



Solid Waste

Report to Congress

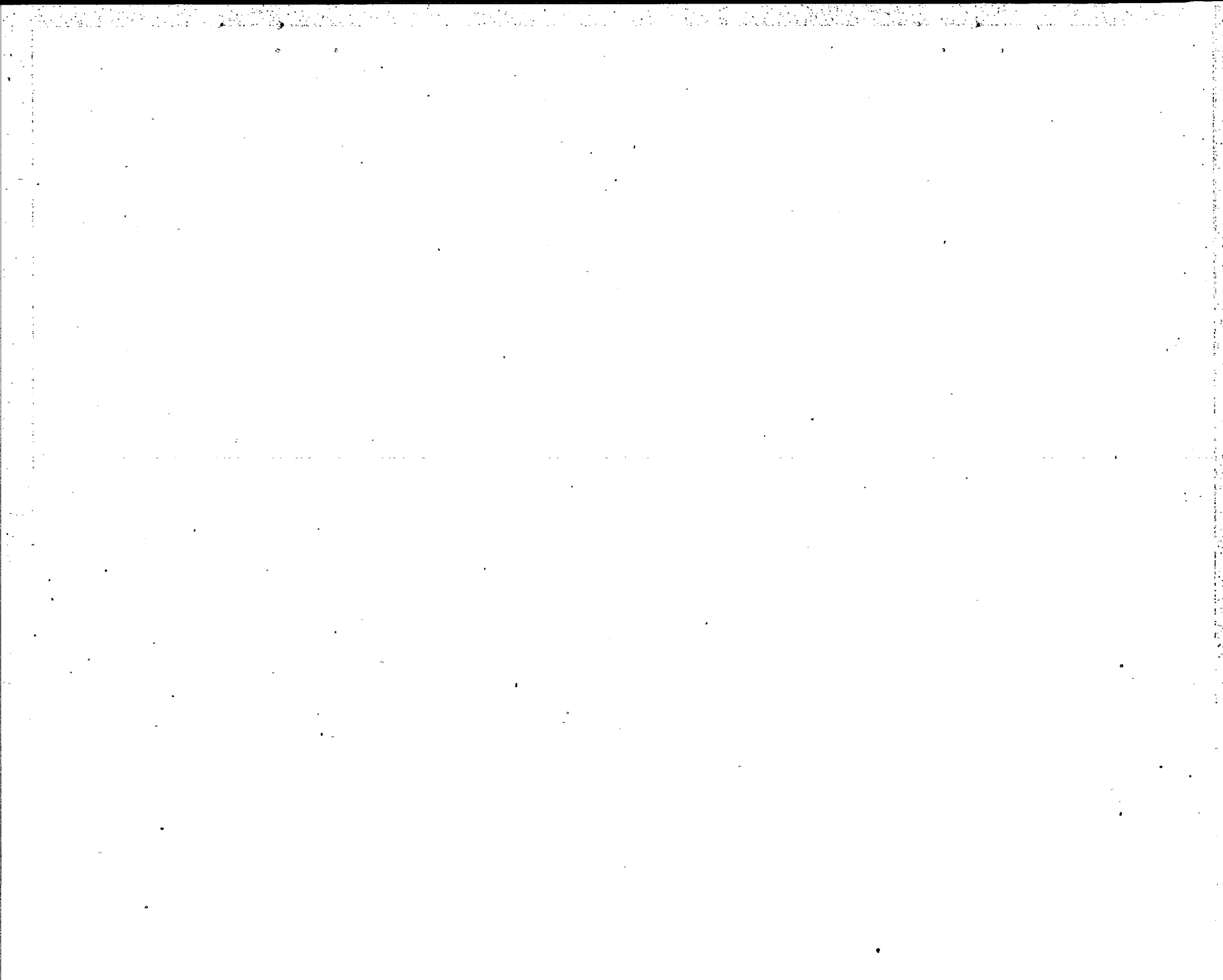
EPA Activities and
Accomplishments
Under the Resource
Conservation and
Recovery Act:
Fourth Quarter Fiscal year 1986
through Fiscal year 1987

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1.0 INTRODUCTION

Section 2006 of the Resource Conservation and Recovery Act (RCRA) requires that the Administrator of the Environmental Protection Agency (EPA) transmit to Congress an annual report describing the activities to implement RCRA. This report describes the activities of the Agency in carrying out the mandates of RCRA and the Hazardous and Solid Waste Amendments (HSWA) of 1984, starting from the last quarter of fiscal year 1986 and going through the end of fiscal year 1987.

The bulk of the activity over the past several years has been focused on development and implementation of the regulatory framework for the safe management of hazardous waste. However, this report also covers several activities we have undertaken to satisfy many of the 1984 HSWA provisions for solid waste.

In the past year, we, as a nation, have experienced a renewed awareness of the problems of solid waste management and will need to balance our priorities to accommodate both hazardous and solid waste. As a country, we now need to set a course that ensures that we arrive at our ultimate goal of a comprehensive waste management system, be it for hazardous or solid waste, that assures protection of human health and the environment.

Chapter Two of this report describes regulatory development activities mandated by RCRA and HSWA, including rulemaking under Subtitle C and a variety of Reports to Congress for activities under Subtitle D.

Chapter Three describes activities undertaken to enhance the regulatory framework under Subtitle C that were not specifically mandated by either RCRA or HSWA. These activities were undertaken by the Agency to ensure that it fulfilled its general mandate of protection of human health and the environment in the most effective manner possible.

Chapter Four describes activities we have undertaken to implement the regulatory framework under Subtitle C in both the States and Regions. This chapter also reports on the status of State authorizations as of the end of this fiscal year.

Chapter Five covers activities related to the permitting of hazardous waste management facilities. The status of permits for different types of facilities is included along with a description of such implementation activities as training and guidance.

Finally, Chapter Six reports on enforcement activities under Subtitle C of RCRA. In this chapter, a summary of enforcement statistics is presented, as well as a variety of implementation activities including training, guidance, and major enforcement policies.

2.0 REGULATORY DEVELOPMENT: MEETING THE RCRA/HSWA PROVISIONS

2.1 Introduction

In this chapter, we discuss major accomplishments in satisfying provisions directly mandated by RCRA as amended by HSWA in 1984. The last 15 months (including the end of fiscal year 1987) have been highly productive, as demonstrated by major progress in the development and implementation of several major new regulations under Subtitle C.

One example of this progress in regulatory development was the November 7, 1986, promulgation of the final framework rule to implement the Land Disposal Restrictions program mandated by Section 3004 of RCRA. This rulemaking marks a turning point in the management of hazardous waste in the United States by prohibiting the disposal of hazardous waste that does not meet performance standards based on best demonstrated available treatment (BDAT) technology. Treatment of hazardous wastes prior to disposal to reduce their toxicity and mobility will greatly lessen the risks caused by land disposal of hazardous waste.

During this reporting period, we have also made substantial progress in the development of several Reports to Congress that cover topics under Subtitle D, as well as in the development of regulations for revising the technical criteria for municipal solid waste landfills.

The chapter begins by describing activities under Subtitle C, then follows with descriptions of activities and progress under Subtitle D, and finally concludes with a review of our activities and accomplishments on waste minimization.

2.2 RCRA Hazardous Waste Universe

2.2.1 Listing Activities

HSWA directed EPA to expand the list of hazardous wastes to include additional dioxin-containing wastes and additional solvents, and to determine whether to list as hazardous wastes from 15 specific industries.

In response, EPA has listed seven wastes streams as hazardous because of the presence of dioxins. EPA has also listed one additional halogenated solvent within the F002 category (spent halogenated solvents) and three additional solvents within the F005 category (spent nonhalogenated solvents). In regard to the 15 specific industries, EPA has promulgated additional hazardous waste listings for 4 industries (toluene diisocyanate, carbamates, organobromines,¹ and chlorinated aliphatics) and has proposed listings for 4 others (chlorinated aliphatics, dimethyl hydrazine, bromacil, and linuron).

Draft rules are under development for streams generated by the preservation or surface protection of wood (which can contain dioxins), the production of coke and coke by-products, and petroleum refining. In addition, EPA is still evaluating whether to list as hazardous, wastes from the other HSWA-designated industries (i.e., chlorinated aromatics, dyes and pigments, inorganic chemicals, coal slurry pipeline effluent, and paint production).

Toxicity Characteristic: Under RCRA, wastes are considered hazardous if they are specifically listed as hazardous (a complex and technically demanding regulatory process) or if they exhibit one or more of the following characteristics: corrosiveness, ignitability, reactivity, and toxicity. The toxicity of wastes is of key concern to RCRA because of the potential for toxic constituents to leach from wastes treated or disposed of on land and to contaminate sources of drinking water.

Congress, through provisions in HSWA, directed the Agency to examine deficiencies in its extraction procedure (EP) toxicity test as a predictor of the leaching

¹ Within the organobromine industry, the listing for methyl bromide has been proposed but not yet promulgated.

potential of wastes and to make whatever changes were necessary to make the test more consistent and comprehensive. The EP toxicity test, for instance, effectively addressed the leaching of metals, but did not adequately address the leaching of organic compounds. We have therefore developed a new test procedure, the Toxicity Characteristic Leaching Procedure (TCLP), to better predict the leachability of organic toxicants (i.e., volatile compounds) from wastes. In addition, HSWA also directed the Agency to develop additional hazardous waste characteristics. As a result, the Agency proposed in June 1986 to modify its existing toxicity characteristic. This proposal would make a number of major changes to the existing characteristic. Specifically, it would (1) require the use of new leach procedures—TCLP; (2) add 38 organic compounds to the characteristic; and (3) use compound-specific dilution/attenuation factors in developing the regulatory levels. These regulatory levels take into consideration potential human health effects and potency, as well as the persistence of the constituent in the environment and its potential to migrate from a disposal site.

Used Oil: Used oil is generated in large quantities and tends to contain a variety of mobile and persistent contaminants, including toxic organic compounds and a number of heavy metals. Substantial amounts of used oil are currently being recycled—a management approach that the Agency strongly encourages. In November of 1985, the Agency issued a proposed rule that would list used oil as a hazardous waste. In the same proposal, the Agency also set out special management standards for recycled used oil. A large number of comments were received on these proposals, many of which opposed any listing of used oil as a hazardous waste because such a listing would discourage recycling and lead to illegal disposal of substantial quantities of used oil.

Based on these comments, the Agency put out a notice in November 1986 that explained our decision not to list recycled used oil as a hazardous waste. In the same notice, however, the Agency did not make a final decision on listing used oil as a hazardous waste when the oil was to be disposed of. The Agency, over the last fiscal year, has conducted a number of technical projects in an effort to determine how to best regulate used oil bound for disposal. For example, we reviewed, compiled, and analyzed data on the concentrations of hazardous constituents found in various types of used oils. Some of

these data were received from used oil processors and some from commenters responding to the proposed rule. During this time, the Agency also evaluated industrial practices that involved mixing of used oil with hazardous waste and the impact of oil on publicly owned water treatment plants. We also evaluated State hazardous waste programs in which used oil was regulated as a hazardous waste.

In addition, the Agency has conducted a number of regulatory and policy studies, including a review of all available used oil characterization, treatment, and combustion data; an analysis of "Do-It-Yourself" (DIY) programs throughout the continental United States; an analysis of the hazards associated with environmentally unsafe used oil disposal practices; an analysis of the used oil facility management standards originally proposed in November 1985; a review of space heater combustion; and an internal laboratory analysis of used oil. In a related matter, on January 26, 1987, EPA issued a notice of tentative denial of petitions received from these parties that EPA suspend certain provisions of the waste-as-fuel administrative standards that had been issued in final form in November 1985. Specifically, petitioners requested that EPA grant a time extension for applicability of the used oil lead specification. The Agency is currently reviewing comments received on its tentative decision.

2.2.2 Decision on Delisting Hazardous Wastes

Under part 261 of the hazardous waste regulations, EPA listed nearly 100 industrial waste streams and 360 discarded chemical products as hazardous. These wastes were listed because they typically and frequently exhibit one or more of the characteristics of hazardous wastes, or they are known to contain toxic constituents or to be otherwise hazardous. Any waste stream that qualifies as one of the streams listed in Subpart D of Part 261 of the regulations is regulated as hazardous.

EPA has recognized, however, that a listed waste generated from a particular facility may not actually be hazardous. This could be the case if the waste:

1. Does not exhibit the characteristics, or contain the constituents, for which it was originally listed; and

2. Does not present any factors (including constituents other than those for which the waste was listed) that could cause the waste to be hazardous; or
3. Contains the listed or additional constituents in concentrations below levels of regulatory concern or in an immobile form.

These situations can occur, for example, if a facility uses manufacturing treatment processes or raw materials that are different from those that were assumed for the industry when the regulations were written. The regulations (in 40 CFR § 260.20 and §260.22), therefore, contain a procedure that allows anyone to petition the Agency to exclude or "delist" such waste streams from hazardous waste regulation.

Wastes petitioned for delisting are evaluated to determine whether they may pose a threat to health and safety if mismanaged. The Agency currently uses two models in its delisting petition review to assess the mobility of toxic constituents. The Vertical and Horizontal Spread (VHS) model is used to evaluate the mobility of metals and inorganic constituents in the waste. The Organic Leachate Model (OLM), which was finalized during fiscal year 1987, is used in conjunction with the VHS model to evaluate the mobility of organic constituents in the waste, if they are present. The models take into account waste-specific factors for constituent concentration and waste volume, and predict the dilution and dispersion of the constituents from the waste in a hypothetical drinking water aquifer. The results of the model evaluations are predicted compliance-point concentrations for each contaminant present in the waste, which are then compared to the Agency's regulatory standards. A predicted compliance-point concentration greater than the regulatory standard would indicate that the petitioned waste has the potential to contaminate ground water and provides a basis for denying a delisting petition. If ground-water monitoring data are available demonstrating that an aquifer is contaminated, this may be grounds for denying a delisting petition.

During the last quarter of fiscal year 1986 and throughout early fiscal year 1987, the activities of the delisting program centered around meeting the Congressionally mandated HSWA deadline of November 8, 1986, to promulgate final decisions for the 150 petitions that were previously granted temporary exclusions. By the November 8 deadline, final actions were taken on 147 of the 150 temporary exclusions. Of the three temporary

exclusions that were not finalized, one had been referred to the Agency by a State and required significant efforts to complete, and two were proposed but not finalized because of petitioner requests for an extension to the comment period for the proposed rule.

For the 147 temporary exclusions for which final actions were taken, 32 were granted exclusions; 43 were denied exclusions; 38 were withdrawn after the petitioners were notified by the Agency that a denial decision was pending; and 34 were removed from delisting consideration because of changes in listing criteria, cessation of waste generation during the time the temporary exclusion was in effect, or closure of facilities and/or waste handling units.

During fiscal year 1987, EPA expanded its spot-check sampling program by visiting a total of 23 facilities to verify information submitted by petitioners. These spot-check sampling trips were intended not only to verify waste-specific data provided by the petitioner, but also to deter intentional efforts to submit inaccurate data.

2.2.3 Report to Congress on Dioxins

The National Dioxin Strategy was developed to provide a coordinated management framework for the myriad of dioxin-related activities occurring across the Agency.

In addition to extensive research and regulatory activities, the strategy included a study of the extent of dioxin contamination in the country as a whole. The study was initiated at Congressional request following environmental contamination and human exposure incidents resulting from improper waste disposal at Times Beach, Missouri; Love Canal, New York; and Jacksonville, Arkansas.

The multiyear, multimillion dollar study investigated hundreds of known and potentially contaminated sites around the country. Sites were grouped into categories—trichlorophenol production and waste disposal sites, pesticide formulation facilities, pesticide use areas (forests, rice fields, rangelands), "background" soil and fish, and combustion sources.

Results confirming contamination have been referred to Federal, State, and local agencies for appropriate action. Follow-on activities are under way, including additional rulemaking under HSWA and TSCA and an investigation of other potential sources of contamination.

2.3 HSWA Small Quantity Generator Provision

2.3.1 Report to Congress

In the past, all facilities generating less than 1,000 kilograms of hazardous waste per month were classified as "small quantity generators" (SQGs) and were exempt from most of the requirements imposed on large quantity generators. Concerned about the potential hazard posed by waste from SQGs, Congress decided, in 1984, to require that small quantity generators, in particular those generating between 100 and 1,000 kilograms of hazardous waste per month, be subject to regulation. Thus, Congress instructed EPA to develop new standards for the SQGs, to prepare a report defining the universe of SQGs, and to evaluate the regulatory impact of new requirements on these generators.

Issued in September 1986, EPA's Report to Congress estimated that 175,000 SQGs generate nearly 760,000 metric tons of hazardous waste annually (probably less than 1 percent of the national total). It found that most SQGs are small, locally owned operations in such industries as vehicle maintenance, metal manufacturing, photography, dry cleaning, printing, and construction. The regulatory burden of RCRA varies by facility type and waste stream, but will probably cause no facility closings.

2.3.2 Small Quantity Generator Rule

The Agency promulgated the SQG rule in March 1986; it became effective in September of that year. Under these requirements, SQGs must make a determination on whether their wastes are hazardous, allow wastes to be handled only by EPA-sanctioned transporters and waste management facilities, comply with Department of Transportation requirements for shipping wastes offsite, use the Uniform Hazardous Waste Manifest System, including reporting of lost shipments (a September 1987 requirement), and maintain copies of manifests for 3 years. In addition, if the waste is to be shipped more

than 200 miles SQGs will be allowed to accumulate wastes onsite for 180 days or 270 days without the need to obtain interim status or a RCRA permit; however, they will be required to comply with special containment and storage procedures. Nevertheless, they are still exempt from biennial reporting and from manifest requirements if recycled wastes are transported away by the reclaimer. In order to provide adequate time for SQGs to adapt to the new requirements, EPA gave these facilities until March 1987 to comply.

