

Annex 1

L-8

**Report of the Subcommittee on Hazardous Waste
to the
Majority Leader of the New York State Senate**



**New York State Subcommittee on
Hazardous Waste**

REPORT OF THE SUBCOMMITTEE ON HAZARDOUS WASTE
TO THE
MAJORITY LEADER OF THE NEW YORK STATE SENATE

NEW YORK STATE SUBCOMMITTEE ON
HAZARDOUS WASTE

SENATOR JOHN B. DALY, CHAIRMAN

SENATOR DOUGLAS BARCLAY
SENATOR FRED ECKERT
SENATOR RAYMOND GALLAGHER
SENATOR MARTIN SOLOMON



JOHN B. DALY
SENATOR 80TH DISTRICT

THE SENATE
STATE OF NEW YORK
ALBANY
12247

CONSERVATION & RECREATION
CORPORATIONS & AUTHORITIES
ENERGY
TRANSPORTATION

Senator Warren Anderson
Majority Leader-New York State Senate
910 LOB
Albany, New York 12247

Dear Majority Leader:

On behalf of the Senate Sub-committee on Hazardous Waste, I am pleased to submit our report on the Committee's activities during the 1979 session and its recommendations. The Committee held a series of 11 hearings throughout the state from Mineola to Niagara Falls.

Working with the Assembly Sub-committee on Toxic Wastes and the Governors office the Sub-committee has participated in the drafting, passage and signing into law, of two extremely important pieces of legislation called the "Pure Earth" Act-which you co-sponsored. We commend you for your leadership in this matter since we are more convinced than ever, that with this legislation, New York State has taken a significant step forward in the long term solution of this problem.

As a result of the Committee's studies I am convinced that we do have technological capabilities to develop a long term solution to this problem if we have the determination to do so. It will require the investment of a significant amount of money but I do believe, as the report explains, that this can be raised without depending on monies from the state taxpayer.

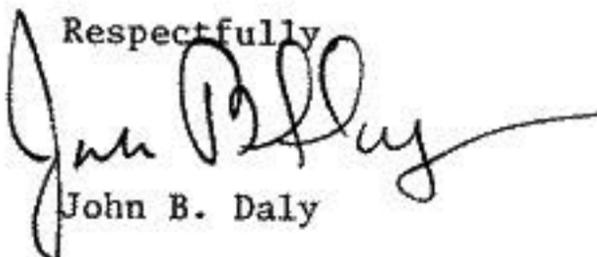
The major problem that thus far defies solution is what do we do with the waste presently being generated.

We worked in a most cooperative and effective manner with the Assembly Committee and with its Chairman Assemblyman Alexander Grannis.

I recommend that this Sub-committee be re-established in 1980 since there is much more still to be done. Most importantly, we should continue to make sure that the study required by the legislation passed this year is proceeding expeditiously so we will have its report and recommendations by March 1st.

I would like to thank you for your confidence in me in assigning me this important assignment.

Respectfully



John B. Daly

JBD:jm

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CHAPTER 1

RECOMMENDATIONS:

That New York State has a massive problem in the area of hazardous waste is no longer in dispute. Our experience with Love Canal and other serious incidents has educated us to the point where we know enough about the hazardous waste problem to be genuinely concerned but not enough to actually solve it.

The New York State Senate Subcommittee on Hazardous Waste held joint hearings in conjunction with the Assembly Toxic Substance Task Force throughout the state in the early part of 1979. Through the many pages of testimony gathered it is evident that a strong commitment is necessary from the government and the citizens of the state to control the future disposal of hazardous waste. The conclusion to be drawn from the testimony is that the regulation of hazardous waste must become the immediate highest priority in the environmental efforts of New York. It is imperative that we be forevermore constantly vigilant in the generation, transportation and ultimate disposal of hazardous wastes in order to prevent future Love Canals.

The culmination of this year's efforts of the Subcommittee and of its Assembly counterpart was the signing into law by the Governor of two bills which comprise the Pure Earth Act of 1979. These laws will provide for the handling of abandoned hazardous waste sites in the State of New York and in addition will provide the base for the future development of hazardous waste regional disposal sites. The Pure Earth package in combination with New York's previously enacted Industrial Hazardous Waste Management Act of 1978 gives New York the framework of a comprehensive and effective hazardous waste management program.

Yet more needs to be done. The toxic waste buried in Erie and Niagara Counties will not just disappear. The thousands of barrels of toxic waste

stored in warehouses and in empty lots in Oswego County will not just disappear. The serious PCB problems in the upper Hudson River and various PCB dump sites in Saratoga and Warren County will not just disappear. The highly toxic chemicals found in the ground waters of the sole source aquifer of Long Island will not just disappear. Therefore government, industry and the people of New York must be willing to make the commitments and adjustments necessary so that we will no longer bury tons of hazardous waste unsafely for future generations to be detrimentally affected. The future disposal of hazardous waste is something to which this state must address itself immediately and comprehensively.

Therefore, this Subcommittee makes the following recommendations:

1. The State of New York must commit itself to develop a regional hazardous waste disposal system.

2. Such a regional hazardous waste disposal system should be constructed and owned by the state. (Majority Opinion) However, there is a minority opinion on the Committee that a combination of a state/private approach might be best. The EFC hazardous waste Advisory Committee, established by the Laws of 1979, should study both approaches in depth and also determine any other approaches to be considered. Their report is due to be completed in March 1980.

3. The financing of a state-owned regional hazardous waste system should be through the use of revenue bonds if possible.

4. Transportation of hazardous waste from outside New York into the state should be reduced by the implementation of the state controlled regional site system.

5. New York should immediately institute a manifest system to track hazardous waste from the point of generation to the point of ultimate disposal.

6. Each local unit that presently has a private hazardous waste disposal operation within its boundaries should be provided with a full-time monitor on the site.

7. Each employee or new employee working in an industry which produces hazardous waste should be provided with information as to the hazardous chemicals they may come in contact with.

8. All deeds or title to land located within the vicinity of a known hazardous waste landfill site should give notice to that effect.

1. THIS SUBCOMMITTEE RECOMMENDS THAT THE STATE OF NEW YORK COMMIT ITSELF TO DEVELOP A REGIONAL HAZARDOUS WASTE DISPOSAL SYSTEM TO ALLEVIATE THE NEED FOR MASSIVE BURIAL OF HAZARDOUS WASTE.

Burial of hazardous wastes is at best a temporary delay of the problems associated with hazardous waste. What we buried several decades ago is now beginning to plague us in a most alarming manner. We can never again be so shortsighted as to think the burial of hazardous waste is a solution. Burial of toxic waste should be limited to the extent modern technology requires and should eventually be eliminated altogether. Regional Waste Disposal sites would be able to handle hazardous wastes within a total system concept and provide treatment which will either detoxify, incinerate or otherwise destroy or solidify the hazardous waste so as not to allow any toxic substance to be released into the environment.

It should be emphasized that a regional hazardous waste disposal system does not necessarily mean a single huge plant in each region. The concept proposes a system in each region tailor-made to handle the hazardous waste produced in that region whether it be one plant or several different plants located in the same site. Regions would of course be defined by the type of industry and type of waste generated in that area. In Niagara and Erie Counties for example where 50% of all hazardous waste in New York is generated we would need a site with several different processes to handle the wide range of different wastes produced.

A complex regional site such as is needed in Niagara and Erie counties would consist of not one big plant but several plants probably at the same site to house the different and varied processes of a tailor-made system. In the upper Hudson Valley area there is a great need for a process to handle PCBs, but that area may not need many of the other processes required in Niagara and Erie counties. The relatively small amount of hazardous waste that one region could not handle would be handled by a process provided in one of the other regions. This would be the extent of a long distance hauling of hazardous waste needed in the state.

2. THE SUBCOMMITTEE RECOMMENDS THAT THE REGIONAL HAZARDOUS WASTE DISPOSAL SYSTEM SHOULD BE CONSTRUCTED AND OWNED BY THE STATE. (MAJORITY OPINION) A MINORITY OPINION WITHIN THE COMMITTEE IS SIMILAR TO THE OPINION EXPRESSED IN THE BOOZ, ALLAN, HAMILTON REPORT OF SEPTEMBER 1, 1979 AND SHOULD BE USED FOR REFERENCE. IT IS FELT THAT BOTH APPROACHES SHOULD BE STUDIED BY THE COMMITTEE.*

*Since Booz, Allan, Hamilton report concentrated its efforts on State/private approach it is felt by the committee that an in-depth analysis of State owned and operated facilities should be presented. In light of the current E.F.C. hazardous waste advisory committee study being conducted at the present time, this in depth analysis will provide an additional option for the committee to digest in its deliberations as to the best approach for the State to take.

We would be remiss if we did not mention the 3rd option in our search for a solution to a complex problem, that of course being complete private site acquisition, construction and operation of such a facility. This too we are sure will be looked at by the E.F.C. hazardous waste advisory committee.

The technology that is available today to adequately dispose of hazardous waste is in its infancy and consequently the cost required to provide the type of complete hazardous waste disposal that is needed for our society will be great. The fact is, however, that there is technology available today to safely neutralize, detoxify or destroy almost every hazardous waste produced. Again the problem is the expense. Different types of hazardous waste require higher or longer exposure in an incinerator for example, and this means varied costs for disposing of various waste. The permanent disposal of certain hazardous waste is just not profitable. A private company may not have the capital to build a system which is able to employ the available modern technology to its fullest extent. The result in the past has been to resort to landfilling.

A state-owned facility designed not to make a profit but rather to employ state-of-the-art technology in a complete system would have as its goal to dispose of hazardous waste to the fullest extent possible. A regional system organized by the state would be able to plan and locate facilities which are tailor-made to handle all the wastes produced in a certain region. This would reduce the amount of hazardous waste traveling long distances on our highways. It would also result in a beneficial type of self-regulated zoning: industries which produce certain hazardous wastes would have an incentive to locate near the regional sites which would adequately handle those particular wastes. This would ensure decreased landfilling of toxic wastes and assure to industry that they could dispose of their wastes in an approved, safe manner.

From the point of view of industry, state regional sites would eliminate a major problem that faces many companies today: public and private liability for hazardous waste they generated and allowed to be buried in its toxic state. Such companies are faced with public liability to clean-up abandoned dump sites and are faced with private suits by those who claim their health and property has been adversely affected by the long-term presence of landfilled hazardous waste. The ability to turn over to a state-run facility the hazardous waste produced by industry for a fee in return for assurance that the state will responsibly and safely dispose permanently of such waste would be a great attraction to industry of all kinds. It is important to realize that it is not just the chemical industry per se that must deal with hazardous waste-almost all industry large or small generates such waste. To have all of this waste permanently cared for would be not only a psychological relief to the citizens of New York but would have a very positive effect on New York State business climate.

Even with state-of-the-art technology in place in a system of regional sites it should be noted that at the present time not all hazardous waste can be destroyed or completely detoxified. The residue waste or non-destructable waste will have to be buried. But in a state run regional site such waste could be neutralized and/or (molecularly encased in solid form so that it will not leach out in liquid) rather than being buried in barrels in liquid or semi-liquid form. In addition the landfill sites would constantly be monitored and maintained by the state with the goal of safety rather than profit. Complete records of all landfills would be kept. Thus the public would always know what is buried where and in what quantities and would be assured that the state would not abandon such a site, since the "state cannot leave the state". Again since all landfills would have complete records at such time in the future that the proper technology became available, the buried wastes could be dug up and handled by the new process in the total system.

Another attraction of a regional disposal facility is the availability of a system which could handle wastes which in the past had been landfilled rather

than destroyed. Thus with a comprehensive waste destruction system in existence, buried waste which is sitting in the ground could be carefully, under state supervision dug up and safely and permanently disposed of by incineration, neutralization, or some other method provided by the comprehensive system.

Another benefit ^{of} regional sites would be the potential for the recovery and use of valuable waste byproducts. Depending on the disposal process of the waste involved a comprehensive hazardous waste disposal system will provide useful and saleable byproducts. For example one step in the detoxification process of certain chloride wastes results in hydrochloric acid as a by-product. Hydrochloric acid is a valuable product and could be sold on the market to provide additional funds to pay off construction bonds or to pay for operation and maintenance. Alternatively, such funds could be used as an emergency clean-up fund for any hazardous waste related problems. It should be noted that one of the major goals of the federal Resource Conservation and Recovery Act, as the title states, is resource recovery. Such a goal is best accomplished in a single system program which brings together under a single roof all the methods and processes of disposing of all hazardous wastes. It is thus the comprehensiveness of an envisioned state owned regional disposal system which makes resource recovery such a viable attraction.

Industry faces a big change in the way it handles toxic waste when the federal Conservation and Recovery Act and its regulations finally become fully implemented. There will be tough new rules and standards that will have to be met by industry in disposing of hazardous waste. Thus in addition to limiting liability and possible cost reductions, generators will be ^{assumed} assumed of safe and approved disposal through the use of a state owned system.

The feedback from private industry to this Subcommittee indicates that the private sector would be willing to have the State of New York undertake responsibility for the disposal and care of hazardous waste.

3. THE SUBCOMMITTEE RECOMMENDS THE FINANCING OF A STATE-OWNED REGIONAL HAZARDOUS WASTE SYSTEM SHOULD BE THROUGH THE USE OF REVENUE BONDS.

One of the Pure Earth Act bills (Chapter 283 of the laws of 1979) which resulted from this Subcommittee's work in the 1979 legislative session requires the New York State Environmental Facilities Corporation to undertake a study to determine what types of regional systems would best suit New York's needs and how best to fund that system. The study will be done by a consulting firm under the guidance of an appointed advisory group consisting of technical and financial experts. The purpose of the study is to recommend to the legislature and the Governor a viable, complete blueprint as to how best to proceed in establishing a regional hazardous waste system: what facilities to put where and how to charge users in order to finance the revenue bonds that will be needed to capitalize the project.

Revenue bonding was selected as a possible method of financing because the principle and interest of the bonds will be paid off by the generators of hazardous waste who will be the users of such facilities. Thus, no tax money would be used. A schedule of charges and long-term contracts could be designed based on the amount and type of waste to be disposed of with the sole purpose of financing the facility and providing for operation and maintenance. The state would not be out to make a profit and therefore it would charge only to provide for safe, effective, and permanent disposal of wastes. Thus any savings by industry could be reflected ultimately in reduced prices of consumer goods.

The major hurdle in the establishment of a regional hazardous waste disposal system is of course cost. It is the belief of this Subcommittee that the use of user-backed revenue bonds is presently the best method of raising the necessary capital. Whether such bonds should be floated by giving the

Environmental Facility Corporation expanded powers to issue bonds or by establishing a new and separate hazardous waste authority is a matter that is presently open to debate.

4. THE SUBCOMMITTEE RECOMMENDS THAT TRANSPORTATION OF HAZARDOUS WASTE FROM OUTSIDE NEW YORK INTO THE STATE SHOULD BE REDUCED BY THE IMPLEMENTATION OF THE STATE CONTROLLED REGIONAL DISPOSAL SYSTEM.

Transportation of hazardous waste is a tricky problem. Perhaps the most upsetting aspect of the many, many hazardous waste landfill sites in New York is that much of that waste is brought in from outside the state. It is hard for a state to control the flow of hazardous waste and through it because of the constitutional constraints of the interstate commerce clause. A recent Supreme Court decision (City of Philadelphia v. State of New Jersey, 98 S. Ct. 2531 (1978)) held that a New Jersey law prohibiting the importation of most "solid or liquid waste which originated or was collected outside the territorial limits of the State..", violated the commerce clause of the U. S. Constitution. One of the advantages of state-owned regional hazardous waste disposal sites is that the State could exercise control over the importation of hazardous waste. If only state owned sites were allowed then the state could decide what kind and how much, if any, hazardous waste would be accepted. It would be an entrepreneurial decision made by the state rather than a mandated prohibition.

In what seems like the fairest possible result, New York would have the ability to handle all the waste produced by its own industry and would be able to limit the importation of hazardous waste into our state. We would not have to ship our hazardous waste to other states nor would we have to accept the waste produced outside New York. If we can limit outside waste then logically the importation of hazardous waste into and through New York would be greatly reduced. The problem with private run facilities is that the state has little ability to control what waste they accept and where it comes from. Since it cannot control this aspect and since the New Jersey decision and the principles

of a required free flow of interstate commerce would seem at this time to preclude a state from an outright ban or limit the importation of hazardous waste, the only control a state has is over how such waste is imported into it. New York, under 27 - 0909, will soon issue regulations on how hazardous waste is to be transported inside its boundries and over its roads. Federal regulations promulgated under the Resource Conservation and Recovery Act will also be someday promulgated on how to transport hazardous waste. But in order to have control over how much, what kind and from where hazardous waste is coming into New York a state run regional system would seem to be desirable and necessary.

