can be considered pre-RCRA facilities, were not properly lined, and may not have been located in the proper geological setting. This liability, along with the new RCRA amendments, is going to force generators to look for alternative waste management methods, of which waste exchange is certainly one.

In Illinois several real success stories have occurred as a result of the waste exchange. For example, in Chicago there were about 10 million pounds of cyanide contaminated X-ray chips. These were discovered after a worker was overcome by fumes and died. The waste exchange was

instrumental in transferring some of those chips to plastic recyclers. In Illinois waste exchanges are being included in Superfund cleanup activities. The state is requiring clean-up contractors to look at the exchange potential of the waste found at the site. At one site, an abandoned solvent site, the state anticipates that at least some of those wastes will be reclaimable or recyclable through the waste exchange. Every waste stream in Illinois must be accompanied by a permit whether it is destined for recycling, treatment, resource recovery, incineration, or final disposal in the land. A permit is issued for every waste stream that enters landfills. For recycling facilities and resource recovery facilities, the state issues what it terms a generic permit by which, for example, all trichloroethylene wastes may be accepted under one permit. This gives a market advantage to the recycler. Many of these permits have been reviewed for the potential of the waste for waste exchange. By examining approximately 500 of these landfill permits, it was found that 22 million gallons of waste could have been recycled.

As of January 1, 1987, hazardous waste will be banned from landfills in Illinois unless a certification accompanies the waste stating that the waste has been reviewed to determine whether it is recyclable or treatable. Part of that certification will probably require the generator to certify that the waste was offered to a waste exchange. Illinois is also considering acting as a host state for the national data base. The state has a firm commitment to the waste exchange principle and has been funding the waste exchange for a number of years and will continue to do so. By hosting a national data base, Illinois will further its commitment to waste exchange.

#### **THE WASTE MANAGEMENT PROGRAM AT FLORIDA STATE UNIVERSITY, *John U. Martin, III***

The bulk of hazardous waste in educational institutions is generated by universities, particularly those with programs in chemistry, physics, engineering, and medicine. Florida State University has very strong programs in the natural sciences and also generates its fair share of waste materials.

As part of the university's waste management program, before material is disposed, an effort is made to transfer that material to someone else in the university. Materials are picked up and brought to a central facility where reusables are sorted out and unknown materials are identified. The university has saved a great deal of money through internal recycling and exchanging of chemicals, some of which are extremely expensive. The State University System, which consists of nine universities, has also begun a chemical exchange among the universities. Im-

proved monitoring and control of chemical purchases has also been instituted by the State University System.

The most prevalent item in Florida State University's waste stream is bulk solvents. The university also generates a substantial amount of very low level radioactive waste. The University of Florida in Gainesville has an agreement with a local industrial group to reprocess some of its solvents, but by and large the State University System has been told in the past that it does not generate enough solvents to make recycling economically feasible.

The SUS has considered establishing a state-of-the-art incinerator facility to handle waste generated by public agencies and others. In certain states, universities have taken the lead in this regard by working with the private sector to develop proper and innovative ways to dispose of hazardous materials. The university has faced opposition on several fronts: the private sector has complained that developing and operating such a facility should be in their domain, and the local people have said that a facility in Tallahassee should not handle waste generated elsewhere.

There is potential for the State University System in Florida to work with waste exchanges. Waste exchanges have helped other universities deal with portions of their waste streams. For example, the University of Illinois, Chicago, transferred 165 pounds of ammonium nitrate and 200 pounds of tin through a waste exchange. Southern Illinois University transferred 100 pounds of mercury. There have been some changes in the education sector, but there still remains much for universities to do to improve their waste management programs.

## **Discussion**

The discussion centered on what other states are doing and on some of the particular problems faced by universities. Texas A and M University is building a state-of-the-art incineration facility and is using some of its clean solvent waste in the university's steam-producing plant, injecting it along with other regular fuel. The University of North Carolina at Chapel Hill and Duke University are considering development of some processing capability.

In many cases it is easier for a university to dispose of materials than to recycle them internally since many researchers will not accept a material unless it has a guaranteed purity. There is also the general problem of recycling or treating small amounts of material that are generated irregularly.

## **DEFENSE PROPERTY DISPOSAL SERVICE,<sup>1</sup> *James E. Scales***

The Defense Property Disposal Service (DPDS), a Department of Defense (DoD) organization assigned to the Defense Logistics Agency, is responsible, with certain exceptions, for the worldwide management of Department of Defense surplus property. The service maintains more than 200 offices and property locations throughout the United States and in eighteen foreign countries. The paramount mission of the Defense Property Disposal Service is to effect the reutilization of all types of DoD generated excess material, including hazardous materials. This material may be redistributed to other federal civil agencies or to other authorized parties. Material not reallocated in this way, unless otherwise prohibited, is generally sold to the highest bidder. Implements of war, such as automatic weapons, tanks, battleships, and combat aircraft, are only sold after they have been demilitarized. The DPDS also operates a precious metal recovery program.

DPDS is vitally concerned with the disposal of hazardous property and is dedicated to ensuring that such disposal is accomplished in an environmentally acceptable manner. Sales of such material is limited to properly licensed and permitted individuals and firms. If the property cannot be disposed of through sales, then it is disposed of by means of a service contract. For many years DPDS has worked closely with recyclers, including the National Association of Recycling Industries and the Institute of Scrap Iron and Steel. More recently, DPDS has collaborated with various waste exchanges in seeking customers.

<sup>1</sup>The Defense Property Disposal Service (DPDS) will be redesignated as the Defense Reutilization and Marketing Service (DRMS) effective July 1, 1985.

## **CONCLUSIONS, *Margo Ferguson, Industrial Material Exchange Service***

The public sector handles a great deal of waste through its own activities as well as through fulfillment of its regulatory responsibilities. Waste exchanges and recyclers should do everything in their power to work with this sector. Some of these agencies, for example the DPDS, have to operate within certain time limitations, but waste exchanges should be flexible enough to accommodate to the needs of such agencies. Serving the public sector is one of the most exciting areas of development for waste exchanges.



## **SESSION IV. WASTE EXCHANGE AND HIGH-TECH INDUSTRIES**

### **INTRODUCTION, *Richard Floyd, Union Carbide Corporation***

There is no single, clear definition of "high-tech," although all of us have a sense of what "high-tech" means. Most obviously a high-tech industry is one centered around some sort of sophisticated and rapidly changing technology. These industries are also frequently highly automated. The computer, robotic, pharmaceutical, electronics, aerospace, genetic engineering, and biochemical industries are examples of high-tech industries.

High-tech industries have been hailed as "clean industries," and all fifty states as well as many foreign countries have programs in place to attract such industries. According to a recent article in *World Wastes* (Tapscott, February 1985:24), high-tech industries, however, generate more hazardous waste than is generally assumed. A 1980 report by a Task Force composed of representatives from Tufts University, Communication Workers of America, the National Campaign Against Toxic Hazards, and the Clean Water Action Project estimates that 20 percent of the total hazardous waste in this country is produced by high-tech firms. Wastes are not always managed properly by high-tech firms. For example, in Silicon Valley, the most concentrated area of high-tech industry in the nation, more than 100 potentially dangerous hazardous waste sites have been located. Santa Clara County has more EPA Superfund cleanup sites than any other county in the country (*Newsweek* February 25, 1985).

What kind of wastes do these industries produce? They can be very esoteric, and they present a challenge to waste exchanges because markets for them are particularly hard to find. It is relatively easy to find people to take waste oils or acids and bases, but it is much harder to find markets for other materials. There is, however, certainly a need for waste exchanges to work with high-tech industries. Our first speaker, Mr. Robert McCormick from the California Waste Exchange, will discuss his experience with high-tech industries in California.

### **THE CALIFORNIA WASTE EXCHANGE AND HIGH-TECH INDUSTRIES, *Robert McCormick, California Waste Exchange***

Californians, like other Americans, have fallen in love with high-tech and enjoy the good things that these industries provide. At the same time, there are costs to be paid, one of which is the time, effort, and

money needed to properly handle the wastes high-tech firms produce. Getting these wastes recycled is a challenge to the California Waste Exchange (CWE) as it is to other waste exchanges.

Before discussing high-tech specifically, it is important to point out several aspects of California's waste management program that affect waste exchange. In California, waste management is regulated by two state agencies, the California Waste Management Board, which is responsible for solid waste, and the Department of Health Services, which is responsible for hazardous wastes. A new department regulating both solid and hazardous waste is expected to be established, but as of April 1985, the California Waste Exchange as part of the Department of Health Services is responsible only for the exchange of hazardous waste. California has developed its own criteria to identify hazardous wastes. Because these criteria are more stringent than those of other states, many more wastes fall into the hazardous category. California has defined waste to include recyclable materials. This was considered necessary because many generators were avoiding the hazardous waste regulations by falsely claiming to be recycling. As a point of fact, over 20 percent of the facilities on California's first Superfund clean-up list were recyclers. Although there are a number of important exemptions that allow some recycling to be unregulated, most recyclers have to manifest their waste and have it transported by a hazardous waste hauler to a permitted facility. These requirements may inhibit recycling activities. California is presently attempting to rewrite its hazardous waste laws and regulations to reduce the regulatory burden on recyclers.

What is high technology? Without attempting an elaborate definition, I will define it operationally as those manufacturing processes that incorporate the most advanced technology. California has many industries that utilize advanced technologies. Aerospace, computers, electronics, photocopying, and medicine are the more important ones. My experience has been primarily with the aerospace industry, which is located mostly in Southern California, and the computer industry, which is concentrated in an area called Silicon Valley in Northern California. One thing these two industries have in common is that each is dominated by a relatively small number of large companies. However, a whole host of medium and small companies support these large corporations. Some of these support companies are very small, even though they use very sophisticated technology. For example, some printed circuit board manufacturers have as few as ten employees. The same is true of electroplating, machine, and other specialty shops.

What kinds of services has the California Waste Exchange rendered to these high-tech industries? The California Waste Exchange has helped them avoid the high cost of disposal, which results in a reduction in the

amount of material being landfilled as well as savings in the use of virgin material.

What kinds of materials from high-tech industries have been transferred through the California Waste Exchange? All kinds. The following are some examples:

- *Alkalis*: Or more precisely, sodium hydroxide solutions. Many of the aerospace companies use a process called chemical milling whereby a part is introduced into a bath of sodium hydroxides until the metal reaches a predetermined thickness. As a result, a large quantity of sodium hydroxide waste is generated, often contaminated with aluminum. This waste has been successfully recycled for use in water treatment systems or for use in the treatment of waste acids.
- *Magnesium turnings*: Both the aerospace and the computer industries use a lot of magnesium because it is so light. California considers the turnings hazardous because magnesium reacts with water to form hydrogen, a highly flammable and explosive gas. Magnesium is also ignitable as a solid. Landfill operators do not like to accept magnesium because of its reactivity. The CWE has been able to get a large amount of this waste recycled.
- *Solvents*
  - Hydrocarbons—all types.
  - Aromatics—toluene, xylene.
  - Oxygenated solvents—MEK, acetone, cellosolve.
  - Halogenated solvents—Freon, perchloroethylene, trichloroethane.In California there are twenty permitted, off-site solvent recyclers that can reclaim through distillation and filtration many solvents for reuse. There has not been very much transfer of solvents without reprocessing for use by another company. Many companies in the Silicon Valley use high purity solvents—more correctly titled “electronic grade” solvents. When the electronic grade solvents become spent, they are still often purer than most industrial solvents. Many companies could use the spent electronic grade material without any refining at all. Very little of this material is being exchanged between solvent users. The generator typically prefers to send it to an off-site recycler.
- *Sulfuric acid*: The aerospace and the computer industries both produce large quantities of sulfuric acid waste. Silicon chip manufacturers produce acid waste that would be considered pure by almost any other industry’s standards. There are two sulfuric acid manufacturers in California. They burn acid waste to generate sulfur trioxide, which can then be reacted to form new sulfuric acid. For this process to be economical, the waste acid should have a concentration of 60 percent or greater. Other waste acid has been used in agriculture as a

soil amendment (to adjust the pH of the soil and also to neutralize waste alkalis).

- **Mercury:** Large quantities of mercury waste are generated by high-tech companies, mostly from scientific instruments. Recently CWE helped to recycle 800 pounds of mercury from one aerospace company.

