

STRATEGY FOR THE IMPLEMENTATION
of
THE RESOURCE CONSERVATION AND RECOVERY
ACT of 1976

December 5, 1977

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Preface

This document presents an overall strategy for the Environmental Protection Agency to follow in carrying out the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976. It states the goals and objectives of the National solid waste management effort, reviews the constraints to success, establishes priorities for action and discusses coordination of RCRA activities with other Federal programs and State and local efforts. This draft document is being circulated for review and comment prior to final adoption by EPA.

This strategy was developed with assistance from a working group comprised of representatives from all major EPA offices (see Appendix A for working group participants). The document was written by staff of the EPA, Office of Solid Waste. John H. Skinner was Chairman of the RCRA Strategy Working Group; Eileen L. Claussen was primary author of this draft; Stephen A. Lingle and Murray Newton were contributing authors. H. Lanier Hickman, Jr. also assisted in the strategy development.

Chapter 1

SUMMARY

This document presents a strategy for the Environmental Protection Agency (EPA) to follow in implementing the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (RCRA), and in fostering improvements in solid waste management in the United States. This strategy:

- ° Presents goals and objectives for the national solid waste management program.
- ° Reviews the economic, technological and institutional constraints to achieving these goals.
- ° Analyzes the major strategic choices that need to be made.
- ° Establishes priorities with respect to waste type, management approach and utilization of the provisions of the Act.
- ° Recommends appropriate Federal, State and local roles and areas of coordination with other Federal Acts and programs.

A. Goals and Objectives

There are two broad goals which are essential to an effective national program of solid waste management. These goals, which are the goals of RCRA and this Strategy, are:

- ° To assure that all solid and hazardous wastes are managed in a manner that will protect public health and the environment.
- ° To conserve natural resources directly and through the management, reuse, or recovery of solid and hazardous wastes.

Consistent with these goals, more specific and measurable objectives are:

- ° To establish solid waste disposal practices that provide acceptable levels of protection of public health and the environment, and to discontinue or upgrade existing unacceptable practices.
- ° To establish practices for the transportation, storage, treatment and disposal of hazardous wastes that will eliminate present or potential hazards to human health or the environment.
- ° To establish resource conservation and recovery as the preferred solid waste management approach whenever technically and economically feasible.
- ° To enforce regulations to protect human health and the environment and to foster voluntary compliance with such regulations.
- ° To develop, through studies, research and development, improved technologies necessary to achieve environmentally acceptable, cost effective solid and hazardous waste management in which conservation and recovery of resources are prime considerations.
- ° To establish Federal, State and local programs to achieve the above objectives.

B. Constraints to Implementation

Technological, institutional, economic, and resource constraints to the successful implementation of RCRA exists. These constraints and their implications for program activities follow:

- ° Technological Constraints. While there are technologies for safe disposal and resource recovery from most solid and hazardous wastes, a number of uncertainties and unknowns regarding their performance and economics still exist. The technology required to successfully implement the Act has not been fully developed or optimized. Therefore research, development, demonstration, evaluation and technical information activities should receive priority consideration in all program areas.

- Institutional Constraints. A major institutional constraint is the incomplete, fragmented and widely varying authority and responsibility for solid waste management at the State and local levels. In many cases, there will be a need for new and additional State and local laws and the development of new organizational arrangements. Therefore technical and financial assistance to State and local governments to facilitate this process is an important and necessary element of the strategy.

Another and perhaps more critical institutional constraint is public opposition to treatment, recovery and disposal facility siting. The inability to locate facilities may seriously reduce the effectiveness of other program activities. Therefore, this strategy emphasizes public education and public participation in Federal, State and local programs. Furthermore, local and regional government involvement in the development and implementation of State plans is necessary to insure that the responsibilities of these levels of government with respect to facility siting are established and accepted.

- Economic Constraints. Implementation of RCRA will result in increased direct costs of solid waste management in order to achieve public health, environmental and resource conservation benefits. Land disposal costs will increase due to the establishment of environmental control requirements. To some extent this will result in increased resource recovery and conservation practices. The willingness to pay additional costs may be, however a constraint to implementation. Incremental costs should be weighed against incremental benefits in regulatory program development. Efforts to reduce costs of administration should be emphasized in order to encourage State and local involvement. Economic incentives or disincentives to stimulate implementation should be developed.

- Resource Constraints. The strategy must be developed with the recognition that available resources will most likely be less than necessary to fully achieve the goals and objectives of the Act. This may be especially true with regard to the financial resources necessary for State and local governments

to plan, develop and implement various programs and the resources necessary for research, development and demonstration activities. As a result, technological and institutional constraints will be addressed at a slower pace than desirable. Resource limitations will necessitate a prioritization and phasing of activities and may well result in delays in implementation and the inability to achieve certain objectives.

C. Program Priorities

Considering the goals and objectives, constraints and mandates and provisions of the Act, the following program priorities are established:

- ° Controlling waste disposal should be the highest priority activity in the RCRA implementation over the next 5 years. This is because:
 1. This activity will have the most direct impact on the adverse public health effects of improper solid waste management.
 2. This activity will provide an indirect stimulus for resource conservation and recovery by increasing the costs of disposal.
 3. RCRA contains very clear and strong mandates relating to disposal controls.

This activity should focus on:

1. The promulgation and implementation of regulations for controlling hazardous waste.
2. The promulgation of criteria and guidelines for controlling inadequate disposal of all solid waste.
3. The development of State programs for implementing the hazardous and solid waste programs through Subtitles C and D and the Technical Assistance Panels.
4. Federal enforcement of hazardous waste (Subtitle C) regulations where States fail to act.

5. Research, development, and demonstration of improved land disposal and hazardous waste management practices.

° In order to establish resource conservation and recovery as the preferred solid waste management options, certain programs are also high priority in the next 5 years. This is because these activities, essential to establishing the viability of resource conservation, have long lead times. It is important to start them now in order to provide alternatives to land disposal in the future.

1. The development of economic and market incentives for fostering conservation and recovery through the Resource Conservation Committee and through Federal procurement of products containing recycled materials.
2. The development of State and regional programs for resource conservation and recovery through the planning and financial assistance programs of Subtitles C and D and the Technical Assistance Panels.
3. Research, development, demonstration and evaluation of technologies for recycling and resource recovery.

° Industrial wastes should receive priority emphasis for all solid waste management activities, particularly those of a regulatory nature. This is due to the relatively greater toxicity and quantity of such wastes. Residential and commercial wastes and wastewater sludges should also receive considerable attention due to the significant potential for resource conservation and recovery, and because programs related to these wastes will be able to proceed more rapidly.

° Encouragement of State implementation is a high priority activity and incentives should be provided for that purpose. Achievement of the objectives of both Subtitles C and D depend upon the establishment and implementation of State programs (both for the regulation of disposal and for resource recovery and conservation). Financial and technical assistance for the development of State programs should be maximized. With expected resource limitations, a

relatively higher level of effort will be allocated to this activity than to local implementation grants, rural community construction grants and technical assistance to local governments.

D. Major Activities

With respect to specific sections of the Act, the following sections will receive more, less and no emphasis:

1. Major Emphasis

- a. Subtitle C regulations and Section 1008 guidelines for identifying the characteristics of hazardous waste, and listing hazardous wastes; and for controlling the generation, transportation, storage, treatment and disposal of hazardous wastes.
- b. Subtitle D Criteria and Section 1008 guidelines for determining acceptable and unacceptable disposal; and for conducting the open dump inventory.
- c. Section 3006, 3011, 4002, 4008 and guidelines and financial assistance to assist States in the development and implementation of hazardous and solid waste programs including the implementation of resource conservation.
- d. Section 2003 technical assistance panels to assist in development of State programs.
- e. Section 8002(i) Resource Conservation Committee recommendations to Congress for resource conservation.
- f. Subtitle H research, demonstration and evaluation activities for the management and recovery of hazardous wastes and solid wastes.

2. Medium Emphasis

- a. Section 6002 guidelines for Federal procurement of recovered materials.
- b. Section 8002 reports to Congress.

- c. Section 7004 public participation guidelines and Section 8003 public information dissemination.
- d. Section 2003 technical assistance teams for local implementation.

3. No Activity

- a. Section 1008 guidelines for the prevention, recovery and disposal of agricultural and mining wastes.
- b. Section 2004 tire shredder grants.
- c. Section 8003 solid waste management library and model accounting systems.

E. Federal, State and Local Government Roles

Roles of the Federal, State and local governments

should be:

° Headquarters - EPA

- Develop policies, regulations and guidelines.
- Develop economic incentives.
- Provide technical and financial assistance to State and local governments to implement RCRA programs.
- Research, development and demonstrations and dissemination of technical information.
- Provide for public participation in the development and implementation of RCRA programs.

° Regional Offices - EPA

- Assist Headquarters in developing RCRA programs.
- Provide Technical and financial assistance to States to implement RCRA programs.
- Assist the States as required in providing technical assistance to local governments.

- Implement hazardous waste programs in States which fail to do so, and oversee enforcement of hazardous waste by States.
- Provide for public participation in the development and implementation of RCRA program.

° States

- Establish State programs for controlling hazardous wastes, eliminating inadequate land disposal practices, and encouraging resource conservation and recovery.
- Coordinate and encourage regional and local planning and implementation responsibilities.
- Provide, with Federal and State funds, financial and technical assistance to local governments.
- Provide for public participation in the development and implementation of RCRA programs.

° Local/Regional

- Carry out implementation of hazardous waste management and open dumping regulations; implement resource recovery programs.
- Provide for public participation in the development and implementation of RCRA programs.

F. Integration with Other Acts

Implementation of this Strategy requires extensive coordination with other Acts and Programs. In particular, this Strategy emphasizes that, where feasible, (1) planning activities will be coordinated with Section 208 of the Federal Water Pollution Control Act; (2) program activities related to surface impoundments under the Safe Drinking Water Act will be coordinated with RCRA regulations and guidelines.

Chapter II

INTRODUCTION

A. Purpose of the Strategy

This document presents a strategy for the Environmental Protection Agency (EPA) to follow in implementing the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (RCRA), and in fostering improvements in solid waste management in the United States. RCRA is only one of the legislative tools available in this effort, and EPA recognizes the value of using all possible legislative tools in implementing this strategy. This document focuses primarily on RCRA, however, because it is the most recent and the most direct statement made by the Congress defining solid waste management as an area of critical concern.

This strategy document is not law and does not have the status of a regulation or official rulemaking. Rather, it broadly describes how EPA plans to proceed implementing RCRA in light of its legislative mandates and the realities of existing Federal, State and local capabilities and resources.

This strategy was developed with assistance from a Working Group composed of representatives from all major EPA offices. It is being widely circulated for review and comment prior to final adoption by EPA. All comments will be carefully considered prior to development of a final Agency Strategy.

B. Outline of Strategy Document

The strategy document includes brief discussions of the solid waste management problem in the United States (Chapter III) and of the Resource Conservation and Recovery Act of 1976 (Chapter IV). Chapter V describes the goals and objectives of an effective solid waste management program, and presents the criteria that will be used to set program priorities. Chapter VI describes the major constraints to effective implementation of the goals and objectives. These include constraints due to shortages of resources, the current status of evolving technologies, and institutional abilities at the various levels of government. The economic implications of various mandates and the extent to which these implications should be factored into strategic decisions, are also discussed in this chapter. Chapter VII then presents an analysis of the major strategic choices that must be made. These include the extent to which EPA should rely on particular tools, such as research and development or technical assistance, at the expense of other tools; and the relative emphasis that should be placed on different management options, such as resource recovery or disposal controls, and different waste streams, such as industrial wastes or municipal wastes.

The chapters described thus far are, in a sense, prefatory to that on program priorities (Chapter VIII). This

chapter reflects the discussions of the preceding four chapters, and establishes the priority program activities.