2.4 HSWA-Mandated Design and Operating Provisions for Hazardous Waste Management Facilities

2.4.1 Double Liner and Leak Detection Rules

The HSWA amendments called for the enhancement of design standards at land disposal units for the purpose of ensuring ground-water protection. In May 1987, EPA proposed a rule to increase the level of such technological control for ground-water protection by establishing leak detection performance and design criteria that will improve liquid removal, collection, and response to leaks at these units.

The proposed rule requires use of an approved leak detection system for new units, which the statute defines as a system or technology capable of detecting leaks of hazardous constituents at the earliest practicable time. The proposal also requires, as part of this system, double liners, leachate collection and removal systems, a construction quality assurance program, and a response program addressing the detection of liquids in a leak detection system.

Final promulgation of this rule will implement a major portion of the Agency's "Liquid Management Strategy." This strategy consists of two elements: (1) the minimization of leachate generation in the unit and (2) the removal of leachate from the unit. This proposed rule helps to implement the strategy by focusing on the latter. Once the land disposal system is in place, its elements should function in an integrated and interdependent manner to prevent leachate migration out of a land disposal unit.

To supplement the proposed rule on leak detection, EPA also issued, in May 1987, a *Liner/Leak Detection Rule Background Document*. This document included data on

constructing liners and leak detection systems, on using the appropriate best demonstrated available technologies (BDAT) for meeting the proposed regulations, and on quantifying leak detection system performance. In April 1987, EPA issued a Notice of Available Data and Request for Comments regarding the effectiveness of specific types of double liner systems. This notice offered data on the performance of different kinds of liners and announced EPA's release of two minimum technology draft guidance documents on the design, construction, and operation of single and double liners and leachate collection systems.

2.4.2 Surface Impoundment Retrofitting

Under HSWA, surface impoundments that were in existence on November 8, 1984, must be retrofitted to meet double liner design standards by November 8, 1988, unless the owner or operator obtains an exemption or ceases receipt of hazardous waste. Exemptions are available if the facility meets one or more of the following criteria:

1. Has one liner for which there is no evidence of leakage, is in compliance with ground-water monitoring standards, and is more than one-quarter mile away from an underground source of drinking water;
2. Generally, is part of a particular phase of a wastewater biological treatment system that is subject to a Clean Water Act permit, and is in compliance with Clean Water Act effluent limitations for best available technology and with RCRA ground-water monitoring standards;
3. Is located, designed, and operated so that there will be no migration of any hazardous constituent into ground water or surface water at any future time;
4. The owner or operator has entered into a mandatory corrective action agreement or order with the EPA Administrator or a State prior to October 1984: In this case, the conditions of the corrective order would protect human health and the environment to at least the same degree offered by the statutory double liner leachate collection system and ground-water monitoring requirement; and
5. The use of alternative design and operating practices, together with location characteristics, will prevent the migration of any hazardous constituents at least as effectively as double liners and leachate collection systems.

In July 1986, EPA announced the availability of a guidance document entitled *Interim Status Surface Impoundments—Retrofitting Variances*. This document explains the Congressional intent behind HSWA's requirements, discusses EPA's implementation policies, and recommends the types of information that owners and operators should submit for each of the five exemptions above. The Agency received 51 requests for waivers. The status of these waivers, as of the end of fiscal year 1987, is zero granted, four denied, 19 withdrawn, and 28 under review.

2.4.3 Liquids in Landfills

Liquid hazardous wastes are of particular concern when disposed of in landfills because they can dramatically affect the integrity of the landfill liner, migrating into ground water themselves (often carrying additional dissolved hazardous material) and allowing migration of other wastes carried by infiltrated water. The HSWA therefore required EPA to promulgate regulations that minimize the disposal of containerized liquid hazardous wastes or hazardous wastes containing free liquids, and that prohibit disposal of liquids which have been absorbed into materials that either biodegrade or release the liquids under compression.

EPA proposed the necessary regulations in December 1986. This rule would curtail disposal of liquid wastes as defined in HSWA. Exemptions are allowed if the container in question was not originally designed for waste storage (e.g., a battery or capacitor) or is a "lab pack" containing very small quantities of laboratory wastes, or is an ampule. Previously, liquid wastes could be exempt if free-standing liquids were removed by decanting, absorption, or treatment (e.g., solidification); the December proposal would eliminate this exemption. Prior to being placed in a landfill, all free liquids must now be solidified by a nonbiodegradable absorbent so that the mixture does not release liquids under pressure.

In June 1987, EPA issued another proposed rule requesting comments on certain parts of the December 1986 rule. The Agency is interested in alternatives to new criteria for defining biodegradable absorbents, new regulatory language for absorbent "pillows"

(prepackaged absorbents), and new regulatory language that clarifies that absorbents are not the sole allowable form of treatment.

2.4.4 Secondary Containment of Hazardous Waste Storage Tanks

In 1980, EPA published interim status standards for the storage or treatment of hazardous waste in tanks. These standards focused on operating measures designed to prevent releases. In 1981, we published permitting standards for hazardous waste storage or treatment tanks that can be entered for inspection. The emphasized adequacy of design, structural integrity, and inspection procedures. These standards deferred possible action on requiring secondary containment, for example, providing an impervious base underlying the tanks that would completely contain spills and leaks until they could be removed.

In July 1986, EPA published new rules for hazardous waste storage and treatment tank systems that require the use of secondary containment with interstitial monitoring (i.e., equipment to detect leaks of wastes into the space between the primary and secondary containments) for all new systems, and call for the phasing-in of the same requirements for existing systems. The Agency took this action because it concluded that no other leak detection method is generally reliable for hazardous waste tank systems. All existing systems storing or treating dioxin-containing wastes must now install secondary containment and interstitial monitoring within 2 years. Other tank systems must install secondary containment by the time the tank is 15 years old, except when required periodic tests show that the tank system is leaking. If a leak is detected, secondary containment systems must be installed before the tank system is returned to service.

The rule allows two types of variances: (1) if an alternative design or operating practice will detect leaks and prevent migration within a "zone of engineering control" within which the owner or operator can and will quickly clean up a spill or release or (2) if a release does occur, there will be no substantial present or potential hazard to human health or the environment. Statutory provisions do not allow for the second variance for new underground tank systems.

In addition to the requirement for secondary containment, the July 1986 rule established design and installation standards for new tank systems. It also set up requirements for inspection, corrosion protection, monitoring, operating procedures, spill-response, financial assurance, closure, and post-closure.

To support this rule, EPA published, in February 1987, a comprehensive guidance document expanding on variance procedures and methods, *Technical Resource Document for Obtaining Variances from the Secondary Containment Requirement for Hazardous Waste Tank Systems*. In December 1986, the Agency had also published a document, entitled *Technical Resource Document for the Storage and Treatment of Hazardous Waste in Tank Systems*, that provides technical guidance to owners and operators, as well as permit writers for hazardous waste tank systems. This document outlines the proper design and installation of tank systems, including parameters for secondary containment and corrosion prevention. The publication of the final rule and its accompanying guidance document represents a significant step forward in controlling releases from hazardous waste tanks.

2.4.5 Burning of Hazardous Waste in Boilers and Industrial Furnaces

In May 1987, the Agency proposed a rule to control the burning of hazardous waste fuels in all boilers and industrial furnaces. This form of hazardous waste management has been exempted from regulation since May 1980, when the initial hazardous waste rules were promulgated as part of a general exemption for legitimate recycling activities.

Under the proposed rule, organic constituents would be controlled by a 99.99 percent destruction and removal efficiency; additionally, specific limits would be established for metals and hydrogen chloride. Emissions of residual organic compounds would be minimized by limiting flue gas carbon monoxide levels to ensure that the devices are operated at a high combustion efficiency. Metals and hydrogen chloride emissions would be controlled with risk-based standards established by back-calculating from safe ambient levels, using air dispersion factors for reasonable worst-case facilities. The national emission standards could be waived if the owner or operator demonstrated, by site-specific risk assessment, that safe ambient levels would not be exceeded.

The proposed rules would apply to all boilers and industrial furnaces except those burning extremely small quantities of waste. Small quantity burners would be exempt from all substantive requirements under a risk-based exemption. These facilities would have to meet only separate notification and record-keeping requirements.

Many comments from the public have centered on the risk-based approach used for regulating hydrogen chloride and toxic metals and on the appropriate allowable carbon monoxide levels in the flue gas to ensure that human health and the environment are protected. At issue is the appropriateness of the Agency's characterization of model facilities, the assessment of reasonable worst-case scenarios, and the health effects data used in the analysis to set back-calculated protective stack emission levels.

2.4.6 Location Standards

Current RCRA standards put certain limits on the siting of hazardous waste management facilities (40 CFR 264.18 and 265.18). They prohibit locating any portion of a new facility within 200 feet of a seismic fault that has been active within the last 10,000 years. They also require any facility within a 100-year floodplain to be designed and operated so as to prevent washout of any hazardous waste by a 100-year flood if such a washout could endanger human health or the environment. They prohibit placement of hazardous noncontainerized or bulk liquids in salt domes, salt bed formations, underground mines, or caves (except for the Department of Energy's waste isolation project in New Mexico). Finally, land-based treatment, storage, and disposal units must meet technical requirements that depend in part on the facility's location; EPA has issued two supporting guidance manuals focusing on the relationship between facility location and the potential for ground-water contamination.

Section 3004(o)(7) of HSWA authorizes EPA to develop criteria for defining acceptable locations for new and existing treatment, storage, and disposal facilities as necessary to protect human health and the environment. Although the site-location issue for hazardous waste facilities has generally focused on contamination of ground water by land-based facilities, EPA is also investigating other routes of exposure, such as air

emissions and surface water contamination. EPA plans to propose these standards in the spring of 1988.

EPA has issued two guidance manuals discussing the relationship between facility location and the potential for ground-water contaminations; these are entitled:

- *Criteria for Identifying Areas of Vulnerable Hydrogeology Under RCRA* (July 1986), and
- *Permit Writers' Guidance Manual for Hazardous Waste Land Storage and Disposal Facilities — Phase I — Criteria for Location Acceptability and Existing Applicable Regulations* (February 1985).

The first document was issued in response to the Congressional mandate in HSWA, Section 3004(o)(7).

2.5 Land Disposal Restrictions

The Hazardous and Solid Waste Amendments (HSWA) of 1984 marked an important turning point in the management of hazardous waste. In that legislation, Congress enacted the broad national policy that "reliance on land disposal should be minimized or eliminated, and land disposal should be *the least favored method for managing hazardous waste*" [emphasis added, §1002(b)(7)]. Congress implemented this policy with an aggressive program to ban the continued land disposal of particular categories of hazardous waste beyond certain firm dates, requiring instead that wastes be treated so as to reduce or eliminate their hazardous properties before their residues can be placed in secure hazardous waste landfills.

The overall schedule for implementation of the land disposal restrictions program is 5 years. Within this period, HSWA sets out a series of short-term, inflexible deadlines or "hammers." As each hammer falls, further land disposal of a particular group of hazardous wastes is banned unless the waste has been treated to levels or by methods specified by EPA. On a site- and waste-specific basis, further land disposal of untreated wastes may be allowed if it can be demonstrated that there will be no migration of hazardous constituents from the disposal unit for as long as the waste remains hazardous. Congress named three principal groups of hazardous wastes, each with its own deadline.

1. Solvents and Dioxins: Deadline—November 8, 1986. This class covers a large number of solvents used in industry, as well as certain wastes contaminated with dioxin.
2. The "California List" Wastes: Deadline—July 8, 1987. The next hammer covers a group of wastes originally listed by the State of California and adopted intact within HSWA. The list includes 12 classes of wastes, including liquids containing free cyanides, various metals, polychlorinated biphenyls (PCBs), and liquids with a pH less than 2.0; in addition, liquid or solid wastes containing halogenated organic compounds were also included within this class.
3. "Scheduled" Wastes: Deadlines—August 8, 1988; June 8, 1989; and May 8, 1990. Congress placed all other wastes listed or identified under RCRA Section 3001 within a third category and required EPA to set a schedule for banning them from land disposal on a timetable that would restrict at least one-third of them by August 8, 1988; at least two-thirds by June 8, 1989; and the rest by May 8, 1990.

2.5.1 The Framework Rule

On November 7, 1986, EPA promulgated its first final rule under the new program, banning solvents and dioxins from land disposal as required by the first hammer deadline of November 8, 1986. This rule also set the general technical and policy framework for the land disposal restrictions program as a whole and is therefore also referred to as the "framework rule."

Under the provisions of the framework rule, the land disposal restrictions program covers wastes produced by regulated "small quantity generators" (defined as those that produce between 100 and 1,000 kilograms of hazardous waste per month, or greater than 1 kilogram per month of acutely hazardous waste) as well as large quantity generators. It exempts only those that generate less than 100 kilograms of hazardous waste per month, or less than 1 kilogram of acute hazard waste. The restrictions apply to both interim status and permitted facilities, regardless of current permit conditions. EPA interprets the land disposal restrictions program to apply prospectively from the effective dates of the regulations and does not require treatment of wastes previously disposed of.

Treatment Standards: Under HSWA, the Agency must define the treatment standards for all hazardous wastes before 1990. After wastes have been treated to the level

or by the methods specified, the wastes can be disposed of on land. As defined by this rule, the key element of the Agency's land disposal restrictions program is its reliance on technology-based standards for defining treatment requirements for the various categories of wastes.

In setting a technology-based treatment standard, the Agency may specify a concentration level of constituents in waste residuals or mandate the use of a particular technology. Performance standards themselves are based on the actual performance of the "best demonstrated available technologies" (BDAT) for a waste or a waste category. In some cases, performance is measured by subjecting the residual left by the treatment technology to a leach test and then measuring the concentrations of the hazardous substances extracted. For certain other wastes, performance levels are tested by a whole waste analysis. In either case, a treater may certify, through knowledge of the process used to treat, that a waste has been treated to the necessary level. This is consistent with the language of HSWA, which requires the Agency to set "levels or methods of treatment, if any, which substantially reduce the likelihood of migration of hazardous constituents from the waste so that short-term and long-term threats to human health and the environment are minimized" [§3004(m)(1)].

The Agency must determine whether a particular technology is "demonstrated" and "available." To be demonstrated, the technology must exist in full-scale operation. To be available, it must (1) be commercially available, (2) present less risk to human health and the environment than land disposal of untreated wastes, and (3) substantially diminish the toxicity of a waste or substantially reduce the likelihood of migration of hazardous constituents from the site.

The Agency made some modifications to the framework rule when it published its July 8, 1987, rule on the California List wastes. Under these modifications, wastes cannot be diluted as the only method of treatment in order to meet applicable standards, or to circumvent the effective date of a prohibition on land disposal. This later rule also prohibits use of evaporation as the sole method of treatment to remove hazardous constituents from a waste banned from a surface impoundment. Finally, the rule also provides additional

administrative flexibility for facilities modifying or expanding their operations in order to expedite the development of needed treatment capacity.

Petitions, Variances, Exemptions, and Waivers: Under HSWA, the EPA Administrator is allowed to grant a national variance from the statutory date, not to exceed 2 years, if national capacity for treatment or recovery of a particular waste category is inadequate. In addition, the Administrator may grant case-by-case extensions of the effective date when an applicant can show that alternative treatment capacity is not reasonably available and the applicant can demonstrate that he has entered into a binding contractual agreement that will result in the development of sufficient capacity to treat the type of waste being generated. EPA established the variance from the treatment standards to account for wastes that are significantly different from the wastes evaluated in setting treatment standards. For EPA to grant this variance, the petitioner must successfully demonstrate that the waste is significantly different and cannot meet the treatment standards.

Under another provision of the statute, the framework rule allows petitions for continued disposal of untreated wastes if the petitioner can demonstrate that no hazardous constituents will migrate from the disposal unit for as long as the wastes remain hazardous.

2.5.2 The Solvents and Dioxin Rule

The Agency promulgated its final rules establishing specific treatment standards based on BDAT for spent solvents (F001-F005) and dioxin-containing wastes (F020-F023, F026-F028). These restrictions were effective on November 7, 1986. The Administrator also granted 2-year national capacity extensions of the effective date to the following subset of waste because of a lack of treatment capacity:

- All dioxin-containing wastes;
- Wastes generated by small quantity generators;
- Wastes resulting from CERCLA (Superfund) response actions and RCRA corrective actions; and

- Solvent-water mixtures, solvent-containing sludges and solids, and solvent-contaminated soils containing less than 1 percent total F001-F005 solvent constituents as listed.

2.5.3 The California List Rule

On July 8, 1987, the Agency issued its final rule on the California List wastes in accordance with the statutory schedule. This rule did not, however, set treatment standards for all wastes on the California List. For some wastes, the Agency allowed the statutory limits (concentration levels unrelated to performance levels based on best demonstrated available treatment technology) to take effect. The rule took effect on the promulgation date, except where these wastes are disposed of in injection wells, for which the statutory date is August 8, 1988. The prohibition affects the following types of wastes:

- Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 milligrams per liter (mg/l).
- Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing the following metals (or elements) or compounds of these metals (or elements) at concentrations greater than or equal to those specified below:
 - arsenic and/or compounds (as As) 500 mg/l
 - cadmium and/or compounds (as Cd) 100 mg/l
 - chromium and/or compounds (as Cr VI) 500 mg/l
 - lead and/or compounds (as Pb) 500 mg/l
 - mercury and/or compounds (as Hg) 20 mg/l
 - nickel and/or compounds (as Ni) 134 mg/l
 - selenium and/or compounds (as Se) 100 mg/l
 - thallium and/or compounds (as Th) 130 mg/l
- Liquid hazardous wastes having a pH less than or equal to 2.
- Liquid hazardous wastes containing polychlorinated biphenyls (PCBs) at concentrations greater than or equal to 50 parts per liter.
- Hazardous wastes containing halogenated organic compounds in total concentrations greater than or equal to 1,000 milligrams per kilogram.

The Agency proposed to modify the statutory limits for some of the wastes listed above (e.g., metal-containing liquid hazardous wastes) and to set treatment standards for these wastes in the future. The Agency is currently receiving formal comments on whether or not to set performance levels below the statutory limits.