In terms of volume the most common material being recycled from these high-tech industries is solvents, while in terms of value, it is precious metals. Many of the components produced by high-tech industries are plated with gold or silver. The spent metal baths have a high intrinsic value, but they are classified as a waste according to California law. For economic reasons, they are typically recycled. Even though a drum of spent plating solution containing precious metals may be insured for \$10,000, it is still considered a hazardous waste and must be treated as such.

Sometimes the California Waste Exchange prevents an exchange from occurring. For example, one company had several hundred thousand gallons of high concentrate ammonium thiosulfate. The waste generator proposed converting it to ammonium sulfate and using it as a fertilizer. However, when the CWE found that there was also a large amount of xylene present in the waste and no explanation of how this would be eliminated or proof that the xylene would not be taken up by the plants, the company was told to investigate other alternatives. Another company wanted to use galvanizing waste in fertilizer. Galvanizing waste is high in zinc sulfate, and zinc is an essential nutrient for plants. However, the presence of a high amount of boric acid, a substance which in high concentration acts as a phytotoxic agent, negated the use of the waste this way. It is the position of the California Waste Exchange that preventing recycling that may be harmful to human health or the environment is as important as promoting recycling itself.

Very few of the rare or exotic materials from high-tech industries are being recycled, at least off-site. Some may be recycled on-site, in which case the generator does not need a permit. A company was recycling hydrofluoric acid, much of which is used by the computer industry. This company closed in 1974 but is currently conducting a market survey to determine if reopening is economically feasible. Because of the increase in volume of hydrofluoric acid as well as changes in certain environmental regulations such an operation may now be feasible. Several other companies are exploring the possibility of salvaging drums from photocopying machines. These drums are coated with toxic material, usually selenium arsenide. Currently the drums are being returned to Japan for reclamation. The selenium arsenide is of limited value, but drums themselves are worth recycling.

The California Waste Exchange has found that high-tech companies are not much different from other types of companies. Some are more than willing to do everything possible to recycle, whereas others are not as concerned with recycling even when it is readily available. For example, the aerospace industry uses millions of gallons of coolant oils each year. When metals are machined, it is necessary to spray an oil and water mixture onto the cutter to dissipate the heat buildup and to prevent damage to the equipment. Equipment is available to recycle this waste, and there are also commercial recyclers with mobile equipment who can come on-site and recycle this waste for immediate reuse. Companies would realize a substantial savings if they were to recycle. Unfortunately, many recycling opportunities are being missed. It can only be concluded that some of these companies are still operating under the "throw-away ethic."

California is actively trying to reduce the amount of hazardous waste being landfilled. In 1976, there were twelve Class I sites (sites where hazardous wastes were permitted to be buried); now, there are six. Some were found to be leaking into the environment. At others, the facility operators did not want to comply with the EPA-mandated insurance requirements. The state of California wants to prolong the lives of the existing sites as it is now almost impossible to site a new Class I site. The state is also increasing the tax on hazardous waste. (The tax has increased from \$0.60 a ton in 1976 to over \$22.00 a ton in 1985 for most hazardous wastes and is expected to increase annually.) Specific wastes have also been banned from landfills, including solutions of certain toxic metals (arsenic, mercury, cadmium), cyanide, low pH acids, and liquid halogenated organic compounds above certain specified concentrations. The waste generator must either treat or recycle these wastes. Several incidents caused the state to implement its landfill ban regulations. For example, a Silicon Valley firm sent 80 drums of silicon tetrachloride to a Class I site for burial. During the rainy season (some six months later), the moisture reacted with the material and generated enough hydrochloric acid fumes to close a major highway for several hours. Because of California's policy of discouraging land disposal, more material will probably be recycled, which should result in an increased use of the California Waste Exchange.

The state of California works closely with trade associations to educate their members. Trade associations are encouraged to begin to assist in the development of strategies for handling the waste of their members. Much material is not recycled because each generator produces it in such a small quantity, but if all the material was collected and brought to a central place, recycling of the waste may become economically feasible. In the oil industry, an association has been

managing the waste of its members for fifteen years. A new organization, Recycling Managers Association, has formed in Silicon Valley to bring managers together to discuss recycling. The Department of Health Services has established a new unit to assist industry in reducing the amount of hazardous wastes generated.

Many companies have a legitimate concern about recycling because of the legal concept of strict liability. Strict liability holds that the waste generators are liable for their waste under all circumstances. Even if generators act in a reasonable, prudent way they are still liable if their wastes are mismanaged by the recycler.

My perception of high-tech companies has changed considerably—from one of clean, problem-free companies to one of companies that require ongoing state supervision. California's Superfund list contains the names of some of the nation's largest high-tech companies. People have expected high-tech solutions to high-tech problems, but the experience of the California Waste Exchange has been that solutions for high-tech firms are based on the same principles of chemistry and of economics as those that govern the management of wastes produced by other types of industries.

#### **HIGH-TECH IN CANADA, Robert Laughlin, Canadian Waste Materials Exchange**

Compared with the United States, Canada has little high-tech industry. There is no genetic engineering industry and little pharmaceutical industry with the exception of some production of insulin. There is a flourishing biotechnology industry in Canada associated with the production of rye whiskey, and there is some aerospace and aircraft industry. For example, the manipulator arm for the space shuttle was developed and built in Canada. The largest high-tech industry in Canada is the telephone switching gear and telecommunications equipment industry. A number of these firms are concentrated near Ottawa in an area called "Silicon Valley North." The Canadian Waste Materials Exchange has been able to place solvents from its high-tech industry directly with paint manufacturers without the material being recycled. Uses for both magnesium and titanium scrap have been found through the exchange. About 100 laboratory chemicals from Bell Northern Research were transferred through the exchange. The exchange is also looking for waste acids to enable one company to develop a system for recovery of precious metals from sewage sludge incinerator ash from the Ottawa area. Canada, like the United States, has a mobile hydraulic oil reclaiming service.

## **REUSE OF WASTE MATERIALS FROM HIGH-TECH FIRMS,**

*Trevor Pitts, Zero Waste Systems, Inc.*

High-tech industries generate, or at least use, very aggressive chemicals. The by-products of high-tech industries are also sometimes hazardous. When a technology is new, a relatively aggressive chemistry is at first used. As the technology matures, the chemical processes change. For example, the amount of solvents utilized by the semiconductor industry is probably going to decline because of the introduction of a new process which marks or layers the silicon directly without the use of masking that results in large amounts of solvent waste. This early use of aggressive chemicals can cause research and development problems, especially in light of the 1984 RCRA amendments. For example, Zero Waste has one customer whose research project in Colorado is at a stand-still because no one can accept the waste as is and acquiring the necessary permits to pre-treat the waste will take a prohibitively long time. Not only will a firm have to design a process that works, but it will also have to generate by-products that can be legally disposed at reasonable costs. This may result in having to skip an entire generation in product development, thus eliminating sales revenue from an earlier, more primitive process to fund the development of a later, improved version. This will result in higher cash and time requirements for new product and process development for high-tech industries. Zero Waste Systems expects many of its customers to leave the United States for a more realistic regulatory environment such as exists in Asia.

Examples of currently used aggressive chemicals in the electronics industry are hydrofluoric acid, silanes, phosphines, arsine and in the genetic engineering industry, dichloromethoxyphosphine. Some aggressive chemicals are also unstable and tend to break down into chemicals that are not nearly as hazardous when they react (with water, for instance) though the reaction itself may be violent. Waste exchanges may not be aware of many of the exotic items used by high-tech industries because they are low volume or surplus items that do not have to be manifested. Also, their market value as a waste can be very low due to the extreme purity requirements of high-tech companies.

Generally, high-tech companies are good suppliers of waste and surplus materials, but bad demanders. Zero Waste Systems originally earned its income by selling a waste which was a solvent mixture contaminated with a trace of photosensitive resin to a paint manufacturer who could tolerate the resin. No processing was required. It is generally impossible to go the other way (i.e., low-tech industry waste, process it, and ship to a high-tech company) because high-tech companies have extreme quality-control demands for raw materials.

## CONCLUSIONS, *Richard Floyd, Union Carbide Corporation*

I would like to conclude this session with some comments on the Investment Recovery Association. There is clearly a need for an association of waste exchanges, and I think there is also a need for similar organizations for generators. The Investment Recovery Association was formed twenty years ago, but was not incorporated until 1979. It is composed of generators of surplus who have joined together to promote the reuse, sale, recycling, or scrapping of those assets. The association is considering the possibility of associate memberships for organizations like waste exchanges that are involved in the process but that are not recyclers or end users. Originally the members of the association dealt primarily with used equipment, then scrap metals, then valves, pipes, and electrical materials, and more recently chemicals, plastics, and recyclable waste. Within the association is a Chemical Commodity Committee, which concentrates on chemicals, plastics, and recyclable wastes. This committee holds workshops at every semi-annual conference of the association. These workshops are an opportunity to obtain information on specific opportunities, problems, and concerns and to share experiences. I would encourage generators to consider joining the Investment Recovery Association.



## **SESSION V. SMALL QUANTITY HAZARDOUS WASTE GENERATORS**

### **SMALL QUANTITY HAZARDOUS WASTE MANAGEMENT,** *William A. Stough, Great Lakes Regional Waste Exchange*

Small quantities of hazardous waste were first considered a management issue with the passage of the Resource Conservation and Recovery Act of 1976 (RCRA). RCRA regulations enacted by EPA defined small quantity generators (SQGs), for the first time, as those establishments that produce 1000 kilograms of hazardous waste or less each month. Establishments that met this criterion were exempted from all RCRA hazardous waste regulations. Subsequent reevaluations of the impact of placing the cutoff level at 1000 kg/mo resulted in increased public and Congressional pressure to reduce the level of exemption. In the winter of 1984, federal action was initiated that lowered the ceiling for SQG exemption to 100 kg/mo. For the first time many service industries and medium to small manufacturing companies that previously had no experience with waste management laws were brought under federal hazardous waste management regulation.

The Resource Conservation and Recovery Act was enacted as an amendment to the Solid Waste Disposal Act of 1965. RCRA established the nation's first hazardous waste management system under Subtitle C of the Act. Following enactment, public attention and enforcement action focused on large quantity generators, which were estimated to be responsible for 99 percent of the 150 million metric tons of hazardous waste generated annually in the United States.

The first major package of regulations covering hazardous waste management was promulgated by EPA in May of 1980 to implement Subtitle C of RCRA. The regulations, which became effective on November 19, 1980, put into place waste identification, manifesting, transportation, and interim status treatment, storage, and disposal requirements. As a result of an EPA decision at that time, SQGs that produced 1000 kg/mo (approximately five 55-gallon drums) or less were exempted from all hazardous waste regulations. This decision was based on the belief that SQGs were responsible for only one percent of all hazardous waste generated. This exemption allowed this group of generators in most states to legally dispose of their wastes in sanitary landfills. In addition, SQGs were not required to containerize hazardous waste in an approved manner or to notify transporters they were accepting hazardous wastes.

As the original RCRA legislation approached expiration, Congressional debate on its reauthorization and amendment focused on the SQG

loophole. The House Subcommittee on Commerce, Transportation and Tourism requested that the Office of Technology Assessment (OTA) review the basis for EPA's initial policy to exempt from regulation generators producing less than 1000 kg/mo of hazardous waste. OTA's analysis indicated that EPA's decision to set the exemption level at 1000 kg/mo was technically unjustified. OTA concluded that the volume of hazardous waste generated by small quantity generators had been significantly underestimated and recommended that the exemption level be lowered to 100 kg/mo or less. OTA also suggested that use of sanitary landfills by SQGs be minimized and that EPA be provided the flexibility to establish regulations for SQGs. This basic position was supported by many special interest groups including the U.S. Chamber of Commerce and the National Solid Waste Management Association during public hearings on RCRA's reauthorization.

On November 8, 1984, the President signed the Hazardous and Solid Waste Amendments of 1984 (PL 98-616), which also reauthorized the Resource Conservation and Recovery Act through 1987. The new amendments, which had overwhelming bipartisan support in both the House and Senate, represent a major new thrust in hazardous waste management in the United States and perhaps a new tendency on the part of Congress toward increased detail in its environmental legislation.