Chapter IX describes the program management responsibilities which the Federal, State, and local levels of government need to discharge in order to bring the strategy to fruition. And the concluding chapter (Chapter X) describes how the RCRA activities will interface with other EPA programs and the programs of other agencies. Of particular importance here are the interrelationships between RCRA and the Safe Drinking Water Act, the Federal Water Pollution Control Act, the Toxic Substance Control Act, and the Clean Air Act.

Chapter III

PROBLEM STATEMENT

Solid waste represents a resource out of place. It includes the widely recognizable discards of community living and the complex liquid, solid and semi-solid wastes of our industrial activities. Solid waste results from the harvesting of crops and from the development of our mineral and energy resources. It also results from our efforts to protect our air and water resources.

The improper management and disposal of solid waste often results in health, environmental and natural resource damage. This chapter will provide a brief discussion of the problems resulting from improper solid waste management practices.

A. Quantities

The United States generated an estimated 6 billion tons of solid waste in 1976, a figure which is expected to grow substantially over the next 10 to 15 years. Table 1 following this page provides information on the quantities of wastes in the various waste streams are defined as solid waste in RCRA.

As can be seen in Table 1, the quantities of mining and agricultural waste far outweigh all other types of solid waste. Industrial (process and manufacturing) wastes and

Table I
Solid Waste Stream Quantities (1976)

<u>Waste Stream</u>	<u>Millions Tons/Year</u> (dry weight)
Residential, Commercial and Institutional Waste	100
Wastewater Treatment Sludge	7
Industrial Solid Waste	375
Agricultural Waste	2000
Mining Waste	4000

sludges, though far smaller in quantity than either mining or agricultural wastes, nevertheless, represent approximately 2 1/2 times the amount of waste than do residential solid wastes and sludges. It is estimated that approximately 10 percent of the industrial waste stream is hazardous in nature, or 30 million tons annually.

It is also important to point out that significant increases in waste generation rates can be expected over the next decade as environmental laws relating to air and water pollution are implemented. Particular waste streams that are expected to be affected are the industrial waste, industrial sludge, and wastewater treatment sludge streams.

B. Health and Environmental Effects

Health and environmental damages attributable to poor solid waste management practices are of increasing concern. These damages occur in the form of surface and groundwater contamination, air pollution emissions, fires, explosions, food chain contamination, noise, and odors.

Surface and groundwater contamination from land disposal sites has been increasingly documented by EPA and other scientists. Groundwater contamination is particularly serious because it is difficult to detect and extremely difficult to control. At the present time, groundwater accounts for about half of domestic water use. Yet it has been estimated that industrial impoundments account for over

100 billion gallons of contaminant per year to groundwater and residential, commercial and institutional land disposal sites account for about 90 billion gallons of leachate to groundwater annually.

Additionally, explosions or fires involving hazardous waste have killed or injured those handling the waste. Even the land itself may be contaminated from solid waste, as the soil biota and chemistry change for the worse. Excessive loadings of heavy metals, for example, may contaminate the land, preventing its future use for agricultural purposes.

C. Natural Resource Effects

The United States is increasingly becoming a "materials-intensive" society. Not only have we increased our per capita consumption of goods and services, but, in many cases, we have also increased our rate of material per unit of product consumed. This is reflected in our large, and increasing waste flow quantities, and in basic production and consumption statistics. For example, U. S. consumption of most classes of raw materials has been growing by 20 to 40 percent per decade in the 20th Century, and typical projections by independent resource economists forecast at least a doubling in U.S. consumption of most raw materials by the year 2000.

Yet it is estimated that far less than 10 percent of our residential solid wastes stream is currently recycled,

with wastepaper recycling accounting for 88 percent by weight of the materials recovered. Approximately 15,000 tons of industrial solid wastes are also processed in resource recovery systems although this, too, presents only a small fraction--about 1 percent--of the total.

Chapter IV

THE RESOURCE CONSERVATION AND RECOVERY ACT

In October 1976 Congress passed Public Law 94-580, the Resource Conservation and Recovery Act (RCRA), thereby amending the Solid Waste Disposal Act. The new Act provides Federal mandates and authorities for dealing with problems of solid waste management. These problems, described earlier in this document, were identified by Congress as relating to increased rates of generation of solid waste, protection of public health and the environment, and conservation of material and energy resources.

Two definitions within RCRA seem particularly significant. The definition of solid waste in RCRA is broad and inclusive. Congress redefined solid waste as "...any garbage, refuse, sludge from a waste treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Federal Water Pollution Control Act, as amended (86 Stat. 880),

or source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954, as amended (68 Stat.923)."

Further, Congress defined disposal as "...the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters."

These two definitions indicate that the Congress intended that any waste material that goes on the land, regardless of its physical form, must be managed in a manner consistent with the provisions of RCRA. These provisions, the most important of which are summarized below, are the tools available to EPA to achieve the goals and objectives outlined in Chapter V. In total these provisions are directed primarily toward the two goals of protecting public health and the environment and conserving natural resources.

SUBTITLE A: GENERAL PROVISIONS

- ° Publication of guidelines which describe levels of performance achievable by various available solid waste management practices, and which provide for: protection of ground and surface waters from leachate; protection of ambient air quality; disease and vector control; safety; and, esthetics.

SUBTITLE B: OFFICE OF SOLID WASTE: AUTHORITIES OF THE
ADMINISTRATOR

- ° Provides for teams of personnel, called Resource Conservation and Recovery Panels, including Federal, State, and local employees or contractors to provide States and local governments upon request with technical assistance on solid waste management.

SUBTITLE C: HAZARDOUS WASTE MANAGEMENT

Sections 3001 through 3010 prescribe regulations to achieve complete control of hazardous wastes from generation to discard. Specific requirements are:

- ° Publication of criteria for identifying hazardous wastes, of the characteristics of hazardous waste and of a list of particular hazardous wastes.
- ° Promulgation of standards for generators and transporters of hazardous wastes, reporting, record-keeping, practices, labeling, appropriate containers, use of a manifest system, and reporting of quantities and disposition.
- ° Promulgation of standards for treatment, storage, or disposal of hazardous waste, including regulations for establishing a system of permits for treatment, storage and disposal.
- ° Authorization to make grants to States for setting up hazardous waste management programs.
- ° Authorization to enforce regulations promulgated under Subtitle C.
- ° Identification of all hazardous waste handlers (generators, transporters, storers, treaters and disposers) through the preliminary notification program.

SUBTITLE D - STATE OR REGIONAL SOLID WASTE PLANS

This subtitle provides both guidelines and financial assistance for development and implementation of and for State solid waste management plans, promulgation of criteria

for identification of unacceptable disposal facilities.

Specific provisions are:

- ° Promulgation of guidelines for identification of regions for solid waste planning and for development of State solid waste management plans.
- ° Publication of criteria for determining which facilities shall be classified as sanitary landfills and which as open dumps and of an inventory of all disposal sites in the United States which are open dumps.
- ° Requirement that any State plan approved by the Administrator and eligible for financial assistance must include provisions for closing or upgrading all open dumps within 5 years from the publication of the inventory.
- ° Requirement that EPA provide financial assistance to States which have submitted plans meeting certain minimum criteria.
- ° Authority for the Administrator to issue grants for the implementation of solid waste management programs to States, counties, municipalities, and intermunicipal agencies. Such assistance is available for facility feasibility studies, consultations, market studies, etc., but not for construction.
- ° Authority to issue grants to special communities with low populations and high levels of generation for conversion or construction of solid waste disposal facilities, and for rural communities to upgrade solid waste management facilities.

SUBTITLE E - DUTIES OF THE SECRETARY OF COMMERCE IN
RESOURCE RECOVERY

This portion of the Act directs the Secretary of Commerce to stimulate broader commercialization of proven technologies by providing guidelines for specifications for recovered materials.

SUBTITLE F - FEDERAL RESPONSIBILITIES

Federal agencies are directed to comply with all Federal State, interstate and local requirements stemming from RCRA unless exempted by the President, including guidelines promulgated under Section 1008. This Subtitle also includes requirements for procurement of products containing recovered materials by Federal, State and local governments and grantees using Federal funds.

SUBTITLE G - MISCELLANEOUS PROVISIONS

- ° Provisions are made to permit citizen suits against any person (including the U.S. Government) who is alleged to be in violation of any permit, standard, or regulation under the Act.
- ° The Administrator may bring suit to enjoin any handling, storage, treatment of waste which is presenting an imminent hazard.
- ° The Administrator is charged with developing minimum guidelines for public participation in the revision, implementation, and enforcement of any regulation under the Act.
- ° EPA is authorized to make grants for training supervisory personnel for solid waste management, and to study of need for additional trained personnel.

SUBTITLE H - RESEARCH, DEVELOPMENT, AND INFORMATION

In cooperation with Federal, State and interstate authorities agencies and institutions and private agencies and institutions and individuals, the Administrator is directed to conduct, encourage and promote the coordination of research, investigations, experiments, training, demonstrations, surveys, public education programs and studies relating to: the protection of health; planning, financing and operation

of waste management systems including resource recovery; improvements in methodology of waste disposal and resource recovery; methods for remedying damages by earlier or existing landfills; and methods for rendering landfills safe for purposes of construction and other uses.

- ° Technologies for solid waste collection, recovery and disposal
- ° Low technology solid waste management, (including resource recovery) systems
- ° Methods for hazardous waste management

Special Studies

The Administration is directed to carry out a number of studies including the following subjects:

- ° Small-scale and low technology approaches to resource recovery.
- ° Front-end source separation for materials recovery.
- ° Mining Waste
- ° Sludge
- ° Airport landfills.

Resource Conservation Committee

A cabinet level committee chaired by the Administrator of EPA is mandated to investigate the impact on resource recovery and conservation of:

- ° Incentives and disincentives, including existing public policies such as tax credits and depletion allowances.

- ° Restricting the manufacture or use of certain categories of consumer products.
- ° Application of a charge on consumer products to reflect the cost of solid waste management services.

Chapter V

GOALS, OBJECTIVES, AND CRITERIA FOR SETTING PRIORITIES

The language of the Resource Conservation and Recovery Act makes clear two broad goals which are essential to an effective national program of solid waste management. These goals are:

1. To assure that all solid and hazardous wastes are managed in a manner that will protect public health and the environment.
2. To conserve natural resources directly and through the management, reuse or recovery of solid and hazardous wastes.

It is noteworthy that these two goals are related and compatible. To achieve the goal of conservation may also fulfill in part the goal of protecting public health and the environment. Similarly, activities to achieve conservation through reuse and recovery are themselves waste management practices that must be carried out in a manner consistent with the protection of public health and environment.

In order to meet the two broad goals defined above a series of broad and narrow objectives must be met. From these objectives, specific program activities are defined and prioritized in Chapter VIII. Major objectives and sub-objectives, as specified in the Act, are:

- ° To establish solid waste disposal practices that provide acceptable levels of protection of public health and the environment, and to discontinue or upgrade existing unacceptable practices.
- ° To establish practices for the transportation, storage, treatment and disposal of hazardous wastes that will eliminate present or potential hazards to human health or the environment.
- ° To establish resource conservation and recovery as the preferred solid waste management approach whenever technically and economically feasible.
- ° To establish Federal, State and local programs to achieve the above three objectives.
- ° To enforce regulations to protect human health and the environment and to foster voluntary compliance with such regulations.
- ° To develop, through studies, research and development, improved technologies necessary to achieve environmentally acceptable, cost effective solid and hazardous waste management in which conservation and recovery of resources are prime considerations.

If the goals and objectives delineated above are to be met, it is necessary to develop a set of criteria that will indicate the relative emphasis that should be given to each program to be developed under RCRA. This system of priorities should be used to (1) resolve the major choices that must be made between broad options, tools and waste stream coverage and (2) to assess resource allocation decision for all program activities. A set of criteria for establishing priorities, with a discussion of each follows:

1. How strong is the mandate for the program/activity in RCRA?

This criterion is intended to permit the assessment of the relative emphasis that RCRA gives to a

particular program or activity. Considered here will be such factors as the degree of control provided in the Act, pertinent discussion in the legislative history, the size of the authorization provided in the Act, and the timing required for implementation.