The rule did set treatment standards for halogenated organic compound (HOC) wastes (except for wastewaters less than 1,000 mg/l HOC), PCB wastes, and corrosives. The standard for halogenated organics is incineration in accordance with existing RCRA regulations. The standard for PCBs is incineration in accordance with both RCRA and TSCA regulations. For HOCs requiring incineration, the Agency granted a 2-year variance because of a nationwide capacity shortage. No extension is granted for the incineration of PCBs, but alternative treatment methods will be allowed under petition. Corrosive wastes must be treated so that their pH is greater than 2.

2.5.4 Scheduled Wastes

The balance of hazardous wastes subject to the land disposal restrictions program include the scheduled wastes, or "thirds," so called because HSWA sets a schedule by which all untreated wastes listed under Section 3001 of RCRA not covered under the two earlier rules will be banned in three successive groups by 1990.

Congress gave the Agency discretion in setting priorities for wastes under this schedule. The Agency made scheduling assignments based on the hazard, volume, and mobility of the constituents of these wastes. The schedule was published in the *Federal Register* on May 28, 1986 (51 FR 19300, 40 CFR 268.10). High-volume, high-hazard wastes will be addressed first, under the August 1988 rule, with lower volume, lower hazard wastes restricted last under the 1990 rule. Work is proceeding on schedule for this rule; the Agency expects to propose treatment standards based on BDAT for the First Third by winter of 1988.

2.6 New Rules for Permitting/Closure

2.6.1 Corrective Action

The broad authorities added by HSWA (RCRA Sections 3004(u), 3004(v), and 3008(h)) changed the scope of the Agency's corrective action program. No longer geared just to the detection and correction of releases to ground water from regulated hazardous waste management units, the new sections stipulate that any Subtitle C permit issued to a RCRA facility must require corrective action for releases of hazardous waste or constituents, both within and beyond the facility boundary, resulting from current and past solid waste management practices. Furthermore, owners/operators now have to demonstrate financial assurance for the costs of corrective action for known releases of hazardous wastes and constituents.

In order to implement the corrective action requirement, the Agency has initiated several activities during fiscal year 1987. As a result of these activities, the Agency has:

- Promulgated regulations to codify certain corrective action requirements;
- Developed a national strategy for RCRA corrective action and issued several guidance documents;
- Created a data base on corrective action technology; and
- Made substantial progress in the development of a proposed rule to comprehensively address technical and procedural requirements for corrective action for releases from solid waste management units.

Codification of HSWA corrective action requirements: The basic HSWA corrective action requirements were codified in a final rule published on July 15, 1985 (50 CFR 28702). The preamble to the rule identified the types of facilities and units subject to corrective action and provided definitions for hazardous waste facilities, releases, and solid waste management units (SWMUs). In addition, the rule codified the statutory requirement for financial assurances for cleanup of known releases.

Other requirements, including the submission of information on hazardous waste releases, were addressed in a rule proposed in March 1986 (51 FR 10706). Under this

proposal, owners and operators of facilities would be required to submit, along with their Part B application, detailed information on their facility and descriptive information on any release of hazardous waste from the SWMUs either within or beyond the facility boundary. This was an important step, since the information allows the Agency to determine the existence or likelihood of a hazardous waste release. Evidence of a release could trigger inclusion of a corrective action schedule of compliance in a facility's permit. The proposal would also codify the statutory requirement that corrective action address releases beyond the facility boundary. The final rule addressing these requirements was published in December 1987.

In a related matter, the Agency determined that the requirement to submit a corrective action plan and feasibility studies with the Part B permit application, in the case of ground-water release from regulated units, could unnecessarily delay the issuance of permits to hazardous waste facilities, and would be inconsistent with corrective action at SWMUs. Thus, the Agency proposed in December 1986 (51 FR 33318) to amend the regulations, allowing, at the Agency's discretion, corrective action plans and feasibility studies to be completed after permit issuance under an enforceable schedule of compliance. This rule was promulgated on June 22, 1987.

Financial Assurance for Corrective Action: Under Section 3004's requirements for corrective action, facilities must provide assurances of financial responsibility for the cost of completing corrective actions for every solid waste management unit (SWMU) operating within a facility. In October 1986, the Agency proposed a detailed set of mechanisms to allow facilities to satisfy these financial assurance requirements through use of a trust fund, surety bond guaranteeing performance, letter of credit, financial test, or corporate guarantee. The proposal applies to all types of units, for all known releases, to any environmental medium (e.g., air, surface water, ground water).

National Strategy for Corrective Action and Program Development: The Agency issued a strategy outlining the framework for managing and implementing a corrective action program, entitled the "National RCRA Corrective Action Strategy," in October 1986. Since corrective actions extend to both operating facilities (i.e., those with interim status or a RCRA permit) and facilities that are closed, closing, or in post-closure, the program must

address a wide variety of situations. The primary goal is to fashion a program that protects human health and the environment and is consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The national strategy lends structure and organization to the program and identifies areas in which the Agency must develop specific policies, guidelines, and regulations over the next several years.

The Agency has designed a six-step process for cleaning up hazardous waste releases. The steps are:

1. RCRA Facility Assessment (RFA);
2. Interim measures, if the Agency believes they are warranted;
3. RCRA facility investigation;
4. Corrective measures study;
5. Corrective measures plan approval; and
6. Corrective measures implementation.

During the past 15 months, the Agency has issued a number of documents designed to help improve the corrective action program. These documents cover technical criteria for evaluating hazardous waste releases and the effectiveness of corrective action measures and the technical procedures for preparing and implementing the corrective action plan. In November 1986, the Agency issued the guidance document "Testing Methods: SW-846" (3rd edition) which sets forth suitable methods for testing, sampling, and analysis for hazardous wastes. At the same time, the Agency also issued "The Corrective Action Plan," which provides the technical framework for developing corrective action orders and permit requirements. In October 1986, the Agency issued methods for setting up ground-water monitoring systems and guidance on conducting a RCRA Facility Assessment (described in more detail in Section 5.3.4 of this report). The Agency is also developing criteria that indicate when corrective action technologies have achieved specific target levels. These criteria will be included in the corrective action rule under development and in other future guidance documents.

Developing a Bibliographic Data Base for Corrective Action Technology: The Agency has begun developing a computer data base to help permit writers evaluate corrective action plans. The data base will provide information on technologies that have actually been used to manage or clean up hazardous waste. Permit writers can use the information to identify and evaluate potential technologies for use at specific sites.

The data base draws on information available from a number of sources, including journal articles, proceedings of conferences, and State reports. The technologies discussed in the data base cover all environmental media. The data base will be expanded and updated periodically.

2.6.2 Alternate Concentration Limits

One of the central concerns of RCRA is to control any unacceptable leakage of hazardous materials from regulated unit land disposal sites of any kind—surface impoundments, waste piles, land treatment units, or landfills. Under the ground-water protection standard required by 40 CFR 264, Subpart F, each facility's permit contains—for each hazardous constituent entering the ground water from a regulated unit—a concentration limit beyond which degradation of ground-water quality must not be allowed. These concentration limits determine when corrective action is required. All such sites must conduct monitoring programs to verify that leaks are not occurring. If unacceptable leakage is detected, the sites are subject to the corrective action requirements of Subpart F.

Three possible concentration limits can be used to establish the ground-water protection standard:

1. Background levels of the hazardous constituents;
2. Maximum concentrations listed in Table 1 of Section 264.94(a) of the regulations; and
3. Alternate Concentration Limits.

The purpose of using Alternate Concentration Limits (ACL) in place of either of the first two standards is to allow flexibility to respond to situations in which these other standards would be unnecessarily stringent. To obtain an ACL, a permit applicant must

demonstrate that hazardous constituents detected in the ground water will not pose a substantial present or potential hazard to human health or the environment.

ACLs are therefore site specific and must be carefully established, using the 19 factors, or criteria, listed in the regulation. Detailed information on each of these criteria is not required in every ACL demonstration because each demonstration requires different types and amounts of information, depending on site-specific characteristics.

2.6.3 Closure: Hybrid and Clean Closure

At the end of their useful life, all RCRA facilities are subject to strict requirements for site closure and post-closure care. Under these requirements, we have given owners and operators of land disposal facilities two basic options:

1. Allow the waste to remain in place, cap the facility to reduce infiltration, and conduct post-closure monitoring and site maintenance, or
2. Remove all hazardous waste from the facility, thus eliminating the need for post-closure care (referred to as clean closure).

Based on experience in reviewing and approving closure plans, the Agency proposed, in March 1987, a significant modification to the closure regulations. The new proposal outlines a third closure alternative, the so-called "hybrid" approach, which combines both existing closure options. The Agency also promulgated certain amendments to the clean closure approach in March 1987.

Hybrid Closure: Rather than designing all caps to minimize infiltration and allowing the waste to remain in place, the new hybrid approach would require the removal of the majority of contaminated materials and would allow covers and post-closure monitoring to be designed based on identified "exposure pathways of concern." For example, if the constituents remaining in the soil were highly immobile and would not migrate to ground water, the cover could be designed to prevent direct contact and inhalation of constituents—which might in this case be the pathways of concern—rather than minimize infiltration. This approach allows the method of closure to be tailored to the specific conditions at a site. It also creates an incentive to remove waste from a unit, rather

than to leave waste in place and rely on control strategies (such as capping) to minimize migration of constituents.

Revised Clean Closure: Under earlier closure standards, an owner or operator could choose either to remove all waste residuals and contaminated soil or to demonstrate that the materials remaining at any stage of the removal were no longer a hazardous waste. We concluded, however, that under the later clean closure approach, there might still be a possibility of significant and potentially harmful levels of hazardous constituents remaining in surface impoundments without these units having to comply with landfill closure, post-closure care, and monitoring requirements.

The new rule upgrades requirements for owners and operators choosing the clean closure approach. They now have to remove or decontaminate all wastes, waste residues, contaminated containment system components (e.g., contaminated portions of liners), contaminated subsoils, and structures and equipment contaminated with waste and leachate. All removed residues, subsoils, and equipment must be managed as hazardous waste unless they are delisted as hazardous wastes or do not exhibit any of the characteristics of hazardous wastes.

2.6.4 Subpart X

RCRA regulates a wide variety of hazardous waste management facilities. The Agency has issued specific standards for all the major categories, including containers, tanks, surface impoundments, waste piles, land treatment units, landfills, incinerators, underground injection wells, and research, development, and demonstration facilities.

There are, however, a number of miscellaneous facility types for which the Agency has not issued standards and, therefore, cannot be permitted by the Agency or the States as hazardous waste management units. Examples include placement of hazardous wastes in salt formations, underground mines, open burning or open detonation units, or thermal treatment units other than incinerators, industrial boilers, or industrial furnaces. Other examples may emerge in the future. With the HSWA mandate for banning most land

disposal of untreated hazardous waste, the need for permitting standards for alternative technologies and practices has become critical.

To respond to this problem, the Agency proposed standards under Subpart X of Part 264 in November 1986. (Final promulgation occurred in November 1987.) Subpart X sets out general performance requirements for miscellaneous units other than those for which standards currently exist.

- Such facilities must be located, designed, constructed, operated, maintained, and closed in such a manner as to prevent releases to ground water, surface water, surface and subsurface soils, and air that may adversely affect human health or the environment.
- Subpart X permits must contain appropriate monitoring, analysis, inspection, response, reporting, and corrective action requirements.
- Miscellaneous facilities that are disposal units must adhere to the post-closure standards of Part 264 Subpart G and other requirements specifically included in the permit.

2.6.5 Final Codification Rule

In December 1987, the Agency issued a final rule codifying several requirements of the Hazardous and Solid Waste Amendments of 1984. This rule is a companion to the Agency's rule of July 1985, which codified those provisions of HSWA that took effect immediately or shortly after HSWA's enactment. The second codification rule implements changes to regulations relating to corrective action and permitting for RCRA facilities. Among its major features are provisions to implement the statutory requirements pertaining to corrective action for releases beyond a facility's boundary (see Section 2.6.1) and to corrective action for hazardous waste injection wells. It also addresses permit procedures, including (1) permit modifications, (2) the "permit-as-shield" provision on compliance with new requirements imposed by statute, (3) the imposition of permit conditions above those mandated by the regulations as necessary to protect human health and the environment, and (4) post-closure permits. Finally, it deals with the immediate effectiveness in authorized States of new Federal requirements imposed by HSWA.

Permitting Requirements: One of HSWA's principal additions to existing RCRA provisions is to require applicants to include information on individual solid waste management units (SWMUs) in their Part B applications. This information would include descriptions of the SWMUs, as well as all available information pertaining to any release from these units. The Agency or an authorized State can also require the permit applicant to conduct sampling and analysis at the SWMUs to determine whether more detailed analysis is necessary.

The Agency does not intend this rule to require extensive sampling and analysis at every solid waste management unit, but believes that sampling and analytical data are often necessary as part of a preliminary assessment. These data should be available before a permit is issued, but should not place an unreasonable burden on the owner or operator to assemble. The proposed rule also requires the Agency to conduct a RCRA Facility Assessment (RFA), (see also Section 5.4(d) below) to determine whether a release from a SWMU has occurred or is likely to occur. Sampling is required only where there is insufficient evidence upon which to make an initial release determination.

Although the emphasis of the corrective action program is on addressing releases that are identified at the time of permit issuance, the Agency recognizes the need to detect and correct future releases from SWMUs. We do not, however, believe that it is necessary to require at this time routine ground-water monitoring at all SWMUs located on Subtitle C facilities. Such monitoring may be required in the future as part of the Subtitle D program, but for the present the Agency intends to require monitoring of individual SWMUs only on a case-by-case basis. Permits will be reviewed after 5 years to determine whether additional corrective action requirements are necessary.

Injection Wells: A hazardous waste injection well must have authorization to operate under both RCRA and the Underground Injection Control (UIC) program set up through the Safe Drinking Water Act (SDWA). RCRA authorization is obtained through interim status or through a permit-by-rule. Neither RCRA nor SDWA authorization alone is sufficient to inject hazardous waste. RCRA permits-by-rule issued after November 8, 1984, must address the corrective action requirements of RCRA, which cover releases of hazardous waste or constituents from any SWMU at the facility, including units other than

the injection well itself. If the well is one of several SWMUs, then the necessary corrective action requirements are addressed through the first RCRA permit issued to the other hazardous waste units at the facility. If the well is the only SWMU on the site, the Agency implements corrective action requirements as they apply to SWMUs on the surface concurrently with the UIC permit process as a "rider permit" to the UIC permit. The same rider permit approach applies to other situations, such as injection wells that were issued UIC permits before November 8, 1984.

Permit Modifications: The codification rule allows permits to be modified because of amended standards or regulations, even if the permittee does not request such a modification, in cases where statutory changes or new or amended regulatory standards affect the basis of the permit. Permit holders are protected through standard rulemaking procedures against arbitrary or unnecessary changes, and we do not believe that this authority will unduly restrict planning efforts at RCRA facilities. The authority is not used for minor procedural changes, but only for significant amendments that may provide a substantial increase in protection of human health or the environment at a particular site. (See Section 3.5.1 for a further discussion of permit modification activities.)

Permit-as-Shield: When new requirements are imposed by HSWA provisions or the Part 268 regulations implementing the land disposal restrictions, they become effective immediately for all permits. EPA does not require that permits be modified to reflect such changes. (New permits, however, typically cite these requirements so that their applicability is clear.) These new requirements become effective and enforceable at RCRA facilities, regardless of whether a facility's permit has specific conditions that require compliance. It is the responsibility of the owner/operator to comply with new requirements even where contrary permit conditions exist.

Permit Conditions Necessary to Protect Human Health and the Environment: Under HSWA Section 3005(c), Congress grants EPA "omnibus" authority to impose permit conditions necessary to protect human health and the environment. In specific circumstances in which regulatory requirements may be inadequate, the Agency can use this authority to impose those additional permit requirements it considers necessary. The Agency intends to use this requirement only where necessary to protect human health and

the environment, and only to address specific environmental circumstances that are not adequately covered in existing regulations.

Post-Closure Permits: RCRA requires that all landfills, surface impoundments, waste piles, and land treatment units that received hazardous wastes after July 26, 1982, comply with the same ground-water monitoring, unsaturated zone monitoring, and corrective action requirements that apply to new units. To implement this requirement, the Agency amended its post-closure permits to clarify that they apply to all land disposal units receiving hazardous waste after that date. Land disposal units that receive waste after the effective date of the Part 264 regulations must obtain permits and meet the Part 264 requirements, even if they close under interim status. The one exception to this requirement is if they can demonstrate that these units have met the Part 264 standards for closure by removal.

Closure by Removal: When surface impoundments, waste piles, and land-treatment units close by removal or decontamination in accordance with Part 265, they do not require post-closure care under a post-closure permit. Some facilities, however, may not meet these requirements and therefore retain post-closure responsibilities, including the requirement to obtain post-closure permits. The Agency has decided to use the Part B application process as the primary mechanism for collecting the information to allow a determination to be made as to whether a regulated unit that closed by removal or decontamination did so in compliance with the corresponding requirements of Part 264. The new rule, however, allows owners or operators to perform an "equivalency demonstration" outside of the Part B permit process to show that a unit has been closed in full compliance with Part 264 removal or decontamination standards. If the Agency finds this demonstration acceptable, it will not require a Part B application or a post-closure permit.

State Authority: Prior to HSWA, a State with final authorization had full delegated authority to administer its program in lieu of the Federal program; Federal requirements no longer applied in the authorized State, and the Agency could not issue permits for any facilities in a State where the State was authorized to issue permits. When new, more stringent Federal requirements were promulgated or enacted, the State was obligated to

enact equivalent authority within a specified schedule; the new requirements did not take effect until the State adopted the requirements as State law. Under HSWA, however, new requirements and prohibitions imposed by HSWA take effect in authorized States at the same time that they take effect in nonauthorized States. The Agency carries out these responsibilities, including the issuance of permits, until the State is granted authorization to do so. The deadline for States to apply for authorization for new HSWA authority is July 1, 1989 (or July 1, 1990 if a State statutory change is needed).