In summary, the benefits of a state-owned regional hazardous waste system financed by revenue bonds are as follows:

BENEFITS TO PUBLIC

1. assurance that hazardous waste will be safely, effectively and permanently disposed of;
2. possible reduced consumer prices passed on by industry;
3. no taxpayer dollars directly involved;
4. a reduction in the amount of "foreign" hazardous waste transported into New York;
5. the potential to clean-up existing hazardous waste landfill sites; and,
6. possible statewide economic benefits due to industrial expansion enticed by the establishment of a system of safe, approved and permanent hazardous waste disposal.

BENEFITS TO INDUSTRY

1. limited public and private liability;
 2. possible long-term cost reductions;
 3. easier compliance with the standards promulgated pursuant to the Federal Resource Conservation and Recovery Act;
 4. fulfillment of the goal of resource recovery; and,
 5. the reliability and permanence insured by a state-controlled hazardous waste disposal system.
5. THIS SUBCOMMITTEE RECOMMENDS THAT NEW YORK IMMEDIATELY INSTITUTE A MANIFEST SYSTEM TO TRACK HAZARDOUS WASTE FROM THE POINT OF GENERATION TO THE POINT OF ULTIMATE DISPOSAL.

The problem of "midnight dumping" of hazardous wastes along sides of roads or in vacant lots has received a great deal of media attention and has demonstrated that we presently do not have a system of keeping track of hazardous waste as it is transported within and through the state. A manifest system requiring that a written description of the amount and kind of all hazardous waste transported be kept with the waste load and a voucher-type system covering the transfer and acceptance of such waste at all points would enable the state to know where any toxic wastes are within its borders at any given time.

The Federal government, under Resource Conservation and Recovery Act regulations that have not yet been promulgated will ultimately require such a manifest system nationwide. Unfortunately promulgation of those Federal regulations has been slow and the practical date of their implementation is still uncertain.

The Subcommittee therefore recommends that the State of New York not wait for the Federal regulations to be finally implemented but rather that it should provide its own manifest system for the control of hazardous waste. This would require only a simple amendment to New York's Industrial Hazardous Waste Management Act.

6. THE SUBCOMMITTEE RECOMMENDS THAT SUPPLEMENTAL LEGISLATION BE PASSED IN THE NEXT SESSION TO FURTHER PROTECT THE CITIZENS OF NEW YORK AGAINST THE PROBLEMS ASSOCIATED WITH HAZARDOUS WASTE DISPOSAL.

Specifically, the Subcommittee recommends:

a) Legislation which would require each private hazardous waste disposal operation to provide funds for the hiring of a full-time, independent monitor on the disposal site. The monitor would have to be approved by the Department of Environmental Conservation and by the local government unit in which the operation is located. The monitor would make periodic reports to the local government and to the Department of Environmental Conservation. The advantage of such an independent local monitor would be that local residents would be informed at all times that the private waste disposal firm was disposing of hazardous wastes in the proper manner.

b) Legislation which would require industry to fully inform each employee or prospective employee as to the hazardous chemicals with which they may come in contact and in what areas of the work place such contact could be made. The purpose would be full disclosure to all employees of any toxic conditions that they may be exposed to during the course of employment.

c) Legislation to require that all deeds or titles to land located within the vicinity of a known hazardous waste landfill site give notice to that effect. This would serve to protect future property purchases from unknowingly buying property located on or near an abandoned hazardous waste dumpsite.

d) Legislation to change the statute of limitations regarding hazardous waste related injuries and illnesses. The recent New York Court of Appeals decision held that in cases involving harmful effects of chemicals, the statute of limitations begins to run whenever the action occurs which ultimately causes the harm, even if the damage caused may not manifest itself for many years after the action took place.

This decision results in a fundamental injustice to those persons who are injured as a result of exposure to chemicals and other toxic substances. Legislation will be needed to rectify this inequity.

CHAPTER 2

RECOMMENDATIONS TO THE FEDERAL GOVERNMENT

The Federal Government's efforts to solve the national problems associated with hazardous waste have been disappointing. Passage of the Resource Conservation and Recovery Act (RCRA) and the Toxic Substance Control Act (TOSCA) were major steps forward in the goal of regulating hazardous waste disposal and the production of toxic chemicals. But since that time federal efforts have been at a standstill.

RCRA is a very comprehensive and complex set of requirements. It has been described as "...one of the most overdue, important, underrated, potentially far reaching and frequently ambiguous of all environmental laws" by a former assistant administrator of EPA. The major problem surrounding RCRA is the implementation of the act through the promulgation of regulations by the Environmental Protection Agency. The regulations are about 1 1/2 years overdue. Court ordered deadlines have been set requiring final promulgation of the regulations by the end of 1979, but many people feel that practical implementation of the regulations may be delayed far beyond that time period because of contemplated court actions by industry directly affected. RCRA has also been criticized as overly vague, confusing and duplicative.

States such as New York which have been at the forefront in trying to implement a permanent program to solve the problem of hazardous waste are hamstrung until the federal agencies establish final regulations for RCRA.

The major reason for the delay in promulgation of the regulations is the same reason that EPA will not be able to enforce the regulations when finally in place: lack of money. EPA has not received the money necessary to adequately administer RCRA. The act itself authorized up to \$11.4 million for fiscal year 1978 for EPA to discharge the administration of the hazardous waste provisions

of RCRA; but the Office of Management and Budget approved less than half that amount for the program.

Congress authorized the states to administer their own hazardous waste programs in conformity with RCRA under 42 USC § 6926. Appropriation of \$25 million was authorized for both fiscal years 1978 and 1979 to aid in the implementation of state authorized programs. But, in part because of the uncertainty of what the final requirements of RCRA would be, the states have only requested \$15 million out of the total \$50 million authorized for both years. In addition states are understandably reluctant to undertake implementation of their own program when there is no promise of federal aid beyond fiscal year 1979. If a state does not implement its own program, the EPA must administer the program in that state. Again EPA has neither the funds nor the staff to administer RCRA nationwide at this time.

A report by the U. S. Comptroller General Hazardous Waste Management Programs Will Not Be Effective : Greater Efforts Are Needed (CED-79-14 January 23, 1979), makes clear that more federal funds are required if RCRA is to become more than just words on paper. The following are excerpts from that report: "Neither EPA nor the States have the resources to effectively operate and manage programs for the control of hazardous waste disposal. EPA has been unable to obtain the funding authorized for program implementation and administration, and the financial and technical assistance promised to the States has not been provided. Unless adequate State assistance is assured, many States have acknowledged they will not accept responsibility for implementing RCRA (P.20)."

"The States have expressed their need for Federal funding to develop, implement, and improve their hazardous waste programs. Most State hazardous waste programs have received only minimal financial support from their legislatures, and many State officials told us their legislatures are not sympathetic to providing additional funding. During our visits to the States, some officials expressed the view that since hazardous waste legislation is a Federal program,

the Federal Government should either operate the programs or fund State programs. These officials said they were reluctant to accept responsibility for hazardous waste programs because in the past they have not received adequate Federal financial assistance to carry out other federally imposed pollution control programs. (p. 15)."

"The Federal and State funding provided for fiscal year 1978 was not adequate, and the fiscal year 1979 funds appropriated are substantially less than estimated needs.

There are no provisions in RCRA for EPA administrative costs or for EPA grants to the States after fiscal year 1979, and alternative long-term funding sources appear to be needed if the program is to be implemented effectively. Without funding assistance, many States cannot implement RCRA's hazardous waste provisions as directed by the Congress, and EPA will be required to provide the program support to operate such State hazardous waste programs. (p. 10)."

"In a December 1977 implementation draft strategy, EPA states that its regional offices will be the focal point for implementing the act. Their functions should include lead responsibility to assist States in developing acceptable hazardous waste regulatory programs, monitoring State progress, and assuring that applications for program funds are adequate.

Hazardous waste program officials in all 10 EPA regional offices informed us that for the immediate future periods, they would not have adequate staff to carry out the following basic activities, which they considered critical to hazardous waste management:

- All 10 EPA regional offices could not provide the necessary technical assistance to the States in initiating their programs.

-Eight regional offices acknowledged they could provide no help to the States in the development of State regulations.

-Eight regional offices acknowledged they could provide no assistance in orienting industry and the public on the regulatory requirements to be developed in the hazardous waste area.

-Six regional offices acknowledged they would not be able to review disposal sites to verify if they were environmentally sound.

EPA officials in all 10 regions stated they would not have the needed staff to authorize, review, and monitor State programs in their regions. (p.11)."

This Subcommittee therefore recommends to the Federal government the following:

- 1) THAT ADEQUATE SHORT-TERM FUNDS IMMEDIATELY BE PROVIDED TO THE FEDERAL EPA SO THAT THE AGENCY CAN COMPLETE ITS OVERDUE MANDATE TO PROMULGATE THE FINAL REGULATIONS WHICH WILL IMPLEMENT RCRA.
- 2) THAT EPA MAKE EVERY EFFORT TO COMPLETE PROMULGATION OF THOSE REGULATIONS.
- 3) THAT ADEQUATE FUNDS BE MADE AVAILABLE TO STATES WHICH CHOOSE TO ADMINISTER THEIR OWN HAZARDOUS WASTE PROGRAMS IN CONFORMITY WITH RCRA REQUIREMENTS. SUCH FUNDING SHOULD BE ON A LONG-TERM BASIS TO PROVIDE AN INCENTIVE FOR THE STATES TO ADMINISTER HAZARDOUS WASTE PROGRAMS AT THE STATE LEVEL.
- 4) THAT ADEQUATE FUNDS BE PROVIDED TO EPA ON A LONG-TERM BASIS SO THAT THE AGENCY CAN PERFORM ITS MANDATED FUNCTION OF

ADMINISTERING RCRA IN STATES WHICH DO NOT HAVE AN APPROVED STATE HAZARDOUS WASTE PROGRAM.

At this time the federal government does not have a program to handle emergency situations related to hazardous waste. A review of the federal government's role in the Love Canal crisis makes that obvious. Various federal officials came into the Love Canal to investigate and evaluate the situation in 1978. Some promised federal disaster relief funds to the residents of the Canal area. Only \$2 million out of the total cost of about \$28 million came from federal disaster relief funds. Money and technical aid came slowly and in small amounts. And when residents were evacuated to temporary housing at the U.S. Air Force Base in Niagara Falls the federal government charged New York State the maximum rent for those forced to move from the Canal. At this time, the state has expended approximately \$16.6 million for emergency relief and the federal government only about \$6.7 million. All but \$2 million of the latter figure were from an EPA demonstration grant not from federal emergency funds.

Clearly the lessons of Love Canal should be written into a comprehensive emergency response program at the federal level to handle any future hazardous waste health emergencies. Merely wishing that there are no future Love Canals does not mean that there will be no more Love Canals.

It is encouraging that there are several proposals in Congress which address the problems of hazardous waste spills and Love Canal situations. The "superfund" concept is the most promising. There are several different superfund bills being considered in Washington.

Superfund proposals establish a multi-million fund by charging various fees to generators and/or disposers of hazardous waste. Money from that fund is usually to be used to reclaim and maintain abandoned hazardous waste sites, for victim compensation and for clean up spills. There is a wide disparity in proposed roles for the states in the various superfund systems. For example, one proposal would reimburse states up to 95% for reclamation and maintenance

of abandoned sites while another would pay 100% of the costs for the first year of up to \$200,000 (+90% above \$200,000) and then require the state to assume full costs for the next 19 years at the site.

It is expected that the eventual establishment of a superfund will be the cornerstone in a federal emergency response program for hazardous waste. The Subcommittee does not at this time recommend any single superfund proposal. Instead we urge the Congress to examine carefully each of the proposals and to incorporate the best provisions from all the proposals into a single piece of legislation. The states, as well as industry, should have an active role in constructing the ultimate federal program. This means not only that the Congress will have to listen but that industry and the states will have to make an effort to be heard. In the next legislative session, therefore, this Subcommittee will focus on the various superfund proposals and will make an effort to have an effect on the legislation which eventually results.

Finally, this Subcommittee has already recommended that New York institute a program of state operated regional hazardous waste disposal system. To help New York and other states which decide to implement such a program the Subcommittee makes the following recommendation:

THAT THE FEDERAL GOVERNMENT INSTITUTE A 50/50 MATCHING FUND TO ENCOURAGE THE CONSTRUCTION OF STATE OPERATED REGIONAL HAZARDOUS WASTE DISPOSAL SYSTEMS THROUGHOUT THE NATION.

What is good for New York should be good for other states that have massive hazardous waste disposal problems. When water pollution became a recognized national problem the federal government responded with a matching fund program for the construction of sewage disposal plants under the Clean Waters Act. A similar program is clearly needed now for hazardous waste.

It is interesting to note that the benefits to society from the chemical industry are enjoyed by everyone in the United States. Because all benefit, all should participate in the solution of any problems that are created.

Federal monies should be made available to states which must bear the heaviest burden in disposing of hazardous waste. Since these states such as New York have contributed the high standard of living in the U. S., the Federal government should assist with the disposal of this waste. This would not be a departure from past Federal government practices. In all areas of Federal assistance the rule has been to assist those with the heaviest burdens.

Nothing less than a concerted national effort with the federal and state governments in close cooperation will move us toward the solution of this country's hazardous waste problems. Nothing less should be our goal.

LOVE CANAL COSTS (Approximately)

REMEDIAL CONSTRUCTION PROGRAM

EPA demonstration grant	\$ 4,600,000
City of Niagara Falls	4,502,000
Federal Disaster Assistance Agency (Reimbursing the City of Niagara Falls)	2,180,000

PERMANENT RELOCATION

New York State	9,725,000
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HEALTH AND ENVIRONMENTAL TESTING

New York State	2,725,000
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TAX MORATORIUM

New York State	1,000,000
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TEMPORARY RELOCATION

New York State	885,000
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MISCELLANEOUS

New York State	800,000
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PERMANENT LEACHATE TREATMENT (earmarked funds)

New York State	750,000
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STAND-BY-BUS SERVICE

New York State	550,000
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HUMAN SERVICES

New York State	200,000
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TOTAL	\$27,907,000
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Total New York	16,625,000
Total Federal	6,780,000
Total City	4,502,000

CHAPTER 3

LOVE CANAL - A LESSON HOW AN ENVIRONMENTAL CATASTROPHE CAN HAPPEN

Mr. William T. Love, a visionary of the 19th century, died without ever realizing his dream for a Love Canal and a "Model City". The chances of his name ever being immortalized were very remote. However, because the electro-chemical industry in New York State chose to situate along the banks of the Niagara River in Niagara Falls, his name has come to personify the most tragic environmental disaster of our time.

In 1892, Mr. Love proposed to build a power canal between the upper and lower Niagara Rivers, utilizing the 300 foot drop in water level to generate electric power to drive the machinery of industry that he had persuaded to locate in his "Model City" a few miles north of Niagara Falls. In those days, long power transmission lines were impractical, so industry was forced to locate close to the generating station.

Love's proposal was greeted with great enthusiasm as evidenced by the fact that financial backers from as far as Chicago were investing money in his venture. In 1894, work started on the Love Canal about six miles upriver from the Falls.

Unfortunately, soon afterwards, the country found itself in the middle of an economic depression and the investment support faded. Undaunted, Love clung to his dream during the depression and planned to complete the project when economic conditions warranted. The final blow occurred when the inventor, Louis Tesla, developed an economical method of transmitting electrical power over great distances by means of alternating current. The need for a "Model City" no longer existed, and by 1910 the last of Love's property, including the partial excavation that was to be his canal, had been auctioned.

For thirty years, the site lay essentially abandoned. In 1942, the Hooker Chemical Company of Niagara Falls began negotiations for purchase of the land.

The Canal site, located in an undeveloped, sparsely populated area, was ideal for the disposal of chemical residues since by design it was built to retain water. The impervious qualities of the clay walls have recently been tested and indicate that the clay has a water transmission rate of only one-third inch in 25 years.

The Canal, itself, was a trench about 3,000 feet long, 60 feet wide and 10 feet deep. The property acquired by Hooker was a 200 foot wide strip with the Canal in the approximate center of the strip.

In approximately 1942, Hooker began disposing of chemical wastes in the northern section of the canal. Chemical wastes in steel drums were placed in the original trench and covered with several feet of clay material. The life of a steel drum is limited and were not intended to insure permanent containment. The impervious clay of the Canal was to provide for a permanent resting ground for the chemical waste.