2. How pertinent is the program/activity to the strategy goals and objectives?

This criterion will permit the assessment of the strength of the linkage between the goals presented in Chapter V and the specific program or activity objectives.

3. Given the tools available in RCRA, will the program/activity be effective?

At issue here is the ability of the program or activity to meet its goals and objectives given the tools that can be utilized for the program under the Act. Those activities mandated to use all tools (i.e. regulations, technical assistance, research, etc.) will be compared with those activities where only one tool is available.

4. Is there a scientific and technological base available to support the program/activity?

This criterion is intended to assess whether there is sufficient supporting information to warrant implementation of the activity. Considered here will be the strength of the data base, and the status of the technology needed for implementation.

5. Is there a high level of public concern about the activity?

The extent to which the public is interested in and concerned about the particular program or activity is at issue here.

6. Given resource constraints, will the program/activity be effective?

This criterion is intended to establish the ability of the program or activity to be effective given limited resources. A favorable ratio between resource input, both in terms of manpower and funding requirements, and effectiveness would be desirable.

7. Given institutional constraints, will the program/activity be effective?

This criterion will permit the assessment of the program's ability to be effective given institutional constraints at the Federal, State, or local level. At issue here is both the program's ability to marshall an effective working partnership for implementation as well as its ability to overcome particular obstacles.

8. Will implementation of the program/activity be economically feasible?

This criterion will assess the economic implications of the program or activity, and the extent to which economic impacts will deter successful implementation.

Chapter VI

CONSTRAINTS

Four major constraints have been identified as impediments to the development of an effective strategy for implementing RCRA. These are:

1. The status of technology for implementation of the Act.
2. The extent to which financial and manpower resource limitations will affect implementation.
3. The institutional capabilities of various levels of government to implement the Act.
4. The extent to which economic implications will limit implementation of the Act.

Each of these constraints will shape the resolution of the major choices and the selection of priority program activities. A discussion of each constraint follows.

A. Status of Technology

The achievement of the objectives of RCRA depends to a large extent on the availability of technology to prevent, recover, handle and dispose of waste in an environmentally sound manner, and the existence of an aggressive research and development program to provide new and/or improved technology where needed. This section looks at the relative importance of technology for achieving various objectives of the Act, assesses the extent to which technology is sufficiently

available to fulfill these needs, and discuss the major implications of the status of technology on the strategy for implementing the Act.

1. Resource Conservation and Recovery

Resource conservation activities include both product design changes or industrial process changes at the manufacturer level and activities at the consumer or municipal level before or after discard. At the manufacturing level, for example, new processes involving different temperatures, pressures, reactants, or process equipment might result in conservation. At the consumer level, to cite an example, use of refillable bottles could reduce the generation of waste.

There is no easy way to classify the availability of technology for resource conservation and recovery. In many cases, industries are already carrying out such activities as a means of reducing costs, and it is likely that a significant expansion of resource conservation and recovery can take place without major advances in technology. To a significant degree, conservation will occur if (1) opportunities for conservation are recognized, and (2) it is in the economic interest of a firm or industry to carry them out. Increasingly, the cost of energy and other resources can be expected to stimulate increased recovery in the future.

Recovery of useful products from municipal and consumer waste presents a slightly different situation. Historically,

almost all recovery has taken place through manual separation of wastes at the source of generation, followed by sale to scrap dealers and then to manufacturers. Although this technology of source separation is relatively straightforward, political and institutional barriers to its application have been significant.

The recovery of materials and energy from mixed residential, commercial and institutional waste in centralized processing plants, on the other hand, is still in the early stages of application, with no more than one percent of residential and commercial waste currently being recovered in this way. One reason for this low level of recovery is the developmental nature of the technology. One energy recovery technology (waterwall incineration with steam generation) has been proven in Europe in over 20 years of application and is now being increasingly applied here. Another energy recovery technology (refuse derived fuel systems) will be applied in at least five commercial plants over the next three years. Other technologies are only now being demonstrated or utilized in early commercial prototypes.

The landspreading of sludges or wastes for resource recovery purposes is a practice that has been studied intensively for some period of time. While it is difficult to assess the health effects of such practices when the wastes are applied to food chain crops, the technologies for application and management are generally well-known.

2. Land disposal

Environmentally acceptable land disposal will, in many cases, require application of techniques and technologies to prevent pollutant migration in soil, to collect and treat contaminants, and to monitor air and water quality in and around the disposal site.

The technology to prevent creation of leachate includes both "capping" sites with impermeable membranes or channeling water so that it runs off quickly in a controlled manner. In both cases, sufficient information or experience exists to conclude that this is not a technology constraint. Collection and treatment of leachate typically involves use of liners below the site to prevent leachate from entering the groundwater. This technology can also be applied now, although information on this technique is not complete. The major unknown is the relative performance of various types of liners and the lifetime of these liners. Once collected, leachate can be treated to acceptable levels by various techniques. Collection and treatment of leachate is still not widely practiced, however, and some pilot or demonstration work is still required.

A phenomenon which is still not well understood and which bears significantly on groundwater protection is leachate attenuation (or purification) through the soil. Estimation of the impact of a disposal site on groundwater

quality includes analyses of the probable effect of attenuation. If attenuation is expected to mitigate the pollutants in the leachate, additional treatment may not be required. However, attenuation is not well understood, and more research and development is needed.

Measuring the quality of the groundwater and surface water is possible with existing techniques. However, techniques of groundwater monitoring are not always straightforward and may be expensive. In addition, significant time may be required to obtain results, and continuous monitoring may be required in some cases.

In total, the technology for controlling water quality is considered to be available for application. However, the present data base is not yet sufficiently extensive applied to provide precise estimates of expected results in all instances. Thus, the broad application of these techniques still remains to be proven in the field.

Additionally, there is a need to develop technology to maximize decomposition and stabilization so as to (1) render landfills safe for the purposes of construction and other uses in a minimum time and (2) to limit the time in which landfill operators are financially and morally responsible for preventing environmental insult. Also, methods must be developed for remedial action in cases in which established landfills are discovered to be causing unacceptable environmental damage.

Technologies for control of air pollutants, disease vectors, and concentrations of explosive gases are generally better known.

3. Hazardous Waste Management

Control of hazardous wastes requires that techniques be available to identify, handle, treat, and dispose of such wastes. Thus, technology plays a major role in environmentally sound hazardous waste management.

Identification of hazardous wastes may require testing for various characteristics, including toxicity, flammability, and corrosiveness. It is believed that a majority of hazardous wastes can be identified by acute characteristics such as flammability and corrosiveness which are readily measured. However, the remaining wastes may require more elaborate techniques for measuring chronic toxicity or other parameters. Efforts are currently underway to select suitable tests for hazardous wastes from available procedures, particularly in the area of toxicity. The results may affect the scope of the regulations to be promulgated. Thus, the availability of a technology may constrain the identification of hazardous wastes.

Technologies to handle, treat, and dispose of almost all hazardous wastes have been identified. However, some of these technologies have not been widely applied commercially and some are still in the research and development stage.

It is generally believed, however, that, technologies are available to control the majority of hazardous wastes in a way that will protect health, safety, and the environment. However, there are likely to be some wastes which will not be easily controlled by techniques which have been applied commercially in the past, and costs may be several times higher than current practices.

Thus, while a technology constraint is present, for certain aspects of hazardous waste control, it is not so significant as to prevent a regulatory effort from being largely effective.

B. Resource Limitations

The strategy must be developed with the recognition that appropriated funds for RCRA may be significantly less than the funds authorized in the Act, especially with respect to the grant support provisions under which EPA assists State and local government in planning, developing, implementing the programs mandated in Subtitles C and D and the demonstration of technologies authorized in Subtitle H. This constraint means that there will be a lower level of financial and manpower resources devoted to solid waste management activities over the next few fiscal years than was envisioned in the drafting of RCRA.

Hence the strategy which is comprehensive and timely in meeting the mandates of RCRA and the strategy which can be

implemented with the resources actually available are not the same. EPA has several options available to deal with this resource constraint: (1) EPA could concentrate on those mandates of the Act which carry with them a deadline, at the likely expense of those mandates that do not: (2) EPA could address all of the mandates of the Act to some extent, but at the likely expense of failing to meet at least some of the deadlines established in RCRA; or (3) EPA could address all mandates carrying deadlines, but on a less comprehensive basis than might be desirable, and at a possible cost to the strength of the data base on which they might be developed.

Under the first option, for example, the implementation of resource conservation and recovery provisions could be affected since there are fewer specific deadlines in this area. Furthermore, some resource recovery provisions such as technology demonstrations would be impacted by a lack of appropriations.

On the other hand, it makes little sense to proceed simultaneously but in a marginal way in all program areas. Such an approach could seriously affect the adequacy of some of the effort, and impact upon the credibility of the entire solid waste management program.

It is expected that resource constraints will require the development of specific priorities for RCRA implementation. The chapters that follow outline the rationale for the priorities chosen as well as the specific priorities themselves.

C. Institutional Aspects

1. Governmental

The Act mandates a solid waste management program involving every level of government: Federal, State, regional (substate, intrastate, and interstate), and local. States are given responsibility for comprehensive solid waste planning in concert with appropriate units of local government under Subtitle D. Subtitle C clearly places the administrative burden upon EPA when a State does not seek authorization to administer and enforce the hazardous waste program, even though Congress clearly intended the States to implement the program. Existing institutional arrangements will, at best, affect the substance and timeliness of implementation; at worst, certain aspects of the Act may be unattainable without major alterations to current institutional relationships.

One example of a potential institutional problem is fragmentation of State environmental management responsibilities. Some States have assigned planning responsibilities to agencies which do not have implementation authority. Other States, have divided responsibility for parts of the solid waste management problem among several agencies, based upon the media to be protected (as where one agency is responsible for "land protection," but another for "groundwater protection,") or, upon the physical state of the waste (as where one agency is responsible for "solid" waste, but another for

"liquid" wastes.) EPA has always avoided interfering in or attempting to influence State organization. The strategy must recognize, nevertheless, that the existence of different patterns of environmental management may complicate and inhibit the implementation of RCRA in some States.

States and localities also have widely differing legislative mandates with respect to solid waste management. With regard to enforcement activities, for example, some jurisdictions have authority to impose penalties which approximate those in RCRA for both criminal and civil offenses. Other jurisdictions have more limited authority, with a few jurisdictions unable to impose criminal penalties at all. This difference in enforcement authorities will impact the uniformity and consistency with which State and local jurisdictions can implement the regulatory aspects of RCRA, both in comparison to the Federal program and to each other.

In the resource recovery area some States have established authorities for carrying out statewide planning and implementation, including responsibilities for ownership and management of facilities and even waste stream control. Other States have a far less extensive role. Some States have enacted major policy legislation that affects resource conservation and recovery activities in their States, such as deposits or controls on certain packaging materials, or grant programs to assist in the construction of resource recovery plants.

Some States have competitive bidding laws and contracting restrictions which hamper procuring and contracting for resource recovery systems. Thus, the strategy must consider the varying abilities of the States to implement the resource conservation and recovery provisions of the Act.

Some jurisdictions which need new or additional legislation may be unable or unwilling to press for it. Institutional relationships among different levels of government (city, State, and county) or between the legislative and the executive may affect the ability of a State or locality to implement RCRA. The strategy must take account of the complexities and difficulties associated with the passage of new or amended legislation at the State and local level.