2.7 Special Wastes

RCRA Section 3001 exempts a number of high-volume wastes from regulation under Subtitle C pending the completion of special studies to evaluate potential management techniques, the danger these wastes pose to human health and the environment, and a number of other waste-category-specific factors described in RCRA Section 8002. Following completion of these studies, the Agency has six months to make a determination on whether the subject wastes should be regulated under Subtitle C. During the past reporting period, the Agency has worked extensively on three waste categories—mining wastes; wastes from oil, gas, and geothermal energy exploration, development, and production; and coal-fired electric utility wastes.

2.7.1 Mining Wastes

At the end of 1985, the Agency submitted its first Report to Congress, *Wastes from the Extraction and Beneficiation of Metallic Ores, Phosphate Rock, Asbestos, Overburden from Uranium Mining and Oil Shale*, as required under RCRA Section 3001(b)(3)(C). On July 7, 1986, six months after submission of this report, the Agency determined that regulation under RCRA Subtitle C was not warranted at that time for the wastes studied in the report. This set in motion a series of activities to determine the type of regulations that should be implemented and to write necessary guidance for managing these wastes.

The Agency was concerned, however, that while extraction and beneficiation wastes do not require Subtitle C regulation, they may pose unreasonable risks if they continued to be exempted from regulation under RCRA. The Agency therefore proposed

plans to develop a program for mining wastes under Subtitle D of RCRA, the purpose of which would be to help develop effective State-implemented programs for mining waste.

The Agency set up an External Communications Committee (ECC) to receive comments from the public as well as from other government agencies and industry on how to tailor mining waste regulations under Subtitle D. The Agency combined the recommendations gathered by the ECC with ones developed internally to fashion a final Regulatory Development Plan, which was released in June 1987. It outlined a Subtitle D approach and suggested additional studies of the six mining wastes discussed in a second report to Congress. In June, the Agency completed a Mining Waste Management Plan based on the Regulatory Development Plan; regulations are tentatively scheduled to be proposed in 1988. New reports on mining processing waste streams will be proposed in 1988.

In October 1985 (i.e., prior to the Report to Congress), the Agency proposed to narrow the scope of the mining wastes exemption, eliminating certain wastes from the processing of ores and minerals and relisting six smelting wastes previously listed as hazardous. In response to extensive comments, however, the Agency withdrew this proposal in October 1986 pending additional studies under RCRA Section 8002. Thus, these wastes remain conditionally exempt from RCRA Subtitle C regulation until EPA completes a Section 8002 study of them and determines whether Subtitle C regulation is appropriate. A second report to Congress, to be issued in April 1988, will cover wastes from the processing of copper, lead, zinc and zinc oxide, aluminum, and bauxite.

The Agency is currently undertaking scoping studies to determine what sectors and wastes might be addressed in a third and final report to Congress. The April 1988 Report to Congress will identify the sectors and types of wastes that might be considered in the third report.

2.7.2 Oil and Gas/Geothermal

The Agency has prepared a draft Report to Congress on wastes from the exploration, development, and production of crude oil, natural gas, and geothermal energy.

Like the mining wastes, these wastes had been exempted from Subtitle C regulation in the 1980 amendments to RCRA. The study has been conducted in accordance with a series of court ordered deadlines, negotiated under a settlement between the Alaska Center for the Environment and the Agency. Under its schedule, the Agency completed a general technical report in October 1986, a report on field sampling of wastes in January 1987, and a draft Report to Congress in August 1987. The final Report to Congress is to be issued by December 31, 1987.

In mid-1986, the Agency conducted field sampling of oil and gas wastes at selected sites throughout the country to characterize exempt oil and gas wastes and to identify constituents of potential concern. Samples of drilling muds, produced water, and other wastes were taken from a limited number of field sites throughout the continental United States and Alaska. The results of this work were published in an extensive report in January 1987.

In parallel with the field sampling, work began on a general technical report describing the methodologies to be used for the final Report to Congress, including the planned approach for evaluating risks and documenting current and recent damages associated with oil, gas, and geothermal operations, and for estimating costs associated with potential future options for additional waste management requirements. This report was circulated for comment and discussed at public meetings.

At the end of August 1987, the Agency completed its draft Report to Congress, containing the results of its analysis of (1) current and alternative waste management practices, (2) case studies documenting damages associated with field operations, (3) potential risks to health and the environment associated with current waste management practices, (4) the costs and economic impacts of potential additional waste management requirements, and (5) the status of State regulatory requirements in the principal producing States. On December 28, 1987, EPA issued its final report.

2.7.3 Utilities Report to Congress

The Agency has prepared a draft Report to Congress on waste from the combustion of coal by electric utility power plants pursuant to the requirements of Section 8002 (n) of RCRA, as amended in 1980. Under Section 3001 (b)(3)(A), the Agency is prohibited from regulating these wastes as hazardous under Subtitle C until at least six months after this report is submitted to Congress.

This draft report examines those wastes generated by electric utilities burning coal. These wastes account for approximately 90 percent of all wastes generated from the combustion of fossil fuels. There are 514 coal-fired power plants currently operating in the United States. Their generating capacities range from 50 MW to more than 3,000 MW with an average capacity of 500 MW. Approximately 69 million tons of ash and 16 million tons of flue gas desulfurization wastes are generated annually. Because of an increase in the use of coal for electrical generation, it has been projected that, by the year 2000, wastes from the coal-fired generating plants will increase by 75 percent, which translates into 120 million tons of ash and 50 million tons of flue gas desulfurization wastes.

The draft report was developed by the Agency with active interagency involvement. Participating on the Agency's work group were the U.S. Department of Energy, the U.S. Department of the Interior, the U.S. Department of Commerce, and the Tennessee Valley Authority.

The final report is scheduled to be submitted to Congress in early 1988. After submittal, the Agency will hold public hearings. Within six months of submittal, the Agency will publish in the *Federal Register* a determination on the need for regulation of wastes generated by the combustion of coal in the electrical utility industry.

2.8 Subtitle D

Subtitle D of RCRA established a cooperative framework for Federal, State, and local governments to control the management of solid waste. As part of this framework, the Agency developed criteria that set minimum performance standards for all solid waste

disposal facilities. These "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR Part 257) were promulgated by the Agency in 1979.

2.8.1 Subtitle D Report to Congress

In 1984, HSWA required the Agency to conduct a study of the extent to which the Subtitle D Criteria (40 CFR 257) are adequate to protect human health and the environment from ground-water contamination. In addition, the study was to include recommendations with respect to any additional enforcement authorities deemed necessary to protect ground water. This study will result in submittal of a Report to Congress. For the study, the Agency collected data in three areas:

- Subtitle D waste characteristics;
- Subtitle D facility characteristics; and
- State Subtitle D program characteristics.

Waste Characteristics: Subtitle D wastes are those solid wastes regulated under RCRA that are not subject to hazardous waste regulation under Subtitle C. Many Subtitle D waste streams have been identified and are discussed in Chapter 3 of this report. The quantity of Subtitle D waste generated annually is enormous. Municipal solid waste and industrial nonhazardous waste, only two of the Subtitle D waste streams, account for more than 500 million tons of waste per year. The characteristics of Subtitle D wastes vary considerably as a result of regional differences in climate and socioeconomics.

Facility Characteristics: Three sources of Subtitle D facility characteristics data were used. The first, the Subtitle D Census, was the most comprehensive. The Census was conducted as a mail survey and includes responses from Subtitle D regulatory program offices in every State and territory in the United States. Landfills, surface impoundments (SIs), and land application units (LAUs) were covered in the Census; however, the quality of data varied. The respondents rated landfill data quality highest and surface impoundment data quality lowest. The Census identified approximately 227,000 Subtitle D facilities. Eighty-five percent were SI, 8 percent were LAUs, and 7 percent were landfills.

The other two sources of data were the Municipal Solid Waste Survey and the Industrial Survey. Both surveys were initiated to fill data gaps left by the Census.

Approximately 9,300 municipal solid waste landfills (MSWLFs) were identified by the Census, while the municipal survey predicted that 6,500 MSWLFs are currently active. The apparent discrepancy may be attributed to the fact that the Census data are older (1984) than the Survey data (1986) and therefore may include facilities that were closed by 1986. In addition, States may have broadly defined MSWLFs for the Census and included landfills that may not have actually been MSWLFs.

Very few Subtitle D facilities employ release prevention controls (e.g., liners and run-on/run-off controls), and only a small percentage conduct environmental monitoring. For example, the Census indicates that only 25 percent of the municipal solid waste landfills monitor ground water. Ground-water monitoring is even less prevalent at SIs, where only 4 percent of the units have monitoring, and LAUs, where 6 percent of the units have ground-water monitoring.

State Program Characteristics: The Subtitle D program is implemented and enforced by the States. The following four areas were examined:

1. Program organization and management;
2. Identification and status of solid waste facilities;
3. Permit and regulation mechanisms; and
4. Enforcement programs.

The Subtitle D universe is extremely large. Because of limited budgets and staff, few State programs address the full spectrum of facilities and activities. The focus of most State Subtitle D programs has been on MSWLFs. In general, only half of the Subtitle D facilities in the United States had been permitted and only 30 percent had been inspected in 1984.

The Agency issued Phase I of this Report to Congress in November 1986, under the title *Phase I Report Subtitle D Study*; data from the Municipal Landfill Survey and the

Industrial Facility Survey were not, however, available for this report. The final report will include the Agency's final conclusions about solid waste disposal facilities and practices and is being developed for issuance to Congress in early 1988.

2.8.2 Subtitle D Criteria Revisions

HSWA also requires the Agency to revise the Subtitle D Criteria for solid waste disposal facilities that may receive household hazardous waste or small quantity generator hazardous waste. The HSWA provisions specify that the revised Criteria shall address, at a minimum, facility location, ground-water monitoring, and corrective action, as appropriate.

The Agency has devoted substantial time and resources to developing revisions to the Criteria. Public meetings were held to obtain views of various parties interested in solid waste management. The Agency also met with various industry/trade associations and environmental groups to learn of their key concerns. An unusually large Agency Work Group was assembled in order to obtain input from other Agency program offices, including the Regional Offices. This work group met many times during fiscal year 1987 and also included representatives of many State solid waste management agencies. Major meetings have also been held with top Agency management to determine the focus and direction of the Criteria revisions.

The Agency has prepared numerous drafts of the revised Criteria for review by the Work Group and Agency management. In addition to addressing location, ground-water monitoring, and corrective action, the Criteria revisions will address other environmental concerns included in the current Part 257 Criteria (e.g., landfill gas controls). Data gathered for the Subtitle D Report to Congress will be used in developing and supporting the Criteria revisions.

The Criteria revisions, directed to municipal solid waste landfills, are scheduled to be proposed in the *Federal Register* in early 1988. The Agency will then hold public hearings on the proposal prior to developing the final rule.

2.8.3 Household Hazardous Waste Management

Hazardous waste is not generated exclusively by industrial and commercial sectors; ordinary private households routinely dispose of significant quantities of hazardous materials in the form of drain openers, oven cleaners, wood and metal cleaners and polishes, discarded pharmaceuticals, oil and fuel additives, carburetor and fuel injection cleaners and starter fluids, paint thinners, paint strippers and removers, herbicides, pesticides, grease and rust solvents, fungicides, and wood preservatives. The Agency has endorsed and supported voluntary collection programs, the focus of which is to encourage proper management of small-quantity household hazardous wastes through community-sponsored programs.

Interest in the area of household hazardous waste began in 1981-82. One of the first household hazardous waste collection days was held in Lexington Massachusetts, in 1982. Since 1981, more than 800 locally sponsored household hazardous waste collection programs have been held in 40 different States, evidence of the increasing attention toward, and interest in, these programs. The majority of these collection days have been day-long events sponsored and financed by a local community, State, or private firm. On the collection day, residents bring their household hazardous wastes to a designated location where the wastes are identified, packaged, and labeled by trained personnel. The wastes then are taken to licensed hazardous waste management facilities for recycling, incineration, or disposal.

The Agency has developed a working definition of household hazardous waste based upon the RCRA definition of hazardous waste. EPA also has developed a regulatory definition of the "household" concept (40 CFR 261.4(b)). A waste is hazardous if it exhibits any of the characteristics of corrosivity, ignitability, reactivity, or toxicity or if it is listed as being hazardous. From this definition, the Agency has developed a list of generic types of household wastes that contain hazardous components. The Agency has also issued a report entitled *Household Hazardous Waste and Related Collection Programs*. The report focuses on the following topics: (1) the definition of household hazardous waste; (2) the quantities of household hazardous waste in the municipal waste stream; (3) the impacts of household hazardous waste on homeowners, solid waste collection and

disposal personnel, and the environment; and (4) household hazardous waste collection programs at the State and local levels.

The Agency's other activities in the household hazardous waste area include sponsoring an annual conference. In November 1986, the Agency sponsored the first conference in Washington, D.C.; approximately 300 people attended. The second annual conference was held in November 1987, in San Diego, California, with a similar turnout. These annual conferences are held to provide a forum for people who run household hazardous waste programs to share experiences and identify effective strategies for managing these wastes. In addition, these conferences provide the Agency with an opportunity to address RCRA and CERCLA liability issues of concern to the administrators of these programs.

2.8.4 Report to Congress on Municipal Waste Combustion

Under Section 102 of the HSWA, Congress required EPA to submit a report on the potential health risks of municipal waste combustion (MWC) caused by emissions of polychlorinated dibenzo-p-dioxins, along with technical evaluations of operating practices appropriate for controlling these emissions. This directive follows from the National Dioxin Study, initiated in 1984, which recommended study of possible dioxin emissions from a variety of combustion sources, of which municipal waste combustors were one.

Low levels of dioxins are found throughout the environment and have caused a high level of public concern because of their potential toxicity and persistence. The Agency's *Municipal Waste Combustion Study*, submitted to Congress in June 1987, drew on a wide variety of technical studies addressing all aspects of emissions estimation, control efficiencies and costs, and risk assessment. The original Congressional directive was expanded to include consideration of particulate matter, sulfur dioxide, hydrochloric acid, and metals in addition to dioxins and dioxin-related compounds.

The report also provided a listing of "good combustion practices" for minimizing organic emissions from MWCs, along with a risk and cost analysis for their application for existing and new facilities. Uniform application of dry scrubber and high efficiency

particulate collection systems would reduce these risks by approximately a factor of ten, to 0.2 to 3 cases for existing sources and 0.3 to 1 for those projected. Adding dry scrubbers to existing particulate controls would increase costs by \$4 to \$12 per ton, depending on the type of combustor. Since many existing modular combustors (which account for about 9 percent of existing facilities) have no flue gas treatment, the costs for those units would be higher, ranging from \$7 to \$16 per ton.

2.8.5 Municipal Waste Combustion—Regulatory Activities

The burning of municipal solid waste is an attractive waste management option because it reduces the volume of waste by 70 to 90 percent and may also be used to recover energy with which to generate electricity. There are 111 municipal waste combustion facilities now in operation, with another 200 planned. Current U.S. combustion capacity is 45,000 tons per day; new facilities will increase this to 117,000 to 252,000 tons per day by the year 2000.

Following the analysis completed in the Report to Congress, the Agency published its intention to regulate municipal waste combustors under Section 111 of the Clean Air Act. This authority allows the Agency to regulate MWC emissions in the aggregate or in terms of individual "designated pollutants." Pending publication of this regulation, we have issued operational guidance for new MWC facilities. This guidance establishes alkaline scrubbers plus fabric filter or electrostatic precipitators as the presumptive standard for best available control technology.

Regulations under Section 111 will reflect the best technological systems of continuous emission reduction that have been demonstrated for municipal waste combustors considering costs, any non-air quality health or environmental effects, and energy requirements. The standards will include emission limits and quantitative requirements for monitoring. Under Section 111, the standards will apply to all sources constructed after proposal of the regulations rather than after final promulgation of the rule.

The Agency is also developing a sampling protocol and guidance to determine whether residual ash is hazardous, and is examining options for ash disposal that would be tailored around the unique properties of ash in a land disposal scenario.

2.8.6 Domestic Sewage

A number of hazardous wastes are excluded from regulation under RCRA because they are discharged to publicly owned sewage treatment plants (POTWs) in combination with domestic sewage and are therefore regulated under the discharge requirements of those plants. In the 1984 HSWA amendments, Congress required EPA to study the number and types of generators that dispose of hazardous wastes under this exemption, and, within 18 months of submitting this report, to revise and expand its regulations as necessary to ensure protection of human health and the environment.

The Agency submitted its *Domestic Sewage Study* to Congress in February 1986, as required, and is scheduled to propose regulations under the Clean Water Act in May 1988. It is expected that the proposal will include a number of significant requirements:

- Administrative Requirements: Plants would have to update their industrial user inventories and lists of significant industrial users every 30 months. Industrial users would have to notify plants of discharges to sewers of listed or characteristic hazardous wastes. Plants would be required to have legal authority to issue individual discharge permits of each "significant industrial user" as defined under the new regulations. They would also have to obtain legal authority to develop local limits based on the "best professional judgment" determination of Best Available Technology (BAT).
- Specific Discharge Prohibitions: Limits are set on the ignitability/explosivity and the reactivity of wastes discharged to treatment plants.
- Spills and Batch Discharges: Plants would require their industrial users to develop and implement plans and procedures to prevent and control spills and batch discharges.

2.9 Waste Minimization

2.9.1 Hazardous Waste Minimization

Congress placed new emphasis on the need for minimizing the generation of hazardous waste in HSWA Section 1003(b):

The Congress hereby declares it to be the national policy of the United States that, wherever feasible, the generation of hazardous waste is to be reduced or eliminated as expeditiously as possible. Waste that is nevertheless generated should be treated, stored, or disposed of so as to minimize the present and future threat to human health and the environment.