In about 1946, the southern end of the Canal became the disposal site. Small sections were excavated, filled with chemical waste and then covered with clay material and compacted. After each excavation was filled, the process was repeated.

During the same period of time, the City of Niagara Falls dumped municipal waste in the central portion of the canal. Consequently, this section is considered to be essentially free of toxic waste.

It is important to note at this point that clay is compacted over a dump site to prevent rain and melting snow from seeping into the deposit below.

In 1952, the Board of Education in the City of Niagara Falls had begun to express interest in acquiring the Hooker property for a school. As a result of the Board's insistence and the likelihood that condemnation proceedings would be initiated, Hooker deeded the property in 1953 for \$1.00 on condition that the

deed include a clause which gave notice of the past use, and under which the School Board and its successors in title assumed the risk of and liability for claims that might result from the buried chemicals and agreed not to make any claim against Hooker that might result from its past use of the land.

In the 1950's, the Board of Education built the 99th Street School on the edge of the central part of the Canal. This area of the Canal had been used by the City of Niagara Falls to dump municipal waste. The School Board deeded the northern portion of the site over to the City for the purpose of building a park, and the southern portion passed into private hands.

With the building of the school, the development of the adjacent properties continued to increase. In the 1960's there were approximately 150 homes in the area and by the middle 1970's, there were more than 200 homes in the area. No homes were built directly over the Love Canal.

Apparently, during the construction of the 99th Street School and the adjacent homes, the clay cap over the Canal was disturbed. Rain water and melting snow were then able to leak into the Canal. Because of the nature of the Canal, the receptacle began filling up like a "bath-tub". As the trench filled, the water mixed with the existing chemicals and formed a leachate which began to migrate from the Canal.

About 20 years after the site was covered, chemical odors began infiltrating basements of homes surrounding the Canal. Also many barrels had floated to the surface of the landfill and the chemicals were exposed in open puddles.

Residents of the area complained to various officials about the odors and the chemical wastes that were migrating in the area basements. Between 1976 and 1978 the Department of Environmental Conservation (DEC) and the City of Niagara Falls undertook a number of inspections and hydrological investigations. The results indicated that a serious health hazard may exist in the area as a consequence of the leaking chemicals that the tests had uncovered.

The State Departments of Health (DOH) and Environmental Conservation then initiated a more extensive air, soil and groundwater sampling program and a house-to-house health survey which grew to encompass all 250 households in the immediate area of the Canal.

The environmental sampling discovered the presence of at least 82 chemical compounds including benzene, a known human carcinogen, or cancer-causing chemical. An analysis of environmental and health data indicated that the chemicals were a possible cause of the higher than expected incidence of miscarriages and birth defects among Love Canal residents.

In January 1977, the City of Niagara Falls hired a consultant to conduct a hydrological investigation of the site and to develop a conceptual pollution abatement system. The report was completed by Calspan Corporation in August 1977 and was reviewed by DEC.

Preliminary work indicated the need for more intensive investigation. In October 1977, DEC sought the assistance of the U. S. Environmental Protection Agency (EPA) in conducting an expanded study of the groundwater pollution. In February 1978, the City of Niagara Falls hired the consulting firm of Conestoga-Rovers to develop the groundwater pollution abatement plan.

On April 13, 1978, the Commissioners of Health and Environmental Conservation along with local officials inspected the site. Based on their personal observations and the recommendations of public health specialists in the Health Department, Commissioner of Health, Dr. Robert Whalen, on April 25, 1978, officially termed the Love Canal "... an extremely serious threat to the health and welfare..." and ordered the Niagara County Health Commissioner to immediately undertake remedial measures to remove visible chemicals and restrict access to the site and initiate health and engineering studies.

Commissioner Whalen's order set into motion a coordinated study by local, State and Federal agencies to further delineate the nature and extent of environmental and public health hazards. As data flowed in, it became evident that unacceptable levels of toxic vapors associated with more than 80 compounds were emanating from the basements of many homes in the first ring directly adjacent to the Love Canal. Ten compounds--including benzene, a known human carcinogen--were selected for evaluation purposes and as indicators of the presence of other chemical constituents.

On July 20, 1978, the Governor and the Legislature gave Commissioner Whalen emergency powers to better deal with the situation; and \$500,000 was provided for DOH to conduct environmental and epidemiological studies. Preliminary findings indicated a higher than expected number of miscarriages in the southern portion of the first ring of homes. A higher frequency of birth defects also was found among those families.

Armed with the new epidemiological information, Commissioner Whalen on August 2, 1978, issued a more detailed order to the county, city and Board of Education reaffirming the April 25 directive and containing recommendations for the relocation of pregnant women and children under two years of age from the first two rings.

On August 3, 1978, Governor Carey directed the formation of the Love Canal Task Force. The Task Force, headed by Transportation Commissioner William Hennessey, included representatives of the Departments of Health, Transportation, Environmental Conservation, Housing, Social Services, Banking, Insurance, Equalization and Assessment, and Disaster Preparedness. Commissioner Hennessey, in turn, immediately set in place at the Love Canal a group of representatives of the larger State Agencies involved to handle the day-to-day task force operations. Of significance was the inclusion of representatives of the area residents.

At the direction of the Governor, Commissioner Whalen's August 2 order to temporarily relocate pregnant women and children under two years of age was expanded to include entire families, not just individuals, and to relocate those families permanently. He further directed that due to their proximity to the remedial construction work and its possible hazards, all the homes in rings one and two be evacuated permanently regardless of the family makeup. These directives called for the immediate relocation of two hundred and thirty-nine families to interim housing, as well as a subsequent move to permanent housing of their selection, and provision of all the relocation benefits which normally accompany state acquisition of right-of-way. The relocation effort was to be carried out with minimum economic burden to the affected families.

The Task Force derived three fundamental tasks from the Governor's expanded direction: relocation of the affected families (to be handled by DOT); the construction project to prevent further migration of the toxic chemical waste (to be handled by the City of Niagara Falls and DEC); and a continuation of the health and environmental studies (to be conducted by DOH).

To handle the relocation process, DOT called in personnel with real property experience from around the State to inventory available housing, interview residents to determine housing needs, survey and appraise homes, arrange for moving to and rental of temporary housing, provide security for the empty houses, purchase the Love Canal Homes at fair market value, and provide for the final move to permanent housing. In addition, the American Red Cross, the Salvation Army, and the United Way of Niagara Falls assisted in the relocation. This temporary relocation effort was substantially complete in December of 1978.

On February 8, 1979, a Supplemental Order was issued by DOH Commissioner David Axelrod which recommended that all pregnant women and children under the age of two residing between 97th Street and 103rd Street, from Frontier Avenue north to Colvin Avenue also be relocated temporarily from the area. The Governor again expanded this recommendation to include each

entire family with a member in each of those categories, and expanded the area of temporary relocation to a distance west of the Canal approximately equal to the area mentioned in the Supplemental Order. This expansion took in all of the LaSalle Development, a low-income housing development west of the Love Canal. Approximately 75 families became eligible for this temporary relocation of which 45 have expressed an interest to date.

DEC's primary task force responsibility was to review the existing plans for remedial construction and to oversee the construction effort. During August and September of 1978 DEC worked directly with the City of Niagara Falls and its consultant, Conestoga-Rovers, on the partly completed plans and specifications, and approved revised plans on September 11, 1978. During the same period, DEC participated in the formation of a detailed on site/off site safety plan for protection of workers in the community during construction.

Final plans use known technology in order to: prevent more water from soaking into the chemical waste disposal area; to halt the outward flow of chemicals seeping into the upper ground waters around the landfill; and to reverse the flow of these groundwaters away from the surrounding basements and back toward the Canal. The project consists of an underground drain tile collection system and an impervious clay cover.

The tile drainage system is located in back yards of the properties adjacent to the Canal. This location avoids disturbing the landfill and its chemical waste. Collected drainage is pumped to a holding tank, treated in a special treatment plant on the site and then discharged to the City's sanitation sewers and treatment plant.

After construction of the leachate collection system, the site was covered with at least three feet of highly impervious clay. The clay cover is contoured to direct all rainfall into surface drains leading away from the site.

Work began October 10, 1978. Test pits were dug in late October and production trenching for the drain tile system began in mid November. During late October and early November, U. S. EPA provided an emergency waste water treatment system on standby to treat any contaminated waters from the trenches. This was replaced in mid-November by a contractor-operated treatment system, which continues on site and will remain until DEC takes over for further remedial work from the city.

The trenching was completed in mid January and placement of clay cover completed on February 7, 1979.

The first (southern) phase of construction is complete with a working drain tile and treatment system, which is drawing contaminated water from the Canal and delivering it for treatment on site. Work concluded in the spring of 1979 included final shaping of the clay cover, topsoil, and seeding. Under a grant from the Federal Environmental Protection Agency, DEC has let contracts for the central and northern portions. Work has begun on these sections in June of 1979.

The DEC will administer the EPA grant. The scope of work will include environmental and epidemiological monitoring and assessment, which will be done in cooperation with the Department of Health. A permanent liquid waste treatment system will be built and studied under the grant, and will later be turned over to the City for maintenance. Long term site integrity, minor repairs, landscaping and maintenance will also be City responsibilities. The Department of Health studies are conducted along two lines. First, environmental investigation, accomplished by analyzing samples of air, sump water, drinking water, storm sewer water, sanitary sewer water, and soil for the presence of chemicals. The second was health investigation through the analysis of blood samples taken from people in the area and by clinical examination in epidemiological surveys.

In addition, DOH conducted other studies to test various hypotheses regarding migration of the chemicals. These include: examination of aerial photographs and maps to identify the paths of old drainage ways or "swales", and other photographs to locate areas of ponds and swamp lands; the excavation of utility trenches in order to determine if they could be avenues of migration; and the excavation of test pits in the locations of fill-in stream beds to test for the presence of chemicals.

All the environmental and health data collected were examined by DOH. The Department presented its findings January 16, 1979, to a group of outside experts, including representatives from the National Institute of Health and National Center for Disease Control. Consultants representing the Love Canal Homeowners' Association were invited and attended the day-long meeting. There was general agreement that the methods and procedures used by DOH in collecting and analyzing the data were appropriate.

The data were then presented on February 7, 1979, to a blue ribbon panel of outside experts (a group also consulted prior to the Health Department's August 2, 1978, order and prior to a November 2, 1978, meeting on possible liver abnormalities).

To date, the New York State Department of Health, Division of Laboratories and Research, has carried out analyses of 656 air samples, 143 sump samples, 138 soil samples and over 4,000 blood tests. Review of these samples corroborate the August 2, 1978, conclusion that there are substantial chemical contamination in houses in ring one and evidence of some chemical contamination of basement air, soil, sump water and storm sewer water collected from homes and properties beyond the first ring of homes in the Love Canal site.

While a great deal of environmental and epidemiological information has been obtained since the August 2, 1978 Order, further studies must continue in order to: obtain additional information to delineate the full limits or boundaries of the Love Canal in respect to possible toxic effects; to determine by con-

tinued sampling, the extent to which toxic chemicals migrated from the site to the surrounding neighborhood; to identify which ground water aquifers have been contaminated by leachate, if any; and to identify adverse health affects and the presence of toxic chemicals and the masses located outside the Love Canal in the area bounded by 93rd Street on the west, 103rd Street on the east, Frontier Avenue on the south, and the Black Creek on the north. The additional health studies will include refinement in existing data and a study of respiratory illnesses with an emphasis on asthma. An expansion of the original Love Canal study which covered the areas between 93rd and 103rd Streets, between Colvin Boulevard and Frontier Avenue, is well under way. The collection of health data from residents living in 250 homes north of Colvin Boulevard is nearly completed and preliminary analytical work has begun. Also planned is extensive soil sampling of individual properties and sediment sampling of storm sewers in an effort to better identify contaminated and noncontaminated properties. More precise environmental data also will be of benefit in attempting to establish a correlation between patterns of illness and migration of chemicals.

The future of this portion of the City of Niagara Falls must ultimately be determined by the local people and local agencies. A number of steps to this end have been taken by them, with State assistance and guidance. They deal with future use of the land, human services, and tax relief, as ascribed below.

In January of 1979, Mayor Michael O'Loughlin of Niagara Falls agreed to serve as chairman of the committee to determine possible future uses of the Love Canal area. A sixteen member committee composed of local officials and residents, has considered a number of alternatives. Its preliminary recommendations have been reported through task force chairman Commissioner Hennessey to the Governor. Removal of ring one homes and grading and seeding of the ring one area was recommended.

It is obvious that at some point the task force will leave the site but that some aspects of the problem will remain. Many of these directly impact the

residents remaining in the area. To assist, the State entered into an agreement with the United Way of Niagara Falls. The agreement provides the United Way with \$200,000 for direct relief to be delivered through its member agencies to the local residents. The agreement will provide longer term medical, mental health, recreation, and information referral services.

To further help stabilize the area and make it more attractive as a residential area, the task force proposed to the legislature a bill providing a reduction in property taxes for area property owners. This bill which was passed by the legislature and recently signed by the Governor allows a five year graduated property tax reduction for homes in the Love Canal area.

CHAPTER 4

CHEMICAL WASTE TREATMENT TECHNOLOGY

INTRODUCTION

The hazardous waste disposal problems of all heavily industrialized states in general, and New York State in particular, have received widespread media attention and are of increasing concern to all levels of government. Federal regulations implementing the Resources Conservation and Recovery Act of 1976 (RCRA) and addressing these problems have been proposed, but are not expected to be promulgated in final form until January, 1980 and fully in effect until July, 1980. These dates are the current projections of U.S. EPA and do not allow for any judicial challenges and/or injunctions which might be levied against these rules when they are promulgated. Delays incurred because of possible litigation may postpone promulgation of these rules to 1981 and beyond.

With the growing emphasis on proper chemical waste disposal, much has been written recently, and the available literature greatly expanded, on current hazardous waste treatment technologies. Such articles help define the "state-of-art" in this environmentally critical area.⁽¹⁾ This section is intended to summarize the various environmentally acceptable disposal methods currently used by, or available to, hazardous waste generators and/or processors.

In general, it can be said that adequate disposal technology now exists for virtually all hazardous wastes, but reluctance to install and operate the necessary facilities has been primarily for economic reasons.⁽²⁾ These technologies can be costly and have therefore resulted in many disposers resorting to less expensive, and perhaps environmentally unsound, techniques. With the promulgation of the RCRA regulations, many of these past environmentally unsound practices will be prohibited.

(1) See a selected bibliography at the end of this section.

(2) There is, however, a great deal of R & D which can be done in this area also.

The techniques described here are general methods of chemical waste disposal. Specific applications of these processes depend on the nature of wastes generated in a geographical locale. Particular hazardous waste disposal facilities for a state region must be an appropriate "mix" of these processes with adequate capacity to accommodate the expected waste quantities generated in, or delivered to, that regional treatment center.

By the same token, use of some of these advanced treatment processes should not be mistaken for total elimination of landfill disposal. Even these advanced operations can result in a solid residue requiring environmentally sound land disposal. Landfilling is a disposal process which will be with mankind to eternity. However, the major advantages of using the advanced treatment processes are either a reduction in waste volume, a reduction in buried waste toxicity, or both.

HAZARDOUS WASTE TREATMENT PROCESS

Hazardous waste treatment technologies can be broken down into three basic categories of operations:

1. Chemical waste destruction through incineration or other oxidation-type processes, or through pyrolysis where the waste may be converted into a useful fuel.
2. Reclamation, or reprocessing the waste into a usable product and recycling it back into commerce.
3. Land disposal, with or without pretreatment. This includes deep well injection which is waste disposal into relatively deep regions of the earth's core (as compared to simple burial). Pretreatment can take on many forms depending on the physical state of the waste (gas, solid, liquid, or a mixture) and its hazard characteristics (ignitable, reactive, corrosive, etc.) Pretreatment includes filtration, solidification, etc.

Each of these processes will be described in some detail with their salient features highlighted. However, for even more details, consult the literature listed in the selected bibliography at the end of this section.

CHEMICAL WASTE DESTRUCTION PROCESS

Incineration

This process relies on the thermal decomposition of waste products at high temperatures (1200-3000°F) in the presence of excess oxygen (oxidizing environment). Some organic wastes such as pesticide residues or waste solvents may have a sufficiently high heat of combustion so that they act as fuels during the incineration process. Other low combustible wastes or those with a high moisture content usually require an outside source of fuel for proper destruction. Therefore, the process should be looked upon as being energy intensive. To illustrate this point, the following table lists some auxiliary fuel requirements for destruction of the given wastes in incinerators operating today:

AUXILIARY FUEL FOR INCINERATION⁽¹⁾

<u>Unit</u>	<u>Waste</u>	<u>Aux. Fuel %total energy</u>
Eastman-Kodak	General	4
Rollins Environmental Services	PCB Test	95-96
Rollins Environmental Services	Nitrochlorobenzene Test	89-90
Marquardt	C56 Test	89-90
3M	PVC Test	96
System Technology	Phenol Test	83-88
	Methylmethacrylate Test	63-69

(1) Data from TRW, Destroying Chemical Wastes in Commercial-Scale Incinerators Phase II, EPA Report SW-155C, 1978.