States and localities are also at different stages of development in building the organizational infrastructure of people and authority necessary to carry out the mandates of RCRA. This constraint could be addressed by: (1) choosing priorities and criteria which will lead to a program all States could implement, even if the program would be less comprehensive than that program which could be implemented by States which have more highly developed infrastructures, or (2) developing a program that meets the more complete interpretation of the Act's goals and objectives, but which at least some State and local governments would be institutionally unable to respond within the time envisioned by the Strategy.

This approach could result in phasing of coverage of the regulations or of implementation of the regulations according to the institutional ability of the State or locality. Alternatively, the strategy could choose certain waste streams or wastes for coverage regardless of the ability of States and localities to respond adequately, but with the expectation that their institutional development would be accelerated as a result.

2. Public

In at least two areas, the attitudes of the public may be the most important and the most difficult constraints to implementing the Act. These areas are facility siting and economic impact.

The history of citizen resistance to the siting of solid waste facilities is extensive and consistent. Such opposition is the nearly-unbroken rule rather than the exception. A number of communities have been unable to overcome citizen opposition to the siting of a landfill or other solid waste management facility. This opposition is not usually centered upon erroneous or disputed data regarding the adequacy of the proposed facility with respect to public health or the environment. It instead demonstrates an educational and attitudinal problem which solid waste management officials will find to be a pivotal constraint and issue in developing alternatives and solutions. The inability to

obtain treatment or disposal facilities renders whatever other steps solid waste management officials may take less effective or ineffective. This suggests that alternatives to disposal must be considered in the development of the strategy.

Public attitudes also present a constraint with respect to the economic impact of this Strategy. Most improvements in solid and hazardous waste management entail increased costs to some sectors of the community. An example is higher fees at a landfill or treatment facility, including the imposition of fees where there may have been none before. Another cost might be the requirement to use certain types of containers for wastes--requiring householders to use specific bags for waste, for example, or requiring industries to use more secure containers for hazardous wastes. Improvements in solid waste management may be expected to increase costs to those disposing of wastes, costs which may be expected to be passed along to the public. Public willingness to pay for improved solid and hazardous waste management is difficult to predict, especially without precise data on the nature and scope of those increased costs. This issue is institutional as well as economic to the extent that the public willingness to pay may be affected by educational and other efforts to impact attitudes. Were the public unwilling or highly reluctant to pay the costs, the goals and objectives of the Act might well be frustrated.

The strategy must therefore take account of the public's attitude toward the siting of new facilities and the economic impact of increased solid waste management.

D. Economic Implications

Constraints to implementing RCRA may arise as a result of the economic implications of the Strategy, although at this time, much of the data by which EPA could assess this impact is not available.

a. Cost of Compliance

Certain costs are nevertheless identifiable as likely to fall onto the regulated and/or affected community, either directly or indirectly. The more obvious include the costs of upgrading unacceptable disposal practices to meet criteria to be developed under Section 4004, and the costs of upgrading or developing an alternative where an unacceptable facility is identified. Where the costs of these actions exceed the ability or willingness of a community to pay, the goals of RCRA and of this Strategy could be frustrated; yet this possibility must be balanced against the public health and environmental benefits to be realized from closing as many unacceptable facilities as possible.

The hazardous waste regulatory program presents similar choices. The costs of using acceptable treatment or disposal practices for hazardous wastes may be many times the cost of current, unacceptable practices. The costs of new transportation

and container packaging requirements, new record keeping and reporting requirements, the obtaining of permits, and the attendant expenses of sampling, analyzing, and monitoring waste streams, and long-term care and surveillance at facilities will all involve additional cost.

EPA must balance these costs to the regulated community against the benefit to be realized, as in deciding the frequency or number of reports, or of sampling and analyses. Wherever EPA requires new or increased reporting, record keeping or sampling, a "cost of compliance" is being levied upon the regulated community. The development and implementation of this strategy must necessarily weigh the incremental costs of these actions against the incremental benefit.

b. Costs of Implementation

The costs incurred by EPA and other regulatory and planning agencies in developing and implementing RCRA may be termed "costs of implementation." Direct costs of implementation include the administrative expenses entailed in implementing and enforcing Subtitle C and implementing and enforcing Subtitle D. The staff time and overhead in developing and promulgating regulations and guidelines, in monitoring reports and related requirements, and in implementing and maintaining permit and systems are all examples of implementation costs.

Finally, the recommendations made by the Resource Conservation Committee (RCC) under Section 8002(j) have obvious

economic implications. Any economic incentive or disincentives will impact on both industry and the public. Some policies such as the product charge concept could create a solid waste fund which could be distributed to the cities and States to cover solid waste collection and disposal costs. The economic implications of such policies will be addressed in the recommendations of the RCC.

The Agency is committed to making every possible effort to minimize negative economic impacts while still minimizing the threat to public health. This commitment relates to all costs, compliance and implementation, primary and secondary.

Chapter VII

MAJOR CHOICES

This chapter presents an analysis of the three major choices that must be made in order to establish specific program priorities and activities.

1. What relative emphasis should be given to the different waste streams that are covered in the definition of solid waste: industrial wastes, residential waste, wastewater treatment sludges and other pollution control residues, mining wastes, agricultural wastes and those portions of these streams that will be considered hazardous?
2. To what extent should resource conservation as opposed to waste disposal be emphasized?
3. To what degree should the tools of regulations, economic incentives, research and development, and public participation be emphasized?

This chapter discusses these choices in light of both the criteria for setting priorities developed in Chapter V and the constraints to implementation discussed in Chapter VI.

A. Waste Stream Priorities

The RCRA definitions of "solid waste" and "disposal" indicate that all waste streams and management practices are subject to the provisions of the Act. Included within the

RCRA framework, therefore, are solid, semi-solid and liquid wastes from residential, industrial, mining, and agricultural sources, disposed of in landfills, impoundments and by landspreading and other recovery and disposal operations.

Because of this breadth of coverage, priorities must be established to permit a logical and rational approach. Phasing will be required. For example, the regulatory program could be developed so as to first address the most critical waste streams, with an option of phasing in other streams at a later date; or the program could be developed to cover all waste streams, with implementation phased in over time. The major factors which influence waste stream priorities include: quantities generated, health and environmental impacts, potential for recovery, and public visibility and concern. Potentially, the waste stream priorities for disposal controls maybe different from those for resource conservation and recovery. The following observations can be made about the waste streams to be covered by RCRA.

1. Quantities Generated

Wastes will be designated as hazardous because of their flammability, corrosivity, toxicity, and other related factors such as persistence and degradability in nature.

This waste stream is comprised of approximately 30 million tons (dry weight), or 5% of the total solid waste

stream. It includes some pollution control residuals, including some wastewater treatment sludges and flue gas desulphurization sludges. The bulk of the wastes to be designated as hazardous are in the form of industrial process wastes.

Residential, commercial and institutional wastes are estimated to total approximately 100 dry million tons per year annually. These wastes are derived from households, commercial establishments, and institutions, such as schools and office buildings.

The wastewater treatment sludge stream is comprised of approximately 7 million dry tons annually. This waste stream is currently the smallest segment of the total, although quantities are growing rapidly due to increased installation and upgrading of municipal wastewater control plants.

These industrial process wastes and pollution control residuals not designated as hazardous comprise a waste stream of approximately 245 million dry tons per year disposed of in an estimated 50,000 disposal sites. These wastes, with mining wastes, estimated at 4 billion tons and agricultural wastes, estimated at 2 billion tons, comprise the three largest waste streams covered by the broad definition of solid waste found in RCRA.

2. Health and Environmental Impacts

Hazardous wastes appear to have the greatest potential for posing a risk to public health and the environment as currently handled and disposed (i.e. through migration of leachate from landfills or impoundments to groundwater; or uptake of contamination from landspreading practices into food crops). Technologies are currently available to minimize the health risks from the management of hazardous wastes, although the state of the art is not sufficient to guarantee a particular level of protection. Implementation of the technology is expected to result in higher costs, with some acceptable disposal facilities costing as much as 10 times current costs.

The improperly controlled land disposal of residential, commercial and institutional waste can also negatively affect public health and the environment as the waste constituents leach into surface streams and groundwater aquifers and significantly impair their quality. While the degree of contamination may be somewhat less than for uncontrolled hazardous waste landfills, the number of non-hazardous landfills (estimated at approximately 18,000) makes the potential health effect significant. Although no data are available to compare the quantity of leachate from hazardous and residential waste disposal facilities, it is not implausible to arrive at the tentative conclusion that the total quantities

of contaminated leachate available to pollute groundwaters from residential sites are not much different than from hazardous waste sites.

Through proper planning, design, operation and monitoring of disposal facilities, many of the public health and environmental risks can be minimized. As with hazardous waste disposal facilities, the techniques to minimize these risks have been successfully applied in particular situations. However, they involve use of control technologies new to the field, and not widely accepted. It has been estimated that implementation of the technology could result in costs on the order of \$200 million annually.

The management of wastewater treatment sludges, the residuals from sewage treatment plant operations, present a potential for adverse effects on health and the environment both through contamination of ground and surface waters and through heavy metal uptake into plants. The risk from these land disposal options is particularly significant if the sludge is contaminated with heavy metals and toxic organics but still falls outside of the hazardous waste umbrella.

There is considerable uncertainty over the technologies for the control of sludge disposal, although it is clear that methods of minimizing degradation are available. The cost of instituting these methods has been estimated at \$50

million. Wastewater treatment sludges can be recycled by spreading the waste on the land, and this activity, if properly managed, is encouraged by EPA.

Industrial process wastes and pollution control residuals are generally disposed of on the land, either in landfills or impoundments (pits, ponds, or lagoons). These disposal alternatives present a potential for risk to the environment because of leachate or leaking of the disposal facility into ground or surface waters. Because of the vast number of industrial disposal sites, estimated at 50,000, this waste stream poses significant risks to the environment.

The theoretical design of an environmentally acceptable industrial waste land disposal site is well established. This design concept is based on use of a natural or artificial barrier between the waste and the ground or surface water to be protected. However, there is a lack of data on the compatibility of specific industrial wastes with both artificial and natural barriers. Only general statements can be made such as, clay type liners may deteriorate when exposed to strong acids, bases or concentrated brines, and polymeric liners may swell when exposed to oily wastes. Anything more specific can only be determined by compatibility tests with various liner materials and the specific industrial waste to be contained. The economic impact of instituting this technology has been estimated to range in the hundreds of millions of dollars.

As pointed out earlier, mining and agricultural wastes represent the largest tonnages of residual materials disposed of on the land. However, environmental impacts and control technologies are the least well known. [Mining is, however, the subject of a study mandated under Subtitle H of the Act.] Total agricultural residues include crop residues consisting of field and packing shed wastes, forestry residues, consisting of wood and bark wastes and manures from confined animal operations.

There are virtually no controls on the use of crop residues and much of the residue is recovered. There are limited controls on forestry residues pertaining to the water pollution and insect aspects. Animal feedlot wastes are regulated as point sources by EPA water pollution control regulations, but these controls do not extend to land application.

3. Potential for Resource Conservation and Recovery

With respect to hazardous waste, there are opportunities both for changing the nature of the hazardous waste stream through in-plant processing system changes, and for the recovery of potentially hazardous wastes through in-plant recycling, waste exchanges, and other methods. At the present time, few hazardous wastes are recycled. Recent studies indicate that management costs for some hazardous wastes could be less than current costs if recycling techniques were employed.

Greater opportunities exist to prevent waste generation and recover resources from residential, commercial and institutional wastes. The 75 to 80 percent of these wastes collected daily in the Nation's urban areas can feasibly all be processed to recover energy and materials. Furthermore, it would be feasible to prevent at least 10 percent of these wastes from being generated.

There are also opportunities for resource conservation and recovery through in-plant processing changes, in-plant recycling and waste exchanges. The energy potential of these wastes is particularly significant. However, industry is already utilizing some of this potential. The potential for additional recovery may be high and should be evaluated.