Under Section 8002 (r), Congress further required EPA to report on "the feasibility and desirability of establishing standards of performance or of taking other additional actions ... to require the generators of hazardous waste to reduce the volume or quantity and toxicity of the hazardous waste they generate." At its extreme, such action could mean the establishment of industry-specific rules, similar to Effluent Limitations under the Clean Water Act or New Source Performance Standards under the Clean Air Act, that would specify industrial process performance to limit the generation of hazardous waste.

The Agency submitted its report in October 1986. For the purposes of the report, we defined waste minimization as a combination of any source reduction or recycling activities that result in either the reduction of total volume or quantity of hazardous waste or in the reduction of toxicity of hazardous waste. The land disposal restrictions program has already set in motion a major diversion of hazardous waste from land disposal toward incineration and other treatment technologies. Because of the emphasis on treatment in the land disposal restrictions program, the report did not cover treatment, even though treatment can be a legitimate form of waste minimization.

The Agency evaluated several options according to their effectiveness in reducing volume and toxicity, their economic impacts, and logistical problems of implementation. After evaluating these options, we concluded that mandatory measures to implement source reduction and recycling are neither desirable nor feasible. First, existing economic incentives to reduce waste are already very strong. These include shortages in available treatment and disposal capacity, rising costs of treatment and disposal, concerns over

financial liability for waste improperly treated or disposed of, and lack of availability of liability insurance. Second, mandatory programs would be difficult and costly, both for the Agency and for industry. At best it would take over a decade to design and implement a mandatory program, which would do nothing to alleviate near-term capacity shortages. Third, mandatory programs would interfere with private production decisions, most likely producing inefficient results and negative economic impacts.

The Agency is now in the process of implementing its waste minimization strategy. The goal of this strategy is to promote the implementation of waste minimization practices by industry, wherever feasible. To achieve this goal, the Agency has adopted a strategy that has both a short-term and a long-term component. The Agency's short-term strategy includes:

1. Promoting industry waste minimization activities by establishing a clearinghouse that develops and disseminates both technical and generic information to waste generators, States, and trade associations on industrial processes, case studies, economic benefit studies, and other matters;
2. Measuring industry waste minimization practices by establishing a baseline data system consisting of surveys and case studies;
3. Conducting appropriate research to evaluate emerging technologies, eliminate technical barriers, and develop generic waste minimization audit protocols; and
4. Assessing industry progress and, if necessary, identifying and evaluating potential regulatory and nonregulatory options for successfully increasing waste minimization practices.

The long-term strategy includes one additional component:

- Monitoring changes over time in industry behavior by conducting longitudinal analyses and case studies of specific industries and firms.

This last component represents a continuation of Agency efforts to assess industry waste minimization efforts by examining changes in the number of waste minimization practices being implemented by industry over the next several years. Given current time constraints, the Agency is unable in its short-term strategy (1987-90) to both establish a baseline of information and systematically determine quantitative changes in waste

minimization. Therefore, longer-term efforts need to include national surveys and case studies of industrial firms to assess changes in industry behavior over time such that the Agency can determine the extent to which industry is moving to minimize waste generation.

The implementation of this strategy is designed to be interactive in nature, so that activities under one objective provide input to another activity and vice-versa. For instance, a major component of this strategy is to collect relevant information and measure industry efforts aimed at minimizing waste generation. Results from these activities can identify particular industry and technology processes in which waste generation is being minimized and allow the Agency to promote waste minimization to other companies through its clearinghouse, as well as identifying targets of opportunity for further research in areas where waste minimization may not be occurring.

Results of these activities provide the Agency with data to assess industry efforts at minimizing waste generation and to identify and evaluate potential regulatory and non-regulatory options, if necessary, to successfully increase waste minimization practices.

2.9.2 Procurement Guidelines

Section 6002 of RCRA directs all procuring agencies that use appropriated Federal funds to procure items containing the highest percentage of recovered materials practicable given that reasonable levels of competition, cost, availability, and technical performance are maintained. The Agency is given the responsibility for (1) designating items that can be produced with recovered materials and (2) promulgating guidelines to assist procuring agencies in carrying out the requirements of Section 6002 and for implementing the policy and programs at all levels of government.

Under this RCRA requirement, the Agency identifies items that can be produced with recovered materials, conducts feasibility studies to determine the extent of the item's use by procuring agencies and other factors, selects items as the subject of procurement guidelines, and prepares and implements the guidelines.

Guidelines have been completed for fly ash used in cement and concrete and for paper and paper products made from recycled material, and have been proposed for asphalt

made from recycled tires and re-refined lubricating oils. Amendments have also been proposed that would strengthen the paper guideline. In addition, the Agency is developing guidelines for retread tires and insulating materials made from recycled paper and glass.

In order to justify a procurement guideline for any given material, it is necessary to demonstrate that certain criteria are met:

1. Evidence of a significant solid waste management problem;
2. Availability of economic methods of recovery;
3. Technically proven use; and
4. Substantial Federal purchasing power.

Based on these criteria, the Agency conducts feasibility studies to identify candidate items to be the subject of procurement guidelines, assess the potential market for the items among affected procuring agencies, evaluate the costs to the item's manufacturer or supplier of complying with relevant Federal procurement rules, assess other relevant costs and benefits, identify relevant legislation, and generally provide an overview of the feasibility of developing guidelines for various items.

In 1984, HSWA added paragraph (i) to Section 6002 of RCRA. This new provision requires procuring agencies to develop an affirmative procurement program for procuring items designated by the Agency. The program must be consistent with Federal procurement requirements and must contain at least four elements:

1. A recovered materials preference program;
2. An agency promotion program;
3. A program for requiring estimates, certification, and verification; and
4. Annual review and monitoring of the effectiveness of the procurement program.

Section 6002 gives the Agency responsibility, in promulgating guidelines, to assist procuring agencies in carrying out these requirements.

3.0 ENHANCING THE REGULATORY FRAMEWORK

3.1 Introduction

In this chapter we discuss activities that were not directly mandated by RCRA or HSWA, but were nevertheless necessary for the Agency to carry out its mission of protecting human health and the environment from unacceptable risks presented by hazardous wastes. These activities were undertaken to improve upon the existing regulatory framework where new information or experience in the past several years indicated that specific changes were necessary. The scope of such activities is broad. Some examples include:

- Initiatives to improve the definition of hazardous wastes;
- Streamlining of the permit process to save the resources of the Agency and the regulated community, as well as to expedite the development of new treatment capacity in anticipation of the land disposal restrictions program; and
- Technical changes to regulations pertaining to ground-water monitoring and hazardous waste combustion to achieve optimal protection of human health and the environment in the most expeditious manner possible.

3.2 Surveys and Data Development

3.2.1 RCRIS

The RCRA program manages large and growing amounts of data on facility permitting, inspections, hazardous waste generation, biennial reports, special surveys, and other issues. The current Hazardous Waste Data Management System (HWDMS) was not designed to handle the volume of data being managed today, and is not able to respond flexibly enough to the reporting demands of RCRA management, the Regional Offices, or the States.

The Agency has proposed, and is in the midst of developing, a more flexible and capable data management system to serve this program. Called the Resource Conservation and Recovery Information System (RCRIS), it is scheduled to replace HWDMS in 1989. The Agency's objective is to build a system that is comprehensive (handling many different types of data needed by this program) and interactive, with strong statistical analysis capabilities. RCRIS will go well beyond the depth and scope of HWDMS. For example, RCRIS will provide information and analytic capability to support programs such as corrective action, which have not been covered by a national reporting system. Through RCRIS, the Agency will be able to share data among the States, the Regional Offices, and EPA Headquarters. It will be especially useful for providing more accurate oversight statistics based on current information over a broad spectrum of activities.

During 1987, the Agency in cooperation with the States determined the types of data and data categories needed and designed methods of data entry suitable for easy State-Federal interaction. The States will continue to have primary responsibility and control for entering data, but all Regional Offices, States, and EPA Headquarters will have access to the data base. Early in 1988 the Agency will begin a 4-month pilot program using RCRIS with one of the EPA Regional Offices and several of its associated States. This test run will help identify problem areas and enable the Agency to deliver the system on schedule at the beginning of 1989.

3.2.2 Biennial Report Revisions

RCRA 3002(6) requires that generators of hazardous waste report at least biennially to the States on their hazardous waste management activities. The information gathered is used by the State and EPA for planning and evaluation of hazardous waste programs, and for reporting to Congress, State legislatures, and the public on many aspects of the generation, management, and disposal of hazardous wastes.

The current reporting form used by the Agency and the States for developing the biennial reports is quite general, reducing the quality and scope of the data it generates. The Agency has therefore developed a new form, which it is recommending for use by all States. The new form has been designed to develop more and better data as efficiently as

possible. To develop this form, the Agency worked closely with the National Governors' Association (NGA). NGA formed an advisory committee composed of State, Region, and industry representatives, which evaluated the reporting needs of the program and advised the Agency that five general areas deserved priority attention:

- Waste Quantity and Processing Tracking: The biennial report should develop the best quality data on hazardous wastes generated, as well as on how they are stored, transported, treated, and ultimately disposed of.
- Waste Characterization: The report must also develop data on the physical form and chemical composition of wastes, as well as any additional information necessary to assess the health and environmental risks they pose.
- Regulatory Status: The report must generate information on hazardous waste handlers—who they are and under what category of activity they should be classified.
- Waste Minimization: Reducing and recycling hazardous waste is emerging as one of the key long-term issues to be addressed under RCRA. The previous report contained only a general narrative statement on this issue; the new form will include both detailed checklists to help respondents to define waste minimization programs in place and additional reporting requirements to clarify progress made on reducing hazardous wastes sent to treatment or disposal.
- Capacity Assessment: The land disposal restrictions program and new State capacity assessment requirements under the Superfund Amendments and Reauthorization Act (SARA) increase the importance of information on the available supply of treatment, storage, and disposal capacity. The new form will gather this information and will require the reporting of changes in the processing capacity, the adequacy of remaining capacity, and the availability of additional capacity.

3.2.3 TSDR/Generator Survey

In 1981, the Agency conducted a survey of treatment, storage, disposal, and recycling facilities (TSDRs) to provide a national overview of the status of hazardous waste management facilities (the Regulatory Impact Analysis mail survey). The information gathered is now seriously dated. Two new surveys, one on TSDRs and one on generators, are therefore under way to update this information. These new data will cover current waste generation and management practices, thus updating the baseline data originally

gathered in 1981 and allowing the Agency to interpret the findings developed through upcoming biennial reports with more accuracy and perspective.

TSDR Survey: The information gathered by this survey will provide support for tracking the overall progress of RCRA, as well as for developing treatment standards and setting effective dates on land disposal restrictions for hazardous wastes. It will also be used as a basis for evaluating the regulatory impact of regulations, developing tank system information for possible tank requirement revisions, and assessing individual State hazardous waste management capacities.

As part of this effort, the Agency sent a pilot questionnaire to 55 facility owners and operators in January 1987. A full-scale mandatory survey encompassing about 2,300 TSDR facilities was sent out in August 1987. The survey is detailed and complete and is designed to develop waste code-specific information. Analysis of the results will begin in December 1987.

This survey will be linked with the generator survey to provide a comprehensive data base on hazardous waste management capacity. The TSDR survey information will be kept current with updates from the Biennial Report. Eventually, most of this information will be integrated into RCRIS.

Generator Survey: Like the TSDR survey, a survey of generators is also in progress to obtain information on current waste generation rates. The Agency believes that a significant shift in the generation and management of solid and hazardous wastes has occurred since the last survey, conducted in 1981. These changes in generation and management are a result of industry's responding to the implementation of the Subtitle C regulatory framework and the resulting cost increases in hazardous waste management over the past decade.

The new survey seeks information on the types and volume of hazardous wastes generated during 1986. In addition, we have expanded the original generator survey to obtain information that will provide a more accurate picture of waste generation. This information includes waste minimization practices, the nature and status of solid waste

management units (SWMUs), and diagrams depicting all waste management operations at the facility. The survey will provide data on all wastes generated by a facility, including wastes considered hazardous under RCRA, wastes considered hazardous by individual States, and wastes containing PCBs, asbestos, and dioxins.

A pretest was conducted in August 1987. A mandatory survey of 10,000 facilities was mailed in December of 1987 after suitable modifications and revisions of the survey were made on the basis of the pretest.

3.3 Improving the Definition of RCRA

3.3.1 "Relisting" of Hazardous Waste

In listing wastes, the Agency previously has not set levels for hazardous constituents below which the waste would no longer be considered hazardous under Subtitle C of RCRA. Rather, once a waste is listed, it remains subject to control under Subtitle C of RCRA even if the waste contains only *de minimis* levels of the hazardous constituent. Waste generators may submit a petition to delist a waste; if granted, however, the petition applies only to that specific waste and location. The Agency considers this to be a problem for the regulated community, the Agency, and the public. In particular, limited resources for the management of hazardous wastes are being used to control slightly toxic or nonhazardous waste; in addition, the Agency's limited resources are being used to process delisting petitions, with limited environmental benefit. To address this problem, the Agency is considering redefining the existing listings by setting concentration limits (either in the waste or the leachate from the waste) below which the waste would not be defined as hazardous under Subtitle C of RCRA. This activity is known as "relisting." As part of this "relisting" program, the Agency is clarifying existing hazardous waste listing where ambiguities exist and is expanding the list of toxicants of concern for listed wastes.

Concentrations for toxicants will be set by evaluating the risks posed to the "most exposed individual" if the waste were disposed of outside the requirements of RCRA Subtitle C. The intent is to model viable disposal options and select the most conservative as the regulatory levels below which the waste is not considered hazardous.

3.3.2 TSCA Section 4 Rule

The Agency does not have toxicity data nor fate and transport data for a number of chemicals of concern. For some of these chemicals, the Agency is conducting a test program to develop such data; for others, we have proposed a rule under the authority of TSCA to require manufacturers to develop the necessary data.

The chemicals subject to this proposed rule are those for which the Agency is unable to determine the extent of their toxicity or fate in the environment (i.e., the chemicals have been found by the Agency to have neither subchronic nor chemical fate data). Health effects testing is required to develop oral subchronic toxicity, while chemical fate testing includes anaerobic biodegradation, soil absorption, and hydrolysis. The proposed human health and chemical fate testing is based on the authority of Section 4(a)(1)(A) of TSCA. All of the chemicals subject to this proposed test rule have been identified as toxic constituents under RCRA and have as their primary hazardous property either acute or chronic toxicity. Chemicals listed solely because they are flammable, reactive, or corrosive have not been included in this rule.

3.3.3 Air Toxicity Characteristic

Under RCRA, wastes are classified as hazardous if they exhibit one or more specific hazardous characteristics, one of which is toxicity. The Agency's prescribed tests for toxicity have, until now, focused primarily on potential exposures through drinking water. The Agency is also concerned about other potential exposure routes, including air. Certain constituents found in industrial wastes—most notably, volatile organics—may be associated with human health effects both directly, through inhalation, and indirectly, through secondary formation of ozone. To address this problem, the Agency is considering development of an Air Toxicity Characteristic through which wastes that pose potential air pollution risks can be properly defined and regulated under RCRA.

Like the other RCRA characteristic tests, the Air Toxicity Characteristic would be performed by generators, treaters, or other parties managing hazardous wastes. The test would predict releases of volatile organic compounds from wastes and would be tied to specific threshold concentrations that, if exceeded, would render the waste a hazardous

waste. The thresholds would take into account considerations of human health effects as well as the transport and fate of volatile air toxicants.

3.3.4 Joint EPA/NRC Initiative on the Regulation of Commercial Mixed Waste

The Agency has jurisdiction over the management of solid and hazardous waste with the exception of those materials specifically excluded by Section 1004(27) of RCRA; namely, source, special nuclear, and by-product material. These radioactive materials are subject to and defined in the Atomic Energy Act of 1954, as amended (68 Stat. 923), (AEA).

Commercial low-level radioactive waste (LLW) is regulated by the Nuclear Regulatory Commission (NRC) under the authority of the AEA and the Low Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPA). The LLRWPA defines LLW as radioactive material that (1) is not high-level radioactive waste, spent nuclear fuel, or by-product material as defined in Section 11e.(2) of the AEA (i.e., uranium or thorium mill tailings), and (2) is classified by the NRC as LLW consistent with existing law and in accordance with (1).

In many instances LLW contains constituents that are hazardous because they either exhibit corrosivity, reactivity, ignitability, or extraction procedure toxicity characteristics or are listed as hazardous under RCRA. Such wastes are now referred to as radioactive mixed waste. Where mixed wastes are generated, they are subject to both EPA and NRC regulations.

Over the last fiscal year, the Agency and NRC have undertaken a number of initiatives to effect joint regulation of radioactive mixed waste. The first joint initiative was to conduct a review of existing EPA and NRC regulations in an effort to identify areas of potential inconsistency. If RCRA requirements are inconsistent with AEA requirements, the latter rules govern, as provided by Section 1006 of RCRA. No inconsistencies were identified as a result of the EPA/NRC comparison of existing regulations, although differences in stringency were observed.

Subsequently, the Agency and NRC developed a series of guidance documents that focused on key elements of mixed waste regulation. The first document, entitled *Guidance on the Definition and Identification of Commercial Mixed Low-Level Radioactive and Hazardous Waste and Answers to Anticipated Questions*, was endorsed by both agencies on January 8, 1987. The document was developed to aid commercial generators of LLW in determining if they were generating a mixed waste.

On March 13, 1987, the Agency and NRC issued a second document, entitled *Combined NRC-EPA Siting Guidelines for Disposal of Mixed Low-Level Radioactive and Hazardous Waste*. This guidance was developed in response to concerns raised by States and Compacts that the absence of the Agency's final location standards could prove to be an impediment to their development of siting plans for LLW disposal facilities in accordance with the 1988 milestone established by the LLRWPA. The guidance not only set forth NRC-EPA combined siting guidelines but also provided the regulated community with Agency contacts to aid them in developing siting plans that would be consistent with the Agency's final location standards.