Most important to our discussion is the amendment to RCRA Section 3001--Small Quantity Generator Waste (Table 1). It is one of the most far-reaching sections of the bill in terms of the number and types of businesses affected. The amendments specify that EPA must write standards for hazardous waste generated by those establishments producing between 100 and 1000 kg/mo. Once rules are developed, the changes provide EPA the flexibility to vary from conventional Subtitle C regulations to strengthen or reduce regulations enough to protect public health and the environment. However, if EPA fails to issue rules by March 31, 1986, small quantity generators that produce more than 100 kg/mo, will automatically be governed by existing regulations to use a manifest, dispose of waste only in a RCRA interim status, or permitted, hazardous waste facility, and will be prohibited from accumulating waste on-site for more than 180 days (unless the waste must be transported more than 200 miles, in which case it may be stored for 270 days, provided no more than 6000 kg is stored during the 270 days), file exception reports, and retain manifest records for a minimum of three years. Beginning August 5, 1985, SQGs will be required to use the national uniform manifest on all shipments of waste off-site.

EPA estimates that 100,000 businesses will be affected by the new regulations. For the great majority of such industries as laundries, auto repair shops, printers, and some wholesale and retail stores, it will be

**TABLE 1**  
**SUMMARY OF THE 1984 AMENDMENTS TO RCRA**  
**SMALL QUANTITY GENERATORS (SQGs)**

1. **Management Standards:**
  - by March 31, 1986, EPA must promulgate standards for waste generated in quantities greater than 100 and less than 1000 kg/month. The standards may vary from the conventional Subtitle C regulations, but must protect human health and the environment.
  - Until the effective date of the standards, within 270 days of enactment, SQG waste that is not managed at a permitted Subtitle C facility may be disposed of only at a state-approved municipal or industrial facility.
  - At a minimum, the standards must provide that: (1) on-site storage may occur for 180 days without a permit,\* and (2) all other management of SQG waste must occur at a Subtitle C facility.
  - If EPA fails to promulgate standards on time, SQG waste generated above 100 kg/month becomes subject to the "minimum" requirements described above plus exception reports and retention of manifests for three years.
2. **Manifest:** Within 270 days of enactment, waste generated in quantities between 100 and 1000 kg/month must be accompanied by a Uniform Manifest.
3. **Reports to Congress:**
  - By April 1, 1985, EPA must submit a study characterizing the generators, wastes, practices, and the risks posed by wastes generated in quantities less than 1000 kg/month.
  - By April 1, 1987, EPA must submit studies on (1) the feasibility of establishing a licensing system whereby transporters assume the responsibilities of SQGs, (2) the merits of retaining the existing manifest system for SQG waste, and (3) the problems associated with the disposal of hazardous waste generated by educational institutions.
4. **Public Education:** Within 30 months of enactment, EPA must inform SQGs of their responsibilities under the 1984 amendments. \$500,000/year is authorized by FY 1985 through 1987 to perform this task.

\*The on-site storage period may be extended to 270 days for waste that must be transported more than 200 miles, provided that no more than 6000 kg of such waste is stored during this period.

their first experience with federal hazardous waste regulations. It is unlikely that these businesses are even aware that they are hazardous waste generators; they are probably unaware that there is even a program to regulate the management of hazardous waste. They may also be forced to deal with a potential adverse public reaction when it becomes apparent that they are hazardous waste generators and have been sending hazardous waste to the local solid waste landfill. The challenge for them will be to manage their wastes properly at an affordable price. Prohibited from using local solid waste landfills, small quantity generators will demand new services from permitted facility operators, from recyclers, and from other firms that can properly reuse their wastes.

The new requirements will be complicated and time consuming for small businesses not familiar with government paperwork requirements. Additional recordkeeping, filing of reports, and maintenance of manifests and records will be required. Not until SQGs begin to understand precisely what will be expected of them and what their liabilities may be will substantial progress be made to protect public health and the environment from the wastes they produce. The massive challenge facing federal, state, and local officials is advising 100,000 small businesses that they are in fact covered by the new program, which will commence on August 5, 1985. To do this, Congress has authorized only \$500,000 annually for fiscal years 1985 through 1987 for the enormous public education and public information requirements that lie ahead.

With these issues in mind, members of this conference are here today to look at some of the positive steps that are being taken to address the problems and challenges presented by the small quantity hazardous waste generator.

**THE SMALL QUANTITY HAZARDOUS WASTE GENERATOR  
FROM THE PERSPECTIVE OF THE REFUSE COLLECTION AND  
DISPOSAL ASSOCIATION, *Thomas Keith, Governmental Refuse  
Collection and Disposal Association***

Among the numerous amendments to RCRA is the reduction of the exemption level for hazardous waste generators from 1000 kilograms per calendar month to 100 kilograms per calendar month. Under the provisions of the amended law, EPA is required to issue new regulations for hazardous waste generators who generate from 100 to 1000 kilograms of waste per month.

Congress intended, through the implementation of the amendments to RCRA, to establish control over many hazardous waste generators who currently discharge all of their wastes into municipal solid waste management systems. Control will be implemented through the issuance of EPA

regulations and the use of a manifest form which shall accompany each shipment of waste. The manifest will serve to describe the amount of waste, the characteristics of the waste, the transportation of the waste, and the ultimate destination of the discarded waste.

The key provisions of the RCRA amendments for small quantity hazardous waste generators were summarized by William Stough. The RCRA amendments raise several issues of concern for landfill operators. Many small quantity generators discharge all of their wastes, including hazardous waste, in municipal solid waste management systems. On August 5, 1985, operators of nonhazardous waste landfills will be faced with the problems of receiving manifests for hazardous wastes from small quantity generators. Will landfills risk liability by accepting these wastes?

Municipal solid waste management systems that collect wastes from small quantity generators will be faced with paperwork requirements that will practically be equivalent to those of hazardous waste transporters if the small quantity generators continue to discharge their hazardous waste into municipal solid waste management systems.

Municipal solid waste storage, transfer, treatment, recovery, and disposal facilities will begin to receive manifest forms, and while the legislation is not clear relative to the responsibilities of municipal solid waste management facility owners regarding the handling of manifest forms, it seems prudent for owners/operators to follow the requirements which now exist for owners/operators of hazardous waste management facilities.

It may be assumed that many SQGs are not aware of RCRA reauthorization, that they generate hazardous waste, or that they may have been in violation of the law before it was amended. It is important that they now understand their responsibilities. It is unlikely that the education and notification efforts planned by EPA will be sufficient to assure that all small quantity generators will become aware of the new legislative requirements. Therefore, trade organizations and local and state governments must also publicize these changes and provide some means of answering questions from small quantity generators regarding the waste they generate.

Should SQGs take actions to remove their hazardous waste from municipal solid waste management systems? The destiny of those wastes is important to local government if public health and environmental quality are to be protected.

The Governmental Refuse Collection and Disposal Association (GRCDA) is taking a position, therefore, that regardless of the efforts that are taken by EPA, state government, and trade associations, GRCDA U.S. membership will take several actions:

- GRCDA U.S. membership will notify all of their accounts that might be SQGs of the new RCRA provisions.
- GRCDA U.S. membership will make every attempt to identify all SQGs within their municipal solid waste management systems and will take steps to determine their current waste management practices.
- GRCDA U.S. membership will inform their counterparts in wastewater management of the new RCRA provisions and determine the interface between the municipal solid waste management systems and wastewater management systems regarding pretreatment and illegal discharges to wastewater management systems.
- GRCDA U.S. membership will advise all commercial haulers within their jurisdictions of the new RCRA provisions and will work with the private municipal solid waste management and hazardous waste management service industry to assure compliance with the law within their jurisdictions.
- GRCDA U.S. membership will work with SQGs to assure the continuation of proper waste management services and practices of SQGs.
- GRCDA U.S. membership will work with the appropriate state solid waste management agencies to assure compliance with the new requirements of RCRA.
- GRCDA U.S. membership will work with SQGs, state government, and the business community to provide alternative systems for the management of hazardous waste from SQGs.

In conclusion, the 1984 RCRA amendments pose a number of significant problems to a number of sectors. EPA will be faced with a monumental task of providing information, developing new regulations, and enforcing the new along with the old. The SQG will be faced with the no-less formidable task of becoming educated with regard to the proper identification and management of their wastes and the implementation of appropriate systems. Waste disposal costs for the SQG will escalate. GRCDA and its counterparts will be faced with a new set of liability questions. Will state and local governments allow SQGs to dispose of their wastes at their nonhazardous waste facilities? Some may, others will not. What are the alternatives? These are only a few of the questions that need to be answered.

Cooperation and education are the keys to making the new RCRA programs effective. It is imperative that effective educational programs be developed and implemented immediately in order to lessen the anxiety felt by the newly regulated community.

## **ADMINISTRATION OF THE AMNESTY DAYS PROGRAM IN FLORIDA,<sup>1</sup> James Hattler, GSX Services, Inc.**

Amnesty Days is a state-sponsored program designed to provide an environmentally sound disposal alternative to sanitary landfill disposal while at the same time creating public awareness of the waste types that constitute "hazardous waste."

The Amnesty Days program is designed in five phases and will allow every small generator and private citizen throughout Florida to participate over a three-year period. The five phases, dates, and regions served are:

- Phase 1 — South Florida and Tampa Areas  
(May 84–June 84)
- Phase 2 — Orlando and Jacksonville Areas  
(November 84–December 84)
- Phase 3 — Panhandle Area  
(June 85)
- Phase 4 — West Palm Beach to Melbourne Area  
(November 85)
- Phase 5 — To be announced

Mobile collection centers are set up in shopping centers and mall parking lots on a prearranged basis for a specified period of time. The state of Florida pays for the packaging, labeling, transportation, and disposal of up to one drum of waste per household or generator. Reduced pricing through GSX is made available to anyone wishing to dispose of additional waste. The mobile collection centers are staffed by a team of highly trained chemists and technicians who identify and record the waste and complete the paperwork necessary for hazardous waste transportation and disposal. In every region of Florida, people will be able to bring their old paint cans, paint thinner, paint stripper, rose spray, herbicide, pesticide containers and the like to these mobile collection centers. Commonly referred to as "trash" when disposed by individuals and "hazardous waste" when disposed by industry, these items can be found in every household and in every region of the United States.

The unique hydrogeology of Florida, coupled with rapid population growth, creates a critical need for dealing with waste disposal problems. In November 1984 President Reagan signed the RCRA Reauthorization bill into law. This law will significantly affect the way hazardous waste is managed throughout the country. Additionally, the definition of hazardous waste generator is changed by the new law. Currently, a hazardous waste generator is one who generates 220 pounds per month or more (approximately four to five drums per month) of hazardous waste. This will

be reduced to 220 lbs/mo. or about ½ drum and will place additional stress on the hazardous waste industry, as these wastes are currently, more often than not, being disposed of in sanitary landfills. This same legislation de-emphasizes the role of landfills in general as a means for disposal of hazardous waste. The vast majority of wastes generated through the Amnesty Days program were disposed of at a secure hazardous waste landfill. The policy of reducing the landfill's role means that recovery, incineration, and treatment technologies will be emphasized; but where are these facilities, and can they pass the stringent financial requirements established in the new regulations? What will they do with their recovery bottoms or treatment residues? These questions remain to be answered. The availability of high-technology facilities in the Southeast is limited, and the prospects of new facilities coming on-line is not promising. Siting is the number one problem facing the hazardous waste management industry today. With the announcement of every proposed hazardous waste treatment facility comes a newly formed opposition group dedicated to the "NIMBY (not in back yard) Syndrome."

One of the keys to the success of the Amnesty Days program in Florida is the broad based political support which it received. As successful as the program is, one must recognize, however, that the waste generated in Florida was sent out of state for disposal. Politically speaking, this position is very easy to support, whereas the siting of a hazardous waste facility is not. Those states that currently have commercial hazardous waste facilities do not want to become dumping grounds for those states that do not possess facilities.

The term "hazardous waste" was created by the Resource Conservation and Recovery Act of 1976, but if one thinks that the generation of hazardous waste began in that year, one is mistaken. Although it is true that Florida is not an ideal place for a chemical landfill, treatment facilities can be constructed in the state. The siting of new facilities needs to be promoted by every person who understands the particular problems associated with hazardous waste. The issues are very complex, and there is no "magic wand" available today to solve the public relations or the other problems the waste management industry faces. The industry needs your help.