Approximately 25 percent of all wastewater treatment sludges are currently recycled. It is expected that this figure will not decline, despite increased regulatory control over unacceptable landspreading practices.

From a resource recovery standpoint there appears to be opportunities for the recycling of both mining wastes and agricultural wastes. However, little resource recovery is practiced because of economic constraints rather than because of technological problems.

4. Public Visibility and Concern

A unique characteristic of residential, commercial, and municipal solid wastes is their public visibility.

There is a heightened awareness and expectation of Federal involvement toward these wastes by the public and Congress. This is also true of wastewater treatment sludges, but does not relate to the other waste streams covered by RCRA.

The foregoing suggests the following priority groupings for waste streams:

For application of disposal controls the highest priority group is hazardous and industrial wastes; medium priority is residential, commercial, and institutional wastes and wastewater treatment sludges; lower priority is mining and agricultural wastes.

For application of resource conservation and recovery the highest priority group is residential, commercial, and institutional, as well as wastewater treatment sludges; medium priority are industrial and hazardous wastes; and lower priority are mining and agricultural wastes. However, the priority of industrial wastes relative to residential wastes could change after the potential for recovery of industrial wastes is evaluated.

These broad waste stream rankings will be used in assessing specific program priorities in Chapter V.

B. EMPHASIS ON RESOURCE CONSERVATION AND DISPOSAL

This section discusses the potential of resource conservation and recovery as opposed to disposal controls for achieving the goals and objectives of RCRA. This discussion will form a basis for establishing priorities by exploring the potentials of the approaches, the interrelationships between them and the strategic options for carrying them out. Basic choices within this option are:

- Primary emphasis on resource conservation, (reuse, and recovery).
- Primary emphasis on disposal controls.
- Balanced emphasis, perhaps with a phasing of the two approaches over time.

1. Emphasis on Resource Conservation

One strategic approach would be to place more emphasis on developing alternatives to disposal than on controlling disposal. Resource conservation approaches divert solid waste from disposal. In doing so, they achieve both protection of public health and the environment and conservation of natural resources.

The extent to which resource conservation measures are actually implemented depends primarily on their economic feasibility relative to other waste management alternatives, and the availability of technology to implement them. These have all been major constraints to implementation in the

past. The first factor will be partially overcome by the imposition of controls to eliminate low cost, environmentally unacceptable disposal. It will also be addressed by the Resource Conservation Committee in their mandated analysis of economic incentives. Technologies are still in early stages of development and application. Although this constitutes a constraint to implementation, some technologies can be and are being implemented.

The potential for recovery of energy and materials from solid waste is significant. Both municipal and industrial wastes are already collected and aggregated, making them accessible. Almost 1 percent of the Nation's energy consumption could be met by recovering energy from just the municipal solid waste generated in urban areas. Industrial waste has nearly two times the energy potential. Materials can be recovered from these wastes representing significant percentages of national consumption. There are also other recovery applications. For example, it has been estimated that 25 percent of the wastewater treatment sludges are now used in landspreading to provide crop nutrients. This figure could be significantly increased.

Estimated impacts of resource conservation and recovery suggest that they can provide a significant reduction in disposal needs, but can by no means eliminate the need for disposal. Based on projections assuming no additional

Federal stimulation, it was estimated that recovery of energy and materials from residential solid waste would increase by approximately 27 million tons from its current level of 10 million tons. This increase would be less than 50 percent of the estimated increase in waste generation during the next 10 years. Thus, residential and commercial waste going to disposal yearly will still increase by 30 million tons over this period in the absence of further Federal stimulation. However, if Federal activity were reduced from current levels, it is possible that the increase in waste recovery over the next 10 years could be no more than half of the projected 27 million tons.

Public concern with resource conservation approaches has been a driving force toward implementation of these approaches. This concern has often been significant enough to reduce institutional barriers to the implementation of conservation options.

From the standpoint of resource management in the economy, these approaches clearly represent "preferred" waste management practices which should be carried out in lieu of disposal to the extent possible. They result in conservation of material and energy resources, they conserve land for beneficial use rather than use as a depository, and they protect the public health from adverse impacts of improper land disposal. Clearly, these practices should be

key components of a long range waste management strategy for the nation.

However, it would not be logical to focus RCRA implementation primarily on resource recovery and conservation approaches at this time. These approaches do not represent the most direct ways of meeting the goal of protection of public health and the environment. Furthermore, the specific time constraints mandated for controlling solid and hazardous waste disposal cannot be ignored. The fact is that even with aggressive Federal efforts toward recovery most wastes will continue to be deposited on the land for many years in the future. Finally, it is doubtful that the authorities in RCRA for resource conservation and recovery are strong enough to justify a major shift of emphasis in that direction.

b. Emphasis on Disposal Controls

Control of the disposal and handling of solid waste is the most direct means of addressing the goal of protection of public health and the environment. By specifying operating practices or emissions levels, regulations can be established to eliminate adverse impacts of disposal. Such controls are a logical complement to the controls already existing and planned relative to air and water. Since the latter tend to create wastes which are disposed of on the land, this "closing of the loop" of environmental controls is clearly necessary.

The authorities in RCRA for control of disposal (as well as handling of hazardous wastes) are relatively strong. Although data on the severity of health and environmental impacts are limited, there is general agreement that an unacceptable level of damage is occurring. Given the continued dominant role of disposal, an emphasis on developing regulations for disposal control can be argued.

The potential impacts of such regulations depend largely on two factors: the availability of data to define the level of control that will protect public health and the environment, and the extent to which the regulations are implemented. The latter factor in turn depends on: the availability of technology and facilities to comply with the regulations; and the extent to which monitoring and enforcement activities are carried out.

It is difficult to make a reasonable quantitative estimate of the extent to which disposal controls will be successful in eliminating adverse effects on health and the environment within the next 10 years. One uncertainty arises from the fact that RCRA does not provide for Federal enforcement of disposal for other than hazardous wastes. For other solid wastes, the Federal role prescribed in RCRA is to establish criteria for characterizing disposal operations which adversely affect health and the environment. The application and enforcement of the criteria is the responsibility of the States. Some States can be expected to move

aggressively to eliminate environmentally unacceptable disposal sites and practices. Other States will not. In fact, several States already have regulations which would eliminate disposal practices which cause adverse health and environmental impacts. Yet in many cases, they are not implemented to a significant degree.

This has often occurred because of lack of staff to adequately monitor and enforce State rules and regulations. Furthermore, monitoring of sites, even to determine initial compliance, is likely to be expensive, time consuming and somewhat imprecise.

Lack of feasible alternatives is another constraint. For example, it has become increasingly difficult to locate new land disposal sites for solid wastes and very difficult to locate sites for hazardous wastes. Many States and cities have started to look to resource recovery as a solution, but have found technological and economic uncertainties that have made them hesitate.

This is not to suggest that disposal controls as a waste management strategy will be ineffective, but rather that they cannot be expected to be quickly implemented and broadly applied. A number of years will be required before they are likely to be effective in controlling the majority of adverse health and environmental impacts of handling and disposal of solid waste.

Furthermore, to the extent that hazardous waste controls alone are emphasized - the area of greatest direct Federal authority - the Federal solid waste program would address only five to six percent of the total municipal and industrial waste streams. There is not evidence to show that the damages from this fraction of solid waste are so significant that the environmental damages and recovery potentials of the remaining 95 percent of the wastes should be ignored.

The limited direct Federal authority to control the disposal of the remaining wastes raises serious doubts about the logic of focusing primary Federal attention only in this area. In fact, the major Federal lever to bring about disposal controls for solid waste sites is financial and technical assistance to the States to develop comprehensive solid waste management plans. This suggests that an emphasis on disposal controls alone would not result in maximum benefit.

c. Balanced Emphasis

The foregoing discussion strongly suggests that the two waste management options are mutually dependent and supportive.

Controlled disposal is basic to achieving the goal of protecting public health and the environment. It is not possible to divert a majority of wastes from disposal in the foreseeable future through conservation-oriented waste management practices. Yet the success of disposal controls

will depend significantly on the availability of recovery and conservation alternatives.

The appropriate strategy for implementing RCRA would thus seem to suggest a balance between the approaches discussed. However, since RCRA mandates greater control of hazardous wastes, and since these efforts will likely prove reasonably effective in the short-term, a greater emphasis on hazardous waste is suggested in the early years.

However, some emphasis on resource conservation must be maintained in order to make the regulations more effective and set the stage for a probable shift of Federal emphasis to this area several years in the future. Furthermore, maximum advantage should be taken of the State planning provisions of Subtitle D to move States toward resource recovery as well as away from environmentally damaging disposal. In short, resource conservation and recovery must work in concert with disposal controls if maximum benefits are to be obtained.

C. Tools for Implementing RCRA

There are five major tools that can be used to meet the goals and objectives of RCRA: regulations, economic incentives, research and development, technical assistance and public participation. At issue in this section is the extent to which each of these tools should be emphasized in the implementation of the Act. A brief discussion of each of these tools follows.

1. Regulations

Regulatory activities are mandated for the management and control of hazardous wastes (Subtitle C), and, to a lesser extent, for the control of other solid waste disposal (Subtitle D). The Resource Conservation Committee (Subtitle H) is also required to investigate the feasibility of regulatory approaches for waste prevention and recovery. Waste prevention and resource recovery are not specifically provided for in the regulatory structures of the Act. However, requirements that these approaches be adequately addressed can be written into the State plan guidelines to be developed under Subtitle D. Additionally, it would be possible to write the regulations under Subtitle C so that recovery facilities would not be considered either treatment and/or disposal facilities and therefore subject to permits under the Act.

The development and implementation of the RCRA mandated regulations provides the clearest and most direct thrust toward meeting the goal of protecting health and environment. It is important to point out, however, that the regulatory process is neither a simple nor an independent one. The development of effective regulations, for example, requires a strong research, development and demonstration base, and the implementation of regulations generally requires some technical assistance.

Looking specifically at the RCRA requirements, it is clear that the regulatory programs cannot stand alone. The data base for developing programs under both Subtitles C and D, for example, is not as strong as would be desirable. Areas of particular concern are the lack of data for defining what constitutes a hazardous waste; what test procedures can be used to identify such wastes; what disposal technologies can achieve various levels of control; and the need for related research, development and demonstration programs.

Similarly, it is not anticipated that implementation of the regulations could be accomplished without a significant technical assistance effort. This applies to hazardous waste program development at the State level, as well as to the development of State programs to implement the Subtitle D efforts.

It is nevertheless important to recognize (1) that sufficient data do exist to develop regulatory programs as mandated under the Act, and (2) that such programs represent the most direct approach to meeting the goal of protection of public health and the environment.

2. Economic Incentives

RCRA requires that economic incentives be studied under Subtitle H of the Act, and that recommendations be made to the Congress on particular incentives that would result in resource conservation.

This mandate in RCRA is potentially the most significant functional tool that can be applied to resource conservation activities. The types of incentives authorized for study would potentially have far reaching effect on the economic viability of resource conservation activities relative to hazardous and other waste streams.

It is, however, important to point out that even if recommended such incentives would require new legislation. The Act itself does not permit the implementation of economic incentives without the passage of specific legislation.

3. Research, Development and Demonstration

Subtitle H of RCRA provides a broad authority for conducting research, development and demonstration projects for all solid wastes. Critical needs for activities of this type exist in a number of areas, particularly in (1) the development of new and improved methods for site selection, design, operation and maintenance of landfills, (2) the development and evaluation of alternative methods of waste residual disposal to land, (3) the development of remedial measures for minimizing the environmental impact of environmentally unacceptable land disposal sites, (4) the development of and economical and environmental assessment of methods for processing and/or treatment of hazardous materials, (5) the development/improvement of technology to increase the recovery and reuse of waste material by developing/improving

technology and developing marketable products and (6) the development of new and improved systems for collection, storage and transportation of solid wastes. Additionally, as has been pointed out in the discussion on regulations earlier in this section, there are not sufficient data on the effects, particularly health effects, of specific practices. Research efforts to develop these data will be necessary in the effort to prepare guidelines on alternative waste management practices.