The Agency and NRC issued a third joint guidance on August 3, 1987. This document depicted a conceptual design for land disposal facilities that could accept mixed waste. The impetus for the guidance stemmed, to a large extent, from concerns that the Agency-approved double liner and leachate collection systems were incompatible with NRC's requirement that contact of the waste with liquids be minimized. The document integrated these two requirements for land disposal facilities.

3.4 Small Quantity Generator Exception Reporting Rule

Under the RCRA manifest system, if a copy of the original manifest is not returned to a generator indicating that the waste has been properly delivered to a treatment, storage, disposal, or recycling facility, the generator must file an "exception report" to this effect. This requirement was not included in the Small Quantity Generator (SQG) rules originally promulgated. As a result, the Environmental Defense Fund (EDF) filed suit, calling for this provision to be included as part of the SQG requirements. EDF argued that wastes from SQGs shipped offsite may at times pose the same risks as that of larger quantity

generators. For instance, SQGs can store wastes of up to 6,000 kilograms before shipping the wastes offsite, and transporters can consolidate wastes from several SQGs before delivering the wastes to a management facility. In response to the lawsuit by EDF, and based on the Agency's re-analysis of the issue, the Agency issued a final rule on September 17, 1987, that requires SQGs to send a copy of the unreturned manifest to the Agency. This rule sets forth a less comprehensive form of exception reporting relative to large quantity generators, reflecting the Agency's desire to minimize burdens on SQGs while still ensuring environmental protection.

3.5 Streamlining the Permit Process

3.5.1 Permit Modification Rule

If the owner or operator of a permitted treatment, storage, or disposal facility (TSDF) wishes to change any conditions of the facility's permit, such changes require a formal permit modification, approved by the Agency or an authorized State. Generally, these changes must be made through the same procedures as are used for issuing the permit. That is, the Agency must publish a proposed modification for comment, provide a 45-day comment period, and hold a public hearing, if requested, before modifying the permit. These procedures require substantial resources and can significantly delay changes that would actually improve protection of human health and the environment.

Recognizing that the permit modification process was becoming increasingly unwieldy, the Agency selected the amendment of the permit modification regulations for regulatory negotiations. After 7 months of negotiations with representatives of industry, the States, and public interest groups, the Agency proposed a rule on September 23, 1987, reflecting agreement among all but one of the members of the negotiating group.

The Agency is now evaluating comments on the proposed rule and expects to promulgate a final rule in the middle of calendar year 1988. As proposed, the rule would establish three classes of permit modifications. Class 1 would cover routine changes that do not substantially alter the permit conditions or reduce the capacity of the facility to

protect human health and the environment. In general, these would cover reference and administrative issues and would not require prior Agency approval.

Class 2 modifications would include changes necessary to enable a permittee to respond to variations in the types and quantities of wastes managed by the facility, technological advancements, and expected regulatory changes (such as land disposal restrictions and listings of new wastes) where such changes can be implemented without substantially changing the facility design or management practices prescribed by the permit. These generally involve increases of 25 percent or less in the facility's non-land-based treatment or storage capacity, authorizations to treat or store new wastes that do not require different regulatory unit design or different management practices, and modifications to improve the design of regulated units or improve management practices.

The proposed process for class 2 modifications obligates the Agency to make a decision on the facility's request within 120 days. If a decision is not made within that time period, the facility may temporarily engage in the requested activity for up to 180 days. During the temporary operation the Agency may take action to approve or deny the permit modification request. If there is no Agency decision within 300 days of the facility's request, then the facility is authorized to conduct the requested activity for the term of the permit. The "default" provision will ensure prompt Agency attention and assure the facility owners that the review of their request will not drag out indefinitely. Furthermore, the class 2 changes subject to the default provision are the kinds of changes that can be readily reviewed because they do not represent major deviations in the facility's permitted activities and the risks are limited. Frequently, these modifications will improve operations at the facility. In all cases, any facility modification under this provision must comply with the appropriate RCRA performance standards.

Class 3 modifications would include changes that substantially alter a facility or its operation, such as increases in land-based treatment or storage capacity; increases of more than 25 percent in non-land-based treatment or storage capacity; authorization to treat, store, or dispose of new wastes that require different engineering design or different management practices; major changes to landfill, surface impoundment, and waste pile liner

and leachate collection/detection systems; and major changes to the facility's ground-water monitoring program.

The proposed permit modification system would improve the ability of facilities to make routine changes necessary to maintain effective operations. It would also provide more flexibility for facilities to respond to changing waste streams, to perform corrective action activities, and to make facility improvements. Public notice and appeal opportunities would be expanded over the current requirements.

3.5.2 Mobile Treatment Unit Rule

Another effort to streamline the permitting process is the Agency's July 1987 proposal to expedite permit procedures for mobile hazardous waste treatment units (MTUs). MTUs include mobile treatment tanks and mobile incinerators. The proposed requirements would make it easier to place mobile units in service and to move the units from one facility to another to treat wastes at a site. Until the Agency promulgates a final rule, MTUs will be subject to the same permit procedures as all treatment, storage, and disposal facilities (TSDFs). Therefore, an MTU must be permitted like a stationary facility at each site where the unit is intended to be used. These requirements could significantly delay permitting of MTUs by imposing redundant reviews without increasing protection to human health and the environment.

The proposed requirements would set up a two-phased permitting process. First, the unit must obtain a State-wide permit specifying technical conditions, applying throughout a State, but not by itself allowing operation of the MTU at a specific site. Before the unit could operate at a specific site, the owner/operator would have to secure a site-specific RCRA permit incorporating general operating requirements contained in the State-wide permit, as well as conditions necessary for the particular site, and requiring public notices and hearings.

Expedited permits for MTUs could play an important role in augmenting treatment capacity. Mobile technologies can be adapted to the full range of treatment processes, from simple pretreatment to full-scale incineration. They may involve single tank trucks that can

be put into operation quickly or may consist of several large modules that can take a few weeks to install and may remain at a site from a few weeks to years. Mobile units also reduce the risks inherent in the transportation of hazardous wastes. The Agency believes this proposed rule will tend to stimulate the development of new alternatives to land disposal.

In conjunction with the MTU proposal, the Agency proposed a new approach to allow delisting of hazardous wastes as part of the permitting process. Before a listed waste from a particular generating facility can be considered nonhazardous, the Agency must determine that it does not meet any of the criteria for which it was listed and that other factors could not cause the waste to be hazardous. The Agency determination can be made only after extensive data are produced and evaluated, a process that can take 8 months or more. The June 3, 1987, proposal allows TSDFs the option of petitioning for a delisting through the RCRA permit process along with the facility's permit application. This approach would expedite the delisting process by consolidating the procedural aspects of the delisting and the permit decision making, whereas currently these procedures have to occur sequentially. The technical criteria for delisting would still have to be complied with before the waste would be considered nonhazardous. This proposed delisting system would be applicable to both MTUs and fixed waste treatment units.

3.5.3 Changes in Interim Status Facilities

Currently, a TSDF operating under interim status pursuant to RCRA 3005 may make changes in its hazardous waste management practices under certain conditions. The Agency believes that current regulations governing these changes may unduly restrict the ability of these facilities to make the changes necessary to comply with the new RCRA requirements, and has therefore proposed a rule that would allow interim status facilities to respond to the following RCRA program requirements:

- Identification of new wastes;
- Minimum technological requirements;
- RCRA 3008(h) corrective action orders;

- Closure requirements; and
- Other changes necessary to comply with Federal, State, and local requirements.

The proposed rule would increase a facility's flexibility to make these changes promptly. Without this rule, it may be necessary to issue permits to these facilities before they can undertake the required activities, thereby delaying the implementation of Federally prescribed actions.

3.6 Hazardous Waste Combustion

At present, toxic metal emissions from hazardous waste incinerators are controlled by a particulate matter limit. Metals and metal compounds in hazardous waste are not destroyed by incineration; they are transformed into other metal species (usually oxides) and then either are removed as ash or in scrubber water or are emitted with stack gases as new metal species. Metals are usually emitted as particulates but can be emitted as metal vapors if the metal is volatile. Under some conditions, the particulate standard may not sufficiently control toxic metals to ensure adequate protection of human health. In addition, under existing rules, hydrogen chloride emissions are controlled by a technology-based standard that may overregulate or underregulate emissions in particular situations. Finally, under present rules, organic emissions are controlled by a destruction and removal efficiency (DRE) standard. This standard requires destruction of toxic organic constituents in the waste but does not directly control products of incomplete combustion.

3.6.1 Revised Incinerator Regulations

To address these potential problems, the Agency is conducting various analyses that could ultimately lead to amendments to the Agency's existing incinerator regulations. One proposal would be to establish risk-based national emission limits for individual toxic metals and alternate hydrogen chloride emission limits based on case-by-case, site-specific risk assessment. Similarly, to address the problem of products of incomplete combustion, the Agency is considering a rule that would require incinerators to operate at high combustion efficiency by establishing limits on flue gas carbon monoxide levels. Low

carbon monoxide levels would be an indicator that unburnable hydrocarbons are not present.

Potential issues involved in proposing any new amendments to the Agency's incinerator rules include the reliability and extent of data needed to conduct site-specific risk assessments, the potential cost of developing this information, and the reliability of using carbon monoxide as a measure of combustion efficiency.

3.7 Monitoring Improvements and Other Technical Amendments

3.7.1 Subpart F

To ensure protection of human health and the environment, RCRA sets strict requirements for the monitoring of ground-water quality in the vicinity of land disposal sites. This monitoring is designed to detect any migration of hazardous constituents from the site exceeding the facility's ground-water protection standard, and to permit rapid and effective corrective action.

Each facility's permit designates a "compliance point" downgradient of the site (generally at the downgradient edge of the waste management area) at which the owner/operator must locate one or more compliance-monitoring wells. The monitoring plan must include a determination of background quality level of the local ground water. It must also take local hydrogeology into account and must be adjusted as necessary for any variations in local ground-water flow. When routine monitoring detects the possible escape of hazardous constituents from the facility, additional, more demanding monitoring requirements automatically take effect to fully characterize the release and support corrective action.

Extensive requirements for ground-water monitoring are contained in Part 264, Subpart F, and Part 270, Subpart B, of the RCRA regulations. In June of 1987, the Agency proposed modifications to these regulations in order to increase their flexibility and improve their coverage. Major changes included:

- A variance from the requirement for siting monitoring wells at the compliance point in situations where it is extremely difficult to gain access to the downgradient edge of the waste management area;
- The establishment of multiple waste management areas for individual units where it is possible to distinguish between contamination released from two different units;
- A provision to allow return to less intensive monitoring requirements whenever a permittee can show that an apparent exceedence of the applicable ground-water protection standard was actually caused by a release from an unregulated source or by an error in sampling, analysis, or evaluation;
- The modification of requirements for annual determination of ground-water flow rates where there is no significant change in the hydraulic gradient between upgradient and downgradient wells; and
- The addition of quality control and quality assurance requirements for ground-water well construction, sampling, and analytical methods.

3.7.2 Appendices VIII and IX

Under RCRA permit requirements, facilities undertake routine "detection monitoring" of a limited list of pollutants. If this program detects a possible release, the facility must conduct more intensive monitoring for a longer list of constituents. When the ground-water monitoring requirements of Subpart F were first promulgated in 1982, the constituents contained in Appendix VIII of Part 261 were used as this longer list.

In 1985 it became clear that a number of the constituents listed in Appendix VIII could not be effectively analyzed in ground water. Some of the Appendix VIII constituents tend to dissociate in water; others lacked adequate laboratory analytical standards or screening methods. Many of the Appendix VIII listings were unusual chemicals that are not contained in commercial products and hence are virtually never present in hazardous wastes. Finally, Appendix VIII chemicals were listed in their pure state, not in the forms they would be expected to take after being disposed of and released into the environment. While these issues do not present problems for waste identification, they do present serious problems for performing ground-water screening analyses.

The Agency therefore convened a week-long meeting of analytical chemists in December 1985, asking the group to create a new list of chemicals, based on Appendix VIII, for which ground-water sample analysis was feasible. Based on the group's work, the Agency proposed a new monitoring rule in July 1986. Comments received on that rule were considered in a second meeting of experts, and the list was modified slightly. In June of 1987 the Agency finalized the list as Appendix IX to Part 264 of the regulations.

3.7.3 Revisions to Solid Waste Testing Manual

The Agency periodically updates its compendium of testing procedures referred to as the *Solid Waste Testing Manual*. The purpose of the manual is to describe suitable analytical methods for testing, sampling, and analysis of hazardous wastes covered by RCRA. It is used by industry, State, and Regional Office testing laboratories. Update and review occur through an annual symposium held to review the latest scientific and analytic developments in testing methods and to obtain feedback on the performance of the testing methods in the previous edition of the manual. This year the Agency published the third edition of this manual.

3.8 RCRA/CERCLA Integration

The HSWA corrective action provisions and the recently passed cleanup provisions embodied in the Superfund Amendments and Reauthorization Act (SARA) led the Agency in this past fiscal year to identify a management strategy that would ensure consistency wherever possible in decisions related to cleanup of sites. Through the strategy the Agency is seeking to integrate the RCRA and Superfund programs in order to achieve similar remedies for similar environmental problems at similar sites.

The strategy will ensure that owner/operators will not find incentives to seek regulation under one program or another. Furthermore, the strategy will enable the Agency to make more efficient use of its resources by avoiding duplicate efforts under the two programs for what amounts to the same type of problem.

The integration of the two programs will be designed to:

- Identify problem sites in need of remediation;
- Set priorities for compelling the cleanup of our worst environmental problems first; and
- Target enforcement efforts at these sites using any enforcement authority or combination of RCRA and Superfund authorities available to achieve the most expeditious and environmentally protective cleanup.

The Agency will implement this strategy through the Corrective Action rule under RCRA and the National Contingency Plan rule under Superfund.

4.0 STATE AUTHORIZATION AND REGIONAL IMPLEMENTATION

4.1 Introduction

4.1.1 Overview

By the fourth quarter of fiscal year 1986, the Agency had authorized 42 States to operate a base RCRA program in lieu of the Federal hazardous waste program. The Hazardous and Solid Waste Amendments of 1984 (HSWA), however, expanded the scope of the hazardous waste program by adding several new requirements and prohibitions (e.g., land disposal restrictions, corrective action, and waste minimization).

HSWA also significantly altered the implementation of the hazardous waste program. Prior to the passage of HSWA, new RCRA regulations promulgated by the Agency took effect only in nonauthorized States. Regulations equivalent to newly promulgated RCRA regulations became effective in authorized States solely through State adoption pursuant to State law. In contrast, the amended RCRA Section 3006(g) provides that HSWA requirements and prohibitions are effective in all States, including authorized States. The HSWA provisions will be implemented and enforced by the Agency in each State until the State is authorized for the HSWA provision.

4.1.2 RCRA Implementation Plan

The Agency annually publishes a guidance document for Regional Offices and States, written with their assistance, prescribing the most effective strategies for implementing RCRA's program goals. Called the RCRA Implementation Plan (RIP), this document provides a framework in which States and Regions can set program priorities on an annual basis. State program authorization, grant administration, and information management requirements also are discussed in the RIP. By modeling their programs and work plans on the directions and priorities of the RIP, Regional Offices and States are expected to integrate all of their technical, management, and enforcement resources toward achieving program progress during the subsequent fiscal year.

The framework of the fiscal year 1987 RCRA Implementation Plan stressed the need for significant accomplishments in program activities at the national and State levels. The two primary components underlying the fiscal year 1987 RIP were (1) a set of high-priority activities for which maximum progress was anticipated and (2) a scheme for categorizing other activities into relative priority groups. Five high-priority activities were targeted for fiscal year 1987:

1. Processing and issuing operating land disposal facility permits to meet the November 1988 permit deadline;
2. Identifying and enforcing ground-water monitoring requirements for land disposal facilities seeking an operating permit;
3. Ensuring adequate ground-water monitoring systems, closure plan implementation, and financial assurance at closing facilities;
4. Expediting the permit process for new and expanded treatment and incinerator capacity, research development and demonstration (RD&D) applications, and offsite commercial treatment facilities; and
5. Conducting inspections mandated by HSWA and Agency policy.

Under the scheme, activities beyond these high-priority activities were to be prioritized based on current knowledge concerning releases and the severity of their environmental effects.

Besides providing an overall list of priorities for State and Regional Office implementation of RCRA, the fiscal year 1987 RIP addressed the various elements of the RCRA program in greater detail. These elements included recommendations for achieving goals for permitting, closure plan approval and implementation, compliance monitoring and enforcement, corrective action, State authorization, grant administration, and information management.

The fiscal year 1988 RCRA Implementation Plan was issued on March 31, 1987. Like its predecessor, the document established a framework for determining national and State priorities and provided guidance on implementing the RCRA Subtitle C program.

The highest priority activities for RCRA delineated in the fiscal year 1988 framework were the following:

1. Make a final determination on operating land disposal facility permits by November 1988, and process and make final determinations on incinerator facility permits by November 1989;
2. Ensure that facilities have adequately assessed ground-water protection concerns, especially at environmentally significant closures;
3. Process permits for new and expanding treatment and incineration capacity, RD&D applications, and offsite commercial treatment facilities, and process permit modifications; and
4. Conduct inspections mandated by HSWA, SARA, and Agency policy, and pursue enforcement against significant violators.

All of these activities have been designated high priority; thus, EPA Regional Offices and States must undertake these activities in order to meet statutory and environmental protection requirements. Regional Offices and States are urged to first address the most environmentally significant facility closures and recognize that corrective action measures are integral to the processing of permits and closure plans. Coordination with Superfund authorities and resources is underscored, particularly with reference to RCRA facilities that accept Superfund wastes, closing facilities, and Federal facilities needing corrective action.