Recovery of some of the energy from the combustion gases is commonly practiced in Europe to help offset some of the incinerator operating costs. This is also receiving greater scrutiny in this country as the cost of energy continues to escalate.

Incinerators must be equipped with the appropriate air pollution control devices, commonly called wet scrubbers, to prevent large emissions of particulates or potentially noxious fumes to the atmosphere. Depending on the types of wastes burned, chemical neutralization of scrubber water may be required due to the formation of acid gases from the waste combustion. Any wastewaters discharged from the treatment facility to surface waters are regulated under the federal water pollution NPDES permit program.

Design of an incinerator must be matched to the wastes burned since the residence time, or time the waste is exposed to the high temperatures to complete combustion, can vary between different types of waste. Residence times can vary from a few tenths of a second up to 4 or 5 seconds, or even minutes or hours, depending on the waste type. Common incinerator designs have a primary combustion zone where the waste is first ignited and an afterburner chamber where the wastes are maintained at even higher temperatures for the appropriate residence time. Auxiliary fuel is usually added in the afterburner zone to maintain the high temperatures needed for complete waste destruction. The afterburner gases are then routed to the wet scrubber, or to a quench tower and then the scrubber, for clean-up of the gases prior to the emission to the atmosphere. The quench tower is used to reduce the temperature of the afterburner gases before entering the scrubbing device.

There are several different types of waste incinerators available today. General names for these pieces of equipment are:

1. Multiple-Hearth furnace
2. Fluidized-bed incinerator

3. Liquid-waste incinerator
4. Waste-gas flare
5. Direct-flame incinerator
6. Catalytic combustor
7. Rotary kiln
8. Multiple-chamber incinerator

In current development is a molten salt incinerator where organic waste compounds are destroyed by exposure to liquid salts at 1500-1800°F. The process also has the benefit that objectionable or toxic offgas constituents are entrapped within the molten salt bed, reducing or eliminating the need for pollution abatement. The contaminated salt can often be regenerated or may be landfilled.

Incineration is perhaps the least land-consuming and most satisfactory method of hazardous waste disposal. Residues from incineration must be land-filled and, in many cases, can be relatively inert and harmless. Complete destruction of the waste assures that a "Love Canal"-type situation will not occur. However, being energy intensive and requiring the appropriate air and water pollution control devices, it is generally the most expensive means of hazardous waste disposal.

Pyrolysis (Air-Starved) Incineration

Normal incineration requires an excess of air or oxygen over the amount theoretically required to completely destroy the waste. Pyrolysis, on the other hand, is an air- or oxygen-starved process in that the amount of gas fed is less than that required for complete combustion. The products from the pyrolysis zone can be rich in fuel value and use in another combustion chamber to generate steam and recover the energy which must ordinarily be lost through conventional incineration.

Pyrolysis is normally used where the waste material has a high heating value. The pyrolysis products can be gaseous, liquid, char, and ash, all in varying quantities. These processes may either require an outside source of fuel or generate excess energy and involve temperatures from 900-3000°F. Municipal garbage has been used in pyrolysis projects with varying degrees of success. The Union Carbide PUROX process has also successfully been used for a mixture of municipal sewage treatment plant sludge and garbage.

Wet-Air Oxidation

Wet-air oxidation provides an alternative means of destroying organic compounds in relatively dilute, aqueous solutions. The process has been used for more than 40 years and operates on the principle that aqueous solutions or suspensions of organic compounds can react rapidly with oxygen at elevated temperatures and pressures. Thus, by pressurizing the solution to 1500-3000 psi (normal atmospheric pressure is about 15 psi), heating it to an appropriate temperature and contacting it with air for a suitable residence time in a pressure reactor, the organic material is almost completely destroyed. This destruction reaction gives off heat which is recovered from the reactor effluent products by heat exchange with the reactor feed. Only a small excess of air or oxygen above the theoretical value is needed to carry out the waste destruction, quite unlike a conventional incinerator. Municipal or industrial sewage treatment plant sludge is a prime example of a waste treated by this process.

Commercial Waste Destruction Processes

To illustrate current availability of these waste destruction processes, below are the names of some companies furnishing the different types of systems just discussed. The list is not meant to be an all-inclusive survey, nor is it meant to constitute an endorsement of the equipment or its manufacturer. It is simply an illustration of the commercial availability of these processes today with which the writer is familiar:

Incineration Systems

Dow Chemical Company-Hydroscience, Inc., a subsidiary
Environmental Elements Corporation
Hibbard Engineers - Rhone-Poulenc process licensee
Midland-Ross Corporation - Surface Division

Pyrolysis Processes

Garrett Research and Development Company
Monsanto Company, Landgard system
Union Carbide corporation, PUROX system

Wet-Air Oxidation System

Zimpco, Inc.

Reclamation or Recovery

These processes actually recover a usable product from the waste treated which helps to offset--or even totally pay for--the treatment costs. Waste oil, waste acid, and solvent reclaiming, silver recovery from photograph developing solutions, and mercury or other metal recovery processes are examples of these operations.

Oil or solvent reclaiming operations using distillation techniques are very energy intensive because of the need to boil the waste treated. Metal recovery may or may not be as energy intensive as distillation operations depending on the type of operation employed. The most energy intensive metal recovery operations are these employing smelting or furnacing techniques.

However, even after recovering the usable portion of the waste, there always remains a residue which may or may not be hazardous and requiring disposal via another of these methods.

A resource conservation idea now being actively promoted around the country is the waste exchange. The objective is to try to arrange for individuals with a need for raw materials to match up with someone else's waste which

can serve his purposes, rather than using virgin raw materials. In New York State, the American Alliance of Resource Recovery Interests, Inc. is actively pursuing this concept. This system has been used and well accepted in other parts of the U.S. and in Europe.

In routine operation, the exchange periodically publishes listings of available wastes or requests for specific types of raw materials which might be supplied by waste materials. Should a waste generator or a material buyer find a potentially compatible outlet, the exchange will bring the two parties together for their own private negotiation of a waste exchange agreement. The only cost of using the exchange to either party is the cost of the listing in the exchange publication.

For many years the federal Bureau of Mines has conducted research in resource recovery and recycling technologies. As pointed out many times in their publications, the mining of the "urban ore stream" (out discarded materials) is still in its infancy and will provide challenges for finding new ways to achieve efficient use of this resource for many years to come.

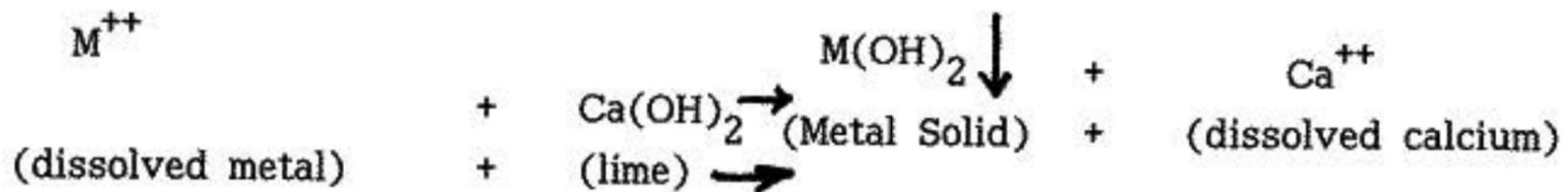
Land Disposal

Land disposal techniques can range from a simple burial in a secure landfill to actual waste destruction through landfarming; i.e., spreading the waste on land and allowing natural microbial or bacteriological action to destroy it. In the context of this definition, we have also included deep-well disposal, chemical fixation, and all other pretreatment processes which might be used to detoxify a waste and make it less environmentally hazardous before landfilling. The definition, therefore, encompasses many facets of this popular form of waste disposal.

Pretreatment Methods

Acid or Alkaline Waste Neutralization

Many corrosive wastes can be rendered essentially harmless through simple chemical neutralization. This offers great possibilities for combining treatment of different wastes since the alkaline wastes from one generator may be suitable for neutralization of someone else's acid waste. Examples of such processes are disposal of spent pickling liquors and caustics or lime slurry residuals from acetylene manufacture. Some wastes, such as metal plating wastes, may be chemically neutralized and the dissolved metal portion converted to a relatively inert solid form in one operation by chemical precipitation. An example of this precipitation reaction is given by the following chemical equation:



The arrow pointing downward (\downarrow) in the above equation indicates that the compound formed is a solid (or "precipitate") which settles out of solution. This is a relatively non-toxic inert form of the metal which is usually landfilled after the metal solids are dewatered. Many heavy metals are amenable to this treatment, the most common being iron, manganese, copper, nickel, and zinc.

The wastewaters resulting from a neutralization operation must, of course, be made suitable for discharge before they can be released to surface waters. This might entail several different methods of wastewater treatment, depending on the types of wastes used in the neutralization process. For example, metal plating wastes can contain cyanide--a deadly poison to humans in certain forms--which remains in the wastewater after neutralization and metal precipitation. Before discharge, this water would have to be treated by alkaline chlorination, ozonation, or other oxidation process to convert the cyanides to a harmless form. Similarly, activated carbon filters might be used to remove toxic organic compounds if these remained in the wastewaters after neutralization. Other biological wastewater treatment processes such as activated sludge,

rotating disc contactors, or trickling filters might also be used if necessary. Waste stabilization ponds or facultative lagoons might then be used for final effluent "polishing" prior to discharge to surface waters.

Chemical Fixation, Stabilization

Chemical fixation converts a solid or semi-solid waste which may be readily leached of hazardous constituents into a relatively harmless solid form suitable for burial or landfilling. The inerting is accomplished by a chemical reaction with a fixation agent which essentially encapsulates the waste in a nonleachable matrix.

Stabilization technologies are usually categorized on the basis of similarity of the principal additive. These could be classified as:

1. Cement-based techniques
2. Lime-based techniques
3. Thermoplastic techniques (including bitumen, paraffin and polyethylene)
4. Organic Polymer techniques
5. Encapsulation techniques

The following table shows the types of wastes treated by these methods:

CHEMICAL FIXATION METHODS

<u>Fixation System</u>	<u>Major Materials Stabilized</u>	<u>Materials to Which System is Not Applied</u>
Cement-Based	Toxic inorganic industrial wastes, stack gas scrubbing wastes	Organic wastes, toxic anions
Lime-Based	Toxic inorganic industrial wastes, stack gas scrubbing wastes	Organic wastes, toxic anions
Thermoplastic	Toxic inorganic industrial wastes	Organic wastes, strong oxidizers

Organic Polymer	Toxic inorganic industrial wastes	Acidic materials, organics and strong oxidizers
Encapsulation	Toxic and soluble inorganic industrial wastes	Strong oxidizers

As can be seen from this table, fixation has not been very effective for toxic organic wastes. These wastes appear to be better handled by incineration at this time. Extensive research is also now being conducted on the chemical fixation of flue gas desulfurization sludges arising from electric power plant sulfur dioxide scrubbing systems. Also, some incinerator residues may be naturally encapsulated or fixed after removal from the combustion equipment. This considerably simplifies the landfilling requirements.

Other Pretreatment Processes

Several other pretreatment methods are available for detoxification, separation, or volume reduction of liquid hazardous wastes which will only be mentioned briefly here. Some of these methods may still be undergoing development on an R & D scale because of the sophisticated nature and potential widespread applications of the technology employed.

1. Reverse osmosis (R-O) - This is a membrane process which allows concentration of dissolved wastes and removal of the solvent. Almost any dissolved solid can be treated by R-O provided the concentrations are not too high and the pH of the solution is relatively neutral (3-8 range).
2. Dialysis and electrodialysis - These, too, are membrane processes which allow concentration of solutions in a manner similar to R-O. As the name implies, electrodialysis uses electric fields to aid in the separation process.

3. Conventional filtration - This is a physical removal of a solid from a solution using a filter medium. The filter cake, if toxic, might be able to be chemically fixed before landfilling to minimize environmental hazard.
4. Ion exchange - This is a method for collecting and concentrating materials from waste streams using chemical exchanges on regenerable solid materials. The most widely known ion exchange process is water softening ("Hey Culligan Man").

Landfarming

This technique has also been known as land spreading, land application, sludge farming, land disposal, and soil cultivation. The basic principal involved is the use of the upper soil zone to biologically decompose the waste to carbon dioxide or convert it into natural organic matter as a waste product of a microbe's metabolism. The microbial populations capable of accomplishing this breakdown are primarily located in the upper 6-8 inches of the soil layer, so it is in this soil segment where landfarming is practiced.

Wastes to be landfarmed should contain organic constituents that are susceptible to biodegradation and not subject to significant leaching while the degradation process proceeds. Petroleum oily wastes and sewage treatment plant sludge are good examples. Some organic chemical plant wastes may also meet these criteria.

Landfilling

This has been the most popular method of land disposal over the years and now the cause of some significant environmental problems in various regions of the country.

Engineering design requirements for a chemical waste landfill will be very stringent once the RCRA regulations are passed. Groundwater monitoring in and around the landfill will be mandatory for the owner, not only during the active years but for 20 years after closure as well.

The proposed RCRA rules also prohibit burial of liquid wastes in order to force liquid waste disposers to incinerate the waste or chemically fix it (solidify it) before burial.

Also under the proposed RCRA rules, existing hazardous waste burial sites must be upgraded to a level of environmental integrity equivalent to new landfills as defined by new facility design standards. Those existing facilities which owners elect to not upgrade to RCRA standards must be phased out and closed within a 5-year period. Because of the stringent engineering design standards, groundwater monitoring, and post-closure maintenance requirements of the RCRA hazardous waste landfill rules, the disposal cost for landfilling hazardous wastes will rise significantly over past costs. Consequently, landfilling may not ultimately be the most economical means of hazardous waste disposal in the future.

To illustrate this point, the Manufacturing Chemists Association,^{*} a chemical industry trade association, in its comments to EPA on the proposed RCRA hazardous waste regulations, presented a comparison of the industry's estimated costs for hazardous waste landfills versus a cost estimate done for EPA during the RCRA rulemaking program. The comparison is revealing:

^{*}In June, 1979, MCA changed its name to the Chemical Manufacturers Association, or CMA.

ESTIMATED UNIT COSTS FOR HAZARDOUS WASTE LANDFILL⁽¹⁾

MT = Metric Ton (1.1 Short Tons)

<u>Item</u>	<u>EPA Estimate</u>	<u>MCA Estimate</u>
Combined Capital and O & M Costs/MT	\$15-55	\$55-150
Insurance/MT	\$6.30	\$13-15
Site Closure/Acre	\$500-\$1,500	\$5,000-\$20,000
Post-Closure Groundwater (capital)	\$15,000	\$15,000
Comprehensive Sampling and (Analysis (4 samples)	\$300-\$1,000	\$1,000-\$2,000
Analysis of Leachate (1st year)	\$3,900-\$13,200	\$3,990-\$13,200
Hazardous Waste Testing/sample	\$750	\$3,575

(1) Data from MCA Comments Upon EPA's Proposed RCRA 3001,3002,
3003, and 3004 Regulations.

By these estimates, the capital and operating costs of hazardous waste disposal by landfilling could rise by as much as a factor of 3, not including the liability insurance costs required in the RCRA financial responsibility regulations. As will be seen later, an increase in landfilling costs of this magnitude could make other disposal methods more economically attractive.

Deep Well Injection

This method of land disposal involves pumping the waste into a permeable geologic formation deep within the ground which is separated from other groundwater supplies by impermeable layers of rock or clay. It cannot be used just anywhere and requires the appropriate geological formations under the disposal site. The technique has been used extensively for disposal of oil field brines,

and wastes have been pumped to depths of up to 8,000+ feet using this method. Generally, the disposal location is selected at a subterranean level where the natural groundwater is unfit for human use. Wastes are normally deep well injected only after all reasonable alternative disposal methods have been evaluated and found less desirable in terms of environmental protection and dependability.

To prevent plugging of the disposal zone formation, the wastes may require pretreatment by filtration or other means of solids removal before being deep well injected. Also, waste neutralization or other chemical pretreatment may be performed to prevent reactions in the disposal zone which could cause plugging of the formation.