Research, development and demonstration activities are, of course, not an end in themselves. However, it is extremely important that high priority be assigned to these activities so that alternative technologies that can minimize health effects and assure the feasibility of resource conservation are made available.

4. Technical Assistance

Technical assistance activities are provided for in various sections of RCRA. Subtitle B requires the establishment of Resource Recovery and Conservation Panels to provide States and localities with assistance on all aspects of solid waste management. Subtitle D also provides for technical assistance to establish State programs for solid waste (including hazardous waste) management.

The Act is clear in its direction that the enforcement of Subtitle C be carried out by the States to the maximum

extent possible. Furthermore, it is considered a more efficient utilization of Federal resources to develop capabilities in the States through technical assistance rather than to create a new capability at the Federal level. Thus, assistance to States is a major functional complement to the development of the regulations for controlling hazardous wastes.

The extent to which technical assistance should be used to bring about the closing or upgrading of unacceptable disposal sites under Subtitle D or the implementation of alternatives to disposal, such as resource recovery, is another key issue. One alternative is to rely on the capabilities of States to classify the sites, provide for upgrading, or implement alternatives. The viability of this approach depends partly on the extent to which techniques and procedures for classifying sites are readily available and can be straightforwardly applied. Although some States have already implemented such procedures, the majority have not. Furthermore, techniques and procedures are not readily available in many instances, particularly for some types of disposal. Thus a technical assistance support effort is anticipated following promulgation of the criteria.

The complexity of implementing resource recovery strongly suggests a need on both the part of municipalities and States for Federal technical assistance. The existence

of new procedures for financing, procuring and managing resource recovery systems, as well as the complexity and newness of the technologies and markets was widely testified by the public and private sector in the framing of this provision of RCRA. Such issues have been widely reported as significant barriers to implementation of resource recovery.

The viability of the technical assistance effort is nevertheless dependent upon (1) the existence of the regulations for hazardous and other waste management, and (2) the availability of technologies for both disposal and conservation. In light of this, highest priority for disposal control activities (particularly in the hazardous waste management area) should be given to the tools of regulation and research development. Technical assistance is regarded as a key to implementation of the regulations, and should become higher priority when the developmental work has progressed sufficiently. Technical assistance to plan and implement State programs for land disposal and resource recovery through Subtitle D are also of a high priority.

5. Public Participation and Information Activities

In view of the disparity of appropriated and authorized funds for RCRA; the difficulties inherent in undertaking its mandated regulatory actions, its prescribed economic incentives and technical-assistance programs; and the need for assumption by industry and the States of many new responsibilities

engendered by the Act,--successful implementation of RCRA depends on a high level of public understanding and participation. Fortunately, the Act contains a full array of public information and participation provisions. Section 7004(b) of Subtitle G requires that public participation in implementing all parts of the Act is to be provided for, encouraged, and assisted by EPA and the States. EPA, in cooperation with the States, is to develop and publish minimum guidelines for such public participation. Section 8003 of Subtitle H requires EPA to develop, collect, evaluate, and coordinate information in key solid and hazardous waste subject areas; to rapidly disseminate this information; to implement programs to promote citizen understanding; and to establish a central reference library on solid waste management.

Public participation is necessary in the implementation of the regulations as well. Section 3010 requires all generators, transporters, storers, treaters and disposers of hazardous waste to notify EPA of such activity. This preliminary notification is a vital portion of the enforcement program. By identifying all participants in the hazardous waste program EPA and the States will more effectively bring all hazardous waste handlers into compliance through enforcement activities. Furthermore, EPA will be able to foster voluntary compliance through the information subsequently forwarded to notifiers.

The public participation guidelines now being promulgated in interim form apply not only to EPA but also to State, regional, and local governments receiving financial assistance under the Act. Each agency is required to conduct its own rulemaking and related activities. To assist the State and local governments, EPA will provide information materials and financial assistance for citizen education programs. The information materials will be prepared in a variety of formats and media for all levels of technical, governmental, and public audiences as aids in understanding the significance of the solid waste data base, the issues that emerge from it, and the resultant decisions that must be made.

Because of the participation by the public in their development, the final regulations, standards, and guidelines when promulgated should represent the views of a wide spectrum of interests, and be therefore more acceptable than would have been the case without public involvement in the decision-making process. Because of the information dissemination and citizen-education programs, when the time comes to enforce Subtitle C, to close or upgrade unacceptable disposal sites under Subtitle D, and to implement the other programs needed to bring about improved waste management practices and resource conservation, EPA should find already in place a base of realistic governmental and public support.

Chapter VIII
PROGRAM PRIORITIES

Chapter VII presents a discussion of the strategic choices that must be made in order to implement RCRA, given the constraints described in Chapter VI and the criteria for setting priorities presented in Chapter V. Based on these discussions, the following priorities, activities and outputs have been selected.

A. Priorities

1. Controlling waste disposal should be the highest priority activity in the RCRA implementation effort in the next 5 years. This is because:
 - a. This activity will have the most direct impact on the adverse public health effects of improper solid waste management.
 - b. This activity will provide an indirect stimulus for resource recovery and conservation by increasing the costs of disposal.
 - c. RCRA contains very clear and strong mandates relating to disposal controls.

This activity will focus on:

- a. The promulgation of regulations for controlling hazardous waste.
- b. The promulgation of criteria and guidelines for eliminating open dumps.
- c. The development of State programs for implementing the hazardous and solid waste programs through Subtitles C and D and the Technical Assistance Panels.
- d. Federal enforcement of hazardous waste regulations where States fail to act.

- e. Research, development, and demonstration of improved land disposal and hazardous waste management practices.
2. In order to establish resource conservation and recovery as the preferred solid waste management options, certain programs are also high priority in the next 5 years. This is because these activities, essential to establishing the viability of resource conservation, have long lead times. It is important to start them now in order to provide alternatives to land disposal in the future.
 - a. The development of economic and market incentives for fostering conservation and recovery through the Resource Conservation Committee and through Federal procurement of products containing recycled materials.
 - b. The development of State and regional programs for resource conservation and recovery through the planning and financial assistance programs of Subtitles C and D and the Technical Assistance Panels.
 3. Industrial wastes should receive priority emphasis for all solid waste management activities. This is due to the relatively greater toxicity and quantity of such wastes. Residential and commercial wastes and wastewater sludges should also receive considerable attention due to the significant potential for resource conservation and recovery, and because programs related to these wastes will be able to proceed more rapidly.
 4. Encouragement of State implementation is a high priority activity and incentives should be provided for that purpose. Achievement of the objectives of both Subtitles C and D depend upon the establishment and implementation of State programs (both for the regulation of disposal and for resource recovery and conservation). Financial and technical assistance for the development of State programs should be maximized. A relatively higher level of effort will be allocated to this activity than to local implementation grants, rural community construction grants and technical assistance to local governments.

B. Major Activities

Within the broad framework of priorities presented in this chapter, it is possible to provide some general groupings of projects that will receive major emphasis, less emphasis and no emphasis.

1. Major Emphasis

- a. Subtitle C regulations and Section 1008 guidelines for identifying the characteristics of hazardous waste, and listing hazardous wastes; and for controlling the generation, transportation, storage, treatment and disposal of hazardous wastes.
- b. Subtitle D Criteria and Section 1008 guidelines for determining acceptable and unacceptable disposal; and for conducting the open dump inventory.
- c. Sections 3006, 3011, 4002, 4008 and 4009, guidelines and financial assistance to assist States in the development and implementation of hazardous and solid waste programs including the implementation of resource conservation.
- d. Section 2003 technical assistance panels to assist in development of State programs.
- e. Section 8002(i) Resource Conservation Committee of recommendations to Congress for resource conservation and committee.
- f. Subtitle H research, demonstration and evaluation activities for the management and recovery of hazardous wastes and solid wastes.

2. Medium Emphasis

- a. Section 6002 guidelines for Federal procurement of recovered materials.
- b. Section 8002 reports to Congress.

- c. Section 7004 public participation guidelines and Section 8003 public information dissemination.
- d. Section 2003 technical assistance teams for local implementation.

3. No Activity

- a. Section 1008 guidelines for the prevention, recovery and disposal of agricultural and mining wastes.
- b. Section 2004 tire shredder grants
- c. Section 8003 solid waste management library and model accounting systems.

CHAPTER IX
MANAGEMENT RESPONSIBILITIES

A. EPA - Headquarters

The role of EPA's headquarters offices should be one of developing program and policy guidance so as to assure consistency in the implementation of the Act and of this Strategy from Region to Region, State to State, and city to city. This will require the setting of certain bounds within which decision makers in the field may take account of unique or unusual circumstances, problems, or approaches to solid and hazardous waste management.

The headquarters offices must necessarily exercise oversight of the Regions, but this need not compromise the validity of describing the implementation of RCRA and of this Strategy as "decentralized."

Specific responsibilities for EPA's headquarters office include: the development of policy, regulations and implementation and enforcement guidance; the development and dissemination of general and technical information; the conduct of analyses and investigation and the research, development and demonstration of technologies for assuring safe disposal and encouraging resource conservation and recovery.

B. EPA - Regional Offices

1. Subtitle C

The Regional Offices will be the focal points for implementing RCRA. The Regional Administrator should not in any sense be precluded from requesting and receiving Headquarters' assistance in any facet of the program; nearly all decision authorities, however, should be delegated to the Regions.

The Regional Offices should have lead responsibility for assisting States in developing hazardous waste regulatory programs sufficient to receive authorization under Section 3006(b) or 3006(c). While Headquarters can, and will, assist the Regions in this, the Regional Offices are better able to understand and evaluate the problems and views of their States, having worked closely with them on a variety of problems over a considerable period of time.

The Regional Offices should also have authority to review and decide whether to approve applications for authorization under Section 3006. The process of developing State programs will usually be closely tied to the grant process, making more compelling the need for the Regional Offices to supervise both processes. The Region will need to work closely with States to ensure that the State program is developing properly, and that such application as the State may make for authorization is adequate.

Where States do not seek or do not receive authorization for their own hazardous waste regulatory programs, the EPA Regional Office will be responsible for administering and enforcing the regulatory programs under Subtitle C. The Regional Offices will issue and enforce permits, manage the reporting systems, conduct the inspections, and discharge all the implementation responsibilities assigned to the Administrator under Subtitle C.

Where States do receive authorization under Sections 3006(b) or 3006(c) the Regional Office will be responsible for exercising oversight of the State program, ensuring that the State is adequately administering and enforcing the requirements of Subtitle C.

2. Subtitle D

The Regional Offices should have the lead responsibility in working with States to designate solid waste management planning areas, and planning and implementation agencies, in assisting both States and designated areas to develop their respective plans, and in evaluating such plans as may be submitted. This process will ordinarily be closely tied to the grant process, making more compelling the need for the Regional Offices to supervise both processes.

The Regional Offices are also expected to provide guidance to States on implementing the Subtitle D Land Disposal Criteria and on the conduct of the open dump inventory. They will, in effect, be the key actors in the EPA implementation

of Subtitle D, providing, wherever necessary, assistance to States and localities in the implementation process. The Regional Office role is viewed as one of encouragement, guidance and advice for Subtitle D implementation, since there is no Federal enforcement of this program.

3. General

Regional Offices should retain the lead responsibility they have for overseeing solid waste planning and implementation grants to State and local government. This includes ensuring that the programs for which EPA is giving grant support will meet the intent of RCRA and this Strategy.

The Regional Offices should also be the focal points for technical and program assistance. This includes assisting States and local jurisdictions in developing approvable plans under Subtitle D; in developing acceptable regulatory programs under Subtitle C; and, assisting States and localities with project specific problems of resource conservation systems, or solid and hazardous waste disposal.