'For additional information on the Amnesty Days program in Florida, see Senator Kirkpatrick's Keynote Speech on page 85.

## **Discussion**

As a result of RCRA reauthorization legislation, the hazardous waste management industry will see many changes. A new generation of hazar-



dous waste generators will be born at a time when the historical method of disposal, landfill, is being de-emphasized. The goals of this new legislation are admirable, but the shortage of available alternatives in the Southeast will create a crisis. Waste exchanges, incinerators, recovery operations, and treatment facilities do represent significant pieces of the hazardous waste puzzle, but, unfortunately, there are residues generated by these alternatives that must be managed. Therefore, in the real world, landfills still represent a piece of the puzzle.

One of the biggest benefits of the Amnesty Days program is an increase in public awareness of what constitutes hazardous waste. Since Amnesty Days is a state-sponsored program, GSX has had the cooperation of local municipalities and private citizens. These ingredients are not present when GSX announces a permanent facility. The future of Amnesty Days will look much brighter when these groups mobilize to support a more permanent solution to the problem—a hazardous waste treatment facility in their backyard. Amnesty Days would be much more effective in conjunction with a treatment facility.



## SESSION VI. INDUSTRY PERSPECTIVE

### INTRODUCTION, *Mary A. McDaniel, Piedmont Waste Exchange*

In this session, waste exchanges will be discussed from the perspective of the client. The title of the session is "Industry Perspective," but the discussion will not be limited only to industry. Many other types of organizations—such as public agencies, consultant firms, and resource recovery operations—use the services of waste exchanges. Waste exchange directors need to know, and to let others know, how their operations have assisted these groups. They also need to hear from members of these groups about ways to improve their services. Gordon Kenna from Chemical Waste Management, Inc., is our first speaker. The session concludes with a discussion of the relationship between waste exchange and industry in France.

### CHEMICAL WASTE MANAGEMENT, INC., *Gordon Kenna*

All of us are in the waste management business together, and there is plenty of room for everyone to operate. Chemical Waste Management, Inc., the largest chemical waste handling firm in the country, is a division of Waste Management, Inc., and is fully integrated in terms of the range of services it provides, including recycling. Chemical Waste's facility in Livingston, Alabama, is one of the largest chemical waste handling operations in the country.

Clearly land disposal is going to change drastically as a result of regulatory changes. As Senator Kirkpatrick pointed out, people demand convenience for the intake of products and use of services, but they frequently do not understand the need for convenience for disposing or recycling of the wastes generated by these products and services. Changes in attitude are also going to have occur. People need to realize that hazardous waste is part of everyone's life and they also need to understand how their lives are enhanced by sound management of this waste. Within a couple of years public understanding, largely brought about through small quantity generator requirements, will help the public better understand and appreciate the waste management industry. The need for safe handling facilities will become more evident as the number of regulated generators increases. The waste management industry is going to have to help this group by making collection and recycling of small quantity generator waste much more convenient through a network of transfer stations and treatment facilities. It is not going to be an easy task, but we must all work together to have these facilities sited.

## Discussion

At the present time Chemical Waste Management is recycling solvents from its waste inventory. Written permission of clients is required before the solvents can be recovered. It is estimated that perhaps as much as 20 to 25 percent of the liquid brought to Chemical Waste's Alabama landfill has a recoverable solvent in it. The ultimate cost to the customer is not much different if the waste is recycled than it is if the waste is landfilled, because most of the cost of ultimate management is for transportation to the facility.

Reference was made to an article in the February 1985 issue of *Discover*, which reports that "pollution from this state-of-the-art clay-lined pit in Emelle, Alabama, is seeping into groundwater" (p. 77). The report was based on a change in pH in the deep groundwater monitoring wells. Changes were found in wells upgradient as well as downgradient from the site. This is apparently a relatively common occurrence at landfills and may just be an indicator of natural fluctuation in pH. When there is a statistically significant change in pH at a site, EPA requires a groundwater quality assessment in which samples are extracted from the wells and tested for all chemical compounds accepted by the site. At the Alabama facility 360 chemical compounds have been accepted. Sampling for these compounds has occurred and the data are still being evaluated. So far none of the compounds have been detected from the samples. The Emelle, Alabama, facility sits in a geologic formation known as the Selma Chalk, which is about 700 feet of stable clay chalk. There are shallow wells directly underneath the disposal trenches and contaminants have never been detected in any of these wells. The deep wells are about 1000 feet underneath the site. Monthly checks of the shallow wells tend to be a relatively better and more immediate indicator of whether anything is escaping from the disposal cells than samples from the deep wells.

An important issue is whether it is feasible to recover materials that have been landfilled. Virtually everything that has been put into the trenches at the Alabama landfill is solidified with cement dust. Chemical Waste is not currently evaluating the possibility of exhuming any of the landfilled materials.

Chemical Waste Management, Inc., has a permitted transfer facility in Pompano Beach, Florida, which accepted about a million and a half pounds of material in 1984, primarily from small generators in southern Florida, and solvent recovery units in Ohio and in Emelle, Alabama. A facility in Memphis for reclamation and incineration is also being developed by Chemical Waste Management. With several other com-

panies, Chemical Waste is attempting to identify small quantity generators and to develop programs to serve them.

The question was raised whether Chemical Waste Management buys waste solvents. Presently they do not; rather they extract solvents from the waste inventory and process materials for customers. The new regulatory structure is going to essentially require that all solvents be recycled, and this is certainly going to expand the solvent recovery market.

#### **RESOURCE RECOVERY OF AMERICA, INC., *Robert O. Kincart***

Resource Recovery of America is located in Mulberry, Florida, which is often referred to as the phosphate capital of the world. The phosphate industry has produced about a million tons of acid-contaminated gypsum, which cannot be used for gypsum board unless it is treated. If any of the waste exchanges could find a use for this material, it would solve one of the phosphate industry's most pressing problems.

One of the things that we do when people contact us about taking their waste is to ask them about other types of waste that they may produce. Many times these other wastes are more attractive to us than the wastes that are the subject of the original inquiry. Resource Recovery of America recycles or exchanges the waste, or, as a last resort, landfills it. A major problem in attempting to exchange waste is the fact that used or recycled materials are usually less pure than virgin materials. If a company has been using a product that is 99.9 percent pure for twenty-five years, the company's managers are hesitant to use a product that is 95 percent pure even though it may work. They just do not know what effect that other 5 percent is going to have on their product. What they might do is to request a sample and to test it. A year later they may call back and request more of the product, but by that time it is frequently no longer available.

Resource Recovery of America also advises generators concerning the segregation of their wastes. Generators need to set up separate tanks to hold different products, and then they need to train their people to properly segregate these materials.

#### **UNION CARBIDE CORPORATION, *Richard Floyd***

The Surplus Products Business of the Corporate Investment Recovery Department at Union Carbide is, in effect, an in-house waste exchange, although we did not think of ourselves as one until EPA called us that a few years ago. There are four full-time people and three part-time people in the business, which was established about 20 years ago. I would like to

share some of our experiences with you and to point out some factors that I believe are important in running a successful exchange.

First, operators of waste exchanges need to recognize that generators are generally ignorant about the benefits of recycling and need to be educated. This is true not only for small and medium-sized generators, but also for the very largest generators. Because they are not aware of the benefits, most companies do not have the people who specialize in recycling that Union Carbide has and are missing some significant opportunities. Recycling is a multimillion dollar a year business for Union Carbide, and I am sure it could be as valuable on a proportionate scale for other companies, particularly small-quantity generators as defined by the 1984 RCRA amendments.

At Union Carbide we go into a plant to study the production process and to determine what wastes are being produced and whether or not recycling is a viable alternative to disposal. It is a Union Carbide policy to try not to create waste in the first place, which is consistent with the recent RCRA amendments requiring certification that measures have been taken to reduce the volume and quantity of waste. We then try to recycle waste, in part because the only sure disposal method for a hazardous waste is incineration, which is expensive. Recycling is frequently cheaper than any form of disposal and may even result in income. In 1979 about one-third of the dollars the Investment Recovery Department contributed to the company came from the avoidance of disposal costs and two-thirds came from sales. Now the ratio has reversed. As it has become more and more expensive to dispose of wastes, it has become much more attractive to recycle. For example, recently Union Carbide paid \$.10 a gallon to have some materials recycled, which we would have had to pay \$.40 a gallon for disposal; the company saved over a quarter of a million dollars.

Second, the exchanges need to be very careful and thorough in conducting their businesses to avoid future liabilities. Most waste exchanges publish disclaimers in their catalogs stating that they are not responsible for anything that might happen after an exchange is made, but that may not keep them out of court, which has costs associated with it even if the waste exchange wins. Beyond this, waste exchanges need to let generators know what their responsibilities are under environmental laws and regulations. Generators do have cradle to grave liability, and the fact that they have gone through a waste exchange and found a recycler does not absolve them of the responsibility for what happens to their materials once they get to that recycler.

Third, recycling is typically not a very high priority for generators. All too often they will take the easy way out and dispose of materials because it is too much trouble to recycle them. It is, therefore, important for

waste exchanges to make it easy for generators to recycle. Included in this is a need for timeliness. Waste exchanges that advertise two, three, or four times a year are not going to begin to tap the total quantity of wastes that is potentially recyclable, because generators frequently cannot wait that long to get rid of their waste. A national data base would improve the timeliness of the waste exchange industry and make it more attractive to companies like Union Carbide that frequently cannot wait for a catalog to be published.

The last major need I want to address is finding customers. The biggest single thing generators can do to minimize risks of liability is to choose their customers carefully. If Union Carbide has a hazardous waste recycled, we insist on knowing who the processor or end user will be. We audit the recycler using a very comprehensive questionnaire based upon OSHA and EPA questionnaires, and inspect the recycler's permits, emergency response plans, and physical features of the operation. We require the processor or buyer to sign a contract stating who is going to process it, where it is going to be done, and exactly what is going to be done and when, and require certification back from the recycler that all of this has actually happened. We also periodically re-inspect recyclers to make sure no Union Carbide materials are being left unprocessed or the recycler's operations have not worsened.

Finding qualified recyclers is probably the number one or number two challenge to the waste exchange industry. These people need to be technically qualified and really understand the regulations and how to market materials so they will not expose themselves and generators to unnecessary risks of liability.

In spite of these problems, there are many opportunities for the waste exchanges. The largest growth in the Investment Recovery Department at Union Carbide is in the area of recycling wastes.

## **Discussion**

Mr. Floyd was asked whether he thought the days of "passive" information clearinghouse exchanges were over and that waste exchanges will only be effective if they take a more active role in education, in service, and in marketing. Mr. Floyd responded that it is also possible to increase the effectiveness of waste exchange operations by encouraging qualified brokers and consultants to use the exchange, even though to do so adds another link to the chain of liability. It is relatively easy to recycle wastes like solvents and acids and bases, but to recycle materials such as laboratory chemicals, you often need a broker who will search the market. An opinion was expressed that waste exchanges typically are not able to search for markets unless they employ relatively costly technical

people. It was suggested that one function of the proposed Association for Waste Exchange and Resource Reuse might be to establish a directory of qualified brokers and consultants.

The confidentiality option provided by most exchanges was also discussed. The consensus seemed to be that this is a useful option not so much for clients who want "to hide something" but rather for clients who want to screen inquiries. Waste exchanges typically forward inquiries to listers, and the decision to respond can then be left to the client who lists under the confidentiality option.

The problems of transporting and collecting small quantities of waste from many sources were discussed. Although a large corporation, Union Carbide has many small plants in geographically diverse locations. Union Carbide is attempting to identify one recycler within a region and to arrange for that recycler to collect the material from each plant. The state of Minnesota is currently in the preliminary stages of establishing a state collection system, which will help overcome some of the problems faced by smaller generators.