Federal EPA is currently preparing regulations for deep disposal wells through the Safe Drinking Water Act. Deep wells in general will not be regulated under RCRA.

DISPOSAL COSTS

The following table gives current ranges of waste disposal costs for some of the methods just described:

<u>Method</u>	<u>Cost Range, \$/Ton</u> ⁽¹⁾
Incineration	20-160
Chemical Landfill ⁽²⁾	6-80
Deepwell Injection	36-60
Sanitary Landfill ⁽³⁾	16-30
Landfarming of Oily Waste	15-20
Chemical Fixation	7-110

NOTES:

- (1) Does not include transportation costs.
- (2) Secure landfill, not a "garbage dump."
- (3) Municipal "garbage dump."

Transportation costs are not included in the above figures and can be one of the principal cost items in the total cost of hazardous waste disposal to a

company. Depending on the distances involved, transportation costs may equal, or even exceed, the actual waste disposal cost.

Comparing the previously given MCA estimated hazardous waste landfilling costs (after RCRA) to the other treatment methods shown above indicates that incineration and chemical fixation may become more economically attractive after the RCRA regulations are promulgated. However, the selection of a particular disposal method for a waste will always be made from an evaluation of factors affecting a waste generator's specific disposal situation and will, therefore, be a case-by-case determination.

Regional Hazardous Waste Treatment Center Concept

From the preceding discussions, it should be apparent that we have a number of different technologies available today for treating hazardous wastes. Those technologies are but building blocks for a recently introduced concept--the regional hazardous waste treatment center. Figure I has been drawn to illustrate how some of these technologies might be pieced together to form a hypothetical regional treatment center.

On the left-hand side of the figures are the wastes for which the center has been designed. The basic treatments involved are:

1. Solvent, oil, and acid reclaiming.
2. Incineration.
3. Acid and basic waste neutralization.

Note that residues from one operation might be used in another of the center's operations, such as organic reclaiming residues being fed to the incineration system. Also note that the ultimate disposition of the leftover solid residues is a secure landfill. This illustrates the point that we will never be able to escape landfilling of solid wastes entirely. The wastewater treatment system and incinerator air pollution control device are also essential parts of the center's environmental control operations.

Shown in dotted lines is a heat recovery device for the incinerator off-gasses, assumed to be a waste heat steam generator. Such devices are now being considered for the newer incinerator designs and will definitely be a major factor in the 1980's as fuel costs continue to escalate in a virtual exponential manner.

As can be seen from the figure, the "products" from the center are reclaimed solvents, oils, and acids for commercial reuse, clean incinerator combustion gases to the atmosphere, and clean, treated wastewater discharges to surface waters. With an appropriate secure landfill design (i.e., one which requires proper use of liners and/or solidification techniques), this hypothetical center represents the current "state-of-the-art" in environmentally safe waste disposal as well as being a contributor to one of the major goals of the RCRA--resource recovery. Hopefully, the concepts expressed in this hypothetical treatment center will, in the 1990's and beyond, correspond to what the model-T was to cars of today.

Wastes to be Treated

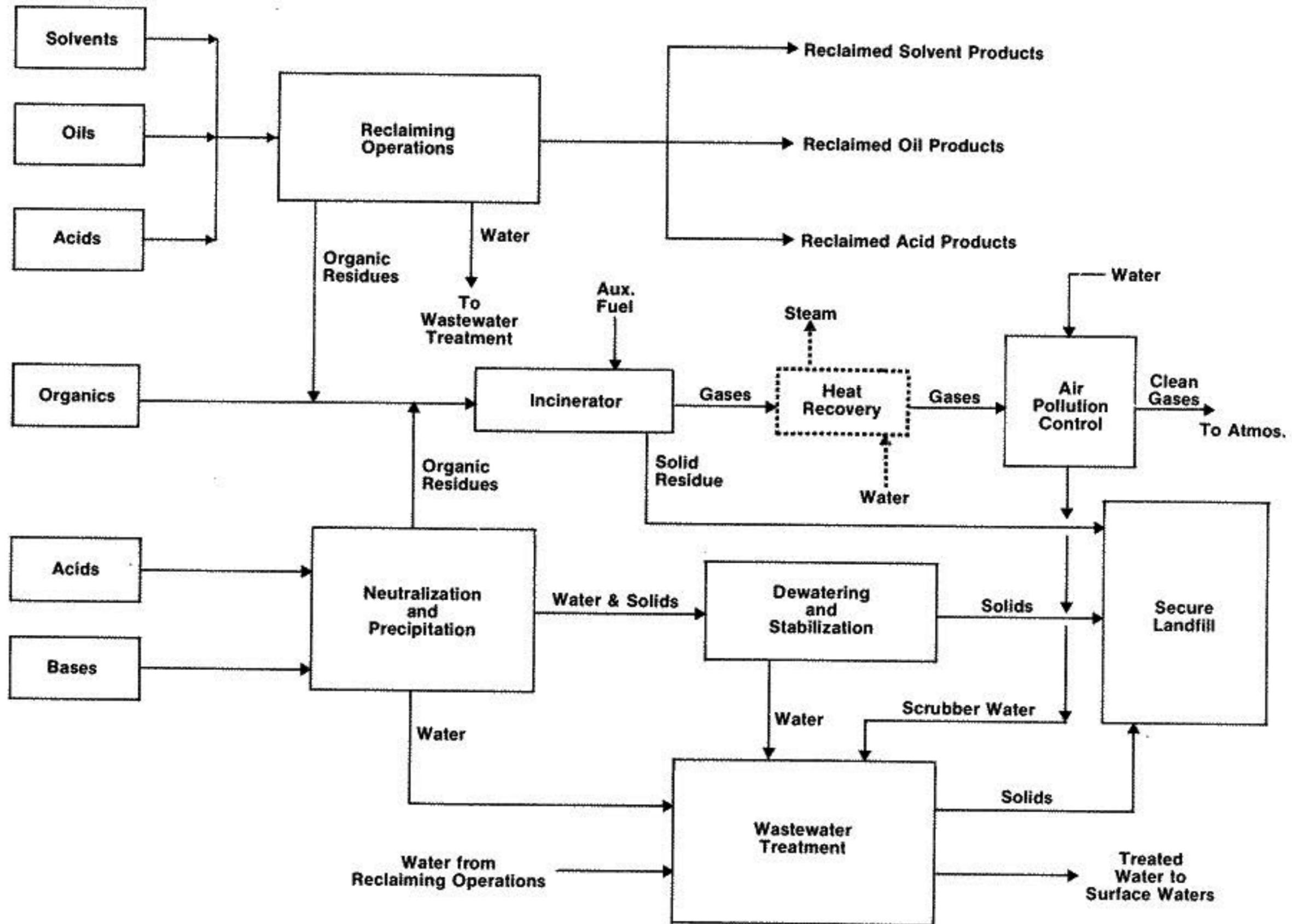


Figure 1: Hypothetical Regional Hazardous Waste Treatment Center Example

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CHAPTER 5 FEDERAL LAW - RCRA AND TOSCA

A. Federal Resource Conservation and Recovery Act

The major federal legislation dealing with hazardous wastes is the Resource Conservation and Recovery Act (RCRA) which was enacted by Congress on October 21, 1976. RCRA is administered by the Office of Solid Waste Management of the Environmental Protection Agency (EPA).

The act has two major goals: First, to assure that all solid and hazardous wastes are properly managed and regulated from "cradle to grave" to protect public health and the environment. And second, to conserve natural resources and to encourage the management and recovery of materials and energy from solid waste.

RCRA (42 U.S.C. § 6901 et seq.) is divided into 8 subtitles of which Subtitle C deals specifically with hazardous waste management. The following is a summary of Subtitle C of RCRA and other relevant sections:

42 U.S.C. § 6901. Identification and listing of hazardous waste.

This section requires EPA to develop criteria for identifying characteristics of hazardous wastes and to list the wastes which will be subject to this subtitle.

The regulations were to have been promulgated within 18 months of the enactment of RCRA, but neither these nor any other Subtitle C regulations have been finally promulgated. See Chart on page 61 of this section.

States are to have input into the continually revised listing of identified hazardous wastes. The governor of each state may petition EPA to identify or list any waste material as hazardous and thereby subject it to the act. EPA has 90 days to act on such a petition.

42 U.S.C. § 6922. Standards applicable to generator of hazardous waste.

EPA is to promulgate regulations establishing standards for generators of hazardous waste including requirements for:

1. recordkeeping
2. labeling practices for hazardous waste containers
3. use of appropriate containers
4. furnishing information on the chemical composition of hazardous waste generated
5. establishment of a national manifest system
6. submission of reports to EPA (or to the state agency in any case in which the agency carries out an authorized permit program pursuant to § 6296 regarding the amount and types of hazardous waste generated during a specified time period and the disposition of such waste.

42U.S.C. § 6923. Standards applicable to transporters of hazardous waste.

EPA is to promulgate regulations establishing standards for those involved in transporting hazardous wastes including requirements for:

1. recordkeeping
2. allowing transportation of hazardous waste only if properly labeled
3. compliance with the manifest system established pursuant to § 6922
4. allowing transportation of hazardous waste only to those authorized to receive it under the manifest system

The regulations promulgated under this section are to be consistent, in any area of overlap, with the Hazardous Materials Transportation Act (49 U.S.C. § 1801 et seq.) and the regulations promulgated by the Secretary of Transportation thereunder.

42 U.S.C. § 6924 Standards applicable to owners and operators of hazardous waste treatment, storage, and disposal facilities.

The EPA is to promulgate regulations to establish performance standards for owners and operators of hazardous waste treatment, storage, and disposal facilities including requirements for:

1. maintaining records of all hazardous material handled and how it was dealt with
2. a system of adequate reporting, monitoring, and inspection and compliance with the manifest system established pursuant to § 6922
3. treatment, storage or disposal of all hazardous waste pursuant to certain operating methods, techniques, and practices approved by EPA
4. the location, design and construction of hazardous waste facilities
5. contingency plans for effective action to minimize unanticipated damage from any treatment, storage or disposal of hazardous waste
6. maintenance and operation of such facilities and requirements as to qualifications for ownership, and standards for continuity of operation, training of personnel and financial responsibility. However, failure to strictly meet these criteria will not preclude a private entity from ownership or operation of a facility where the entity can otherwise provide assurances of financial responsibility and continuity of operation.
7. compliance with requirements respecting permits for treatment, storage or disposal (pursuant to 42 U.S.C. § 6925).

42 U.S.C. § 6925 Permits for treatment, storage or disposal of hazardous waste

EPA is to promulgate regulations requiring every owner or operator of a facility handling hazardous waste to obtain a permit.

Every application for a permit under this section must include all information required by EPA under its regulations including information respecting:

1. estimates covering the type, amount, and concentration of hazardous waste expected to be disposed of, and the time frame within which such wastes will be handled.
2. the site at which hazardous waste will be handled

Permits will be issued to facilities which comply with the regulations. Any modifications proposed or required will be noted on the permit with specified time limits for the completion of the modifications. The permit may be revoked upon a determination by the EPA (or a state having an authorized program under 42 U.S.C. § 6926) of non-compliance.

Any facility in existence at the time of enactment of RCRA which is required to obtain a permit will be allowed to operate the facility without a permit until the final administrative disposition of its application if:

1. it has complied with the requirements of 42 U.S.C. § 6930;
2. has made application for a permit; and
3. has furnished all information reasonably required or requested in order to process the application.

42 U.S.C. § 6926 Authorized state hazardous waste programs

In consultation with state authorities, EPA is to promulgate guidelines to assist states in the development of state hazardous waste programs. Any state may apply for authorization to conduct its own hazardous waste program in lieu of the federal program. Such a program must:

1. be equivalent to the federal program under this act;
2. be consistent with the federal or state programs applicable in other states; and
3. provide adequate enforcement of compliance with the requirements of this act

Any state which has a hazardous waste program in effect 90 days before the effective date of the federal regulations may apply for a 24 month interim authorization to continue the program if it is shown to be substantially equivalent to the federal program. If a state program is not being administered and enforced under these requirements the EPA will, after a public hearing, so notify the state and if corrective action is not taken within 90 days then the EPA administrator will withdraw authorization of the state program and establish a federal program under the guidelines of this act.

42 U.S.C. § 6927 Inspections

Anyone who generates, stores, treats, transports, disposes of or otherwise handles hazardous waste must, upon request of any duly authorized officer or employee of EPA (or of the state if that state has an authorized state program), furnish or permit that officer or employee, at all reasonable times, to have access to, and to copy all records relating to such wastes. To achieve this, authorized officers or employees may enter any facility that handles hazardous waste to inspect and to obtain samples of any hazardous wastes, containers or labeling practices.

The information obtained under this section is to be public unless it is shown that if the information is made public it will divulge information entitled to protection under 18 U.S.C. § 1905.

If such a showing is made then the information will be held in confidence except that it may be obtained by other representatives of the government concerned with carrying out the act or when relevant in any proceeding under this act.

42 U.S.C. § 6928 Federal enforcement

Whenever the administrator of EPA determines that there is a violation of any requirement of this act he must give notice to the violator. If after 30 days the violator has not complied, the administrator may commence a civil enforcement action in the U.S. district court in the district in which the violation occurred. If the violation is in a state which has an authorized state program then that state will receive 30 days notice before the administrator commences a civil action under this section. If a violator fails to take corrective action within 30 days he is liable for a civil penalty of up to \$25,000 per day of continued non-compliance and the administrator may suspend or revoke any permit issued to the violator whether issued by the EPA or by the state.

Any order or any suspension or revocation of a permit will become final unless within 30 days the persons involved request a public hearing. At such a hearing the administrator may issue subpoenas for the attendance and testimony of witnesses and for the production of necessary documents.

Any order issued by the EPA under this section must specify the violation, the time limit for compliance, and the penalty for non-compliance (based on the seriousness of the violation and taking into account good faith efforts to comply).

Any person who knowingly transports, treats, stores, or disposes of any hazardous waste without the required permit or who knowingly makes a false statement in any application, label, manifest, record, report, permit or other document used for the purposes of compliance with Subtitle C, is subject to a criminal penalty of up to a maximum of \$25,000 for each day of violation or 1 year imprisonment or both. A second violation of this section raises the maximum to \$50,000 and 2 years respectively.

42 U.S.C. § 6929 Retention of state authority

No state can impose requirements less strict than those set by the regulations authorized under this act with respect to the same subject matter covered by the regulations. However, if the operation of a regulation is postponed or enjoined, the state may set its own standards until the regulation takes effect.

42 U.S.C. § 6930 Effective date

Within 90 days after final promulgation of the regulations under 42 U.S.C. § 6921 (identification and listing of hazardous waste), any person generating or transporting a hazardous waste or owning or operating a facility for treatment, storage, or disposal of such substances must file with EPA (or the state if it has an authorized program under 42 U.S.C. § 6926) a notification stating the location and general description of the activities performed and the hazardous wastes handled. No hazardous waste may legally be transported, treated, stored, or disposed of unless proper notification has been given.

The regulations under this subtitle are to take effect on the date six months after the date of promulgation thereof or six months after the date of revision in the case of any regulation which is revised after the date required for promulgation thereof.

42 U.S.C. § 6931 Authorization of assistance to states

Grants totalling \$25,000,000 for each of the fiscal years 1978 and 1979 were made available to assist the states in developing and implementing authorized state hazardous waste program. Allocation of the money is to be determined by the administrator and based on the extent to which hazardous waste is generated, transported, treated, stored, and disposed of within each state, the extent of exposure to human beings and to the environment within each state, and other such factors.

The Regulations

The regulations to be established pursuant to RCRA were not promulgated within the time limits set by the statute. The regulations are a complex and detailed set of rules which have caused much confusion and controversy.

In September 1978 several environmental groups and the State of Illinois asked the U.S. District Court for Washington D.C. to order EPA to issue all the regulations by June 30, 1979 or earlier. On January 3, 1979 Judge Gerhard Gesell ordered promulgation of the regulations by the dates noted in the following chart:

SCHEDULE FOR HAZARDOUS WASTE REGULATIONS
(RCRA Subtitle C)

Authorization in RCRA Section	Regulation	Date Proposed	Date scheduled for final promulgation	Court- Ordered Deadline
42 USC § 6921	Standards for criteria, identification, and listing of hazardous wastes	12/18/78	1/25/80	12/31/79
42 USC § 6922	Standards applicable to generators	12/18/78	1/25/80	12/31/79
42 USC § 6923	Standards applicable to transporters	4/28/78	1/25/80	12/31/79
42 USC § 6924	Standards for owners and operators of treatment, storage, and disposal facilities	12/18/78	1/25/80	12/31/79
42 USC § 6925	Permits for treatment, storage or disposal	These regulations were consolidated and proposed 6/14/79	1/25/80	10/31/79
42 USC § 6926	Guidelines for authorized state programs	(§6926 regulations were originally proposed 2/1/78)	1/2/79	10/31/79
42 USC § 6930	Preliminary notification of hazardous waste activities	7/11/78	8/1/79	

B. TOXIC SUBSTANCES CONTROL ACT

Efforts by the Federal government to control the manufacture and marketing of hazardous substances have resulted in the Toxic Substances Control Act (TSCA). Under TSCA the Environmental Protection Agency (EPA) is charged with monitoring all chemicals now in use. EPA is granted the power to remove from the market place any chemicals that cause a serious environmental or health problem. In addition, EPA is empowered to prevent any new chemicals which are found to be dangerous from ever being manufactured.