The Regions should take every opportunity to encourage the development and implementation of plans and of programs which increase resource conservation and recovery. As the level of EPA closest to grantees, the Regions are uniquely able to ensure that the mandatory or priority work which is performed by States and localities includes attention to the important but lower priority goals of RCRA and this Strategy.

C. EPA - Enforcement

In order to adequately enforce the regulations promulgated under Subtitle C, RCRA provides the following authority to the Administrator of EPA.

Section 3007, Inspections, grants the Administrator the authority to inspect facilities which handle hazardous wastes, and to have access to all records kept pursuant to the other sections of Subtitle C.

The authority to inspect is a major element of the compliance monitoring and permitting programs. Hazardous waste management facilities will be inspected before a permit is granted, and all hazardous waste handlers (including the facilities) will be inspected on a continuing basis for compliance monitoring. Inspections will also serve as a means of gathering additional data on the technology of hazardous waste management. This information will be used to update the regulations as necessary, and to apply the most current standards to the control of hazardous wastes for the best protection of public health and the environment.

Section 3008, Federal Enforcement, provides the enforcement mechanisms and remedies the Agency may apply in the event a violation of Subtitle C regulations is discovered. The three major remedies available are the Notice of Violation (NOV), the Compliance Order, and the civil or criminal penalties of up to \$25,000 per day per violation and/or a

maximum of 1 year in prison. These enforcement actions occur in succession (NOV first, then compliance order, etc.). However, if the violator does not respond to the NOV after 30 days, the Administrator may seek injunctive relief in the appropriate U.S. district court.

Furthermore, RCRA authorizes the Administrator to restrain imminent and substantial endangerments to health or the environment. Section 7003, Imminent Hazards, provides the Administrator injunctive authority against persons who handle both solid and hazardous waste in a manner which endangers public health and the environment.

Based on these requirements, enforcement priorities and responsibilities will include:

1. Response to hazardous waste emergencies (including imminent hazard situations) and reports of flagrant violations of RCRA and RCRA regulations
2. Early emphasis on the identification of all participants in the hazardous waste regulatory program;
3. Issuance of permits to hazardous waste management facilities on a priority basis;
4. Monitoring of compliance with RCRA regulations and standards by generators, transporters, storers, treaters and disposers of hazardous wastes on a priority basis;
5. Enforcement against violators of RCRA regulations and standards.

D. States

1. Subtitle C

The legislative history clearly suggests that States should implement the regulatory program authorized by Subtitle C. EPA will therefore make every effort to structure a program which is manageable by States. The problem facing EPA in encouraging State assumption of the hazardous waste program may be described as a continuum: at one end, the program is comprehensive, strict, and offers a high degree of protection to the public health and environment. Such a program will also be difficult and expensive to administer, resulting in many States being willing but unable to seek authorization. At the other end of the continuum lies a program which includes the least possible administrative burden and expense to the States, but which offers a somewhat lower level of protection. Both of these goals (protection of health and environment; State implementation) are important to the Act. Given that neither an EPA managed nor a State-managed program can be effective immediately, the long-term goals of the Act can more effectively be met by encouraging as many States as possible to develop acceptable regulatory programs under Section 3006.

The States shall have primary responsibility for administering and enforcing hazardous waste regulatory programs, subject to the approval of the appropriate EPA Regional Office.

2. Subtitle D

The State is the focal point for the implementation of Subtitle D. States will be encouraged to participate to the maximum extent possible in the implementation of these programs, and the requirements prepared at the Federal level will be as flexible as is feasible as a means of encouraging State participation.

Specific State responsibilities center on implementation of the Land Disposal Criteria with the prohibition of open dumps. States will also be encouraged to conduct the open dump inventory, and to encourage resource conservation and recovery wherever possible through the State planning program.

The State should have responsibility for developing the plan called for under Subtitle D for the management of solid and hazardous wastes within the State. This includes planning for non-designated areas, as well as the overall State plan. The State should also review and approve any regional plans being submitted to EPA.

The State should be responsible for ensuring that the long-term resource conservation and recovery goals of the Act are built into the more immediate planning tasks mandated by Subtitle D.

3. General

States should offer as much technical and program assistance to sub-State planning jurisdictions as is possible. This may include financial assistance, and may be project-specific.

States should also develop a data base for use in future planning and enforcement activities. Sources of this data include: the open dump survey; hazardous waste surveys; and, the information resulting from implementation of hazardous waste manifest tracking systems.

States will be encouraged to foster resource conservation and recovery programs at both the State and local levels. In some cases, this may be facilitated through technical assistance. Pass through money for Subtitle D may also be used in some States to encourage and direct local implementation of resource conservation approaches.

C. Local and Sub-State Regional

1. Subtitle C

Local governments will bear the brunt of any opposition to the siting of hazardous waste treatment or disposal facilities. Consequently, local jurisdictions should place heavy emphasis on citizen education and on public participation in order to ensure a well-informed public. The problem of facility siting and the preferred response to that problem (citizen awareness) are the same for hazardous waste as for other solid wastes, but are compounded.

2. Subtitle D

Local jurisdictions will be the principal level of planning, where they constitute (in whole or part) a designated area. Their planning should include an effort to promote resource conservation and recovery within the Subtitle D

plans they develop. The plans must also include all solid and hazardous wastes, rather than some part or parts of the whole waste stream.

As with Subtitle C, local governments will also bear the brunt of any opposition to the siting of solid waste disposal facilities. Conducting a well developed program of citizen education and awareness will therefore be a key role of local governments in the implementation of RCRA.

3. General

Local jurisdictions are, and should be, the focal point for resource recovery systems. They should continue to take the lead in developing and implementing innovative approaches to resource conservation and recovery. However, these local initiatives should be consistent with the overall State plan.

Chapter X

INTERFACE WITH OTHER EPA PROGRAMS

AND OTHER AGENCIES

There are a number of legislative mandates being implemented by EPA and other Agencies that interface directly with the programs to be developed under RCRA. This fact is recognized within the Act itself, where the Administrator is urged to integrate all provisions of RCRA with the appropriate provisions of other EPA legislation (Section 1006). Additionally, Subtitles E and H of RCRA specify certain responsibilities for other Agencies (Department of Commerce and Energy Research and Development Administration, now part of the Department of Energy) in the implementation of RCRA. The following narrative describes the specific areas of interface, and suggests areas where other Acts and other Agency programs could be used to strengthen RCRA.

A. Federal Water Pollution Control Act (Public Law 92-500)

1. Section 208 of the Federal Water Pollution Control Act Amendments of 1972 provides for the identification of complex water quality problem areas, and the designation of areawide agencies in those areas to do water quality management (WQM) planning. The State is responsible for WQM planning in all areas of the State which are not designated and for coordination of all WQM activities within the State. As

part of the WQM effort, State and areawide WQM agencies are to identify a process to control the disposition of all residual (solid) waste in their areas which affect water quality (Section 208(b)(2)(J)). After plan completion, the Governor must designate management agencies to carry out the solid waste elements of the WQM plan.

Subtitle D of RCRA is complementary to the approaches to residual waste management under Section 208. Subtitle D requires States to develop plans for areawide management of solid wastes and for resource recovery where such planning is appropriate. Hence, it is essential that close coordination exist to assure that duplication of effort does not occur.

In identifying agencies for solid waste management planning and implementation, the State should review the solid waste activities being conducted by designated WQM planning and management agencies. Where those activities meet the intent of the Act (RCRA), the State should consider identifying the WQM agencies as being responsible for carrying out the solid waste activities under Section 4006(b) of RCRA.

Where the solid waste management and WQM agencies are separate entities, strong coordination provisions should be established. Procedures should be developed for:

- a. Use of a common data base (e.g. demographic and population projections, public participation programs and program development strategies).

- b. Use of compatible report formats, maps, scales, legends, etc.
- c. Use of common geographic boundaries, wherever feasible.
- d. Use of a consistent sludge management policy (e.g., source reduction vs. consolidation and treatment and type of treatment).
- e. Mutual identification of State legislative changes needed for implementation; and
- f. Coordination of implementation strategies.

2. The National Pollution Discharge Elimination System (NPDES) established under Section 402 of the FWPCA controls pollutant discharges from point sources to waters of the United States. Permits under Section 402 can be used for waste disposal if the permits can be shown to be necessary to the attainment of the water quality standards that are included as conditions of the permits. The possibility of combining Section 402 permits with hazardous waste facility permits is being explored. Additionally, the next revisions of municipal NPDES permits will contain requirements that industrial users subject to pretreatment be notified of RCRA regulations, both those promulgated under Subtitles C and D of the Act.

3. The FWPCA authorizes EPA to make grants for the construction of municipal wastewater treatment plants,

including sludge processing, management and disposal facilities. In approving grants for these facilities, the Regional Administrators will be able to utilize the RCRA Subtitle D criteria and Subtitle A guidelines for sludge disposal, thereby awarding grants only to those facilities that will be in compliance with RCRA.

Another area of interface between the FWPCA and RCRA relates to the funding of facilities that co-dispose of sewage sludge and other wastes. At the present time, Section 201 of the FWPCA does not permit the financing of those portions of a facility that handle other wastes. To encourage co-disposal facilities, it may be desirable to finance the entire project. This is a disposal mode that is rapidly becoming of interest to many communities, and will require attention by implementers of both Acts.

B. Safe Drinking Water Act (Public Law 93-523)

1. Surface Impoundments

Section 1442(a)(8)(C) of the Safe Drinking Water Act (SDWA) requires a study of the nature and extent of the impact on underground sources of drinking water of ponds, pools, lagoons, pits and other surface disposal of contaminants. For simplicity, these methods of surface disposal have been grouped under the general heading of surface impoundments. In partial fulfillment of this requirement, the Agency has contracted for such a study.

The Agency is currently pursuing three courses of action which address surface impoundments. Two of these are under RCRA and one under SDWA. Under Subtitle C of RCRA, the Agency will regulate facilities storing, treating or disposing of hazardous wastes including surface impoundments, landfills, etc. Under Subtitle D. of RCRA, the Agency is required to promulgate criteria for determining which waste disposal facilities should be classified as sanitary landfills and which should be classified as open dumps. The definition of "solid waste" and "disposal" in RCRA clearly indicate that surface impoundments will be covered by these criteria. Within one year of publication of the criteria, the Agency must publish an "inventory" of open dumps. This requirement is virtually impossible to meet due to the number of disposal sites involved and the magnitude of the technical, economic, legal and administrative tasks involved. The inventory, therefore, will be phased in over the next few years. The first year of the RCRA inventory will focus on municipal solid waste landfills and sludge sites (not covered by the SDWA assessment). The SDWA assessment will focus on surface impoundments (industrial, oil and gas, mining, municipal, and agricultural). This assessment will be conducted by the States and it will involve counting the surface impoundments within each State. A statistical sample of these surface impoundments will be assessed to determine their potential

for contamination of groundwater. In the second year, based upon the SDWA assessment, the RCRA inventory will cover industrial landfills. In later years the inventory will cover agricultural and mining sites with priority on those impoundments identified as potential problems in the assessment program.

The programs under RCRA and SDWA will be integrated and coordinated so that they are mutually supportive and minimize duplication of effort. The surface impoundment assessment program planned under SDWA will be used to support the inventory of such facilities in that the SDWA assessment program will serve as a screening device to establish priorities for the RCRA inventory of surface impoundments. However, if a State had sufficient information to determine which surface impoundments were potential problems they could proceed directly with the RCRA inventory earlier than indicated previously. In fact, the States are encouraged to use the inventory and other RCRA provisions to attack their worst problems in accordance with State priorities; the assessments being an appropriate aid in establishing such priorities. This would not lessen the need for the SDWA assessment in order to obtain a national survey of practices and to help establish future policies. While this initial action will begin to bring such sites under State control under RCRA, EPA will continue to explore and reevaluate its authorities

under RCRA, SDWA, the Federal Water Pollution Control Act and the Toxic Substances Act in order to determine the best regulatory approach under any or a combination of these various authorities. If these authorities are not sufficient to assure the adequate control of surface impoundments, EPA will seek additional legislative authority which will assure

2. Underground Injection Control

The SDWA requires the promulgation of regulations containing minimum requirements for effective State programs to prevent the endangerment of underground sources of drinking water from injection of fluids (40 CFR 146). Those States designated under the SDWA as needing an underground injection control program must adopt and implement a program which meets the requirements of these regulations. In the event that a State fails to adopt and implement such a program, the Agency is required to prescribe and implement a program in that State.