#### **WASTE EXCHANGE IN FRANCE, *Daniel Lemarchand***

In France waste exchanges are promoted by the French Agency for the Recovery and Disposal of Waste (ANRED) in cooperation with the Chambers of Industry. ANRED subsidizes the creation of all waste exchanges by paying half the costs for their first year of operation. ANRED, which functions under the auspices of the Ministries of Environment, Industry and Budget, was established by law in 1975 to "facilitate the disposal or recovery of waste, or to implement actions of a similar nature which satisfy the public interest, in the case of insufficient public or private means." Its objective is to implement legislative and administrative actions designed to protect the environment from the pollutants of waste, as well as to conserve raw materials and energy by recovering consumer, commercial, and industrial wastes.

In France some private, profit-making enterprises have developed as intermediaries between producers and reusers of wastes or by-products, but their activities center around a limited number of materials: ferrous and nonferrous metals, some kinds of paper and board, textiles, and some plastic materials. Industry also produces other wastes in smaller quantities or without the trade value of these products. Many contacts are often necessary before a use can be found for these wastes. Waste exchanges were established in France to deal with these hard-to-place materials.

In France waste exchanges are often created as a service of the Chamber of Industry and thus do not require an expensive infrastruc-



ture. The Chamber of Industry also provides the waste exchanges with the contacts they need to help them be successful. In early 1985, there were fifteen regional waste exchanges in France, the first of which was established in 1978.

French waste exchanges have three main functions: to publish catalogs, to publish information about wastes, and to offer technical assistance. Producers or reusers of by-products advertise in the waste exchange publication. Some waste exchanges publish catalogs twice a year and some publish catalogs four times a year. Each exchange's catalog is sent to the other French exchanges, and in some regions the catalog is sent to neighboring countries, such as Germany, as well. The basic jobs of the waste exchange are to publish waste-related advertisements, to gather inquiries, and to send them to the advertiser. The identity and location of the advertiser remain confidential. Some exchanges are more active and try to find a user for the waste through phone calls to potential reusers.

Most waste exchanges also publish monographs about wastes produced in the region or about treatment, technology, regulation, or exemplary waste treatment operations in regional or other industries. Some exchanges also organize technical conferences on recovery, disposal, and management of waste.

Some waste exchanges offer technical assistance; for example, exchange personnel will visit factories and discuss ways to reduce the waste flow or to improve the quality of waste management by such actions as avoiding mixing toxic waste with nontoxic waste.

Each waste exchange circulates its publication to 2,000 to 10,000 enterprises, and each publication contains 100 to 2,000 advertisements. These figures vary according to regional industrial activity. The French waste exchanges have a transfer rate of between 20 and 38 percent of the published advertisements. The rate of transfer depends on the nature of the available or wanted materials. For example, paper and board, polymer, and wood are exchanged easily. Exchanges of chemical waste are more difficult for a number of reasons. Frequently constant composition and a large amount of waste are required in order to transfer chemical wastes. In addition, impurities may render the waste unacceptable to many potential reusers.

Analysis of the transactions of the French waste exchanges shows that solutions are often found in another activity. For example, agriculture offers many possibilities for reusing waste. It appears that a great diversity in industrial activities and a thorough knowledge of these activities are the major factors for success of a regional waste exchange.

After three or five years, most of the regional waste exchanges experience a decline in the number of listings. The easier transactions have

been achieved. At this point some exchanges take a more active role and establish direct contacts with potential reusers. They may also collaborate with waste exchanges of neighboring regions. This collaboration is enhanced by the spread of computerized data processing, although transportation costs may still limit exchanges between regions.

## **SESSION VII. ASSOCIATION FOR WASTE EXCHANGE AND RESOURCE REUSE**

### **INTRODUCTION, *Walker Banning, Northeast Industrial Waste Exchange***

During the first conference on waste exchange held in 1983 there was a general consensus that some kind of national or international organization should be formed to represent the common interests and concerns of the various groups involved in waste exchange, resource reuse and recycling. Perhaps the most basic purpose of such an association is to promote communication, understanding, and cooperation among its members, as well as among the public, regulatory officials, and legislators. A trade association representing each of the groups involved in off-site recycling (generators, exchanges, brokers, transporters, and recyclers) can speak more effectively than an individual firm. An association can also serve as a clearinghouse for technical information, innovative techniques, and relevant legislation, both at the state and federal levels. Publication and distribution of a newsletter or technical journal can also be an important function of an association. The possibility of some sort of certification program for waste exchanges has been discussed also. How do you go about such a process? How do you write certification criteria? This is an activity that the association may want to undertake eventually, but it is not an activity to consider at this early stage of development.

More formally stated, the suggested purposes and objectives of the association are:

- To promote the conservation of resources and energy through waste exchange and resource reuse;
- To increase the reuse of waste materials in the public and private sectors by promoting waste exchange and investment recovery;
- To encourage information exchange and technical assistance which promote resource reuse;
- To provide information, education, and training on waste exchange and resource reuse;
- To function as a legislative and information clearinghouse to meet the needs of waste exchange and resource reuse; and
- To promote research and development relating to waste exchange and resource reuse.

### **Discussion**

A participant requested further explanation of the association's function as a legislative and information clearinghouse. As a legislative clear-

inghouse, the association would keep its members up to date on bills as they are introduced at the state and federal levels. As an information clearinghouse, the association would communicate activities of members that others might find helpful.

The question was raised whether the association should distinguish between hazardous and nonhazardous waste in statements of its goals and purposes. Several participants expressed the belief that such a distinction is not necessary, or even desirable, since waste exchanges deal with both kinds of waste and since the definition of "hazardous" is always subject to change.

The intention of the association was discussed. Should the intention be to have generators and industry as members or should the intention be to have waste exchanges, recyclers, and brokers as members so that the association can promote the waste exchange concept and advertise it to industry and generators? Walker Banning replied that he had never made that distinction and that he does not perceive any benefits of an organization that excludes any specific group that has an interest in waste exchange and resource reuse. There are also legal issues. Faith Gavin Kuhn pointed out that it may be difficult for an association to maintain its non-profit status if it excludes in its by-laws any types of potential members who are at all involved with waste exchange. The association may, however, distinguish among types of potential members in its fee structure.

**FORMATION OF THE ASSOCIATION, Faith Gavin Kuhn,**  
*Hazardous Waste Services Association and National Association of Solvent Recyclers*

The Association for Waste Exchange and Resource Reuse has gone beyond the first step in association formation. People have already determined there is a need for such an association. The next step is to prepare for the initial meeting of the Association for Waste Exchange and Resource Reuse. It is important to encourage all the people who are interested in joining the association to attend the first meeting. At that meeting the first order of business would be to present proposed by-laws and to introduce proposed officers. Following these presentations there should probably be a technical session. The next day after people have had a chance to think about the proposed by-laws and to talk among themselves, they could return for a voting session, during which proposals to revise the by-laws or to add new officers may be considered. The members could also vote on the by-laws and officers during this session.

It is important to structure the meeting to avoid lengthy discussions that do nothing to perpetuate the goals and objectives of the association. That is why it is necessary to have the proposed by-laws prepared and the proposed officers selected the first day of the meeting. The next day, changes are proposed and the actual voting occurs. The discussion on the second day should be limited to actual proposals or amendments.

The most important advantages of any kind of association are the contacts it provides and the exchange of information that occurs. Awareness of any federal legislation and regulations that affect waste exchange is crucial. Associations may also lobby without jeopardizing their non-profit status under 501(c)(3) of the IRS code as long as lobbying is not the organization's primary objective. The association's main objectives would be dissemination of information to its members and the hazardous waste industry. In fact, many of the members of the association would probably be nonprofit organizations as well. Even having a corporate membership category would not be a problem for the association because the association's main objective is not for profit. All the money the association receives from memberships would be used for such things as publications and meetings. The revenues collected by the association would not be used to perpetuate the organization but rather used for other purposes.

Services are the selling point of associations. The Hazardous Waste Services Association and the National Association of Solvent Recyclers publish newsletters every two weeks, which entails monitoring EPA and Congress and writing comments. Just knowing who to call or knowing where to get information many times can save a member a fine or can help the person manage his or her business more cost effectively. Some of the services offered by associations are intangible. There are the tangible things like the publications, the meetings, the contacts, but there is also that sense of fraternity. People join groups to show their strength and their commitment to improving themselves and their industry. As a means of diverting wastes from disposal, waste exchanges are compatible with the goals of the 1984 RCRA amendments. The success of waste exchanges has been proven at the regional and state level. The focus now should be on obtaining a national identity. The sooner waste exchanges establish themselves through an association, particularly to show a commitment to growth, the sooner waste exchanges will benefit individually as well as collectively.

## **Discussion**

Clarification was requested of the distinction between the two types of nonprofit designations at the federal level: one designation is tax-exempt

and the other is not. This is a complicated issue, but the point was made that one distinction is that a tax-exempt nonprofit organization cannot spend more than 20 percent of its revenues on lobbying. One way people avoid this restriction is to lobby through political action committees.

**PRESENTATION OF DRAFT PROPOSED BY-LAWS AND DISCUSSION, William A. Stough, Great Lakes Regional Waste Exchange**

One of the resolutions of the first National Conference on Waste Exchange held in 1983 was to establish a committee to work on some of the issues identified during that conference. In April 1984, Roy Herndon, Walker Banning, Margo Ferguson, and I met in Chicago to discuss the formation of an association as well as other issues such as uniform coding and listing procedures. As a result of that meeting, I volunteered to work on the by-laws for the association.

Several basic issues are usually addressed in by-laws. One is the types of membership that are available. We have considered three types of membership: corporate, institution, and individual. The corporate designation seems appropriate for people who can give an association more support than other kinds of organizations or individuals can. The corporate designation is acknowledgment of that support.

A participant pointed out that some organizations use the term "sustaining members" to distinguish among members. Another participant suggested that we consider the use of charter membership. It was also proposed that there be two classes of individual membership: one a voting and the other a nonvoting membership. Having a nonvoting membership option would encourage students and others with limited resources to join the association.

An association needs to carefully consider how it intends to handle the issue of termination of membership. There is a potential liability issue if the association decides that a member has done something improper. The association may find itself taking jurisdiction over something that as a nonprofit association it may not have the authority to do. It is very difficult to determine criteria for voting out a member. It is also difficult to justify voting out a member if he or she has never been voted in. The general issue of controlling the conduct of members can be partially addressed through standards of conduct.

Annual dues are also frequently established in by-laws. There was considerable discussion about the amount of dues for different types of members, but no agreement was reached.

The next issue addressed was the selection of officers and the board of directors. It was proposed that the officers—president, vice president,

secretary, and treasurer—would manage the association on a day-to-day basis. The board of directors could be increased to whatever size the membership wants, but initially it should be small enough so that the members can work closely together to initialize the association. It was suggested that board members represent the following interests among others: manufacturers, recycling or reuse industries, government, and waste exchange organizations. The question was raised whether “recycling or reuse industries” was broad enough to include service organizations such as testing laboratories and consultants. Another participant thought transporters should be included. The question was raised whether each of these industries would have a representative on the board of directors. Terms of office for the directors were also discussed. It was felt that it is important for members of the first board of directors to serve staggered terms so that everyone is not replaced at the same time.

The meeting concluded with an agreement that work would continue on the by-laws and on a membership form. After these items have been developed, they will be distributed to conference participants for review.





## KEYNOTE SPEAKERS

### THE AMNESTY DAYS PROGRAM IN FLORIDA,<sup>1</sup>

*Senator George Kirkpatrick*

In 1983 the Florida legislature passed a very significant piece of environmental legislation, the Water Quality Assurance Act. The act covers many different subjects from pesticides to groundwater monitoring. One of the areas that the act addresses most successfully is hazardous waste. Basically the act states that anyone who is improperly disposing of any toxic waste is violating the law. The catch 22, however, is that there is no proper disposal facility permitted in Florida. The legislature tried to compensate for this fact with the Amnesty Days program.

Amnesty Days became one of the most perfect political vehicles I have ever seen. There are no enemies to Amnesty Days. This program is an opportunity to involve the small generator in the overall waste problem. Through the Amnesty Days program, people throughout the state are able to bring their hazardous wastes to highly visible mobile collection facilities. Through this program 600,000 lbs. of waste were collected from 6,500 participants during the first year. There was not a single incident and not a single local government that refused to participate in the program. The appropriation for the first year of the program was \$1.2 million. So essentially this very toxic material was collected for \$2.00 a pound.