TSCA authorized EPA to obtain data from industry on the production, use, health effects and other matters concerning chemical substances and mixtures. (Pesticides, tobacco, nuclear material, food additives and drugs are exempted from the act and are regulated under other laws). If necessary, the EPA may regulate the manufacture, processing, marketing, use and disposal of a chemical.

The EPA may require manufacturers or processors of potentially harmful chemicals to determine toxicity, to determine the possible health or environmental effects or to evaluate the characteristics of the chemical. Before such a test can be required EPA must find specifically that 1) the chemical may present an unreasonable risk to the health or the environment or there may be substantial human or environmental exposure to the chemical; 2) there are insufficient data and experience for determining or predicting the health and environmental effects of the chemical; and 3) testing of the chemical is necessary to develop such data. The manufacturers or processors of a chemical must pay for the testing. Manufacturers of new chemical substances must give the EPA notice and certain information (including chemical identity and molecular structure, by-products, proposed use, and any required test results) 90 days before the manufacture of the chemicals. Any chemical which is not listed in an inventory of existing chemicals to be published by the administrator of EPA will be considered new for purposes of requiring notice. In addition anyone who intends to manufacture or process a recognized chemical for a "sig-

nificant new use" (as determined by the Administrator based on consideration of the anticipated extent and exposure to humans or the environment) must also give 90 days notice before manufacturing the chemical for that new use.

Exemptions from the premanufacture notice requirements are granted to those chemicals 1) included in categories of chemical substances listed on the inventory of existing chemicals; 2) produced in small quantities solely for experimental or research and development purposes and 3) used for test marketing purposes and 4) determined by the Administrator not to present an unreasonable risk.

If the EPA determines there is a reasonable basis to conclude that a new chemical presents, or will present, an unreasonable risk of injury to health or the environment, an order may be issued even before the end of the premanufacture review period to prohibit or limit the manufacture, processing, distribution, use or disposal of a chemical. If the manufacturer objects to the order, the Administrator of EPA may seek a court injunction to prevent manufacture of the chemical. If a total ban is not necessary the administrator may set rules immediately effective to otherwise limit or control the manufacture or use of the chemical.

In proposing regulatory actions the administrator must provide an opportunity for comments by all interested parties including an oral presentation at a hearing, and in certain circumstances cross examination. A regulation limiting, but not banning, a chemical may become effective immediately if the EPA determines that the chemical is likely to present an unreasonable risk of serious injury to health or the environment before normal rule making procedures could be completed. However in the case of a rule totally prohibiting the manufacture of the chemical, the administrator must first obtain a court injunction before the ban can be made immediately effective. For any chemical that presents an imminent and unreasonable risk or serious or widespread injury to health or the environment, the administrator is empowered to go to court to require whatever action may be necessary to protect against such risk or injury.

EPA is authorized to issue rules requiring manufacturers and processors of selected chemicals to report to the agency the name of each chemical, its identity, its proposed uses, estimates of production levels, its by-products, adverse health and environmental data, and number of workers exposed to the chemicals. Unless the EPA determines that a report is necessary because of an unreasonable risk, small manufacturers are exempt from these reporting requirements except for chemicals that are subject to the testing requirements under the regulatory provisions of the Act.

The EPA is required to publish a continuously updated list of all chemicals manufactured or processed for commercial purposes in the U.S. or imported into the U.S. within the last three years. In addition the law requires any person who manufactures, processes, or distributes in commerce any chemical substance or mixture to keep records of significant adverse health or environmental problems allegedly caused by a particular chemical. Such employee health records must be kept confidential for 30 years. Confidential data such as trade secrets and processed financial data contained in required records will be protected from disclosure by EPA.

For the most part TSCA will not affect the authority of any state or municipality to establish regulations concerning chemicals. But if EPA restricts the manufacture or otherwise regulates a chemical under the Act a state may only issue requirements which are identical or more stringent, which are mandated by other federal laws, or which prohibit the use of the chemical altogether. EPA may grant a state an exemption if the state requirement 1) would not cause a person or activity to be in violation of a requirement under the Act and 2) would provide a greater degree of protection and not unduly burden interstate commerce.

Any person may bring a civil suit to restrain a violation of the Act by any party or to compel the administrator to perform any nondiscretionary duty required by the Act. Civil actions concerning violations of the Act may be brought by the administrator in a U.S. district court. Any chemical substance

or mixture that is manufactured, processed or distributed in commerce in violation of the Act is subject to seizure.

CHAPTER 6

NEW YORK STATE LAW

New York State law for the most part is consistent with federal law. Many of the requirements of the Resource Conservation and Recovery Act (RCRA) are already met by Article 27 of the New York Environmental Conservation Law (ECL) which is the comprehensive statutory authority for the Department of Environmental Conservation to administer the collection, treatment and disposal of refuse and other solid waste. Titles 9 and 11 of Article 27 comprise the Industrial Hazardous Waste Management Act (Chapter 639, L. 1978) and deal specifically with hazardous waste.

The stated purpose of Title 9 is "...to regulate the management of hazardous waste (from its generation, storage, transportation, treatment and disposal) in this state and to do so in a manner consistent with...RCRA."

To achieve that purpose Title 9 of Article 27 is structured to provide the following:

§ 27-0901. Definitions

Among other definitions is that of "hazardous waste" which is the same as that in RCRA:

"Hazardous waste" means a waste or combination of wastes, which because of its quantity, concentration, or physical, chemical or infectious characteristics may:

- a. Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness; or

b. Pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed or otherwise managed."

§ 27-0903. Identification and listing of hazardous waste.

Within six months after final regulations are promulgated by the federal Environmental Protection Agency for the identification and listing of hazardous waste (42 U.S.C. §.6921), the state Commissioner of the Department of Environmental Conservation (DEC) is to develop criteria for the listing of hazardous waste. Wastes which meet the state criteria will be incorporated into the federal EPA list and this combined list will identify the particular hazardous wastes which will be subject to the New York Law.

Provision is made for exemptions from the Act, by regulation, for small quantities of hazardous waste when used or produced by research and limited-use operations. In addition DEC may amend the list and listing criteria based upon hazardous waste conditions of particular relevance to the state.

§ 27-0905. Manifest system.

Within six months after the state's list of hazardous waste is promulgated, DEC, in consultation with the Department of Transportation, is to establish by regulation a manifest system which conforms to that adopted by EPA pursuant to RCRA. The manifest system will be to monitor the transportation, storage and disposal of hazardous waste and will, as a minimum, require that:

1. Hazardous waste generators use a specified form identifying the composition, quantity and disposition of each shipment of hazardous waste;
2. Copies of the manifest form be carried during transportation of hazardous waste; and

3. generators, transporters and owners and operators of hazardous waste treatment, storage and disposal facilities maintain copies of the manifest form for at least 3 years.

§ 27-0907 Standards applicable to generators of hazardous waste.

By March 1, 1980, DEC is to establish standards for generators of hazardous waste with respect to:

1. recordkeeping;
2. labeling practices for hazardous waste containers;
3. use of appropriate containers;
4. furnishing information on the chemical composition of hazardous waste generated;
5. use of the manifest system established under § 27-0905;
6. submission of reports to DEC regarding the amount and types of hazardous waste generated during a specified time period and the disposition of such waste.

§ 27-0909. Standards applicable to transporters of hazardous waste.

By March 1, 1980, DEC, after consultation with the Department of Transportation, is to set standards for transporters of hazardous waste including:

1. recordkeeping practices;
2. allowing transportation and storage of hazardous waste only if properly labeled;
3. compliance with the manifest system established under § 27-0905;
4. allowing transportation of hazardous waste only to those authorized to receive it;

5. requirement of a bond to meet all responsibilities in case of release of hazardous wastes causing damage as a condition to the issuance of a certificate of registration to a transporter as required by § 27-0913.

§ 27-0911. Standards applicable to owners and operators of hazardous waste treatment, storage, and disposal facilities.

Standards for owners and operators of hazardous waste treatment, storage and disposal facilities are to be the same as those established by Article 27, Title 7 of the ECL for solid waste management facilities. Thus the rules and regulations promulgated by DEC pursuant to § 27-0703 to prevent or reduce water pollution, air pollution, noise pollution, obnoxious odors, unsightly conditions and other conditions inimical to the public health, safety and welfare will govern the operation of hazardous waste facilities. In addition, such standards are to be consistent with comparable standards promulgated pursuant to the federal government's RCRA (specifically 42 U.S.C. §6924) and must also include compliance with the manifest system established by § 27-0905.

§ 27-0913. Permits and registrations for storage, transportation, treatment, or disposal of hazardous wastes.

Everyone engaged in the storage (including storage at the site of generation), treatment or disposal of hazardous wastes must obtain a permit pursuant to the rules and regulations promulgated through the authority of Article 27 Title 9 which governs solid waste disposal facilities.

Everyone engaged in the transportation of hazardous wastes must obtain a certificate of registration from the Commissioner of Environmental Conservation as provided in § 27-0301 and its related regulations. The registration is to be made or reviewed annually at a fee established annually by regulation. In addition, a performance bond will be required by § 27-0909 as a condition to the issuance of such a registration.

§ 27-0915. Inspections and general reporting.

For the purpose of developing regulations or enforcing the provisions of this act, anyone who handles hazardous waste at any stage (generation, storage, treatment, transportation, or disposal) may be required to provide access to all records relating to hazardous wastes to any duly authorized officer or employee of DEC. In addition, authorized employees or officers of DEC may:

- a. enter at reasonable times any establishment or other place maintained by any person where hazardous wastes are generated, stored, treated or disposed of; and
- b. inspect and obtain samples from any person of any hazardous wastes, containers or labeling for such wastes.

§ 27-0917. Long-term maintenance.

DEC is to evaluate methods for guaranteeing long-term maintenance, ownership, monitoring, and environmental soundness of hazardous waste storage and disposal sites. The department is to examine among other options such methods as state ownership of such sites, establishment of long-term care funds, conveyance of completed sites to the state and the requirement of long-term performance bonds. By September 1, 1979, and after public hearings and with the approval of the state environmental board, DEC is to promulgate regulations to provide for the long-term care of all hazardous waste storage and disposal facilities. DEC is to recommend to the legislature a schedule of fees and assessments to fund the long-term care program eventually promulgated by DEC.

§ 27-0919. Proprietary information.

DEC is to hold in confidence information obtained for the purpose of this act when shown by any person that such information, if made public, would divulge competitive business information, methods of processes entitled to protections as trade secrets of such person.

Title XI - Industrial Siting Hazardous Waste Facilities

§ 27-1101 Definitions

Among other definitions is "Industrial hazardous waste treatment, storage and disposal facility" which means, a specialized facility or site other than a sewage treatment facility for the purpose of treating, storing, compacting, recycling, exchanging, or disposing of industrial hazardous waste material.

§ 27-1103 Criteria for siting industrial hazardous waste treatment, storage and disposal facilities.

The Commissioner of DEC after allowing an opportunity for public comment is to publish criteria for siting industrial hazardous waste treatment, storage and disposal facilities. The criteria are due by September 1, 1979 and are to insure the maximum safety of the public from hazards associated with treatment, storage and disposal of hazardous wastes.

Factors to be taken into account in issuing these siting criteria include:

- a) density of population in areas neighboring the facility;
- b) density of population in areas adjacent to delivery routes to the facility;
- c) risk of accidents during the transportation of hazardous wastes;
- d) risk of contamination of ground and surface waters by leaching and runoff from the facility;
- e) risk of fires or explosives from improper storage and disposal methods;

- f) impact on the municipality where the facility is to be sited in terms of health, safety, cost and consistency with local planning; and
- g) nature of the probable environmental impact, including specification of the predictable adverse effects on the natural environment and ecology, public health and safety, scenic, historic, cultural and recreational value, water and air quality, wildlife and an evaluation of measures to mitigate adverse effects.

Also by September 1, 1979 the Commissioner is to adopt criteria prescribing the form and content of applications for a certificate of environmental safety and public necessity to construct an industrial hazardous waste treatment, storage or disposal facility. The certificate form will require the applicant to supply detailed information regarding:

- a) location of the proposed facility;
- b) a description of the design and capacity of the facility;
- c) expected sources of hazardous wastes for the facility, the proposed methods of transporting the wastes to and from the facility and the routes over which waste will be transported;
- d) the need for the facility;
- e) the environmental impact of the proposed facility;
- f) a description of reasonable alternative locations for the proposed facility; and,
- g) any other information needed by the Commissioner to determine whether the proposed facility is needed and whether it would be compatible with the surrounding environment and population.

§ 27-1105 Siting industrial hazardous waste facilities

After September 1, 1979 no person can begin construction or operation of a new industrial hazardous waste facility without having received a certificate of environmental safety and public necessity from the facility siting board established by this section.

The following procedures are to be followed to obtain a certificate of environmental safety and public necessity:

- a) application is to be made on the form adopted by DEC pursuant to § 27-1103 of this title;
- b) once a completed application is received, DEC is to notify both the applicant and the office of the Governor. A copy of the application is sent to the Governor's office with a request by DEC that a facility siting board be established for the proposed site.
- c) upon a determination that an application is complete, notice is to be given specifically to the chief executive officer of each municipality in which the facility is proposed to be located and to all property owners of record within 300 feet of the subject facility. General public notice is to be given by publication in the environmental notice bulletin and in at least two local newspapers. In addition, DEC may direct the applicant to provide such reasonable notice and opportunity for public comment as the department deems appropriate.
- d) within 15 days of receipt of notice, the Governor shall establish a facility siting board composed of the Commissioners of Transportation, Environmental Conservation, Health, and Commerce, the Secretary of State and three ad hoc members appointed by the governor, two of whom must be residents of the judicial district in which the facility is primarily proposed to be located. The membership of the ad hoc

members is to last only for the term of the particular proceedings for which they were appointed. The Governor shall appoint the chairman of the board and the Commissioner of Environmental Conservation is to make staff available to support the board in carrying out its responsibilities.

- e) within 60 days of the establishment of the board an adjudicating public hearing upon the application will begin. Public notice of the hearing is required.
- f) the board renders a decision based upon the record either granting the application, denying it, or granting it upon such terms, conditions, limitations, or modifications as the board may deem appropriate. The board is to deny an application to construct or operate a facility if residential areas and contiguous populations will be endangered, if construction or operation of such facility would be contrary to local zoning or land use regulations in force on the date of the application, or if it otherwise does not conform to the siting criteria established under § 27-1103 of this title or if the board finds that the facility is not necessary or is otherwise not in the public interest.
- g) a final decision is to be given to all parties within 60 days of completion of the hearings.

§ 27-1101. Powers of Municipalities.

Unless expressly authorized by Article 27 of the ECL or by the facility siting board, no municipality may require any other approval, consent, permit, certificate or other condition regarding the operation of a facility which has been granted a certificate under this title.

New York State Law

As a result of the efforts of this Subcommittee, the Assembly Task Force on Toxic Waste and the governor's office, two major pieces of legislation were enacted in this year's legislative session. The following is a summary of these bills.

Chapter 282 of the laws of 1979 establishes procedures for and provides additional powers to the state departments of Health and Environmental Conservation and the Environmental Facilities Corporation to enable those agencies to help protect public health and the environment from the threats posed by inactive hazardous waste disposal sites.

In this regard Article 27 of the environmental conservation law was amended by adding a new title 13 which provides as follows:

§ 27-1301 DEFINITIONS

The definition of "hazardous waste" is to be the same as the federal definition in RCRA until a specific list of hazardous wastes is promulgated by the Commissioner of the Department of Environmental Conservation pursuant to § 27-0903 of the environmental conservation law (see page 66 of this report).

"Inactive hazardous waste disposal site" means any area or structure used for long-term storage or final placement of hazardous waste which were used prior to, but not after, August 6, 1979.