The SDWA through the UIC program provides for the regulation of injection of all types of fluids through wells. This includes the injection of hazardous wastes identified through 3001 of RCRA. The hazardous waste regulations may provide more extensive control over the disposal of hazardous wastes through wells than does the UIC program regulations. For this reason regulations into the permitting process under the UIC program are being explored. Such an

integration would minimize or eliminate duplicative regulatory coverage of this practice.

The UIC program under the SDWA is applicable only to those States designated as needing such a program. The Land Disposal Criteria under RCRA are applicable to all States. The definitions of "solid wastes" and "disposal" contained in RCRA are broad enough in scope to cover disposal of "liquid" into wells where such practices are not regulated under the UIC program. There are large numbers of (shallow) wells used to dispose of wastes into underground sources of drinking water. These wells pose a significant threat to these sources. Under the UIC program these practices would be regulated in the designated States under Subparts F and G of the regulations. The initial proposed listing of States includes about 18 States whereas subsequent listings will be used to expand the number, eventually including all 50 States. A second listing could occur within two to three years. Because of the potential threat these wells pose to human health and the environment and because such wells will not be regulated under the UIC program until a State is designated (two to three years in some cases) the possibilities of incorporating the requirements of Subparts F and G of the UIC regulations into the Land Disposal Criteria are being investigated. This would bring these wells under control at the earliest possible date by imposing the same requirements

which will be applied once a State is designated. Such an approach will place these wells under compliance schedules which will not be interrupted once their regulation is transferred to the UIC program. Comments are requested on this approach toward regulating shallow disposal wells.

The UIC regulations require that groundwater not be endangered from well injection of fluids. "Endangerment" is defined as contaminating groundwater so that additional treatment is necessary for its present or future use or to such an extent as to otherwise adversely affect the health of persons. This regulatory approach is not limited to well injection and is applicable to other practices which could threaten groundwater. If practicable, both the Land Disposal Criteria and Hazardous Waste Disposal Regulations should prohibit "endangerment" of groundwater in the same manner as the UIC regulations in order to provide a uniform and consistent agency policy on groundwater protection.

C. Toxic Substances Control Act (Public Law 94-469)

The Toxic Substances Control Act (TSCA) includes reference to the "disposal" of toxic substances in several places. Section 6 appears to be especially relevant to RCRA, in that it authorizes the "regulation" of certain substances, specifically allowing the Administrator to establish rules "...prohibiting or otherwise regulating any manner or method of disposal of such substance or mixture, or of any article containing such substance or mixture, by its manufacturer or processor or by any other person who uses, or disposes of, it for commercial purposes (Section 6(a)(6)(A))."

The above section appears to be complementary to Subtitle C, RCRA in at least two ways. The first is that substances designated under Section 6(a)(6)(A) of TSCA could also be listed under Section 3001, RCRA, thereby bringing such substances into the regulatory program established under the latter act.

Alternatively, certain wastes, as designated and listed under Section 3001, RCRA, could also be designated under Section 6(a)(6)(A), TSCA. This dual authority would allow the RCRA regulatory program under Subtitle C to be written specifying performance standards (as contrasted with process standards) for the great majority of hazardous wastes, while still leaving EPA authority to mandate process standards for a few specific wastes.

TSCA also complements RCRA through the information gathering authority of the former. The data accumulated under TSCA will be useful in identifying likely sources and locations of waste streams containing potentially hazardous constituents.

D. Federal Insecticide, Fungicide, and Rodenticide Act
(Public Law 92-516)

The Federal Insecticide, Fungicide, and Rodenticide Act as amended (FIFRA) provides, in Sec. 19(a), that "the Administrator shall...establish procedures and regulations for the disposal or storage of packages and containers of pesticides and for disposal or storage of excess amounts of such pesticides..." Pursuant to this authority, the Office of Solid Waste acting as a "contractor" for the Office of Pesticide Programs, promulgated recommended procedures for storage and disposal of pesticides and containers (36 FR 15236; May 1, 1974), and proposed regulations to prohibit certain methods of storage and disposal of pesticides and containers (36 FR 36867: October 15, 1974).

The Resource Conservation and Recovery Act (RCRA), prohibits open dumping of any waste, provides for the regulatory control of hazardous waste, and mandates the development of regulations to establish standards for generators and transporters, and for facilities which treat, store, or dispose of hazardous wastes. RCRA also directs that its provisions

be integrated with appropriate provisions of several other acts, including those of the FIFRA. Several aspects of this integration are discussed in greater detail below.

The basic interface is, of course, Section 19(a) of FIFRA with Subtitle C of RCRA. Waste pesticides (excess pesticides, pesticide containers, residues from pesticide containers, and unused quantities of prepared spray solutions) are, by and large, a sub-set of hazardous wastes. Many waste pesticides are likely to meet the criteria for hazardous wastes being developed under RCRA 3001, and thus would be covered by the Subtitle C regulations. But some waste pesticides might not be found hazardous by the 3001 criteria; in this case, the provisions of RCRA Subtitle D relating to criteria to distinguish sanitary landfills from open dumps will apply. Thus, when RCRA is fully implemented (mandated for 1983), it will be possible either to directly control the disposal of waste pesticides by Subtitle C regulations, or indirectly control them through the open dumping prohibition of Subtitle D.

However, RCRA provides for the closure of all open dumps by 5 years after publication of the inventory called for in Section 4005, and there is a potential for substantial environmental damage before that date. Secondly, FIFRA is the basic document authorizing the regulation of pesticides; the principal means is through control of the information and statements on the label.

Because the FIFRA requirements are compatible with the RCRA regulations, criteria, and guidelines, a single label statement coordinating the FIFRA and RCRA requirements could be developed.

Other future cooperative programs will include (1) promulgating disposal prohibitions for FIFRA 19 that satisfy legislative mandate and facilitate development of labels, (2) developing evaluation criteria for disposal data, and (3) forming joint OSW/OPP disposal review group for reviewing label statements, and monitoring the RCRA/FIFRA interface.

E. Clean Air Act (Public Law 95-95)

The RCRA definition of "disposal" includes allowing solid or hazardous waste "...to be emitted into the air...", thereby presenting an area of possible overlap with the Clean Air Act. The wording in RCRA would appear to require EPA to include air emissions parameters in the permits issued to hazardous waste storage, treatment and disposal facilities under Section 3005, and to require that EPA include air pollution standards in establishing the requirements for hazardous waste facilities pursuant to Section 3004. Facilities which incinerate hazardous wastes (included in the RCRA definition of "treatment") could also be subject to both the permit requirements of RCRA and to the Clean Air Act, depending upon their status as "new sources" under the latter.

The Clean Air Act includes specific reference to "hazardous air pollutants" in Section 110 (Section 112 in the 1970 version, Public Law 91-604). Section 110 directs the Administrator to list and establish emission standards for each hazardous air pollutant so identified. EPA has so far identified and established standards for asbestos, beryllium, mercury, and vinyl chloride. The 1977 amendments to the Clean Air Act direct the Administrator to study the need to establishing emission standards also for "...radio-active pollutants (including source material, special nuclear material, and by-product material) cadmium, arsenic, and polycyclic organic matter... (Section 122)." This leaves unclear the way in which emissions of other pollutants will be controlled by EPA where the source is a solid or hazardous waste treatment or disposal facility. OSW plans to develop these standards under Section 3004 of RCRA.

F. Marine Protection, Research and Sanctuaries Act
(Public Law 92-532)

Section 102 of Public Law 92-532 requires EPA to establish criteria for ocean dumping of materials and to regulate the ocean transportation for dumping and the dumping in ocean waters of such materials, except dredged materials, through a permit system. Administration of this permit

system cannot be delegated to the States. Municipal wastewater treatment sludges, as well as other wastes, mostly industrial in origin, which are dumped into the ocean from barges are regulated under these permits.

While the RCRA definition of disposal includes "discharge into any water," is it not anticipated that ocean discharge or disposal will be covered by RCRA. These practices are, and will continue to be, covered by permits issued under Public Law 92-532.

However, hazardous wastes intended for ocean disposal will also be subject to the generator reporting and land transport manifest requirements of Subtitle C of RCRA.

G. Department of Commerce Role in RCRA

Subtitle E of RCRA describes certain authorities and responsibilities of the Department of Commerce. Broadly these are: (1) Section 5002 - Development of Specifications for Secondary Materials; (2) Section 5003 - Development of Markets for Recovered Materials; and (3) Section 5004 -Technology Promotion.

The authorities of Section 5003 and Section 5004 are nearly identical to responsibilities assigned to EPA in other sections of the act, specifically Section 2003 - Resource Recovery and Conservation Panels, and Subtitle H - Research, Development, Demonstrations, and Information. Consequently, a close coordination of activities is required.

EPA and the Department of Commerce are currently preparing an interagency agreement which will define respective responsibilities. One major Department of Commerce responsibility which will complement EPA's activities is the development of guidelines for specifications for materials recovered from solid waste and intended for sale for remanufacturing. The Department of Commerce will also develop information on markets for recovered materials, coordinating this with work being done by EPA so that there will be no overlap. Furthermore, the Department of Commerce will work with industry to promote technologies which have been proven in commercial operations.

With the coordination and definition of responsibilities which will be fostered by the interagency agreement, the activities of the Department of Commerce should provide a valuable complement to EPA's activities under RCRA, while minimizing overlap.

H. DOE Role in RCRA

EPA is given broad responsibilities for Research, Development, and Demonstration activities in Subtitle H of RCRA. ERDA is provided with similar authorities under the Federal Non-Nuclear Energy Research and Development Act of 1974. RCRA specifically mandates in Section 8001 that "any activities undertaken under Section 8002 and 8003 as related to energy ...shall be accomplished through coordination and consultation with the Energy Research and Development Administration.

Recognizing both the mutual interest of the agencies and the potential for overlap of programs, EPA and ERDA have signed an interagency agreement regarding division of responsibilities. The agreement says that "for those energy-related projects of mutual interest, planning will be conducted jointly, following which project responsibility will be assigned to one agency." The agreement further states that "new project responsibility will generally rest with EPA." However, the agreement also states that ERDA will have the responsibility for "input and evaluation of the energy-research-related portion of the project."

The mechanics of implementing the agreement have still not been totally resolved. However, the agreement forms a firm base for joint planning and mutually supportive project management. Both a working group and a steering committee have been established, comprised of personnel from each agency. The staff level working group is responsible for developing program plans. The steering committee is responsible for approving the plans and for resolving project management responsibilities.

It is clear that both EPA and ERDA have significant missions in recovery of energy from solid waste. The Interagency Agreement provides the opportunity for developing complementary programs with a minimum of duplication and overlap.

I. Other Agencies and Programs

1. Department of Transportation

The Department of Transportation has enforcement responsibility over the transportation of hazardous materials under the Hazardous Materials Transportation Act. To assure that all requirements for hazardous wastes are consistent with one another, extensive coordination between the two Agencies, EPA and the Department of Transportation is required.

2. National Environmental Policy Act (NEPA)

EPA will provide for the functional equivalent of the NEPA impact statement requirements in all regulatory actions taken under Subtitles C and D of RCRA.

Appendix A

RCRA STRATEGY DEVELOPMENT WORK GROUP

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