The Amnesty Days program had three objectives:

- To eliminate as much of the material as possible from the environment.
- To create a high level of awareness in the average citizen and the small business person that they are a large portion of the problem. (It is estimated that a significant amount of the hazardous waste disposed of in Florida comes from individual citizens and small business people.)
- To reduce the public's level of anxiety about the creation and location of collection and transfer facilities.

Siting of waste facilities, like siting of prisons, is a tremendous problem. In an effort to begin to resolve this problem the Water Quality Assurance Act requires every county to select a location for a hazardous waste transfer facility. There will not be a need for such a transfer facility in each county, but the legislature believes that all local governments should have to face the difficult decisions that must be made regarding hazardous waste management.

Through Amnesty Days it was found that thousands and thousands of pounds of chemicals are building up in houses, garages, and small businesses, and that, if given the opportunity, people would participate in the safe disposal of these substances. In Dade County alone every year a million gallons of motor oil are drained out of automobiles onto the ground even though used motor oil can be recycled. The legislature wants people to realize that they are part of the problem and to demand conveniently located collection facilities.

For intake of hazardous materials communities demand convenience. For example, people want the dry cleaner in the neighborhood in spite of the fact that dry cleaning fluid is one of the more toxic materials in the environment. Photographic chemicals are another very toxic material. All of the chemicals with the potential to damage the environment are located within our communities. We should also demand convenience for management of these materials as waste whether through recycling, exchange, reuse, or disposal.

Through Amnesty Days the legislature wanted people to begin to deal with the serious questions of disposal and to feel good about it. Thousands of people participated, bringing in their cans, bottles, bags, and canisters of waste. In Dade County 300 lbs. of lead arsenic, enough to potentially contaminate the entire water supply of Coral Gables, was brought in. It had been sitting in a dilapidated shed at a public golf course for fifteen years.

For waste problems to be solved in this state, and in the nation, members of the public are going to have to become aware that they are a major cause of the problem, and they are going to have to tell their local governments to develop incentives to involve the private waste management industry. The state of Florida is not going to fund a hazardous waste collection program. Florida is not going to get into the business of solving everyone's hazardous waste or any other kind of toxic material problem. Local governments can not afford to solve these problems either. Cooperation among government, generators of hazardous waste, and waste management firms is the answer.

For private industry to develop this partnership with government, government is going to have to provide some incentives. One incentive is to identify the market. Florida had a very effective program to identify small generators. Florida has also attempted to eliminate some siting problems through the requirements of the Water Quality Assurance Act.

In Minnesota the whole hazardous waste collection program has come to a halt because of a debate over four potential disposal sites. The Minnesota legislature declared a two-year moratorium on siting to let the controversy die down, but the problem is not going to go away, and in those two years the materials are going to continue to go to landfills.

What Florida needs to do is to educate the public and to make them full partners in solving the problem. As you have read so many times, to paraphrase Pogo, "We've met the enemy and it is us." I do not think there is any where that statement is more applicable than in waste management. We all use services and materials that produce waste and we will continue to do so. We are going to continue to convert convenience items and necessary items into potential problems, and the longer we wait to do something about it the worse the problems are going to be.

I want to conclude by showing you the Chinese word for crisis, which I learned in Minnesota. There are two components to the word: one means danger and the other means opportunity. That is the condition Florida is facing today in regard to waste management and the protection of natural resources, particularly ground water.

<sup>1</sup>For additional information on the Amnesty Days program, See James Hattler's section on page 67.

**DEPARTMENT OF DEFENSE HAZARDOUS WASTE  
MANAGEMENT,**

*Carl J. Schafer, Jr., and Mahlon B. White, Jr.,  
Office of the Secretary of Defense*

This paper provides a general overview of hazardous waste management, both preventive and corrective, within the Department of Defense (DoD). The paper describes routine industrial processes and identifies DoD unique operations and their impact on compliance. Data are presented on generation, processing, and disposal of excess hazardous materials and wastes. The paper also examines the impact of federal acquisition and property management laws on compliance goals.

The second portion of the paper describes the DoD equivalent of CERCLA, the Installation Restoration Program. Each phase of the program is examined along with progress to date. The paper concludes with a summary of accomplishments to date and a description of future directions.

The Department of Defense conducts a number of industrial processes and manufacturing operations that significantly affect the environment. Like other agencies or private concerns, the department must comply with multiplying federal, state, and local regulations. Recognizing these requirements and the need to protect the environment, DoD is dedicated to national leadership in environmental programs. This goal has taken on new importance as a management imperative demanding the same faultless performance in environmental programs as is required in operating sophisticated weapons systems.

The size and complexity of DoD operations resulted in the development of major hazardous waste programs, preventive and corrective, to deal with environmental impact from these activities. The corrective program, Installation Restorations, is intended to identify, investigate, and clean up contamination from hazardous substances and wastes both on active installations and formally used DoD lands. The preventive program, Hazardous Waste Management, provides effective, compliance-oriented management of current hazardous waste operations.

Defense installations throughout the United States and the world perform functions related to the DoD mission. DoD wastes are by-products of the operations and manufacturing processes which support this mission. Most DoD wastes are similar to those produced in the civilian sector because of similar processes and operations. Industrial operations common to both include metal finishing, utilities operations, degreasing, painting and stripping, aircraft, vehicle, and ship repair, fuel storage and supply, and pest control. The hazardous by-products of these activities include acids, caustics, PCBs, plating and stripping wastes, solvents, petroleum wastes, heavy metals, and various sludges and sediments.

The department also faces unique hazardous waste disposal problems which result from specific defense operations. The manufacture of explosives, propellants and other ordnance-related items results in by-products which require unique handling and disposal. Operations such as ship overhauls with asbestos removal and hull blasting often generate large volumes of wastes in a short time. Demilitarization of ordnance or explosive materials and chemicals requires unique detoxification and declassification procedures prior to disposal.

Effective hazardous waste management is further complicated by the enormous quantities of wastes involved. In the years 1982 and 1983, the department disposed of 900 tons of DDT. This figure represents the quantity remaining after all alternatives for sales, donation, and legal use were exhausted. Since 1978 the department has disposed of over 23 million pounds of PCBs and PCB items at a cost of over \$15 million. Current total hazardous waste generation is over 500,000 tons per year.

New legally mandated storage of DoD excess hazardous material and waste requires 172 new facilities which conform to new RCRA requirements. Scheduling and construction of these facilities has become a major challenge due to increasing public and congressional interest, and a complicated permitting process. A major effort this year will be to implement this program. Specific areas under investigation include development of a standard design, program decentralization, and development of a standardized permit application.

DoD installations are frequently subject to diverse, site-specific environmental requirements. For example, identical defense by-products

may be defined as hazardous wastes in one state but regulated as hazardous materials in another. Certain unique treatment procedures such as incineration, open burning, and open detonation are regulated to different degrees in different locations. These diverse regulations require a certain degree of decentralized management to best achieve effective compliance.

DoD hazardous waste management is further complicated by federal laws regulating procurement and property management. The Federal Procurement and Acquisition regulations provide stringent guidelines for contracting disposal services. Although the purpose of these regulations is to provide service at the lowest cost, they often complicate selection of the best long-term disposal method. The Federal Property Management Act of 1949 requires excess property, including hazardous materials, to be put through a lengthy processing scheme before disposal occurs. The procedures allow for reuse, transfer to other government agencies, donation, and sale *before* disposal can occur. The law is consistent with RCRA but significantly impacts on storage requirements and processing times. The department is currently revising policy to meet requirements of the RCRA Amendments and the FPMA.

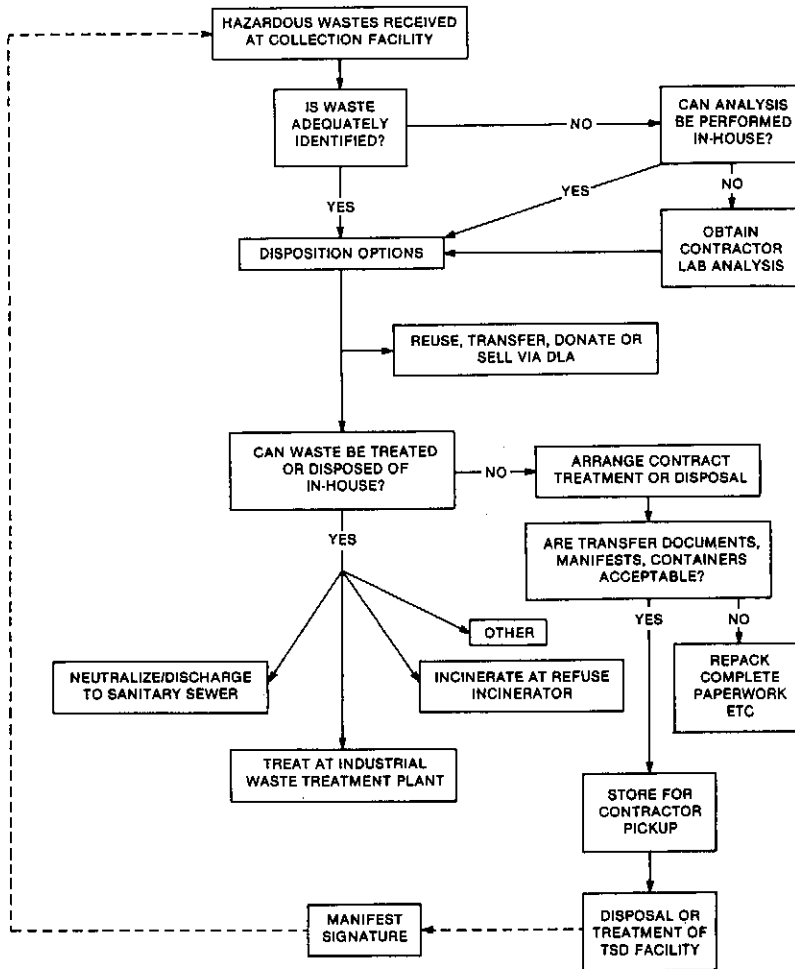
The DoD has two key goals in hazardous waste management: full compliance with federal, state, and local environmental laws and minimizing waste generation. Hazardous waste management is the most difficult challenge in the environmental program. DoD consists of 911 major installations, most of which are hazardous waste generators. Over two-thirds of these installations are also classified as treaters, storers, and disposers. These installations generate both legally defined hazardous wastes and excess hazardous materials. Excess hazardous materials include solvents, adhesives, petroleum products, acids, bases, and other "hardware store" materials. Approximately 50 percent of these excess materials are paints. These materials become excess due to damage, deterioration, or expired shelf life. Every attempt is made to recycle or reuse these materials before ultimate disposal as a waste.

Congress assigns responsibility for disposal of excess government property. This responsibility has been delegated to the Defense Logistic Agency (DLA). The DLA manages the disposal program according to requirements of the Federal Property Management Act. This program provides federal and state agencies the opportunity to reuse these materials. Materials not reutilized through these procedures are then offered for sale. Figure 1 provides an outline of these disposal procedures.

Materials which remain after donation, transfer, and sale procedures are scheduled for disposal as wastes. The preferred method of waste disposal is in-house treatment where capabilities exist. This procedure reduces the volume of waste disposed off-site, allows for better manage-

**FIGURE 1**

**DOD HAZARDOUS WASTE MANAGEMENT**



ment, and limits long-term liability. Those wastes not amenable to in-house treatment are disposed by commercial contract.

Contractor selection is important in insuring proper disposal. In the selection process, emphasis is placed on performance history, compliance with regulatory requirements, and cost. Contractor performance is monitored by installation personnel and through a working agreement with the EPA National Environmental Investigative Center in Denver, Colorado.

In the past year the DoD has reaffirmed its commitment to environmental leadership in the area of hazardous waste management. In January 1984 the Defense Environmental Leadership Project was established to develop innovative solutions to long-term environmental problems. This project, consisting of six environmental professionals, has focused its efforts in the hazardous waste management area. Significant accomplishments to date include the following:

- Establishment of a Used Solvent Elimination (USE) Program which requires recycling and reclamation of solvents. The program goal is to reuse or recycle solvents and eliminate their disposal as a waste material.
- Establishment of a DoD-EPA PCB Compliance Agreement under which DoD disposed of 10 million pounds of PCBs and PCB items.
- Completion of a True Cost of Landfill Disposal Study resulting in a ban on landfilling of certain categories of hazardous wastes.
- An investigation into the use of regional DoD hazardous waste treatment facilities. Results will identify methods to optimize use of existing facilities and minimize off-station disposal and future liability.
- Establishment of a data base for RCRA compliance with EPA. This program will improve response time in correcting program deficiencies.