An "inactive hazardous waste disposal site remedial program" means activities undertaken to eliminate, remove, abate, control or monitor health and/or environmental hazards or potential hazards in connection with inactive hazardous waste disposal sites or to treat or dispose of wastes and waste contaminated materials from such sites.

§ 27-1303 IDENTIFICATION OF SITES

Each county is to survey its jurisdiction to determine the existence and location of suspected inactive hazardous waste disposal sites and submit a report to DEC describing the location of each suspected site and the reasons for suspicion. The counties are to update such information annually.

§ 27-1305 REPORTS BY THE DEPARTMENT; REGISTRY OF SITES

DEC must submit to the governor and the legislature an annual report identifying all known inactive hazardous waste disposal sites in the state. Each report must include the following information with respect to each site:

- a) a general description of the site including location, type and quantity of hazardous waste disposal of at the site, and name of the current owner;
- b) an assessment by DEC of any significant environmental problems at and near the site;
- c) an assessment by the department of health of any serious health problems in the immediate vicinity of the site and any health problems related to conditions at the site;
- d) the status of any testing, monitoring or remedial actions in progress or recommended by DEC;
- e) the status of any legal actions or government permits or approvals concerning the site; and
- f) an assessment of the relative priority of the need for action at each site to remedy any environmental or health problems at such site.

DEC is also to maintain a registry of all inactive hazardous waste disposal sites in the state. The registry would include:

- a) description of the site from latest report by DEC to the Governor and the legislature;
- b) location of the site;
- c) time period of use for disposal;
- d) current and past owners and operators;
- e) identification of generators and transporters of waste disposal at the site;
- f) type and quantity of hazardous waste disposed of;
- g) manner of disposal;
- h) nature of soils at the site;
- i) depth of water tables at the site;
- j) location, nature and size of aquifers at the site;
- k) direction of present and historic groundwater flows at the site;
- l) location, nature and size of all surface waters at and near the site;
- m) levels of contaminants in the water, air or soil at the site;
- n) current quality of all drinking water as determined by the Department of Health and any changes in quality over time; and

- o) proximity of the site to private residences, public buildings or property places of work or other areas where individuals may be present.

DEC and DOH are to jointly establish the relative priority of the need for action at each site to remedy environmental and health problems resulting from the presence of waste at such sites.

§ 27-1307. REPORTS TO THE DEPARTMENT

To facilitate DEC's effort to secure information under the previous section, any person may be required to furnish to the department:

- a) the name and location of 1) facilities within the state that have generated significant quantities of hazardous waste; 2) of sites within the state which have received wastes and which are now or were formerly owned or operated by such person or 3) to or from which the person has transported such waste;
- b) a description of current and past waste generating and disposal activities at generating facilities;
- c) a description of all current and past waste disposal activities at a receiving facility;
- d) names of persons that have transported hazardous waste to disposal sites or from generating sites; a description of any testing, monitoring or remedial actions undertaken or planned at such sites, and any significant health or environmental problems known or suspected to exist at such sites; and,
- e) any other information deemed pertinent by DEC to prepare its annual report or the registry.

If information cannot be furnished there must be a written explanation of efforts to comply. Anyone who knowingly furnishes false information is subject to criminal penalty.

§ 27-1309 ACCESS TO RECORDS AND SITES

Every person, upon written request of the Commissioner of DEC or his designee must allow a duly designated officer or employee of DEC access to and the opportunity to copy all books, papers, documents, and records relating to both current and past hazardous waste generating, transporting or disposal activities of such person. DEC is empowered to issue and force compliance with subpoenas if necessary.

In addition any duly designated officer or employee of DEC may enter any inactive hazardous waste disposal site and areas near such a site to inspect and take samples of wastes, soils, air, surface water and groundwater. No samples are to be taken if there will be substantial disturbance of the ground surface unless there has been an effort to identify and notify the owner of the site. If an owner is identified he must be given at least 10 days notice of the intent to take samples.

§ 27-1311 CONFIDENTIALITY

The DEC must hold in confidence information obtained under this act if it is shown by any person that public release of the information would cause substantial injury to the competitive position of the subject enterprise. DEC must give reasonable notice before it attempts to release information alleged to be entitled to confidentiality.

§ 27-1313 REMEDIAL PROGRAMS

This section and § 1389-b of the Public Health law set a dual structure of responsibility for problems connected with inactive hazardous waste disposal sites. DEC is responsible for inactive hazardous waste disposal site remedial

programs where the Commissioner finds that an inactive hazardous waste disposal site poses "a significant threat to the environment". But if the Commissioner of Health declares that "conditions dangerous to life and health" exist then the Department of Health (DOH) becomes the lead agency in charge of coordinating remedial programs and any orders issued by DOH supercede those of other agencies including DEC.

In cases where DEC declares that a hazardous waste disposal site poses a significant threat to the environment, the Commissioner is empowered to order the owner of the site and/or any person responsible for the disposal of hazardous wastes at such a site to develop an inactive hazardous waste disposal site remedial program subject to DEC approval and to implement it within reasonable time limits specified in the order. Any order of this type by the Commissioner of DEC can be issued only after notice and opportunity for a hearing is provided to the person subject to the order and after a final decision is rendered if a hearing is requested. Responsibility is to be ascertained in the hearing according to applicable principles of statutory and common law liability and defenses.

If the person ordered to eliminate a threat to the environment under this section has failed to do so within the time limits set by the order DEC is empowered to develop and implement a remedial program for the site. The reasonable expenses of the program are to be paid by the person to whom the order was issued. If after a reasonable attempt DEC is unable to fix responsibility or is unable to find the responsible party, DEC may develop and implement a remedial program. If the responsible party is subsequently identified or located DEC, subject to the requirements for notice, hearing and review may recover from the party the reasonable expenses incurred by the state.

DEC has the authority to delegate responsibility for remedial programs to the municipality in which the problem is located and can contract with the Environmental Facilities Corporation and any other entity to perform necessary work in connection with such sites.

§ 27-1315 RULES AND REGULATIONS

The Commissioner of DEC is given the power to make rules and regulations necessary to carry out the purposes of this act. Such regulations are to include procedures for hearings pursuant to § 27-1313 and must set forth specific findings which must be made before the Commissioner can declare that a significant threat to the environment exists pursuant to § 27-1313.

Article 13 of the Public Health law was also amended to add a new title 12-1 which provides as follows:

§ 1389-a DEFINITIONS

"hazardous waste and inactive hazardous waste disposal site" and "inactive hazardous waste disposal site remedial program" are defined the same as in § 27-1301 of the ECL (see page 74).

§ 1389-b POWERS OF THE COMMISSIONER

The Department of Health (DOH) is responsible for assessing a) serious health problems at and in the immediate vicinity of inactive hazardous waste disposal sites and, b) any health problems deemed by the Department to be related to conditions at such sites.

If the Commissioner declares the existence of "a condition dangerous to life and health" resulting from an inactive hazardous waste disposal site, DOH becomes responsible for a) monitoring the site, b) approving remedial programs for the site, and c) coordinating all remedial programs for the site. In addition, such a declaration by the Commissioner of DOH empowers him to order the owner of a site and/or any person responsible for the disposal of hazardous wastes to develop a remedial program subject to DOH approval and to implement the program within the time limits set by the order. Orders by the Commissioner of Health under this section supercede any made by the Commissioner of Environmental Conservation under § 27-1313 of ECL.

Any order of this type made by the Commissioner of Health can be issued only after notice and opportunity for a hearing is provided to the person subject to the order and after a final decision is rendered if a hearing is requested. Responsibility is to be ascertained in the hearing according to applicable principles of statutory and common law liability and defenses.

If the person ordered to eliminate a condition dangerous to life or health under this section has failed to do so within the time limits set by the order, DEC is to develop and implement a remedial program for the site pursuant to a memorandum of understanding between DOH and DEC. The reasonable expenses of the program are to be paid by the person to whom the order was issued. If after a reasonable attempt, DOH is unable to fix responsibility or is unable to find the responsible party, the department may develop and implement a remedial program. If the responsible party is subsequently identified or located DOH, subject to the requirements for notice, hearing and review may recover from the party the reasonable expenses incurred by the state.

If a municipality, commission, or political subdivision of the state is the "person" ordered to eliminate a condition dangerous to life or health and fails to do so, a deduction and withholding of state local assistance aid to the municipality, commission, or political subdivision other than education aid may be made in an amount equal to the amount expended by DOH, DEC or any other state agency. Where such deductions are to be made the following procedure is to be followed:

1. DOH, DEC or any other agency must certify the expense of any action taken to eliminate a condition dangerous to life or health. Such certification must be approved by the director of the Division of the Budget and notice must be given to the affected locality.
2. Prior to approval by the Division of the Budget, the director is to a) develop a schedule of deductions and withholdings that will ensure the continuity of essential services by the affected locality, and b) give 30 days written notice of the deductions and withholdings to the

speaker and minority leader of the assembly, the majority and minority leaders of the senate and the chairmen and ranking minority members of the senate finance committee and the assembly ways and means committee.

3. The comptroller is then to make the scheduled deductions. The deductions or withholdings are not to take effect until one full fiscal year of the affected locality after the date of approval by the Director of the Division of the Budget.
4. The state because of such deductions or withholdings is not obligated to pay any additional or increased allotments, payments or apportionments of state aid.

Money for actions taken by DOH, DEC or any other state agency in connection with the elimination of a condition dangerous to life or health pursuant to this section shall be paid from the governmental emergency fund directly to the agencies. The governmental emergency fund was increased to \$9.5 million.

§ 1389-c RULES AND REGULATIONS

DOH has the power to make rules and regulations necessary to carry out the purpose of this title including provisions establishing procedures for hearings under § 1389-b.

Portions of the Public Authorities law are also amended to allow involvement by the Environmental Facilities Corporation (EFC) in remedial programs. Thus § 1281 of the Public Authorities law adds "inactive hazardous waste disposal site remedial program" to the definition of what projects can be undertaken by the EFC. In addition, the same definitions of "Hazardous Waste", "Inactive hazardous waste disposal site", and "Inactive hazardous waste disposal site" as are found in 27-1301 of the environmental conservation law are added to § 1281.

A new section § 1285-e is added to the Public Authorities law which specifically states that EFC is empowered to carry out inactive hazardous waste disposal remedial programs and which allows the corporation to subcontract for the work included in carrying out such programs.

The second major piece of legislation passed and signed into law this year takes aim at solving the long-term problems of hazardous waste. Its purpose is to ".....begin the process of implementing a comprehensive hazardous waste disposal program which will utilize the knowledge, experience and operating abilities of all levels of government and the private sector in order to insure the citizens of New York a pure earth and a safe environment."

Thus the Public Authorities Law is amended by adding a new section 1285-f:

§ 1285-f. PROGRAM FOR ULTIMATE DISPOSAL OF HAZARDOUS WASTE.

The Environmental Facilities Corporation is to begin preparation of a comprehensive program of hazardous waste disposal including an examination of the technology, siting, marketing and financing necessary for such a program.

EFC is to provide to the Governor and the legislature a marketing and feasibility study by March 1, 1980. The study is to include findings and recommendations as to available technology; the desirability of regional disposal sites, and the feasibility of generating sufficient revenue to amortize bonds which may be issued in connection with the program. The study is to be prepared in consultation with experts in the field of public finance.

An advisory committee is established to advise EFC on a comprehensive program for the ultimate disposal of hazardous waste and in connection with the required study. The committee is composed of the commissioners of the departments of health, environmental conservation, commerce, the director of the budget and five individuals with recognized expertise in the fields of hazardous

waste management and technology on public finance. The latter five members are appointed by the Governor and one of them is designated by the Governor as chairman. A sunset provision dissolves the committee when EFC's study is presented to the Governor and legislature but 2 of the appointed members of this committee, expert in the technological aspects of the report, become members of the permanent advisory committee established by § 1285-d (3) of the Public Authorities Law. The permanent advisory committee is at that time expanded from five to seven members.

A sum of \$300,000 is appropriated for the purpose of the study required of EFC by this section.

CHAPTER 7

LEGISLATION OF STATES OTHER THAN NEW YORK

It is clear that hazardous waste disposal is a national problem. The waste is generated in the manufacture of products used nationwide and is often transported from one state to another for final disposal. In the absence of a coordinated national policy, the individual states have taken several different approaches to the hazardous waste problem with varying degrees of effectiveness.

A report to the Congress by the Comptroller General entitled Hazardous Waste Management Programs Will Not Be Effective: Greater Efforts are Needed (CED-79-14 January 23, 1979) summarizes a survey of present state hazardous waste legislation:

"The State legislative authorities ranged from separate laws clearly defining the scope of State authorities to broadly worded provisions included as part of other environmental acts, such as in State solid waste acts or water pollution control acts. In most cases, State organizations operated under broadly worded provisions, without designated standards and criteria. As a result, generators and handlers interpreted the requirements in varying ways. In some cases where State controls were clear, compliance was often difficult to enforce since the needed treatment and disposal facilities were not available within the particular State's jurisdiction."

"In October 1978, 41 States had some provisions for hazardous waste controls within existing solid waste legislation. Additionally, only 17 of the States had enacted specific legislation for the management of hazardous, special, or industrial wastes. Certain of the States that generate the greatest estimated amounts of hazardous materials lacked such legislation. At least 12 States are considering or are planning to propose hazardous waste legislation."

"Although under current legislation many of the States attempted to define which hazardous waste materials were to be regulated, such definitions differed widely among the States. They ranged from listings of materials considered hazardous to explicit characteristic properties distinguishing hazardous waste from other general solid waste. Frequently, even though two States had equally comprehensive management plans, materials regulated under one State's requirements were not to be regulated under another's requirements."

"Only 12 States had some type of regulations or guidelines for hazardous waste controls or waste-related activities. Certain of these regulations or guidelines were inclusive for all activities, while others were specific for only certain aspects of hazardous waste management, such as disposal activities or waste generator activities. The differences in controls were attributed to factors such as the amount and variety of hazardous wastes being produced. However, under existing legislation, most States had started to identify sources of hazardous wastes within their boundaries. At least 35 States have completed or are in the process of assessing hazardous waste amounts being generated in their areas."

The following summarizes some recent developments by individual states in the area of hazardous waste management. All states were surveyed at least to some extent but not all appear in this selective summary.

CALIFORNIA

The California Hazardous Waste Control Act enacted on July 1, 1973 is in many respects similar to the New York Industrial Hazardous Waste Management Act of 1978.

The provisions of Chapter 6.5 of Division 20 of California's Health and Safety Code (§ 25100 et seq.) requires:

-establishment of a Hazardous Waste Technical Advisory Committee to provide consultation to the Department of Health Services concerning matters covered by the act.

-promulgation by the Department of Health Services of minimum standards and regulations for the handling, processing, use, storage, and disposal of, and the recovery of resources from hazardous and extremely hazardous waste to protect public health and the environment.

-an allowance for varying standards throughout the state based on population density, climate, geology and other factors.

-the establishment of a manifest system including a listing of the kind, amount and the chemical and numerical composition of the waste and the origin and destination of the waste. The list is to be carried by the transporter and given to the person responsible for the ultimate disposal of the waste. Suggested inclusions on the manifest form include antidotes, first-aid, and other safety measures to be taken in case of accidental contact with the waste.

-the registration of transporters of hazardous waste with a \$50 registration fee and an additional charge for each vehicle used to transport hazardous waste.

-the Health Services Department to coordinate research, conduct studies, undertake planning and establish an information clearinghouse for the purpose of establishing long-term programs dealing with handling, use, storage, processing, disposal, exchange, recycling and resource recovery related to hazardous waste.

-the establishment of a fee for operators of hazardous waste disposal facilities. The fees are deposited in a revolving account to be used by the Department of Health Services to carry out the provisions of the acts.

-the establishment of a list of hazardous wastes that are economically and technologically feasible to recycle. Whenever any waste on the list is disposed of by a person, Health Services may require the disposer or producer to file a formal, complete and detailed statement justifying why the waste was not recycled.

-the Health Services Department to establish standards for the issuance of permits for the use or operation of hazardous waste facilities and to prohibit disposing of hazardous waste except at a disposal site with a valid permit. Violators are subject to a fine of up to \$25,000 and imprisonment of up to one year.

In 1978, California amended its Water Code in several areas to provide assurances that owners or operators of presently functioning hazardous waste disposal sites would have a plan to eventually seal off the site and maintain it safely.