Further, the fiscal year 1988 RIP advises the Regional Offices to devote resources to activities related to supporting the land ban, permit modifications, and the call-in of storage applications, as well as reporting, technical assistance, State authorizations, and effective oversight of State permitting and enforcement actions. Examples include planning for post-closure permits and case development inspections. Regional budgeting for important activities not specified in the RIP, such as special Regional initiatives, also is encouraged and will be addressed specifically in the fiscal year 1989 RIP.

The fiscal year 1988 RIP includes two new sections not contained in the previous RIP—Federal Facilities Issues and Cross-Media and Program Issues. The program objective of the Agency's RCRA work with Federal facilities is to ensure that they afford

the same degree of environmental protection as other hazardous waste handlers. Specifically, efforts will be directed at (1) applying corrective action rules and policies to Federal facilities, (2) meeting the fiscal year 1988 deadline for permitting DOD chemical demilitarization facilities, and (3) integrating DOE-NRC mixed waste facilities into the RCRA program.

Because environmental problems do not respect media boundaries or program jurisdictions, RCRA must refrain from shifting risks from one environmental medium to another. The fiscal year 1988 RIP considers it imperative for RCRA to utilize its resources to achieve an overall reduction of environmental risks. Consequently, the RIP emphasizes both the need to coordinate RCRA activities with the Agency's air and water programs and the integration of RCRA and Superfund activities.

4.2 Summary Statistics on State Authorization

States are encouraged to apply for authorization for Federal program changes as soon as practicable. In fiscal year 1987, the Agency approved eight program revision applications that amended the States' base program authorization. With the exception of Georgia, these program revision applications reflected primarily RCRA (non-HSWA) changes. To date, Georgia is the only State that has been authorized for major HSWA provisions. In fiscal year 1988, the Agency will continue to review and approve program revision applications for both RCRA and HSWA regulations. In addition, we expect that several States will receive authorization for the RCRA base program in fiscal year 1988.

Table 4-1
State Authorization Status
Progress to Date (9/30/87)

EPA Region	HSWA Authorized	RCRA Base Only *	No Authorized State Hazardous Waste Program
I	0	Vermont, Rhode Island, New Hampshire, Massachusetts	Maine, Connecticut
II	0	New York, New Jersey	Virgin Islands, Puerto Rico
III	0	Dist. of Columbia, Delaware, Maryland, Pennsylvania, Virginia, West Virginia	0
IV	Georgia	Georgia * Florida, Mississippi, North Carolina*, Kentucky South Carolina*, Tennessee*	Alabama
V	0	Illinois, Indiana*, Minnesota*, Michigan, Wisconsin	Ohio
VI	0	Arkansas, Louisiana, New Mexico, Oklahoma, Texas*	0
VII	0	Kansas, Missouri, Nebraska	Iowa
VIII	0	Colorado*, Montana, South Dakota, North Dakota, Utah	Wyoming
IX	0	Arizona, Nevada, Guam	California, Hawaii Northern Marianas American Samoa
X	0	Washington, Oregon	Idaho, Alaska
TOTAL	1	42	14

* Program Revisions Approved.

The Agency undertook a variety of activities over the past five quarters to support implementation of State programs under RCRA and HSWA. Updating the criteria for quality State programs is one activity being implemented. Others are discussed below.

4.2.1 State Consolidated RCRA Authorization Manual (SCRAM)

As noted earlier, the passage of HSWA in 1984 fundamentally changed the process for implementing the Federal hazardous waste program in authorized States. The State Consolidated RCRA Authorization Manual (SCRAM), which will be published shortly, provides guidance to States in developing applications for authorization. It describes the requirements for obtaining authorization and lists the necessary elements to be included in applications for base programs as well as in program revision applications. The manual also discusses internal Agency procedures for processing these applications.

4.2.2 National Conference on State Authorization

The Agency held a 2-day "Program Revision Workshop" in Washington in February 1987. The main purpose of the workshop was to apprise Federal and State officials of changes in State authorization procedures and other related requirements resulting from the new requirements of HSWA. It also addressed how these changes will affect applications for authorization and interactions between State and Federal programs. Among the specific topics discussed were the elements of a program revision application (i.e., program descriptions, Memorandum of Agreement, Attorney General's Statement, and Federal program changes affecting HSWA and non-HSWA requirements that States are required to meet by specified dates for the phased authorization of States), the role of mixed waste Federal facilities, and HSWA capability.

4.2.3 Training/Grants

The *National Criteria for a Quality Hazardous Waste Management Program Under RCRA* (issued jointly by the Agency and the Association of State and Territorial Solid Waste Management officials) recommends that EPA, Regional Offices, and States identify specific training needs in their annual work plans. Training activities are eligible for funding under RCRA Section 3011 grants. In fiscal year 1987, States were strongly encouraged to set aside up to 5 percent of each grant for training activities. Contract funds may also be used to provide training, whether with Regional Office contract resources or with reprogrammed State funds.

In fiscal year 1987, the Office of Solid Waste also supported State training activities through a special grant to the State association. This money is being used to develop a basic permit writer's course, as well as an entry-level inspector training program for State personnel.

In fiscal year 1987, several changes were made to grant allotments. The population data and the numbers of treatment, storage, and disposal facilities were updated in the formula used to determine each Region's allotment. Allotments were allocated on a Regional rather than a State-by-State basis to provide maximum flexibility to Regional Administrators. Grants to the States continue to require a 25 percent State match. As before, the fiscal year 1987 grants were performance-based; this approach uses financial assistance as a management tool to promote effective State RCRA programs and to ensure accountability.

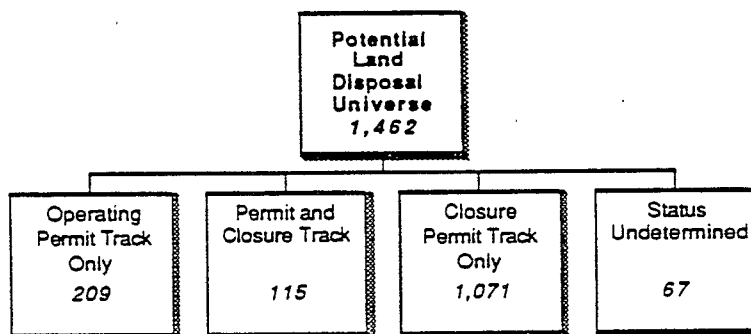
5.0 PERMITTING ACTIVITIES

5.1 Introduction

Priorities for permitting activities in fiscal year 1987 focused first on processing Part B permit applications and issuing operating permits to land disposal facilities in order to meet the November 1988 permit deadline. The Agency provided guidance to authorized States to use enforcement actions aggressively to support the permit process, particularly with respect to obtaining compliance with ground-water monitoring requirements.

High priority was also given to permitting new commercial incineration facilities, as well as existing facilities seeking to expand incineration or treatment capacity. The deadline for permitting incinerators is November 1989. Furthermore, incinerators, along with other forms of non-land disposal permitting, are of particular importance because of the current disposal capacity shortage, caused by the large number of facility closures, more stringent land disposal facility requirements, and the land disposal bans.

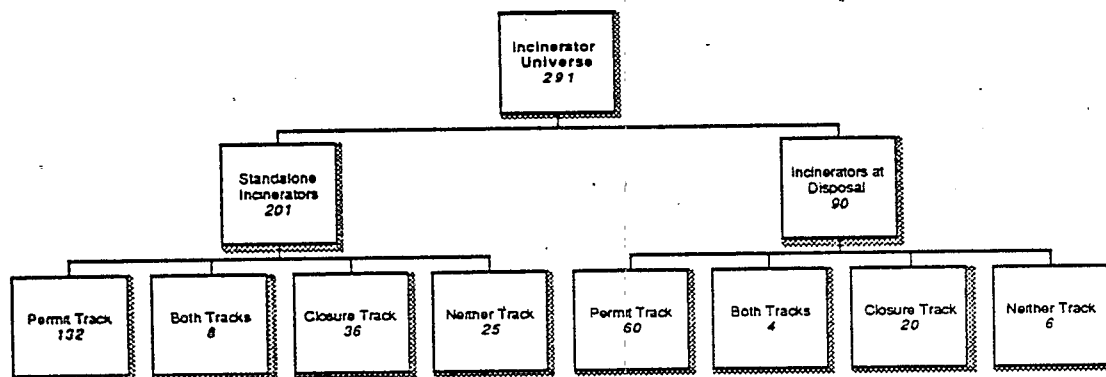
For the 1,462 land disposal facilities, the Agency expects the breakouts between permitting and closure to be as shown in the diagram below.



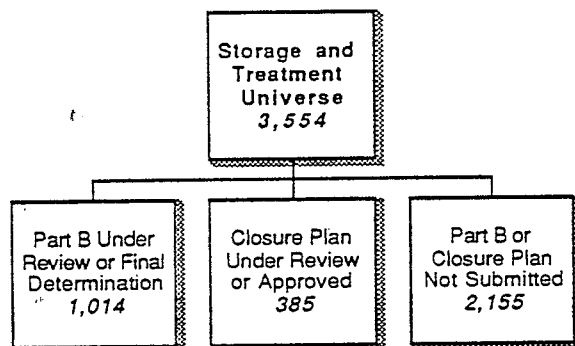
As this diagram indicates, the majority of land disposal facilities are expected to close. The diagram illustrates the expected course of action for land disposal facilities. Disposal facilities may be on a permit track only, a closure track only, both permit and

closure tracks, or neither closure nor permit track (status undetermined). Facilities could be on the neither (status undetermined) track for any of several reasons, including site abandonment or regulatory disagreements between facility, Regions, and/or EPA.

The incinerator universe falls into two broad categories—stand-alone incinerators and incinerators at disposal sites. In contrast to land disposal sites, the breakout for permitting and closure of incinerators indicates that a majority of incinerators are expected to be fully permitted. Incinerators on the neither tracks have undetermined RCRA status for some reason, and, because their expected course of action cannot be determined, they have not yet been placed on either permit or closure tracks.



Storage and treatment facilities make up the greatest percentage of facilities that must be permitted. The deadline for permitting these facilities is November 8, 1992. The status of these facilities is shown below.



Closures are also of primary concern; the Agency's strategy is to address facilities that close on a priority basis, beginning with the most environmentally significant. Throughout the program, emphasis is placed on ensuring that closing land disposal facilities have an adequate ground-water monitoring system, and that owners and operators implement closure plans and provide the required financial assurances. The goals are to minimize the post-closure release of hazardous constituents into the environment and to take corrective action to remedy already existing environmental problems.

This chapter discusses guidance issued on the closure procedure for treatment, storage, disposal, and recycling facilities; on ground-water monitoring for land disposal and other facilities; on the RCRA facility assessment process; and on incinerator permitting and trial burns.

5.2 Summary Statistics

Tables 5-1 and 5-2 summarize the progress made in permitting and closures during the past reporting period.

Table 5-1 Final Determinations for Permitting Facilities Fiscal Year 1986 Through Fiscal Year 1987

	Land Disposal Facilities			Incinerator Facilities			TSDFs			Total for Quarter	
	Permit Issued	Permit Denied	Total	Permit Issued	Permit Denied	Total	Permit Issued	Permit Denied	Total	Issued	Denied
FY86*	13	14	27	9	3	12	79	7	86	101	24
1st Qtr. FY87**	10	0	10	2	0	2	8	1	9	20	1
2nd Qtr. FY87	19	8	27	10	0	10	20	2	22	19	10
3rd Qtr. FY87	22	20	42	12	1	13	29	6	35	63	27
4th Qtr. FY87	54	37	91	14	2	16	49	13	62	117	52

* These data are total for all FY86.

** FY 87 numbers are cumulative by quarter.

Table 5-2 Closure Plans Approved for All Facilities
4th Quarter Fiscal Year 1986 Through Fiscal Year 1987

	LDF	Incinerator	TSDFs	Total for quarter
FY86*	161	9	151	321
1st Quarter FY87 **	45	0	18	63
2nd Quarter FY87	111	6	6	123
3rd Quarter FY87	163	9	134	306
4th Quarter FY87	332	13	223	568

* Cumulative total for all FY 86.

** FY 87 numbers are cumulative by quarter.

Over the coming year, the Agency will make determinations regarding land disposal facilities awaiting permits and expects to meet the November 1988 deadline for completing these permitting activities.

5.3 Implementation

5.3.1 Closure Guidance

The process for safe and secure closure of TSDR facilities is complex and therefore requires detailed guidance for proper implementation. Over the past year, the Agency has developed several important guidance documents for closure operations.

Land Treatment: Land treatment involves the controlled application of certain types of hazardous wastes to soil. In the soil, waste constituents may degrade through biological action of soil organisms, become immobilized within the soil matrix, or be transformed through chemical and biological processes into nonhazardous materials. Interim guidance on closure and post-closure of hazardous waste land treatment facilities was issued in April 1987.

The guidance provided this year on appropriate methods of closure and post-closure care includes such technologies as soil removal, cover or cap placement, and ground-water monitoring. Plans must be site specific. In reviewing closure and post-closure plans, the Agency is particularly concerned with the extent of degradation, transformation, and immobilization of constituents within a defined treatment zone, and with the control of pathways of migration of hazardous waste and hazardous constituents into the environment, including ground water, surface water, the atmosphere, and food-chain crops grown onsite. Information on all of these factors is used to predict potential pathways of migration of wastes and waste constituents into the environment.

Plans submitted by the owner or operator must include a method of evaluation of potential migration of residual wastes into all environmental media, based on laboratory studies or environmental modeling. The time required for closure is a function of the method chosen for closure. Performance is based on concentration limits for Appendix VIII constituents for each potential route of exposure; the concentration limits are set, where possible, at the Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act or at risk levels specified in the guidance.

Clean Closure: In September 1987, the Agency completed work on its *Surface Impoundment Clean Closure Manual*, written for RCRA facility owners and operators of surface impoundments and for Regional Office permit writers. The term "clean closure" refers to the removal of all waste from a facility in order to close it, and is distinct from closure procedures that seal wastes within the facility to prevent any eventual migration from the site.

The manual provides detailed information on the Agency's policy for clean closure by removal of waste, providing evaluation criteria for setting cleanup target levels and procedures for ensuring that they are met. It describes a comprehensive process to prevent environmental threats from the facility following closure, since the implication of completing closure by removal of wastes is that the owner or operator is not subject to any further regulatory control, including corrective action, and is relieved of any financial responsibility.

Closure/Post-Closure: The Agency has issued two documents designed to assist Regional and State authorities and owners/operators in understanding the closure and post-closure regulations. The first, titled *RCRA Policy Compendium for Subparts G and H* (December 1986), is a reference tool for Regional and State permit writers that identifies relevant Agency documents and policy memoranda on key provisions in the closure and post-closure regulations. The second, titled *RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements* (January 1987), is a document for owners/operators who are actually in the process of preparing closure and post-closure plans. It offers practical information and procedural methods on plan preparation and review and on economic analysis. Examples illustrating the types of information that should be included in the plans are provided. In addition, the manual includes an extensive discussion of site-specific factors and a series of checklists covering the major items that owners/operators must address in plan preparations. The guidance manual also leads owners/operators through the cost-estimating process. Each of its five sections addresses a particular aspect of the estimation process, including the basic rules for preparing costs, cost revisions that reflect changes in the plans, annual adjustments for inflation, and the documentation needed to prepare the estimates.

5.3.2 ACL Guidance

In July 1987, the Agency published interim final guidance for RCRA facility permit applicants and permit writers on setting alternative concentration limits (ACLs). ACLs will be used by facilities in establishing their ground-water protection standard (GWPS).

As discussed in Section 2.6.1 the purpose of an ACL is to provide flexibility in setting concentration limits that would act as "triggers" for corrective action. An ACL is a means of demonstrating that hazardous constituents on a site do not pose a threat to human health or the environment when they meet the site-specific ACL levels. The Agency's new guidance is based on three basic policy guidelines:

1. Ground-water contaminant plumes should not increase in size or concentration above allowable health or environmental exposure levels;
2. Increased facility property holdings should not be used to allow a greater ACL; and
3. ACLs should not be established so as to contaminate offsite ground water above allowable health or environmental exposure levels.

5.3.3 RCRA Facility Assessments

In October 1986, the Agency issued the *RCRA Facility Assessment Guidance*. This guidance describes the process by which the Agency or an authorized State assesses treatment, storage, and disposal facilities to determine whether any solid waste management units at the facilities are likely to be releasing hazardous wastes or constituents. If the Agency identifies a likely release, it will require a more detailed investigation and, if necessary, cleanup under a permit or Section 3008(h) order. The RCRA Facility Assessment (RFA) also enables the permit writer to determine whether "interim remedies" are necessary to control threats to human health and the environment. Interim remedies might include repacking damaged drums, removing drums from the site, or providing alternative sources of drinking water where there is ground-water contamination.

Specifically, the guidance outlines the following steps for the RFA:

Preliminary Review: The Preliminary Review (PR) is an evaluation of existing information gathered from the permit application and other sources. It identifies the location of solid waste management units, the types of waste they have received, and any available monitoring or other data that provide evidence of a release.

Visual Site Inspection (VSI): This is an onsite visit to ensure that all elements of the facility have been properly identified; to fill data gaps identified in the Preliminary Review; and to detect visible evidence of releases.

Sampling Visit: In many cases, a sampling visit will be necessary to complete an assessment. For example, an investigator may choose to sample if he or she needs additional information to support a determination that a release has occurred or may be occurring to compel an owner/operator to begin a RCRA Facility Investigation (RFI).

RFA Report: The investigator summarizes the RFA in a report containing all the evidence gathered during the assessment. The report can make recommendations for (1) no further action, (2) further investigation with a formal RCRA Facility Investigation, (3) planning and implementation of interim corrective measures, or (4) referring information on a detected release to another environmental program for control. Only the first recommendation completes the corrective action element in the permitting process. The others require additional activity by either the permit writer or other Agency offices.