Existing or proposed initiatives which continued DoD leadership in environmental protection include:

- Establishment of demonstration projects to show successful modifications of industrial processes to reduce waste.
- Development of an incentives program to encourage reuse of waste stream components.
- Studies on the environmental effects of open burning/open detonation for disposal of military munitions.
- Joint studies with EPA on the accuracy of tank leak testing methods and on methods of carcinogenic risk assessment of groundwater pollutants.
- Procedures and policy development for used oil recycling.

The second major program in DoD hazardous waste management is the Installation Restoration Program, the DoD equivalent of Superfund.

This program began in the mid 1970s when the services became aware of the effects of what were, until that time, acceptable disposal practices. By 1978 the services had developed programs to identify and assess problems on active military installations. The 1984 passage of the Defense Appropriations Act expanded the program to include formerly owned DoD sites. The act broadened the definition of hazardous to include structures and abandoned debris. The act also directed DoD to assume overall program management to ensure a consistent approach and adequate resource allocation. This program and funding were needed because CERCLA prohibits the use of Superfund for clean up of federal sites. The Installation Restoration Program has two objectives:

- To identify and evaluate past hazardous material disposal sites at DoD facilities and control contamination migration that presents a hazard to health or welfare.
- To review, and decontaminate as necessary, land and facilities excess to DoD.

Because this program preceded the Superfund legislation and subsequent guidelines, the procedures for reaching these objectives are similar but not exactly analogous to the steps required by the National Contingency Plan. DoD site evaluations are accomplished in the following four phases:

- Phase 1 Initial Assessment Phase
- Phase 2 Confirmation Study
- Phase 3 Technology Development
- Phase 4 Remedial Action

The Phase 1 assessment investigates the potential for existence of a hazardous waste disposal or release site. This effort involves a records search to determine material use, storage, and disposal. It is a rigorous investigation of an installation to identify any potential problems from past operations. By September 1984 DoD had initiated Phase 1 studies at 414 active installations and approximately 50 former sites. Phase 1 investigations should be complete by 1986.

During Phase 2, the Confirmation Study, a field investigation is conducted to identify any actual pollution present. Tests are conducted to determine contaminants present, concentrations, migration, and potential adverse effects. Data obtained are used to develop and analyze cleanup alternatives. Proposed alternatives and investigation results are made available to the public and EPA. At the end of fiscal year 1984, 51 Phase 2 studies had been completed with another 129 in progress. About 300 installations will require Phase 2 evaluation.

Phase 3 is primarily a research effort to define an acceptable level of decontamination. This phase is only necessary when a confirmation study uncovers a contaminant for which there is no known standard or



treatment. An estimated \$15 million will be devoted to this effort in fiscal year 1985.

Phase 4 is remedial action to eliminate or mitigate the hazard to an acceptable limit. Nine remedial actions have been completed to date. Approximately 400 sites will require remedial action. The average cost per cleanup based on these nine actions is \$12.5 million.

The most widely publicized of these projects concerns the Army's Rocky Mountain Arsenal. In response to groundwater contamination, the Army has drilled more than 1,500 wells on the 25-square-mile site and completes as many as 6,000 analyses monthly. The army has accumulated over 270,000 data points and published some 900 technical reports. This effort demonstrates DoD's determination to pursue aggressive cleanup.

Examples of remedial actions at DoD installations are provided below.

- Naval Weapons Industrial Reserve Plant, McGregor, Texas  
Actions expecting to cost in excess of \$500,000 are underway to clean up pesticide contamination and improper asbestos disposal.
- Milan Army Ammunition Plant, Tennessee  
In 1980 the Army detected groundwater contamination by chemicals used in explosives. The Army implemented interim source control measures in 1981 and began assessing the nature and extent of the problem. Corrective action included the closure and encapsulation of eleven wastewater lagoons at a cost of \$9 million.
- Wurtsmith Air Force Base, Michigan  
A small leak in an underground storage tank resulted in base water supply contamination with trichloroethylene. The Air Force installed an activated carbon treatment system in 1981.
- Naval Base, Naval Shipyard, Charleston, South Carolina  
The Navy constructed a catchment area to intercept and remove oil leaching from an abandoned oil sludge pit.
- Anniston Army Depot, Alabama  
The Army detected groundwater contamination by volatile organic compounds. Removal of hazardous material from the disposal site was completed in May 1982 at a cost of \$5.4 million.

The Army is the lead service for compiling, refining, and coordinating development of new and improved technology. The Army also chairs a tri-service technology transfer group which monitors joint DoD and EPA research. Three key areas of this joint research are decontamination and cleanup technology, criteria development, and development of analytical systems.

These initiatives in hazardous waste management and installation restoration demonstrate that DoD has been sensitive to the problems posed by hazardous wastes. The commitment to proper waste manage-

ment, site cleanup, and regulatory compliance and cooperation is strong. The DoD works closely with EPA and state agencies. The department consults with and seeks regulatory agency approval to insure its programs are both technically sound and in the public interest.

The next few years will bring an increased effort to minimize waste generation through process modification, recycling, materials substitution, and other initiatives mentioned earlier. These actions are part of the DoD strategy for eliminating the disposal of untreated waste. DoD is committed to excellence in its environmental and hazardous waste management program. This commitment and continued cooperation with scientific, regulatory, and government agencies insures hazardous waste management which is economically sound and provides protection and enhancement of the environment.

## **APPENDIX A**

### **RCRA DEADLINES IMPOSED ON INDUSTRY AND EPA**



Table 1 lists the deadlines applicable to organizations other than EPA (primarily private industry). At the end of each deadline description is a number that cross references the deadline requirement to both the HSWA and the Solid Waste Disposal Act (more commonly known as RCRA). For example, the reference number 201(a)-3004(b) means that this deadline can be found in Section 201(a) of the HSWA and will ultimately be codified in Section 3004(b) of RCRA.

(Please note comment at end of Table 2 on dates listed)

**TABLE 1**

**DEADLINES IMPOSED BY THE RCRA HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984 ON INDUSTRY AND NON-EPA ORGANIZATIONS**

<b>Date</b>	<b>Activity Required</b>
10/84	Hazardous wastes are prohibited in salt domes, salt beds, underground mines and caves. [201(a)-3004(b)]
10/84	Use of waste or oil containing hazardous wastes or dioxin (except ignitable wastes) for dust suppression is prohibited. [201(a)-3004(1)]
10/84	No fuel containing hazardous waste can be burned in a cement kiln located in an incorporated municipality of more than 500,000 population unless the kiln can meet incinerator standards. [204(b)(1)-3004(1)]
01/85	Invoices and bills of sale for fuels containing hazardous wastes must be labeled to indicate that the fuels contain hazardous wastes. [204(b) (1)-3004(r)]
03/85	Exporters of hazardous waste must begin filing an annual report summarizing the types, quantities, frequency, and ultimate destination of all wastes exported during previous year. [245(a)-3017(g)]
04/85	Landfilling free liquid wastes (both bulk and container) is prohibited. [201(a)3004(c)(1)]

- 04/85 Any expansion of interim status landfills, surface impoundments, or waste piles must comply with new minimum technology requirements of double liners and leachate collection. [243(a)-3015(a)&(b)]
- 04/85 Injection of hazardous wastes into or above a drinking water aquifer is prohibited (Class IV injection wells). [405(a)-7010(a)]
- 04/85 Governors must designate state or local agencies to receive notifications of underground storage tanks. [601(a)-9002(b)]
- 04/85 No underground storage tanks containing regulated substances can be installed without corrosion protection. [601(a)-9003(g)]
- 07/85 Small quantity generators must use Uniform Hazardous Waste Manifest when shipping wastes off site. [221(a)-3001(d)(3)]
- 07/85 Permit applications for landfills or surface impoundments must be accompanied by a health assessment of the facility. Deadline also applies to previously submitted applications. [247(a)-3019(a)]
- 09/85 Generators disposing of wastes on-site must certify in permit that a program is in place to reduce volume and toxicity of waste. [224(b)-3005(h)]
- 09/85 Generator must certify on manifest that he has a program in place to reduce the volume or quantity and toxicity of his hazardous wastes. [224(a)-3002(b)]
- 10/85 Placing any non-hazardous liquid in a hazardous waste landfill is prohibited. [201(a)-3004(c)(3)]
- 10/85 Interim status is terminated for land disposal facilities unless they have applied for a final permit and certified their compliance with groundwater monitoring and financial assurance. [213(a)-3005(e)(2)]
- 10/85 Any person intending to export hazardous wastes must notify EPA of his intent to export. [245(a)-3017(c)]

- 10/85 Owners of underground storage tanks must notify the state or local agency of existence, age, size, type, location, and uses of such tanks. [601(a)-9002(a)(1)]
- 10/85 National Ground Water Commission is to complete preliminary study concerning groundwater contamination from hazardous and other solid waste. [704(f)(2)]
- 01/86 Owners and operators of facilities producing, using, or marketing fuel containing hazardous wastes must notify EPA of their activities. [204(a)(1)-3010]
- 01/86 Federal agencies must begin submitting biannual inventory of sites used to treat, store, or dispose of hazardous wastes at any time. [224-3016(a)]
- 02/86 States must have final authorization to administer the RCRA program or the program reverts to EPA. [227-3006(c)]
- 04/86 If EPA has not promulgated small quantity generator standards, these wastes must be managed at an interim status or finally permitted facility. [221(a)-3001(d)(8)]
- 04/86 Owners of underground storage tanks taken out of operation after January 1, 1974, must notify the state or local agency of the existence of such tanks. (601(a)-9002(a)(2)(A))
- 10/86 Hazardous wastes cannot be exported unless the receiving country has agreed to accept the waste. [245(a)3017(a)]
- 10/86 Land disposal of dioxin wastes and solvents (F001-F005) is prohibited. [201(a)-3004(e)(1)]
- 10/86 Incineration facilities must apply for a final permit or interim status will terminate. [213(c)-3005(c)(2)(c)]
- 10/86 Owners/operators of interim status surface impoundments must apply for a determination on exemption from double liner standards if they are qualified for the exemption. [215-3005(j)(5)]
- 10/86 Temporary delisting petitions will expire if final decision has not been made by EPA. [222(a)-3001(f)(2)(B)]

- 10/86      National Ground Water Commisison is to report on detailed findings and conclusions of ground-water study. [704(f)(1)]
- 04/87      Standards for underground storage tanks containing petroleum products become effective. [601(a)-9003(f)(1)]
- 04/87      States can seek authorization from EPA to administer the underground storage tank program. [601(a)-9004(a)]
- 06/87      Land disposal of the "California list" of hazardous wastes is prohibited. [201(a)-3004(d)(1)]
- 10/87      States must implement permit system for solid waste facilities receiving hazardous wastes from households and small quantity generators. [302(c)-4005(c)]
- 10/87      Standards for new underground storage tanks become effective. [601(a)-9003(f)(2)]
- 10/88      All hazardous waste facilities (other than land disposal and incineration facilities) must apply for a final permit or interim status will terminate. [213(c)-3005(c)(2)(c)]
- 10/88      Surface impoundments must be retrofitted with double liners or must stop receiving, treating, or storing hazardous wastes. [215-3005(j)]
- 10/88      Regulations on leak detection, correction, prevention, and financial responsibility for underground storage tanks become effective. [601(a)-9003(f)(3)]
- 09/89      States must implement permitting program which incorporates EPA criteria for solid waste facilities receiving hazardous wastes from households and small quantity generators. [302(c)-4005(c)(1)(B)]



Table 2 lists the deadlines that EPA is required to meet under the HSWA. Given the multitude of regulations, standards, reports, and studies that EPA will be required to issue, many of the deadlines will probably be missed. In some cases (such as the 7/88 deadline on regulations for land disposal bans) failure to act will impose automatic statutory requirements. These automatic requirements were imposed because of EPA's past history of not meeting Congressional deadlines.