Chapter 784 of the laws of 1978 provides the following:

"Owners or operators of liquid waste disposal sites or hazardous waste disposal sites may be required to submit a report to a regional water quality control board if it determines a site closure plan is necessary to prevent an adverse threat to the environment. The report is to describe the physical characteristics of the disposal site, mechanisms to control leaching and runoffs, alternative methods of ultimate site closure and subsequent safe maintenance, an estimated cost for each of the alternatives, a recommendation on which alternative would be best and a detailed financial plan to adequately provide for the alternative method of site closure and maintenance recommended by the owner or operator.

Upon acceptance of the recommended plan by a regional board the owner or operator must provide annually an assurance that the estimated money is available to implement the plan for closure and subsequent maintenance of the site.

If the owner or operator fails to submit an acceptable plan the regional board is empowered to require that a bond be posted or a monetary reserve fund be established in an amount estimated by the board to sufficiently ensure effective site closure and subsequent maintenance.

A Site Closure and Maintenance Revolving Account is established. Owners or operators of liquid waste disposal sites or hazardous waste disposal sites are charged proportional assessments sufficient to maintain the account at a level not to exceed \$500,000. The charges are levied only to the extent necessary to ensure that adequate money is available in the account.

The account is used to ensure the adequate closure and subsequent maintenance of liquid waste disposal sites or hazardous waste disposal sites which pose a threat to the environment and for which adequate closure and subsequent maintenance are not sufficiently provided by other provisions of the act.

At this time California has no law dealing with the problem of abandoned or inactive hazardous waste dumpsites. A survey is being planned to determine the extent to which such sites pose a problem. The state has thus far not discovered many sites and has dealt with those it has found to be a problem on a site-by-site basis.

ILLINOIS

Illinois presently has a hazardous waste program in operation for all waste disposal operations including on-site facility regulation.

A proposed bill which has passed both houses of the Illinois Legislature this year would:

-prevent location of a hazardous waste site:

- 1) above an abandoned coal mine
- 2) within 2 miles of an active fault in the earth
- 3) within 1000 feet of an existing private well or existing public water supply source

-enable the state's Pollution Control Board to prescribe requirements and standards for adequate care and maintenance of, closure, and post-closure monitoring, maintenance and use of hazardous waste disposal sites.

-establish a "Hazardous Waste Fund" constituted from the fees collected from the owner or operator of each hazardous waste disposal site. The fees would be set at \$.01 per gallon or \$2.02 per cubic yard of hazardous waste received. The fund is not to exceed \$25,000,000. It is to be used under the direction of the state EPA for the purpose of taking whatever preventive or corrective action is necessary or appropriate in circumstances certified by the Governor and Director of EPA to exist in which hazardous waste disposal sites will or may cause an immediate or long-term danger to the environment or to the public health or welfare.

-make every owner or operator of a hazardous waste disposal site, without limitation, responsible for the site for a period of at least 20 years after closure. Responsibility will include monitoring the site and taking whatever remedial action is necessary to solve any problems which occur at the site during the 20 year period. Standards and requirements of financial responsibility by owners and operators of hazardous waste sites are to be the same as those eventually promulgated by the federal EPA pursuant to RCRA for the development, operation, closure and post-closure care of such sites.

- allow requirement of a bond or other security as a condition for the issuance of a permit for a hazardous waste disposal site.
- require a public hearing in the county where such a site is proposed before issuance of the required permits.

OHIO

The treatment, storage, transportation and disposal of hazardous waste was comprehensively regulated in Ohio in 1978. Requirements were established under Ohio's Solid Waste Disposal Law (Chapter 3734 of the Revised Code) which are administered by the Ohio EPA.

The Ohio law parallels the federal RCRA requirements by calling for the promulgation of regulations consistent with those under RCRA including regulations:

1. For identifying hazardous waste, (the list of which is to be the same as those listed by the federal EPA)
2. Establishing standards for generators of hazardous waste.
3. Establishing standards for transporters of hazardous waste.
4. Establishing performance standards for owners and operators of treatment, storage and disposal facilities.
5. Governing the issuance, modification, revocation, suspension, and denial of installation and operation permits for hazardous waste facilities and transporter certificates of registration.
6. Specifying information to be included in permit applications for the installation and operation of hazardous waste facilities.

7. Protecting trade secrets.

Also being considered this year in the Ohio legislature is Substituted House Bill 486. Highlights of this proposed bill include:

1. A required periodic determination of the market potential and feasibility of the exchange, use, and recovery of resources from hazardous waste.
2. Establishment of a Hazardous Waste Facility Management fund of up to \$30 Million. Funding would come from fees levied on hazardous waste disposal facilities and by any grants or other monies obtained from the federal government. The fund would be used to administer the hazardous waste program established by the bill although up to \$500,000 over a 3 year period could be spent in the form of grants to localities to encourage the siting of hazardous waste storage, treatment, or disposal facilities in their areas.
3. Before being issued a permit to establish or operate a hazardous waste treatment, storage, or disposal facility the potential owner or operator must pose a surety bond in the amount fixed by the director of the Ohio EPA in accordance with the length of time (either 20 or 30 years) for which he chooses to be responsible for the long term care of his facility after final closure. A final closure plan must be submitted, approved and complied with upon the shutdown of a facility or the bond is forfeited in the amount necessary to accomplish closure.

Upon proper closure of the facility the owner or operator is responsible for long-term care for either 20 or 30 years depending on the amount of the bond filed with the director. A proper long-term care plan must include:

- a. Establishment and maintenance of adequate soil and vegetative cover.
- b. Collection and treatment of contaminated surface water runoff.

- c. Collection and treatment of leachate.
- d. Regular monitoring and analysis.
- e. Removal from a landfill site of any hazardous waste which develops into an imminent and substantial threat to public health or safety or to the environment.

If the long-term care plan is not fully complied with, that portion of the surety bond equal to the estimated cost of bringing the facility into compliance will be forfeited. If the bond recovery is not sufficient to bring a facility into compliance, the attorney general would be able to bring an action for the amount of money needed to complete such works.

- 4. A procedure would be established whereby localities would identify suspected abandoned or inactive hazardous waste landfills and request the Ohio EPA to survey the site. If the site presents a substantial threat to public health or safety or is causing a pollution problem, the state agency is empowered to order abatement of the problem by the present owner of the site if that person had previously profited in the past as owner or operator of site. If the order is not complied with the agency may enter, the site and perform the measures prescribed in the order after a hearing reimbursement for that work is to be credited to the Hazardous Waste Facility Management fund.

In a situation where all other remedies have been exhausted, or where the present owner did not own the property during the period it accepted hazardous waste and is not financially able to perform the required measures, the agency may obtain the property by purchase, gift, donation or contribution. The agency would then reclaim the facility and allow use of the land by the state for any suitable purpose or would sell it for restricted or unrestricted use depending on the condition of the site.

5. Localities would be reimbursed up to two-thirds of their reasonable and necessary expenses to properly close or to abate any serious health or environmental problem caused by an inactive hazardous waste site which the locality formerly operated. Such expenses would be paid out of the Hazardous Waste Management fund.

Also from that fund, up to 50% of the cost of proper closure or abatement would be payable in the form of grants to owners of inactive sites closed before March 1979 who did not own or operate the site or profit from it and to owners of sites closed after March 1979 because such sites could not meet the standards set by regulation and therefore would not be granted a permit under Chapter 3734.

PENNSYLVANIA

A provision in Pennsylvania law authorizes a permit fee to be levied on hazardous waste management facilities to fund the cleanup of abandoned sites. Fines from statute violations may also be used for clean-up purposes.

TEXAS

A proposed bill to establish a perpetual care fund from fees on generators, transporters, and disposers of industrial waste to remedy problems arising at abandoned sites did not pass.

Another unsuccessful bill would have required the execution of a bond large enough to satisfactorily close a hazardous waste site - before a site permit was issued or renewed.

Despite the large amount of hazardous waste generated in the state, one Texas government official said that the state was "living in the dark ages" in terms of hazardous waste management. There are evidently no state restrictions or regulations dealing with company-owned dump sites.

MICHIGAN

An omnibus hazardous waste bill was introduced in the 1979 legislative session and was expected to pass sometime in August. The bill would establish:

- a hazardous waste disposal facility siting process that would incorporate local participation. A hazardous waste disposal facility siting board would be established consisting of one representative each from the state departments of Natural Resources, Public Health, and the state police fire marshall; one independent engineer, 2 representatives from the local county involved and 2 representatives from the locality involved. The board would preside over the procedure to review and license proposed hazardous waste disposal facilities.
- a requirement that each disposal facility would monitor landfill sites for 20 years after it was closed. A perpetual care fund would be established by assessment on the disposal industry to provide for monitoring and care of landfill sites after the 20 year period or sooner if a private facility goes out of business.
- a separate emergency fund for spills.
- a hazardous waste transportation licensing system. Each hauler would need a business license and a vehicle license and would be required to obtain a surety bond to indemnify the state for abatement of any problem caused by improper handling, disposal or storage of hazardous.

TENNESSEE

A proposed bill in this year's legislature would require an appropriate notice to be included on property deeds by the county register of deeds if hazardous wastes have been disposed of on the property.

INDIANA

An unpassed bill in the legislature would have assessed a \$.50 fee per ton of waste landfilled in the state to be placed in a \$25 million Environmental Protection Trust Fund to be used to "remedy the hazards of abandoned sites" and to "deal with uninsurable or unmanageable risks." The \$.50 fee was considered too high.

Another unsuccessful bill dealt with abandoned hazardous waste sites and would have required the operator of a facility to maintain proof of the financial resources necessary to safely close the site.

LOUISIANA

Louisiana passed a comprehensive act in 1978 to establish the framework for the regulation, monitoring, and control of the generation, transportation, treatment storage and disposal of hazardous wastes. Act 334 of 1978 provides:

- for administration over the development, implementation and enforcement of a comprehensive hazardous waste control program under the exclusive jurisdiction of the Department of Natural Resources, with the Office of Science, Technology and Environmental Policy serving in an advisory capacity to the Department for development of regulations.
- that the Department develop a list of hazardous wastes which are subject to the act.
- for the promulgation of standards for generators of hazardous wastes including detailed record-keeping and allowable methods of disposal of hazardous waste.
- for regulations applicable to transporters of hazardous waste including record-keeping, equipment standards and a licensing procedure which

includes a surety bond in favor of the state to assure financial responsibility in the event of damages due to accident or negligence.

-for regulations applicable to operators of treatment, storage and disposal facilities including a licensing process, design construction and operational standards, record-keeping and surety bond in favor of the state sufficient to assure financial responsibility in the event of damage resulting from accident or negligence and to assure continuity of operations and maintenance in the event of a shutdown or operator changes.

-for implementation of a manifest system for the orderly tracking of hazardous wastes from generation to final disposal.

-that no facility or activity pursuant to the act shall be granted a permit or license if the siting of the facility or activity violates a parish or municipal land use or zoning ordinance.

The implementing regulations were to be promulgated on or before October 21, 1980 but were ready on June 7, 1979 and were to take effect August 1, 1979.

SOUTH CAROLINA

A proposed bill would require that a surety bond of at least \$20 million be posted before a hazardous waste disposal site permit can become effective. The bill also requires that a qualified chemist from the Department of Health and Environmental Control be on duty at a disposal site when hazardous wastes are transferred to or from the site.

MASSACHUSETTS

This state is also considering a requirement to guarantee financial surety via bonds or other methods for hazardous waste disposal facilities.

WISCONSIN

A Waste Management Fund is being built up to a limit of \$15 million from fees of from 15 to 35 cents per ton of hazardous waste. The fund is to be used to correct unanticipated problems arising during the operation of a waste management facility and to provide long-term care after an owner relinquishes responsibility (which ordinarily 30 years after closure).

CONNECTICUT

Hazardous Waste haulers are required to submit monthly reports to the State Hazardous Materials Management Unit on the nature and quantity of wastes transported and the origin and destination of those wastes.

Present law requires the elimination of ground and surface water pollution caused by hazardous wastes.

A \$1 million emergency spill response fund has been proposed to clean up "environmental problems" caused by hazardous wastes. The proposed bill includes an attempt to establish liability for clean-up efforts based on negligence. Another bill would provide a minimum penalty of \$10,000 for the illegal disposal of hazardous wastes.

KENTUCKY

A report on a low-level nuclear waste disposal site presents a methodology for perpetual care and maintenance of the site in the form of a combination post closure maintenance fund/performance bond. The same type of methodology could be applied to hazardous waste disposal facilities and such a requirement is being considered.

MARYLAND

A proposed bill entitles landowners with property adjacent to a landfill to receive compensation for the decrease in the value of their lands by virtue of their proximity to the landfill.

IOWA

A proposed bill would allow the state attorney general to institute legal proceedings to determine how best to eliminate any serious and imminent health problem caused by abandoned hazardous waste sites. The courts would also decide how the cost of eliminating the problem should be allocated to or among the past and present owners and operators of the site, and any other responsible parties including the state or the localities. The court would base its allocation of costs on the following criteria:

- the extent to which parties complied with the law and attempted to comply with the law.
- the extent to which parties profited by acting contrary to the law.
- the extent to which parties exercised good judgment and discharged their responsibilities to society in accordance with the perceptions of the time.
- the ability of parties to pay for corrective measures.
- the extent to which the parties would benefit from the elimination of the threat to human health.
- the broad implications for society of an allocation of cost.

-the damages to other persons associated with the hazard created by the disposal site.

-other criteria as the court deems pertinent.

KANSAS

A proposed bill would regulate the processing, collection, storage, treatment and disposal of hazardous wastes originating in another state.

A recently enacted law provides for an assessment of fees on the various segments of the hazardous waste industry to be used to monitor sites and to establish a perpetual care fund to further monitor and repair sites following closure and to abate threats at abandoned sites. The law also deals with standards for site closure and long-term maintenance by the operators of hazardous waste disposal sites.

ARIZONA

Non-radioactive toxic wastes (and radioactive wastes from the University of Arizona) are presently buried on state-owned land. In addition, the Division of Environmental Health Services is developing a report on the feasibility of a hazardous waste disposal operation on land owned by the state.

The following chart is taken from a Report to the Congress by the Comptroller General entitled Hazardous Waste Management Programs Will Not Be Effective: Greater Efforts Are Needed (CED-79-14 January 23, 1979). It lists the states in order of the amount of hazardous waste GAO estimates will be generated by 1980. The definitions or criteria for inclusion of wastes in this study were compatible with those of the proposed Subtitle C regulations under RCRA. It should be noted that since direct determination of the quantity of hazardous wastes generated in the United States is not presently possible, estimates such as these must be based on extrapolations from the portion of wastes for which data are available.

HAZARDOUS WASTE MANAGEMENT PROGRAMS WILL NOT BE EFFECTIVE:
GREATER EFFORTS ARE NEEDED

January 23, 1979

Report to Congress by Comptroller General of U.S.

STATE	ESTIMATED 1980 QUANTITY* (THOUSANDS OF METRIC TONS)		STATE	ESTIMATED 1980 QUANTITY* (THOUSANDS OF METRIC TONS)	
NEW JERSEY	4,640		CONNECTICUT	950	
ILLINOIS	3,840	Top 10	KENTUCKY	900	Top 30
OHIO	3,840	States	ALABAMA	850	States
CALIFORNIA	3,760	Generate	MARYLAND	840	Generate
PENNSYLVANIA	3,710	59.9%	MINNESOTA	690	94.6%
TEXAS	3,580	of Total	IOWA	540	of Total
NEW YORK	3,500		WASHINGTON	540	
MICHIGAN	2,640		KANSAS	440	
TENNESSEE	2,480		DELAWARE	430	
INDIANA	2,020		ARKANSAS	420	
NORTH CAROLINA	1,690		MISSISSIPPI	360	
VIRGINIA	1,550		COLORADO	300	
MISSOURI	1,480	Top 20	OKLAHOMA	300	
LOUISIANA	1,360	States	OREGON	290	
SOUTH CAROLINA	1,350	Generate	RHODE ISLAND	240	
MASSACHUSETTS	1,290	82%	IDAHO	230	
FLORIDA	1,220	of Total	MAINE	200	
WISCONSIN	1,210		NEBRASKA	190	
WEST VIRGINIA	970		ARIZONA	180	
GEORGIA	970		NEW HAMPSHIRE	170	

* Note: Tonnage estimates may be significantly affected by the definition of hazardous waste as finally promulgated in the overdue RCRA regulations.

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<u>STATE</u>	<u>ESTIMATED 1980 QUANTITY</u> <u>(THOUSANDS OF</u> <u>METRIC TONS</u>
UTAH	140
NEW MEXICO	80
MONTANA	60
VERMONT	60
NEVADA	50
D. C.	40
HAWAII	40
ALASKA	40
NORTH DAKOTA	30
SOUTH DAKOTA	20
WYOMING	20