5.3.4 Training Workshop Series on Hazardous Waste Combustion Sampling and Analysis

The trial burn is the most important part of the permitting process for hazardous waste incinerators because it determines whether the unit can meet the performance standards; if the unit does meet the standards, the trial burn provides data enabling the permit writer to set operating conditions in the permit. Sampling and analysis for incinerator trial burns and for waste analysis are technically complex.

The purpose of this workshop series, presented in three cities, was to share the expertise of EPA research personnel and technical contractors with the permit writers and industry. The presentations discussed the various sampling and analysis methods used for

incinerator testing, as well as quality assurance/quality control measures used in data collection.

5.3.5 Incinerator Guidance

The Agency is currently expanding the scope of its regulations for hazardous waste incinerators to include impacts associated with the combustion of wastes containing toxic heavy metals, such as lead and cadmium. Until these new regulations take effect, however, permit writers will need interim guidance on defining and applying appropriate controls for these facilities under existing permitting authority.

The purpose of the interim guidance is to provide this information in a manner that is consistent with the general policies to be embodied in the forthcoming regulations. The approach is to base controls on potential worst-case risks associated with the combustion of waste-containing metals and hydrogen chloride (HCl), which is typically associated with metals-bearing hazardous waste streams. Such an approach is consistent with HSWA's goal of protecting human health and the environment.

5.3.6 "Performance Improvement Project" on Hazardous Waste Incineration Permitting

The Agency tracks the performance of its field operations through a variety of quantitative administrative indicators and measurements, such as the number of permits issued in a particular year, the number of inspections completed, and so forth. Over the past year, the Agency has also established a trial program, called the Performance Improvement Project, intended to focus on the quality as well as the quantity of field operations management. As part of this effort, the Agency used the hazardous waste incineration permitting process as a pilot evaluation.

The purpose of this project was to improve permitting by providing a common level of technical knowledge to Federal, State, and local government permit writers and to owners/operators and applicants in the regulated community. The Agency held five technical seminars throughout the country during the fall of 1986 and extensively evaluated the results of these seminars in the following months, using before-and-after questionnaires

as well as an analysis of the improvements in the quality of applications received. The seminars reached 66 percent of EPA incinerator permit writers and were well received.

6.0 ENFORCEMENT ACTIVITIES

6.1 Introduction

During fiscal year 1987, compliance monitoring and enforcement activities focused on:

- Abating any release of a hazardous waste or constituents (not addressed by CERCLA) posing an immediate threat to human health or the environment;
- Supporting issuance or denial of all land disposal facility operating permits;
- Pursuing a formal enforcement action against RCRA land disposal facilities with inadequate ground-water monitoring systems;
- Under the corrective action program, conducting facility-wide assessments to determine whether there are releases and whether further investigation or corrective action is needed;
- Enforcing against closing land disposal facilities to require compliance with approved closure plans;
- Enforcing compliance with final orders, decrees, and permit conditions;
- Enforcing major HSWA requirements, including land disposal bans;
- Ensuring Federal facility compliance; and
- Supporting criminal enforcement.

The Agency's general enforcement strategy has been to direct compliance monitoring and enforcement actions toward those handlers and those violations likely to pose the greatest threat to human health or the environment. As established in fiscal year 1984 and fiscal year 1985, the general RCRA enforcement strategy sets the following priorities:

1. Handlers whose releases may present an immediate threat to human health or the environment.

2. Ground-water monitoring facilities. Actions are to be brought against facilities that are not operating in compliance with their permits or that are not in compliance with permit application requirements.
3. Corrective action.
4. Closing facilities. This includes enforcing ground-water monitoring and compliance with closure plans and financial assurances for corrective action.
5. Federal facilities. Authorized States have the lead in enforcement for Federal handlers, but a Regional Office must take formal administrative action if a State declines or is unable to take formal action.
6. Criminal enforcement: This area received increased emphasis in fiscal year 1987 because increased illegal disposal activity, linked to shortages of land disposal and treatment capacity, is anticipated.

Inspections are an important tool in overseeing and ensuring compliance. Inspections fall into two categories: (1) mandatory inspections, which fulfill statutory requirements and Agency policy, and (2) nonmandatory inspections, which are recommended to meet RCRA requirements. During fiscal year 1987 mandatory inspections included inspections to provide documentation on high-priority enforcement actions; inspections of all government, commercial, land disposal, and other TSD facilities; and inspections of at least 4 percent of generators and transporters. Nonmandatory inspections include inspections to support the criminal program, inspections of non-notifiers, case development inspections, inspections of waste oil TSDFs, and additional generator and transporters inspections, particularly as related to the land bans.

6.2 Summary Statistics

The following table summarizes enforcement activities over the past reporting period.

Table 6-1 Progress on RCRA Enforcement

	Formal Administrative Actions		Civil Actions		Criminal Referrals		Total for Quarter	
	Regional Offices	States	Regional Offices	States	Regional Offices	States	Regional Offices	States
4th Qtr. FY86*	235	519	66	25	20	0	321	544
1st Qtr. FY87	28	61	2	12	3	0	33	73
2nd Qtr. FY87	75	184	9	14	4	2	88	200
3rd Qtr. FY87	130	326	8	29	5	5	143	360
4th Qtr. FY87**	217	613		86		8	217	707
Total***	685	1,703	85	166	32	15	802	1,884

* Cumulative data for all of FY86.

** Data will not be available until late October 1987.

*** Total based on data to September 30, 1987.

6.3 Implementation Activities

6.3.1 Land Disposal Restrictions Enforcement Strategy

In 1987, the Agency developed a strategy for enforcing both solvent and dioxin regulations and the California List regulations under the land disposal restrictions program. This strategy identifies the relative universe of facilities that must comply with these regulations and requires the development of mandatory Regional enforcement strategies. The Agency evaluated the effectiveness of Regional strategies and emphasized these strategies during the enforcement training course.

To date, the numbers of land ban inspections and enforcement actions are estimated as shown in Table 6-2.

Table 6-2 Estimated Number of Land Ban Inspections and Enforcement Actions

Region	Number of Inspections	Enforcement action
1		Region has sent Section 3007 letters.
2	53	8 Administrative Orders
3	30	Evaluating inspection results. 1 Administrative Order
4	214	96 Notices of Violation
5	400	290 Notices of Violation
6	45	10 Letters of Warning 1 Administrative Order 10 under case development
7	180	170 Notices of Violation
8	55	6 Section 3007 Letters 3 Letters of Warning 3 under case development
9	35	1 Letter of Warning 1 Notice of Violation (in draft) 26 Notices of Violation to be sent to Federal facilities 5 Administrative Orders (in draft) 1 Section 3007 Letter
10	25	No Actions

6.3.2 Land Disposal Restrictions Inspection Manual and Checklists

In April 1987, the Agency issued its *Inspection Manual: RCRA Land Disposal Restrictions Rule for F001-F005 (Solvent) Wastes*. This manual presents all necessary data for conducting inspections under the rule banning disposal of certain untreated solvent wastes.

The manual discusses the Agency's major concerns with respect to enforcing this rule, including (1) proper identification of F-solvent wastes by generators and (2) proper management of F-solvent wastes at treatment, storage, and disposal units. The heart of the manual is a series of extensive checklists for inspectors. These checklists cover all aspects of the rule, including proper identification of wastes, correct administrative identification of each generator's regulatory status in relation to the solvent ban, and a detailed list of technical review items to ensure that wastes are being managed at each site in accordance with regulatory requirements.

The Agency has also completed a draft checklist for enforcement of wastes covered by the California List rule.

6.3.3 Model Order for Corrective Actions at Interim Status Facilities

With the passage of HSWA in 1984, EPA is now authorized to compel owners/operators of interim status hazardous waste facilities to conduct corrective action on the basis of information that there is or has been a release of hazardous wastes. Because of the complexity of cases involving the investigation and cleanup of hazardous waste releases, the Agency is in the process of developing a Model Order to be used by the Regions in drafting Section 3008(h) administrative consent orders.

In February 1987, the Agency sent the draft section 3008(h) Model Consent Order to the Regions for their use pending the finalization of the Model Order, scheduled to be released before the end of this year. The Model Order assists the Regions in developing comprehensive and consistent section 3008(h) consent orders by providing (1) model Findings of Fact and Conclusions of Law to support the elements of a Section 3008(h) cause of action; (2) sample scopes of work, to be tailored by the Region to be site specific; and (3) model legal provisions, including reservations of rights and provisions relating to delay in performance, stipulated penalties, termination and satisfaction, and dispute resolution.

6.3.4 Training for States and Regional Offices

Corrective Action Order Training: In fiscal year 1987, the Agency developed and presented a 2-day training course for Regional enforcement and permitting personnel to assist them in the development and oversight of orders and permit conditions requiring corrective action. Presented in all ten Regional Offices, the course focused on (1) RCRA and CERCLA authorities that can be used to compel corrective action; (2) the elements of a Section 3008(h) corrective action order; and (3) the technical components of all phases of corrective action—interim measures, the RCRA Facility Investigation, the Corrective Measures Study, and the Corrective Measures Implementation.

In addition, the Agency provided a grant to the National Association of Attorneys General (NAAG) for the development and presentation of a corrective action seminar. Pursuant to that grant, NAAG sponsored three Regional corrective action seminars in St. Paul, Minnesota, Santa Fe, New Mexico, and Nashville, Tennessee, which were attended by representatives of State Attorneys General and State environmental agencies.

Risk and Decision Making Workshop: In 1987, the Agency developed a training workshop focusing on the application of risk assessment to a prototypical Regional-State level hazardous waste problem. The purpose of the two-day "Risk and Decision Making Workshop" is to explain the concepts of risk assessment, risk management, and risk communication in the context of a case study centered around a cleanup problem at a hypothetical hazardous waste management facility. The workshop is intended to help EPA Regional and Headquarters staff to increase their understanding of the potential uses and limitations of risk assessment, to develop a common base of knowledge and terminology, to use risk concepts in formulating site-specific decisions, and to refine skills needed to communicate these decisions. In December 1986, the Agency held a pilot workshop in Region 1; participants included Regional Office and State staff, as well as representatives from industry, academia, and the public. The refined workshop was held in Washington in the spring of 1987, and similar workshops were held in Regions VII, VIII, and X. The Administrator has recently required all EPA staff at both Headquarters and Regional Offices to participate in this training program.

6.3.5 Implementation Strategies and Guidance

Over the course of the past year, the Agency has developed a number of enforcement strategies and enforcement guidance documents for use under various elements of the RCRA program.

Ground-Water Protection: The Comprehensive Ground-Water Monitoring Evaluation Guidance Document was developed to evaluate the adequacy of the design and operation of ground-water monitoring systems at RCRA facilities. It includes a detailed explanation of the scope and methods of ground-water monitoring and a checklist for use by the person conducting the evaluation.

National Corrective Action Strategy: This strategy is described in Section 2.6.1 of this report.

Loss of Interim Status Strategy Implementation: This strategy identified three classes of clear violations that are given high enforcement priority:

1. Land disposal facilities clearly not in compliance with ground-water monitoring and financial responsibility requirements;
2. Facilities that lose interim status and continue to accept hazardous waste; and
3. Facilities that are required to submit closure plans but have not done so.

The focus of the program is to bring civil, criminal, and administrative actions against those land disposal facilities most clearly violating the interim status requirements of RCRA.

Phase I Waste Oil Guide and Strategy: This document provides technical guidance to enforcement officials for planning and conducting inspections and case development related to standards for used oil and hazardous waste intended for energy recovery.

Compliance and Evaluation Inspection (CEI) Guidance (Draft): This is a general inspection manual for compliance and inspections of RCRA regulated facilities. The guidance is developed for use by Regional Office, State, and contracted enforcement

personnel. It will serve as a training guide for new inspectors and a reference manual for those with experience. The manual explains proper procedures for conducting the inspection, as well as pre- and post-inspection procedures.

Hazardous Waste Tank Guidance/Checklist (Draft): This document outlines specific inspection procedures and provides a regulatory checklist for Hazardous Waste Tanks. This guidance/checklist is developed for use by Regional Office, State, and contracted enforcement personnel. It serves as an aid to inspectors in interpreting the Hazardous Waste Tank Rule, which became effective on January 12, 1987. It covers inspection procedures for secondary containment systems, integrity assessment, leak detection, and tank system installation procedures.

RCRA Inspection Manual (Draft): The revised inspection manual will be a comprehensive guide to conducting effective RCRA inspections for State and Regional Office inspectors. It will address inspection preparation, permit review for inspecting permitted facilities, communicating with owner/operators, post-inspection activities, report preparation, and keeping up-to-date with RCRA. In addition, the manual will provide inspection procedures and checklists for both generators and treatment, storage, and disposal units. This manual should be completed in early 1988.

State Oversight Inspection Guidance (Draft): This guidance document includes a discussion of the purpose and objective of the inspection, preparation techniques, performance of the inspection, and procedures for reporting the findings of the inspection. A recommended oversight inspection report is included as part of the document. It is expected to be issued in its final form in early 1988.

Technical Case Development Guidance (Draft): This guidance will include an overview of the case development process, a discussion of the rules of evidence as relevant to inspections, pre-inspection and onsite procedures, sampling techniques and strategies, and investigative and administrative procedures (including maintenance of inspection files and the preparation of reports). The guidance will also address how to collect technical information suitable for use as evidence at hearings and trials.

The guidance will serve as a useful compilation of case development experiences. It will explain why certain procedures, techniques, and strategies have either succeeded or failed in the past.

Guidance for Public Involvement in RCRA Section 3008(h) Actions: This guidance emphasizes that there are minimum public involvement requirements for all 3008(h) orders, whether consent or unilateral. The document also identifies situations in which additional public involvement will be necessary.

RCRA Laboratory Inspection Guidance (Draft): The laboratory inspection guidance is used to determine:

1. Whether the laboratory that the owner/operator is using for ground-water sample analysis is properly equipped, maintained, and staffed;
2. Whether there are adequate quality assurance and quality control procedures in force at the laboratory; and
3. Whether samples are properly logged and tracked throughout the laboratory.

This inspection does not constitute laboratory certification for the RCRA program, nor does it guarantee that the analytical data that the laboratory produces are reliable. The laboratory inspection guidance will determine whether the laboratory is capable of producing quality laboratory results.

RCRA Corrective Action Plan: As discussed in Section 2.6.1 of this report, the purpose of the RCRA Correction Action Plan (CAP) is to aid Regional Offices and States in determining and directing the specific work the owner/operator or respondent must perform as part of a complete corrective action program. It should be used as a technical framework during the development of Corrective Action Orders and corrective action permit requirements.

Enforcement Response Policy: The RCRA Enforcement Response Policy (ERP) was revised during fiscal year 1987. Originally issued in December 1984, the ERP provides a general framework identifying violations and violators of concern and describing timely and appropriate enforcement response to noncompliance. The changes

were made to reflect changes in the program and the regulated universe. Since the development of the original ERP, new program initiatives have developed as provisions of the 1984 ERP placed priority on enforcement against interim status land disposal facilities that were out of compliance with ground-water monitoring, closure/post-closure, or financial responsibility requirements. HSWA and overall development of the RCRA program have mandated closer scrutiny of other segments of the regulated community and other types of violations. This expansion of focus required a broadening of programmatic emphasis. For example, corrective action requirements and land disposal restrictions direct more attention to hazardous waste treaters, storers, and generators, as well as to land disposal facilities.

Study of State Authorities and Procedures: During 1987, the Agency completed a study of the State's hazardous waste enforcement authorities and procedures. The study examined the statutory, common law, regulatory, procedural, and institutional features bearing on the effectiveness of enforcement. To assist the Agency in developing policies and guidance that recognize and deal with State-specific variation, the study identifies the factors necessary to evaluate State hazardous waste enforcement programs. An understanding of State enforcement authorities and procedures is critical to the Agency's continued oversight of the States and the Agency's evaluation of States for authorization. Information from this study has proved useful in revisions to the Enforcement Response Policy, which was recently finalized, and for revisions to the State authorization requirements under development.

Operation and Maintenance Guide: The Operation and Maintenance (O&M) inspection adds a new perspective and focus to the Agency's efforts to ensure the proper implementation of the RCRA ground-water monitoring regulations. In general, the O&M inspection focuses on how owner/operators operate and maintain their ground-water monitoring systems.

The O&M Inspection Guide is designed to assist the inspector in evaluating the following conditions:

- Determine whether the owner/operator is collecting ground-water samples in accordance with the Part 265 Sampling and Analysis Plan (Interim Status) or RCRA permit;
- Ensure that the owner/operator's sampling devices are working and that they are maintained properly;
- Ensure the individual monitoring wells and piezometers/observation wells within a ground-water monitoring system have not deteriorated so that their ability to yield representative ground-water samples or their ability to yield reliable hydrologic data have been compromised;
- Identify flagrant violations of O&M programs or trigger a more thorough scrutiny of the owner/operator's ground-water monitoring program (i.e., Case Development Inspection);
- Identify issues or concerns that should be assessed in a future Comprehensive (ground-water) Monitoring Evaluation; and
- Collect ground-water evaluation data, determine direction(s) of ground-water flow, and assess, in a general sense, the viability of past decisions made by the owner/operator regarding the number and placement of monitoring wells.

The Environmental Priorities Initiative: The Environmental Priorities Initiative (EPI) is an integrated RCRA/CERCLA management system designed to enable the Agency, and ultimately the States, to identify, evaluate, rank and clean up first those sites that present or may present the greatest threat to human health and the environment.

Enforcement Strategies for Financial Responsibility Requirements: The document, *Enforcement of Financial Responsibility Requirements for RCRA Treatment, Storage, and Disposal Facilities That Are Closing*, describes the process for determining whether closing RCRA TSDs that did not establish financial assurance may use a more flexible schedule to meet closure and post-closure costs. It also describes enforcement of liability requirements for closing TSDs.

The document, *Enforcement of Liability Requirements for Operating RCRA Treatment, Storage, and Disposal Facilities*, describes the financial assurances required of operating facilities and discusses enforcement actions that can be taken against facility owner/operators without insurance.