(Please note comment on dates shown at end of this table)

**TABLE 2**

**DEADLINES IMPOSED ON EPA BY THE HAZARDOUS AND  
SOLID WASTE AMENDMENTS OF 1984**

<b>Date</b>	<b>Activity Required</b>
03/85	Promulgate final permitting standards for underground tanks that cannot be entered for inspection. [207-3004(w)]
04/85	Submit a study on small quantity generators to Congress. [221(c)]
04/85	List as hazardous, wastes containing dioxin and chlorinated dibenzofurans. All such wastes not listed within 6 months of enactment must be listed within 12 months. [222(a)-3001(e)(1)]
04/85	Report to Congress on feasibility of using nongovernmental inspectors to inspect TSD facilities. [231-3007(e)(2)]
04/85	Submit an inventory of all hazardous waste injection wells to Congress. [701(a)]
10/85	Begin a program of annual inspections of Federal facilities. [229-3007(c)]
10/85	Begin a program of biannual inspection of all TSD facilities. [231-3007(e)]

- 10/85      Propose whether to list or identify used automobile and truck crankcase oil as a hazardous waste. [241(a)-3014(b)]
- 10/85      Promulgate regulations governing the export of hazardous wastes. [241(a)-3017(b)]
- 10/85      Prescribe the form of notification for underground storage tanks. [601(a)-9002(b)(2)]
- 10/85      Complete a study on underground storage tanks containing petroleum products. [601(a)-9009(a)]
- 01/86      Final regulations must be promulgated to minimize disposal or presence of free liquids in landfills. [201(a)-3004(c)(2)]
- 01/86      Promulgate recordkeeping regulations for notifiers of hazardous waste fuels. [204(b)(1)-3004(s)]
- 01/86      Decide whether to list specific categories of wastes, including solvents, refining wastes, chlorinated aromatics, dyes and pigments, paint wastes, and coke by-products. [222(a)-3001(e)(2)]
- 01/86      Report to Congress on the hazardous wastes which are currently exempt from regulation because they are discharged to a publicly owned treatment works. [246(a)-3018(a)]
- 02/86      Administer the RCRA program for those states that have not received final authorization. [227-3006(c)]
- 04/86      Issue guidance criteria identifying areas of vulnerable hydrogeology. [202(a)-3004(o)(8)]
- 04/86      Promulgate standards for small quantity generators producing 100 to 1,000 kg/mo of hazardous wastes. [221(a)-3001(d)(1)]
- 10/86      Submit a schedule to Congress for reviewing and taking action on the land disposal of all listed hazardous wastes. [201(a)-3004(g)(1)]

- 10/86 Issue regulations or guidance on minimum technological requirements for landfills and surface impoundments (double liners, ground-water monitoring). [202(a)-3004(o)(5)(A)]
- 10/86 Promulgate regulations on production, use, and distribution of fuels containing hazardous wastes. [202(b)(1)-3004(q)]
- 10/86 Promulgate standards for transporters of fuel produced from hazardous wastes. [204(b)(2)-3003(c)]
- 10/86 Promulgate regulations on additional hazardous waste characteristics, including measures or indicators of toxicity. [222(a)-3001(h)]
- 10/86 Report to Congress on feasibility of requiring generators to reduce volume or toxicity of wastes. [224(c)-8002(r)]
- 10/86 Make final determination on listing used automobile or truck crankcase oil as hazardous. [241(a)-3014(b)]
- 10/86 Promulgate standards for generation and transportation of used oil which is recycled. [241(a)-3014(c)(2)(A)]
- 10/86 Report to Congress on methods to extend the useful life of existing sanitary landfills. [702-8002(s)]
- 01/87 Promulgate regulations on release detection, prevention, and correction for owners and operators of underground storage tanks containing petroleum products. [601(a)-9003(a)]
- 02/87 Make changes in EP Toxicity Test to insure that it predicts actual leaching behavior. [222(a)-3001(g)]
- 04/87 Promulgate regulations for monitoring and control of air emissions from hazardous waste TSD facilities. [201(a)-3004(n)]
- 04/87 Promulgate standards for approved leak detection systems at land disposal facilities and underground tanks. [202(a)-3004(o)]
- 04/87 Submit a study on the existing manifest system to Congress. [221(d)]

- 04/87     Submit a report on feasibility of having transporters assume some of the administrative burdens of small quantity generators. [221(e)]
- 04/87     Submit a report to Congress on the problems of hazardous waste management at educational institutions. [221(f)]
- 07/87     Promulgate regulations to assure that wastes discharged to publicly owned treatment works are adequately controlled. [246(a)-3018(b)]
- 07/87     Promulgate standards for new underground storage tanks. [601(a)-9003(e)]
- 10/87     Make determinations on applications for exemptions from double liner retrofit standards for surface impoundments. [215-3005(j)(5)(D)]
- 10/87     Report to Congress on the effect on ground-water quality of wastewater lagoons at publicly owned treatment works. [246(a)-3018(c)]
- 10/87     Report to Congress on the adequacy of current guidelines to prevent ground-water contamination at solid waste disposal facilities (municipal landfills and surface impoundments). [302(a)(1)-4010(a)]
- 10/87     Complete study on underground storage tanks containing other than petroleum products. [601(a)-9009(b)]
- 04/88     Promulgate criteria (ground-water monitoring, location, corrective action) for solid waste facilities receiving hazardous wastes from households or small quantity generators. [301(a)(1)-4010(c)]
- 07/88     Complete review and make final determination on deep-well injection of the wastes which are banned from land disposal. Failure to act will result in automatic ban. [201(a)-3004(f)(3)]
- 07/88     Promulgate final regulations for the land disposal ban for high volume/high hazard listed wastes. Failure to act will require disposal of these wastes in finally permitted facilities. [201(a)-3004(g)(6)(A)]

- 07/88 Promulgate regulations on leak detection, prevention, correction, and financial responsibility for underground tanks containing CERCLA regulated materials. [601(a)-9003(a)]
- 10/88 Issue or deny a final permit for all land disposal facilities having submitted applications. [213(c)-3005(c)(2)(A)]
- 05/89 Promulgate final regulations for land disposal ban on second 1/3 of listed wastes. Failure to act will require these wastes to be disposed in finally permitted facilities. [201(a)-3004(g)(6)(B)]
- 10/89 Issue or deny a final permit to all incineration facilities having submitted permit applications. [213(c)-3005(c)(2)(A)]
- 04/90 Promulgate final regulations on land disposal ban for final 1/3 of listed wastes. Failure to act will require disposal of these wastes in finally permitted facilities. [201(a)-3004(g)(6)(C)]
- 10/92 Issue or deny a final permit to any facility having submitted a permit application (other than land disposal and incineration facilities). [213(c)-3005(c)(2)(B)]

#### **ERRATA**

THE HAZARDOUS AND SOLID WASTE AMENDMENTS OF 1984 WERE SIGNED BY PRESIDENT REAGAN ON NOVEMBER 8, 1984. THE DEADLINES LISTED IN TABLES 1 AND 2 ASSUMED AN ENACTMENT DATE OF OCTOBER 1984 RATHER THAN NOVEMBER 1984. THEREFORE, MOST OF THE DEADLINES LISTED IN TABLES 1 AND 2 SHOULD BE EXTENDED BY 1 MONTH.



## **APPENDIX B**

### **CONFERENCE AGENDA**





**1985  
NATIONAL CONFERENCE  
ON  
WASTE EXCHANGE**

March 5-6, 1985  
Florida State Conference Center  
West Pensacola and Copeland Streets  
Tallahassee, Florida

**AGENDA**

**TUESDAY, MARCH 5, 1985**

- 7:30 - 8:30 a.m.      **REGISTRATION AND CONTINENTAL BREAKFAST**  
St. John's Room  
Florida State Conference Center
- 8:30 a.m.            **CONFERENCE OVERVIEW**  
Dr. Roy C. Herndon, Conference Chairman
- Summary of the 1983 National Conference on Waste Exchange
  - Objectives and Goals of the Conference
  - Conference Format
- 8:45 a.m.            **OPENING COMMENTS**  
Mr. Michael Cook, Deputy Director  
Office of Solid Waste  
U.S. Environmental Protection Agency
- Federal Regulatory Perspective
- 9:30 a.m.            **SESSION I: North American Waste Exchanges**  
Moderator: Dr. Robert Laughlin  
Canadian Waste Materials Exchange
- Panel: Mr. Walker Banning  
Northeast Industrial Waste Exchange
- Ms Margo Ferguson  
Industrial Material Exchange Service
- Ms Mary McDaniel  
Piedmont Waste Exchange
- Mr. William A. Stough  
Great Lakes Regional Waste Exchange
- Mr. Robert McCormick  
California Waste Exchange

**TUESDAY, MARCH 5, 1985**

Mr. Trevor Pitts  
Zero Waste Systems, Inc.

Mr. Gene B. Jones  
Southern Waste Information Exchange

11:15 a.m.

**SESSION II: Legislation and Regulations**

Moderator: Mr. Michael Cook  
U.S. Environmental Protection Agency

Panel: Mr. William M. Sloan  
Maryland Hazardous Waste Facilities Siting Board

Mr. Raymond L. Moreau  
Florida Department of Environmental Regulation

Representative Michael Friedman  
Florida House of Representatives

Ms Faith Gavin-Kuhn  
Hazardous Waste Services Association  
National Association of Solvent Recyclers

12:30 - 2:00 p.m.

**LUNCHEON MEETING**

Keynote Speaker: Senator George Kirkpatrick  
Florida Senate  
The Kissimmee Dining Room  
Florida State Conference Center

2:00 p.m.

**SESSION III: Serving Public Agencies**

Moderator: Ms Margo Ferguson  
Industrial Material Exchange Service

Panel: Mr. Mahlon White  
USAF Regional Civil Engineers Office

Mr. William Child  
Illinois Environmental Protection Agency

Mr. John U. Martin, III  
Florida State University

Mr. Jim Scales  
Defense Property Disposal Services

**TUESDAY, MARCH 5, 1985**

3:45 p.m. **SESSION IV: Waste Exchange and High-Tech Industries**

Moderator: Mr. Richard Floyd  
Union Carbide Corporation

Panel: Mr. Robert McCormick  
California Waste Exchange

Mr. Trevor Pitts  
Zero Waste Systems, Inc.

Dr. Robert Laughlin  
Ontario Research Foundation

5:15 p.m. **ADJOURNMENT**

5:30 - 6:30 p.m. **HOSPITALITY HOUR**  
Hosted by **Chemical Waste Management, Inc.**  
Fireside Lounge  
Florida State Conference Center

6:30 - 8:00 p.m. **DINNER MEETING**  
Keynote Speaker: Mr. Mahlon White  
USAF Regional Civil Engineers Office  
The Kissimmee Dining Room  
Florida State Conference Center

**WEDNESDAY, MARCH 6, 1985**

7:30 - 8:30 a.m. **REGISTRATION AND CONTINENTAL BREAKFAST**  
St. John's Room  
Florida State Conference Center

8:30 a.m. **SESSION V: Small Quantity Hazardous Waste Generators**  
Moderator: Mr. William Stough  
Great Lakes Regional Waste Exchange

Panel: Mr. Thomas Keith  
GRCDA

Mr. John Moerlins  
Florida State University

Mr. James Hattler  
GSX Services, Inc.

**WEDNESDAY, MARCH 6, 1985**

10:00 a.m.

**SESSION VI: Industry Perspective**

Moderator: Mr. Jerry Roberts  
Carolina Utility Customers Association

Panel: Mr. Gordon Kenna  
Chemical Waste Management, Inc.

Ms Mary McDaniel  
Piedmont Waste Exchange

Dr. Roy C. Herndon  
Southern Waste Information Exchange

11:30 a.m.

**SESSION VII: Association for Waste Exchange and Resource Reuse**

Moderator: Mr. John Moerlins  
Florida State University

Panel: Mr. Walker Banning  
Northeast Industrial Waste Exchange

Ms Faith Gavin-Kuhn  
Hazardous Waste Services Association  
National Association of Solvent Recyclers

Mr. William A. Stough  
Great Lakes Regional Waste Exchange

12:30 p.m.

**SESSION VIII: Conference Summary and Critique**

Moderator: Mr. Walker Banning  
Northeast Industrial Waste Exchange

1:00 p.m.

**CONFERENCE ADJOURNMENT**

## **APPENDIX C**

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